UNCTAD/DITC/TED/8

GREENING TRADE IN VIET NAM

Edited by Dr. Veena Jha

UNITED NATIONS

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Analytical studies on Trade, Environment and Development

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PREFACE

The project on "Trade, Environment and Development: Policy Implications for Viet Nam" (VIE/98/036), funded by UNDP, was jointly implemented by UNCTAD and the Directorate for Standards and Quality (hereinafter STAMEQ). The project was designed to enhance understanding of trade and environment linkages, with a view to facilitating Viet Nam's integration into the global economy. In order to meet this objective, information has been collated regarding the impact of environmental requirements on trade, and the impact of trade regulations on the environment. This project builds on two earlier events that provided important inputs to the project, namely:

- A Workshop on Trade and Environment organised in Ha Noi in April 1998 by STAMEQ, in collaboration with UNCTAD; and

- The Conference on International Trade and Environment, organised in Ha Noi in April 1999 by the project on Strengthening the Environmental Management Authority of Viet Nam (SEMA), implemented by the National Environment Agency (NEA) with the financial support from the Swedish International Development Agency (Sida).

In exploring the challenges and opportunities in moving towards greater integration of trade and environment policies, two interesting aspects have been brought to light. The first is the use of traditional knowledge in Viet Namese medicine and the second is the practice of different forms of organic agriculture in Viet Nam. Both issues are of key interest to Viet Nam and have also generated a lot of interest at the international level.

One of the mandates originating from the tenth session of the United Nations Conference on Trade and Development was to study ways to enhance the income-generating capacity of traditional knowledge holders, by ensuring that the commercial benefits of traditional and herbal medicines accrue to developing countries where to a large extent they originate. The commercial exploitation of alternative systems of medicine is likely to yield substantial gains. These systems environment- and health-friendly require a whole package of measures. Through the course of the project and through intensive discussions on these issues, the contours of such policy initiatives may be emerging.

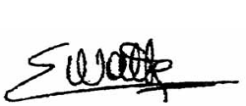
Similarly, in the case of organic agriculture, the project tried to link up with ongoing initiatives to develop a scheme for a wider initiative on the promotion of organic food.

A pilot scheme on ISO 14000 was already in operation, and the present project makes some recommendations on the basis of the lessons learnt from its implementation.

The experiences acquired from the project has led to suggestions for the formulation of various policy initiatives and their implementation, which are included in this volume. Lessons learnt from other countries have also provided valuable inputs. It is hoped that these suggestions will be debated and used by the relevant government bodies, as they have been developed in consultation with all levels of government and the private sector. It is equally hoped that this volume will be of value to the donor community, working in similar areas in Viet Nam.

The book also identifies areas for further work, especially as regards traditional medicine and organic agriculture. This may be particularly interesting to the Governments and the donor community, as the suggestions for future work are backed by substantive research.

Almost all the articles contained in this book have been written by local researchers, consistent with the capacity-building objectives of UNCTAD, UNDP and the Government of Viet Nam. National consultants, have put in a commendable effort, without which the book would not have seen the light of the day.



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LIST OF ABBREVIATIONS

AI	Active Ingredient
AF	Agro-Forestry
AFTA	ASEAN's Free Trade Area
APEC	Asia-Pacific Economic Community
ASEAN	Association of South East Asian Nations
BCS	Microbial Rodenticide
BPH	Brown Planthopper
BT	Bio Technology
CBD	Convention on Biological Diversity
CIEM	Central Institute for Economic Management
CTE	Committee on Trade and Environment
DAP	A Fertilizer
DAT	Days After Treatment
DBM	Diamond Back Moth
DM	Deutsche Mark
DRVN	Democratic Republic of Viet Nam
ECO-ECO	Ecological Economy
EHS	Environment Health and Safety
EM	Environment Management
EMS	Environmental Management System
EU	European Union
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FFS	Farmers Field School
FPR	Farmers' Participatory Research
FYM	Farm Yard Manure
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GC	Guide Committee
GDP	Gross Domestic Product
HCMC	Ho Chi Minh City
HDI	Human Development Index
IFOAM	International Federation of Organic Agriculture Movements
IK	Indigenous Knowledge
IMF	International Monetary Fund
IPC	Inter-country Programme

IPM	Integrated Pest Management
IPRs	Intellectual Property Rights
ISO	International Standards Organisation
IUCN	The World Conservation Union
JVs	Joint Ventures
KC1	A Fertilizer
LDCs	Least Developed Countries
LUC DIEP TO	A fertilizer
M.D	Million Viet Namese Dong
MAR	Maximum Allowed Residue
MARD	Ministry of Agriculture and Rural Development
MEA	Multilateral Environment Agreements
MFN	Most Favoured Nation
MOSTE	Ministry of Science, Technology and Environment
MRAs	Mutual Recognition Agreements
MRL	Maximum Residue Level
NEA	National Environment Agency
NGOs	Non Governmental Organisations
NIC	Newly Industrialised Countries
NIPP	National Institute for Plant Protection
NO3	Nitrates
NPK	Nitrogen, Phosphorous and Potassium
NPV	Other Nitrates
NT	National Treatment
OA	Organic Agriculture
ODA	Official Development Assistance
PBRs	Plant Breeders Rights
PC	Phytosanitary Certificate
PEO	President's Executive Order
PGR	Plant Genetic Resources
PIC	Prior Informed Consent
PPD	Plant Protection Department
PPMs	Production and Process Methods
PPSD	Plant Protection Sub-Department
R&D	Research and Development
S&T	Science and Technology
SAPP	Safe Agriculture Pesticide Programme
SAP	Safe Agriculture Program

SCM	Subsidies and Countervailing Measures
SCU	Specific Commodity Understanding
SEMA	Strengthening of the Environment Management Authority of Viet Nam
SMEs	Small and Medium Enterprises
SOE	State Owned Enterprises
SPS	Sanitary and Phytosanitary Measures
SPU	Safe Pesticide Use
STAMEQ	Directorate for Standards and Quality
SVP	Safe Vegetable Production
TBTs	Technical Barriers to Trade
TC	Technical Committee
TK	Traditional Knowledge
TNC	Transnational Corporations
TOT	Training of Trainers
TRIMs	Trade Related Investment Measures
TRIPs	Trade Related Intellectual Property Rights
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UPOV	The International Convention for the Protection of New Varieties of Plants
USA	United States of America
VAC	Viet Namese Agricultural Association
VACVINA	Viet Namese Gardening Association
VCCI	Viet Namese Chamber of Commerce and Industry
VHT	Vapor Heat Treatment
VILAS	Viet Nam Laboratory Accreditation Scheme
VIPESCO	Viet Nam Pesticide Company
VND	Viet Namese Dong
WHO	World Health Organisation
WTO	World Trade Organisation
WWF	World Wide Fund for Nature

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CHAPTER 1

INTRODUCTION

KEY ISSUES ON TRADE AND ENVIRONMENT IN VIET NAM

By Dr. Veena Jha

The trade and environment interface in Viet Nam has characteristics, which are somewhat different from other developing countries for two reasons. First, as Viet Nam has not integrated into the global economy, it has had various problems relating to product quality, in some cases substantially outdated technology and a shortage of capital goods. Viet Nam thus views environmental requirements as one additional factor that must be addressed in its efforts in integrating with the global economy. In a bid to enter export markets, Viet Nam's efforts are focused at increasing quality across the board. Joining the World Trade Organization and Multilateral Environmental Agreements would provide Viet Nam with a possible avenue for upgrading its technology and increasing its capital stock.

Secondly, the national debate is situated in national circumstances: while Viet Nam was excluded from the world economy and is at a disadvantage in some areas, where possible it will want to exploit its well-kept traditions. This tension is perhaps more apparent when one considers the social and environmental merits of organic agriculture and the possible negative impact of intensifying production for food security reasons. This tension is further described below in the section on Organic agriculture and in Prof. Bo's chapter on organic agriculture. This also explains why this project has emphasized traditional medicine and organic agriculture. Viet Nam has developed a pragmatic approach to the resolution of trade and environment issues; however, the debate and the tradeoffs inherent in policy making are as much a part of Viet Nam's structures as in other more advanced countries and developing countries.

The interface between trade, environment and development is important for Viet Nam, for the following reasons:

(a) One of the most important policy objectives of Viet Nam's economic policy is integration into the world economy. Viet Nam has become a member of the Association of South East Asian Nations (ASEAN) and the Asia-Pacific Economic Community (APEC). Trade and investment play a key role in this process. In this context, the ability of Viet Namese producers and exporters to respond to environment and health related requirements and to enhance environmental quality is important both to gain access to markets and ensure environmentally-sound export growth.

(b) Viet Nam is in the process of negotiating its accession to the World

Trade Organization (WTO), which brings with it a large number of rights and obligations, including obligations regarding environmental measures.

(c) Viet Nam is a member of key Multilateral Environmental Agreements (MEAs), implying both the need to implement commitments as well as to make appropriate use of facilitating measures under such agreements. Especially interesting in this context and for the purpose of this book is Viet Nam's membership in the Convention on Biological Diversity (CBD). Viet Nam's vast bio-diversity, as well as its extensive traditional knowledge, implies that both conservation and commercialisation, under appropriate conditions, would result in extensive trade and environmental benefits originating from this sector.

(d) Viet Nam has to prepare itself for future environmental and trade negotiations in many fora.

(e) Viet Nam should also benefit from the opportunities for environmentally friendly exports, especially in the area of organic food.

The special programme and policy development project on Trade, Environment and Development: Policy Implications for Viet Nam therefore aimed to:

(a) support policy analysis in Viet Nam by, for example, carrying out research on trade and environment, conducting workshops, creating "policy dialogues" between trade and environmental policy specialists, and gaining experience with multi-stakeholder approaches;

(b) enhance policy coordination and policy coherence on trade, environment and development at the national level;

(c) strengthen Viet Nam's national capacity to address trade and environment issues and to achieve environmentally sound export growth; and

(d) assist the business community in enhancing international competitiveness in the light of environmental factors, by gathering information and facilitating analyses.

In keeping with these overall policy objectives, five key issues were explored by the project. These are discussed below.

The impact of environmental requirements on market access and export performance

Environmental factors play an important role in Viet Nam's efforts to achieve rapid and sustained export growth. A recent study under a regional project of the UNDP (RAS 92/034 of the UNDP) indicates that a variety of environmental and health-related requirements are emerging in sectors of export interest to Viet Nam. These requirements have generated market access and competitiveness concerns, for example among export-

ers of agricultural and fisheries products, as well as textiles and clothing. However, environmental concerns may also provide new trading opportunities to the extent that Viet Namese firms are able to take advantage of niche markets (for example, trading opportunities for organic agricultural products, see below). Both the government and the business community can play an important role in avoiding negative and maximizing positive effects. This issue was discussed at the initiation workshop (proceedings have been included in this volume) held in Ha Noi in the third week of February 2000. Various stakeholders, including from the Viet Nam Chamber of Commerce and Industry and the private sector, and a number of officials from the Ministry of Trade and the Ministry of Science, Technology and Environment (MOSTE), attended this meeting. Following the meeting, some questions were drawn up between the project coordinator and a senior official from the Ministry of Trade who conducted an extensive survey in different centres in Viet Nam. The results of her survey are summarized below.

Through field surveys the project has sought to enhance understanding of the exact nature of the trade impacts of environmental and health standards on exports from Viet Nam. Ms.Hang's surveys show that firms have very little knowledge of what constitutes environmental and technical regulations in international markets, even though they are abiding by quality requirements of their importers. For them, **Sanitary and phytosanitory standards** (SPS) requirements, environment standards, technical regulations, product design and packaging are all seen as elements of product quality. These requirements have an impact on their market access in terms of delivery delays and extra transaction and compliance costs. Exports are diverted to less onerous markets when access to a certain market is too demanding, but firms acknowledge that trading conditions such as payments are more risky in these markets.

Differences in standards among importing countries limit the ability of enterprises to penetrate new markets, as their production systems are not flexible enough to respond to all kinds of requirements. Furthermore, large investments of millions of US dollars may be needed to satisfy particular requirements. Some industry associations state that upgrading investments for meeting quality requirements could reach US $30 million for the coffee industry and US $90 million for the tea industry.

A comprehensive approach to meeting quality standards would be to obtain ISO 9000 certification. However, up to February 2000, only about four enterprises in the agricultural sector were certified ISO 9000, of the total of 110 certified enterprises. Thus agricultural producers find it especially difficult to demonstrate compliance with external requirements.

Some enterprises estimate that extra business costs may comprise up to 20per cent of the contract. In addition, delivery delay or rejection is as

serious as extra business costs. Delay or rejection results in breaking of contracts and loss of business confidence and credibility.

Importing countries also usually classify their exporting partners by SPS, environmental and quality criteria. Viet Nam is excluded from some preferential lists, therefore certain Viet Namese agricultural exports to those markets are prohibited while other exporting countries are allowed to send their products. No justification from importing countries has been given so far.

Small and medium-sized enterprises (SMEs) find it difficult to export agricultural products directly to importers, because they do not have facilities to comply with both technical and procedural requirements. An additional contract fee of 20 per cent in order to meet environmental standards may threaten their survival.

The surveys themselves were an exercise in capacity building. Ms.Hang conducted these surveys back to back with training courses imparted by the Ministry of Trade, so these occasions were also used to sensitise producers to forthcoming and existing environmental regulations. In terms of recommendations, this paper strongly suggests that being out of the WTO is a very important handicap in raising issues with importers in their major markets. The paper does suggest that harmonization of standards as well as timely information could help some firms in upgrading standards, but lack of financial and technical resources remain a critical bottleneck. Technical assistance from developed countries may provide some relief to exporters.

Trade implications of environmental management standards (EMS) such as ISO 14001

International standards on environmental management systems (EMS), such as ISO 14001, may create both barriers to trade and provide opportunities to increase competitiveness and strengthen market positions. National implementation issues are of key importance in this regard. For companies, EMS standards may be a useful tool in controlling the environmental effects of their activities, to achieve cost savings as well as to obtain other economic benefits. Although the ISO 14001 standard is only recent, it is generally believed that developing countries have an interest in promoting its wider use. The Viet Namese government has taken a proactive approach to the implementation of ISO 14000 standards. This issue was discussed in a large multi-stakeholder meeting in February 2000. The Ministry of Science, Technology and Environment was an important protagonist of ISO 14000 in Viet Nam. The experiences recorded below were the findings of several multi-stakeholder meetings as part of the pilot programme implemented by the Directorate for Standards and Quality (STAMEQ) and NEA on ISO14000.

Mr. Hoc's paper in this volume shows some interesting findings about ISO 14001 in Viet Nam. His study shows that trans-national corporations (TNCs) such as Sony, Toyota, Fujitsu and others operating in Viet Nam have indicated a strong interest in conforming to ISO standards. However, by December 2000, only seven companies were certified to be in conformity with ISO 14001; all of these were joint ventures or 100 per cent foreign-owned. They were mostly guided by their parent companies in Japan, the USA, Korea, etc. Some large local companies such as Petrolimex, PetroViet Nam, Textile Corporation, cement producers and pesticide companies already have some interest in implementing ISO 14000 standards, but they have yet to begin the process of implementation. For most SMEs, ISO 14000 implementation will not be a reality, as they foresee difficulties in the improvement of technology required by this standard, largely due to lack of resources.

To a large extent, the environmental problems resulting from SME operations in Viet Nam are due to poor housekeeping, the low level of education of unskilled workers, and resource shortages. Thus, SMEs will require capacity building such as improvement in skills, knowledge, and technical know-how. Compared to Taipei, Province of China, South Korea, Japan, China, and Malaysia, SMEs in Viet Nam have been much less enthusiastic about ISO 14000. New firms find it easier to meet environmental standards and to implement ISO 14001 than old existing firms and SMEs.

The possibility of demonstrating conformity with local environmental legislation is considered to be the most important motive for all businesses, including SMEs, to go in for ISO 14001 certification. TNCs have sought certification for improving their corporate image internationally as well as domestically and to maintain their export markets. Generally, foreign pressure seems to be more important for larger companies, whereas local demand is more important for SMEs, which as a consequence see no need to implement an EMS. Low commercial return is considered to be an obstacle for SMEs rather than for business in general. In comparison to the arguments related to legal compliance and customer demand, strengthened market share is attributed relatively little importance for most of the companies. The high cost of certification was considered a deterrent to implementing ISO 14001 standards by all firms.

While the environmental benefits are quite clear for the companies implementing ISO 14001, the market benefits of meeting requirements of ISO 14001 are still not visible. Moreover, ISO 14001 certification does not guarantee compliance with certain regulations for environmental performance. ISO 14001 certification is designed to meet a management standard in which each company sets its own environmental objectives.

The paper suggests that more analysis and experience is needed to fully understand the trade and investment implications of ISO 14001. It

recommends that there should be complementarities between voluntary standards in EMS and regulatory requirements, and synergies in their implementation should be developed. The paper also suggests that certification and accreditation should be fair and rigorous, in order to safeguard the credibility of the ISO 14001 certificate. Therefore, Viet Nam should develop the necessary infrastructure to allow conformity assessment, certification and accreditation harmonized with international and regional activities in these areas. Government could play an important role in providing an enabling environment for the implementation of EMS, for example by promoting the creation of necessary infrastructure and legislation, as well as appropriate incentives.

Environmental Impact of joining the WTO

In the stage of designing the project it was considered essential to get a macroeconomic picture of the possible environment effects of trade expansion consequent to Viet Nam joining the WTO. In this context the Ministry of Planning and Industry's premier research institute, the Central Institute for Economic Management (CIEM), was contacted to provide an overall picture of the possible environmental effects of Viet Nam joining the WTO. CIEM had already conducted a pioneering study on the competitiveness of Viet Namese exports. Adapting this study to the possible environmental costs and reassessing competitiveness effects was therefore considered to be an achievable task.

The study by Dr. Tu and Ms. Hong therefore focuses on Viet Nam's main exports, which they point out are natural resources and semi-produced products. Among the main exports in 1999 were crude oil exports (17.5 per cent of total exports), rice (9.6 per cent), marine products (8.5 per cent), coffee (6 per cent), textile and garments (14.6 per cent), footwear (12.2 per cent), and electronics and electrical appliances (5 per cent).

These figures indicate that Viet Nam's international trade is based mainly on natural resource extraction. Among these, according to studies carried out by CIEM, Viet Nam is competitive in the production of rice and coffee, but for the other products its competitiveness remains somewhat uncertain. To make the latter category of products competitive as well as to mitigate their environmental effects, substantial investment will be required. By contrast, because of the competitiveness of products such as rice and coffee, compliance with environmental standards as well as making the necessary adjustments for negative environmental effects will be relatively easier.

The paper states that in evaluating the environmental effects of joining the WTO, one must also evaluate the benefits. First, low tariffs for imports will enable enterprises to reduce production costs and to develop an export strategy for expanding exports markets. Second, as a WTO mem-

ber, exported products and services of Viet Nam will be treated equally with products and services of other countries. Third, Viet Nam can participate in several negotiations and ask for special and differential treatment that developing countries are entitled to. In other words, it is expected that by being a member of the WTO, Viet Nam's international trade will experience a dramatic boom. However, this process may cause negative environmental effects such as ground water degradation from the excessive use of fertilisers and pesticides, and adverse impacts on health of farmers. The expansion of agriculture both for cultivation of cash crops and for subsistence agriculture will result in deforestation and destruction of wetlands and other protected areas. In the process of import expansion, some products that are banned as unsafe in other countries may be exported to Viet Nam without full information about their environmental and health risks. While it lacks the information and infrastructure to adequately monitor and regulate trade in these products, Viet Nam may incur high environmental costs and experience serious public health effects.

The paper suggests that technical assistance, especially financial and technological assistance, is needed to mitigate the negative effects of expanded trade. However, reforms in other areas including regulations and the institutional framework, are equally important. These requirements will ensure that when Viet Nam becomes a member of the WTO, its regulations are stable, equitable, transparent and consistent with international regulations. The paper stresses that it is very important to improve Viet Nam's infrastructure and to inspect and control the quality of exports and imports in order to meet other countries' requirements, as well as to implement necessary sanitary measures in protecting public health.

In order to undertake the above measures, Viet Nam would need technical assistance from international organisations. The government should formulate and implement policies to encourage industries to invest in environment-friendly technology and cleaner production, and consider applying appropriate economic instruments to ensure industries comply with environmental regulations. Like Ms. Hang's paper, the paper points out that SMEs in Viet Nam account for about 34 per cent of the country's exports by value, and thus play a very important role in the economy. However, given many disadvantages as compared with large enterprises, SMEs in Viet Nam have fewer incentives to implement cleaner production. Special measures should be formulated and implemented for SMEs in order to assist them to move to higher environmental standards.

Organic Agriculture

The second stakeholder meeting convened in Ha Noi consisted of brainstorming sessions and field visits. The focus was mostly on organic agriculture and different aspects of traditional medicine. It was felt that these products would provide Viet Nam with examples of reconciling promotion of trade and preserving its environment. The principal participants in this meeting included the Ministry of Agriculture and Rural Development (MARD), several farmers who were conducting experiments with organic agriculture such as the safe vegetables project, and international experts from standardization bodies such as the International Federation of Organic Agriculture Movements (IFOAM). Mr. Alexander Daniels, the chief Asia coordinator for IFOAM, attended the meeting and later met with several officials in MARD and MOSTE to discuss organic agriculture issues. Through interactive sessions many of Viet Nam's problems with organic agriculture were discussed. The papers and the viewpoints presented at the conference are summarized below.

Dr. Tuat's paper expresses grave concerns about the excessive and indiscriminate use of pesticides in several areas in Viet Nam. Quoting from case studies conducted by the National Institute for Plant Protection (NIPP) in four crops in different provinces (Ha Noi, Hai Phong, Bac Ninh, Ha Nam, Thai Nguyen and Ninh Thuan), he states that 30 to 40 per cent of the pesticides used in the market are distributed through Government organizations and cooperative farms. This means that the private sector plays an important role in the provision of pesticides. He expresses the view that government supervision is inadequate. The number of chemical applications per crop season is always higher than the technical guidance provided in the manuals. A very small percentage (5.1per cent) of chemical users use safety equipment.

Increasing use of fertilizers and pesticides in agriculture has led to the outbreak of several pest epidemics and has resulted in higher pest resistance to pesticides used. In the past, areas infected by such pests were controlled by single applications. Today farmers often apply two or three doses of pesticides, due to the resistance developed by the pests. Excessive use of pesticides has increased the pest resistance capacity of the diamond back moth (DBM), which often feeds on vegetable crops. Overuse and frequent application of pesticides with increased dosages has led to the rapid development of chemical tolerance of the DBM. The author therefore recommends that programmes on integrated pest management and controlled use of pesticides would be useful. Such programmes have been initiated and have met with a moderate degree of success. As a means to reverse excessive pesticide usage, organic or semi-organic production should be encouraged. This would lead to beneficial health effects for both producers and consumers.

Prof. Bo's paper highlights that several farmers in Viet Nam are reluctant to convert to organic agriculture because of perceived adverse impacts, such as high production costs, lower incomes due to unsustainable premium markets for organic agriculture products, declining nutrient content in soil, the high transportation cost of organic fertilizers, and high demand for food crops. In order to meet the crop requirement (mostly now high yielding varieties), farmers have to apply a high rate of organic fertilizers in replacing chemical ones. Cropping systems are changing towards maximum yield crops and to a worsening of the nutrient input-output balance, so that only combined organic-inorganic fertilization can sustain a high crop yield. The best ratio of nutrients from organic and inorganic sources is 30 to 70 per cent. MARD's estimation shows that organic fertilizer can increase paddy yield by only 0.5 tonnes per hectare, compared to an increased yield of 1-1.7 tonnes per hectare in the case of chemical fertilizer application, or 1.8-2.5 tonnes per hectare when chemical and organic fertilizers are combined. Organic agriculture cannot ensure food security but can contribute safe products for local consumption and export, especially when the target of the government is diversification of agricultural production toward increasing value added products.

Recognising the comparative advantages of agro-ecological conditions, the organic products with the best potential are as follows:

- In the urban areas: vegetables, fruits, spices/flavour vegetables, animal husbandry products (meat, egg and milk).
- In the mountainous provinces: tea, coffee, pepper, fruits, medicinal plants, forest specialties and husbandry products.

Prof. Bo does not recommend going organic with products such as rice, but the government should consider selected crops in which organic agriculture is to be encouraged. For ensuring optimum yields in the production of organic products in Viet Nam, he recommends experimenting with special crop varieties with high resistance to pests and unfavourable climate conditions. He also recommends crop rotation, especially with leguminous plants, and integrated crop management (including integrated soil management, integrated water management, integrated pest management and integrated nutrient management). He also recommends the establishment of relevant organizations for organic product certification.

Dr. Hy and Dr. Ha from the National Environment Agency (NEA), MOSTE take a more optimistic view of organic agriculture in Viet Nam. Their unique contribution is a detailed cost benefit analysis in monetary terms of some products, such as fresh vegetables and rice. By moving to the IFOAM criteria for organic production, although the methodology used for this analysis is not clearly spelled out, they feel that the social benefits to the country as a whole would be roughly four times the loss in produc-

tion to individual producers, and for rice it is estimated to be several times the loss in production. The authors conclude, however, that the government would initially have to induce producers to go organic and this would require a 30 per cent subsidy, which they conclude is not exorbitant by international standards.

One interesting illustration of organic agriculture is provided by the Vinh Phuc province's experiment with safe vegetables. While the concept of safe vegetables and organic production may not be identical, and in this context, a benchmark for establishing comparisons between SVP and international standards on organic vegetables would have been useful, they appear to have similar objectives. Upgrading this program to international standards such as IFOAM may not be as difficult as in the case of conventional non-organic agriculture. Mr. Tung's paper on "safe vegetable production (SVP)" points out that products produced by techniques aiming to limit the use of toxic chemicals, minimize pesticide use, nitrates and pathogens as specified by the regulation of the Ministry of Agriculture and Rural Development are included in the SVP project.

This program aims to expand SVP to a large scale of production. The thrust is to assist farmers with cultivation techniques instead of providing material subsidies. It is also necessary to keep the standards simple or farmers will find it difficult to comply with them. Most controls are exercised at the production rather than at the retail end, though random checks at the retail end have also been carried out.

The author points out that producers should be assured that their costs would be covered even if they were forced to sell below the market premium. For the consumer, it is necessary to guarantee product quality at a reasonable price (not over 20-30 per cent higher than comparable products).

Experiments with SVP have been particularly successful in crops such as cabbage, pennycress, bulb onion, potato, legume, morning glory, cucumber, kohlrabi and five kinds of mushrooms. The production techniques followed rely mostly on manual land preparation, planting, and harvesting. Proper management of planting time to avoid pests, as well as experimenting with different vegetable varieties in the field, have yielded beneficial results.

The overall results show decreased crop yield of 1 to 5 per cent, however SVP also reduced nitrogenous fertilizer costs by 20 to 40 per cent and other pesticide costs by 40 to 46 per cent. As a result, the total cost of cultivation was lowered by about 5 per cent.

The paper recommends that a national program for safety agriculture combining research, production, marketing and export should be set up for safe vegetables and fruits. It also recommends that investment including foreign investment should be directed to this sector. It concludes

that government policies should encourage the domestic consumption and export of safe vegetables. Agriculture extension services should experiment with different technologies and there should be a better dissemination of information on SVP through the media and other sources.

Prof. Nghia and Mr. Tuan's paper finds that organic agriculture as defined by IFOAM can perhaps be found only in mountainous areas, especially in high and remote villages. Some products (for example, upland rice, corn, vegetables and fruits, wild vegetables and fruits, roots and tubers both wild and cultivated, bamboo shoots, wild honey and snow tea) could pass the organic tests of western markets. However, he expresses grave doubts about whether they could be supplied in sufficient quantities or marketed effectively in western markets.

He feels that there should be a coherent policy on organic agriculture that would review traditional agricultural practices, rare and precious species and varieties, and organic fertilizers. There should also be a concerted effort to develop biotechnological and microbiological technologies, combining modern technologies and indigenous knowledge and practices. Domestic market development through raising public awareness and promoting high value export of traditional products in order to provide more income to producers and to stimulate higher production of organic products is necessary. He further recommends that some areas with ecologically safe conditions (no pollution, less soil degradation) should be selected for certified organic agriculture to produce clean and safe products.

Genetic resources, Use and Commercialisation in Viet Nam

The role of traditional knowledge and models of access to genetic resources and benefit sharing were discussed extensively in the second stakeholder meeting convened by the project. This meeting was attended by a Costa Rican expert, Dr. Jorge Cabrera, and an Indian expert, Dr.Suman Sahay, who provided insights into their own experiences with respect to access and benefit sharing from genetic resources and traditional knowledge. Viet Nam's experience, and especially the role of traditional medicine in providing primary health care as well as treatment for other more sophisticated ailments, was also discussed. A visit to a village where all stages of traditional medicine were made also provided concrete evidence of this living tradition. The viewpoints that emerged as well as forward looking policies prescribed by the authors are summarized below.

Prof.An's paper highlights the importance of traditional knowledge (TK) in Viet Nam. The use of biological resources plays a very important role in agriculture (including forestry and fisheries) by providing livelihood and food security to the nation, as well as in in the health sector, where more than 3,000 medicinal plants and thousands of preparations have been used by the people of Viet Nam for centuries. Can Tho University is also in-

volved in the distribution of traditional rice cultivars to farmer-based rice genetic resource conservation and development.

Some science and technology institutions continue to produce and supply plant seeds, but the seed supply systems are developed and maintained by plant seed companies. There are regulations for sharing benefits among various stakeholders, but these work more to the advantage of plant breeders, rather than to the local communities owning traditional knowledge.

In the area of traditional medicine, Dr. Do Tat Loi has written a well-known book entitled "Medicinal Plants and Medicinal Ingredients of Viet Nam", in which more than 800 plant species are described with their biological and therapeutic characteristics. The use of traditional knowledge and consultation with eastern physicians and doctor-herbalists has permitted him to introduce hundreds of prescriptions for treating many diseases. Sometimes, the combination of traditional and modern medicines is very helpful in treating serious diseases, for example Artemisia annua for treating malaria, and Catharianthus roseus for treating blood cancer.

The fact that only the State has the exclusive right to use varieties and species, and the author is granted only a symbolic remuneration, suits only collective agriculture inherent to centrally planned economies. Appropriate mechanisms for formulating benefit-sharing mechanisms are needed in the framework of the TRIPs agreement.

Dr. Nang's paper on the legal framework for protecting TK suggests that while there are several environment-related laws on the protection of forests and property, there is no decree on the protection of property rights and intellectual property over new plant varieties. While such protection may encourage creativity and investment in producing useful new varieties, negative impacts on environment, bio-diversity and genetic source protection could also be felt.

Research and development, management, transfer, transport, utilization and unleashing genetic modification as a result of advanced biotechnology and their products might cause an adverse impact on the preservation and sustainable utilization of bio-diversity as well as on environment and health. Therefore, strict management of these activities must be made on the basis of a legal document.

A decree on herbal protection and exploitation and knowledge of traditional medicine should be prepared for submission to the government. In the long run, codes on this important issue need to be developed.

After several years of implementation, this document could be changed into an ordinance or law. This legal document must include the protection of rights and interests of local populations and individuals to

grasp knowledge on medical herbals and traditional medicine.

Further studies must be conducted to continue improving the legal system on environmental protection, including regulations on bio-diversity protection. The possibility of drafting and introducing an ordinance or law on bio-diversity should be raised.

The formulation of macro policies such as a national bio-diversity inventory, information management systems and investment in science and technology and in priority areas of protection will provide a more favourable scenario for biological prospects.

Prof. Chau quotes Ho Chi Minh's policy on traditional medicine and points out that in order to broaden medical scope and scale, Oriental and Western medicines should be combined. According to the Pharmaceutical Corporation, enterprises currently use from 62 to 144 pharmaceutical herbs in their production. Clinics and hospitals use about 100 types of herbs to treat patients and produce their own products. At private clinics, the number of pharmaceutical herbs used depends on the physician, but on average the number is about 240. Property rights of all pharmaceutical products (both public and private) are protected by the State. This protection has two aspects: permission by the Ministry of Health for producing and selling products (a license must be obtained from the Ministry of Health for producing tonics and treatment medicine), and the producer has rights to register his copyright at the Department of State Industrial Property. Thirty to fifty per cent of the total production of traditional medicine is in tonics. Traditionally, both tonic and normal medicines are used for curing patients. Tonics are used to provide vitamin that patients may be lacking, while other medicines are used to treat the disease, get rid of the causes and improve the health condition of the patients at the same time.

Exports account for 3 to 17 per cent of the total products, of which more tonics than other medicines are exported. In addition to import-export of traditional medicine and pharmaceutical herbs, herbal physicians have been sent to work long-term in Angola, Algeria and Cuba. They have been invited to give lectures on acupuncture in many countries. However, he proposes that the State should have a clear-cut and consistent policy on the use and development of traditional medicine, the combination of traditional with modern medicines, and treating traditional medicine equally as modern medicine in the public health sector.

Mr.Vien's study on traditional medicine is an account of cultivation, processing and marketing in the Nghia Trai village. Nghia Trai remains the only locality where all stages of the business are in place, from planting and processing medicinal plants to buying and selling pharmaceutical products. Nghia Trai villagers are faced with three main constraints: lack of proper farming techniques, lack of markets for their products, and lack of suitable land.

There are so far more than 150 native Nghia Trai villagers practising traditional medicine either in their home village or elsewhere in the country. Until the late 1980s, when Viet Nam's economy was operated with a system of government subsidies, provincial and central pharmaceutical enterprises procured a number of traditional pharmaceutical products from Nghia Trai through the system of trading cooperatives. Now, the intermediary role has shifted from these firms to private traders.

At present, there is no specific government policy aimed at encouraging the development of medicinal plants. Although pharmaceutical materials produced by the villagers are being marketed in different forms, they are often auctioned to private traders. Nghia Trai villagers feel that in a market mechanism, the government need not provide subsidies, but should formulate regulatory plans and directly procure from producers such materials as are needed by medical and pharmaceutical institutions. The paper recommends that the Government work with concerned government agencies, medical and pharmaceutical institutions, state-owned enterprises, and foreign countries in finding stable outlets for a number of pharmaceutical products. It should also set up a centre located in or near Nghia Trai village to procure and process medicinal plants and provide medical treatment with oriental medicines.

This book on trade and environment in Viet Nam is the first of its kind and is also unique in the sense that it reflects a bottom-up approach to resolving problems on trade and environment. National problems and their resolution, where tradeoffs are determined at the national level, have already become a part of the trade and environment interface in Viet Nam. While there are several advantages of expanded trade, the down-sides of increased global trade are also becoming evident in Viet Nam. The book clearly illustrates the importance of finding pragmatic rather than ideological solutions to trade and environment problems.

The book also points to some useful lessons which can be learnt from Viet Nam, especially about growing environmentally friendly products such as organic agricultural products, and systems for protecting and commercialising traditional knowledge. The book also usefully points to the benefits of multilateralism. In an era when globalisation is viewed with suspicion, the book indicates that economies outside multilateral systems may be disadvantaged.

In the final analysis, the resolution of trade and environment issues will require tradeoffs at the national level. It will require education, capacity building of both developed and developing countries and will have to be sensitive to development concerns. It is hoped that this book will assist in this process.

SECTION 1

MAIN ISSUES

- **Chapter 2** Challenges and Opportunities faced by Viet Namese firms in implementing ISO 14000 Series of Standards on Environmental Management – by Mr. Tran Van Hoc

- **Chapter 3** Survey Report on the Impacts of Quality and Environment Requirements on Viet Nam Agriculture Exports – By Ms. Tran Thi Thu Hang

- **Chapter 4** Introduction to genetic resources & traditional knowledge use and commecialization in Viet Nam – by Prof. Le Quy An

- **Chapter 5** Environmental impact review of WTO agreements – by Dr. Nguyen Minh Tu and Ms. Vu Xuan Nguyet Hong

- **Chapter 6** Summary of the discussions – by Ms. Nicole Casellini

CHAPTER 2

CHALLENGES AND OPPORTUNITIES FACED BY VIET NAMESE FIRMS IN IMPLEMENTING ISO 14000 SERIES OF STANDARDS

By Mr. Tran van Hoc
Directorate for Standards and Quality, STAMEQ, MOSTE

INTRODUCTION

At present, the process of globalisation affects many activities of nation states, particularly in the field of trade and environment. In Viet Nam, for instance, policy-makers and business persons are not fully aware of the challenges that the country faces in ensuring both trade promotion and environment protection. Until recently, these issues did not seem to pose a threat to many organizations and business sectors in Viet Nam.

However, since 1996, Viet Nam has come to better realize the importance of these issues in the country's sustainable development. It has learned from the experience of other countries, and from its recent participation in international and regional integration processes, that trade and environment linkages need to be studied thoroughly.

The International Standards Organisation 14000 series of standards (more specially, ISO 14001 and ISO 14004), the first set of environmental standards to be implemented on a global scale, was published in September 1996. Many firms have started to apply for certification so as to produce environmentally friendly products or production processes based upon the use of cleaner production technology. This series of standards on environmental management has met general adoption as national standards in many countries including Viet Nam. The operation and possible trade and investment impacts of environmental management standards, particularly the ISO 14000 series, on developing countries, and the identification of possible opportunities and needs in this context, are under consideration and expert study by different organizations in Viet Nam. Issues discussed recently included:

(a) the possible trade effects of environmental management standards;

(b) the impact of environmental management standards on foreign direct investment and the role of transnational corporations;

(c) implementation, certification and accreditation issues; and

(d) the needs of industry, especially small and medium sized enterprises (SMEs);

There is some degree of consensus that environmental management systems and ISO 14001 can be useful in improving the environmental performance of companies, and that it can assist in facilitating trade, although it can also result in creating an obstacle to trade when companies fail to meet requirements to certify to the standard. However, it is recognized that there is little experience and empirical research on the implementation of ISO 14001.

The voluntary nature of the ISO standards, as well as threshold levels for standards (especially such standards as environmental management systems and eco-labelling) were paid special attention. There was a recognition that while governments retained their role in setting mandatory standards, there is a complementary role for voluntary standards in achieving policy and other objectives, as well as for achieving overall cost effectiveness.

The rate of implementation of environmental management standards is rapidly increasing. Their possible trade and investment impacts are a matter of concern for developing countries as barriers to trade may arise, especially for SMEs. Implementation of environmental management systems (EMS) is also a matter of concern because of the costs involved. On the other hand, environmental management systems may greatly contribute to establishing fair operational practices in the globalisation of trade, and they may offer potential advantages for many countries, especially developing countries, to enter markets.

Environmental management standards, however, do not by themselves guarantee improvements in the environmental performance of production or products; rather, they assure only compliance to an adopted EMS and to a declared environmental policy that fulfils, at a minimum, national regulations. This implies that competition in markets may depend much less on the adoption of an EMS through the ISO 14000 series, and more on the environmental goals set in the environmental policy statement. This relates closely to the requirement in the ISO standard to continuously improve environmental performance. This requirement, which derives from the precautionary principle as stated in Agenda 21, commits producers to a level of environmental performance well beyond national standards in order to contribute effectively to the process leading to sustainability.

Transparency, participation and consensus are vital elements for the implementation of such a process among countries and within them. The adoption of ISO 14000 is a promising instrument to establish a common basis and to fill the existing gaps between developing countries and SMEs.

Problems and activities towards implementing ISO14000 standards in Viet Nam

The Viet Namese economy is in a transition period, facing numer-

ous challenges in the process of integration into the regional and world economy. The government has decided to follow a strategy of sustainable development as a foundation for its development plan, paying particular attention to combining economic development and environmental protection. However, in order to implement this strategy, beside macro policies, concrete and effective measures need to be taken. Some policymakers recognize that implementation of ISO 14000 may be an important factor in realizing that strategy. EMS standards could be a useful tool to enhance the environmental performance of an organization's activities, as well as to reduce its costs through a more efficient use of resources.

Experts have suggested that Viet Nam, being an exporting country, will consider ISO 14000 as an important element in order to remain competitive globally. There has been a lot of discussion about ISO 14000 implementation recently, but the rate of implementation or acceptance is not as fast as that of the other developing countries in the region.

In Viet Nam, transnational corporations such as Sony, Toyota, Fujitsu and others have indicated a strong interest in conforming to ISO standards. Thus, ISO 14000 (EMS) has been implemented on a voluntary basis by large transnationals. They are mostly guided by their parent companies in Japan, USA, Korea, etc. For many others, the concept of ISO 14000 (EMS) is very new but there is a growing awareness that it will be an important tool for prevention of pollution by industry. Some large local companies such as Petrolimex, PetroViet Nam, Textile Corporation, and cement producers and pesticide companies have already expressed some interest in implementing ISO 14000, but have not begun implementation. The lack of government policy regarding encouragement and support of industry implementation, lack of awareness of the possible benefits, and the expense of implementation and certification, may be the main reasons for delay.

For most SMEs, ISO 14000 will not be a reality as they foresee difficulties in improvement of technology due to lack of resources. Even though at least half of the problems experienced by SMEs can be attributed to the lack of administrative capability, the low level of education of unskilled workers can also make support of EMS difficult. SMEs require help in capacity building in skills, knowledge, and technical know-how.

Viet Nam, through its Directorate for standards and quality (STAMEQ), is participating in the activities of ISO/Technical Committee 207 as an "Observer member" (before 1999) and a "Participating member" (since November 1999).

It has established a National Committee on Environmental management standards (TCVN/TC207), members of which are selected from institutions, industries, government agencies, trade organisations, etc. The Viet Nam Standards Centre, a subsidiary institution of STAMEQ, serves as Secre-

tariat for both the National Committee and sub-committees. One of the major activities of the national committee and sub-committees has been to study and assess the relevant ISO documents and draft ISO standards, and formulate national views and comments on them. The challenge is to assure that ISO documents are in line with national interests, and to ensure applicability to organizations at various levels of development.

Viet Nam Directorate of Standards and Quality (STAMEQ) recommended and the Ministry of Science, Technology and Environment (MOSTE) adopted ISO 14000 standards for EMS and Environmental Auditing (TCVN/ ISO 14001, ISO 14004, ISO 14010, ISO 14011, ISO 14012) as national standards (TCVN) in 1997 and 1998. Other ISO 14000 standards were under consideration for adoption as national standards by the end of 2000. The implementation of the ISO 14000 national standards by companies operating in Viet Nam is not mandatory; rather, it is voluntary.

As the ISO14000 series, especially ISO 14001 on environmental management systems is relatively new, considerable misunderstanding exists, including misinterpretation of what the standards aim to accomplish.

Many experts in the environmental field, including environmental managers, consultants and government officials, believe the standards prescribe worldwide environmental performance. Others want the standards to dictate environmental goals for pollution prevention, technology or other desirable environmental outcomes.

Because of its wide breadth of coverage, people have confused ISO 14000 with other initiatives that cover the same subject matter, including environmental management systems, environmental auditing, life cycle assessment, environmental labelling, environmental performance assessment and others. There is understandable potential for confusion about what is and is not required for ISO 14000 certification. Views on implementation have also varied widely, with some assuming mistakenly, for example, that there is only one way to meet the elements of the standard.

To overcome the difficulties caused by these misunderstandings, and to promote the implementation of ISO 14000, STAMEQ together with the National Environmental Agency, have tried to disseminate the concept of ISO 14000 series standards within the country by conducting (in cooperation with other national, international organizations including ISO and existing bilateral projects on environment in Viet Nam) seminars, workshops and awareness training courses for people from different organizations and industry over the past three years.

In late 1997, STAMEQ and the National Environment Agency (NEA) prepared recommendations on development and implementation of environmental standards, including ISO 14000. This Project-Recommendation was submitted to MOSTE, whose officials supported it for implementation.

Following the above-mentioned Project-Recommendation, a joint study group was established in 1998 to deal with ISO 14000 implementation, and to assess the possibility of organizing a national campaign on implementation of ISO 14000, especially ISO 14001 in Viet Nam. Other experts from Governments, industry associations and chambers of commerce, academic institutions and non-governmental organizations (NGOs) involved in the study have also given their attention to ISO14000. This interest has focused on how to help and encourage industry implement these standards in order to prevent pollution and save resources, bringing benefits both to firms and to the country.

As ISO14000 includes elements that are not familiar to many companies (for example standards on environmental performance evaluation and life-circle assessment), it has therefore been suggested that at the early stage of implementation, three fields of ISO 14000 should be the priority in Viet Nam, namely:

1. Standards on environmental management systems (ISO 14001, ISO 14004)

2. Standards on environmental auditing (ISO 14010, ISO 14011, ISO 14012) and

3. Standards on environmental labelling (ISO 14020)

STAMEQ and the NEA have jointly prepared a pilot program for ISO 14001 implementation, and invited interested applicants to join the program in 1999. The pilot program is intended to run for 18 months and is aimed at educating both industry and STAMEQ/NEA on the interpretation and implementation of the new standards. It is hoped that the pilot program will result in a greater number of certified firms, and better environmental practices countrywide.

National Pilot program for implementation of ISO 14001

- **The objectives of the pilot program are:**

1. To improve awareness, knowledge, skills and responsibilities of the companies in environmental management and control, and the impacts of their activities, products or services on the environment.

2. To improve knowledge of environmental legislation that applies to the companies concerned.

3. For participants to learn from each other how to understand, interpret and implement EMS standards, and to share practical knowledge and experiences.

4. To help domestic companies to put their own EMS in place, operate it effectively, and gain experience in demonstrating how ISO 14001 can improve the environment and business profits.

■ **Operation of the pilot program**

The pilot program includes four main activities as follows:

1. Conducting awareness training on environmental management, ISO 14000 and environmental legislation for industries locating in the development triangles of North, South and Central Viet Nam. Coordinating the resources (including consultants and technical environmental experts) for assisting pilot program participants in conducting environmental management programs.

2. Implementing ISO 14001 for selected companies:

All applicants to the pilot program will be divided according to their wishes into two groups as follows:

■ Group 1: Companies implementing ISO14001 without certification

■ Group 2: Companies implementing ISO14001 including certification

The number of companies allowed to join the program will be determined by the responses received.

3. Organizing seminars, workshops or meetings for exchanging opinions and sharing experiences in EMS implementation among pilot program participants.

4. Summary of all feedback from participants on the problems, disadvantages, costs, and benefits arising from implementation, for future guidance.

The EMS pilot program is described as shown in the chart below:

■ **Current status of the EMS pilot program**

• The EMS pilot program was prepared and approved by the third quarter of 1999, but did not begin its activities until the fourth quarter of 1999. By that time, eight companies at different stages of implementation had applied to the Program. Sony Viet Nam has almost completed development of its system based on the parent company's EMS, and is preparing to apply for certification and wishes to participate in the program for sharing its experience (group 2).

• Sanyo Viet Nam has begun to develop EMS documentation based on its parent company's system, and wishes to join the pilot program for improving knowledge and learning from other companies' practical experiences (group 2).

• Castrol Viet Nam Ltd. started with a study of its parent company's EMS, and wanted to participate in the training aspects of the program (group 2).

• Novartis Viet Nam already has an EHS (environment, health and safety) system adapted from its parent company, and wishes to further develop its

EMS, to help ensure compliance with environmental legislation (group 1).

- Sao Mai Joint-venture Cement Company intended to develop an EMS for sites in Kien giang and Ho Chi Minh City, but cannot begin before 2000 (group 1).

- Liksin Packaging Enterprise began development of an EMS after getting ISO 9000 certification (group 1).

- Bien Hoa Packaging Company wanted to improve compliance with legislation by developing an EMS (group 1).

- Lam Son Sugar Company in Thanh hoa province has also just begun implementation (group 2).

In March 2000, after the workshop on "ISO 14001 implementation and sharing experiences", the following three other companies have been registered as participants in the Pilot program:

- Yazaky Co. Ltd. in Binh Duong Province

- Viet Nam Pesticide company (VIPESCO). in Ho Chi Minh City

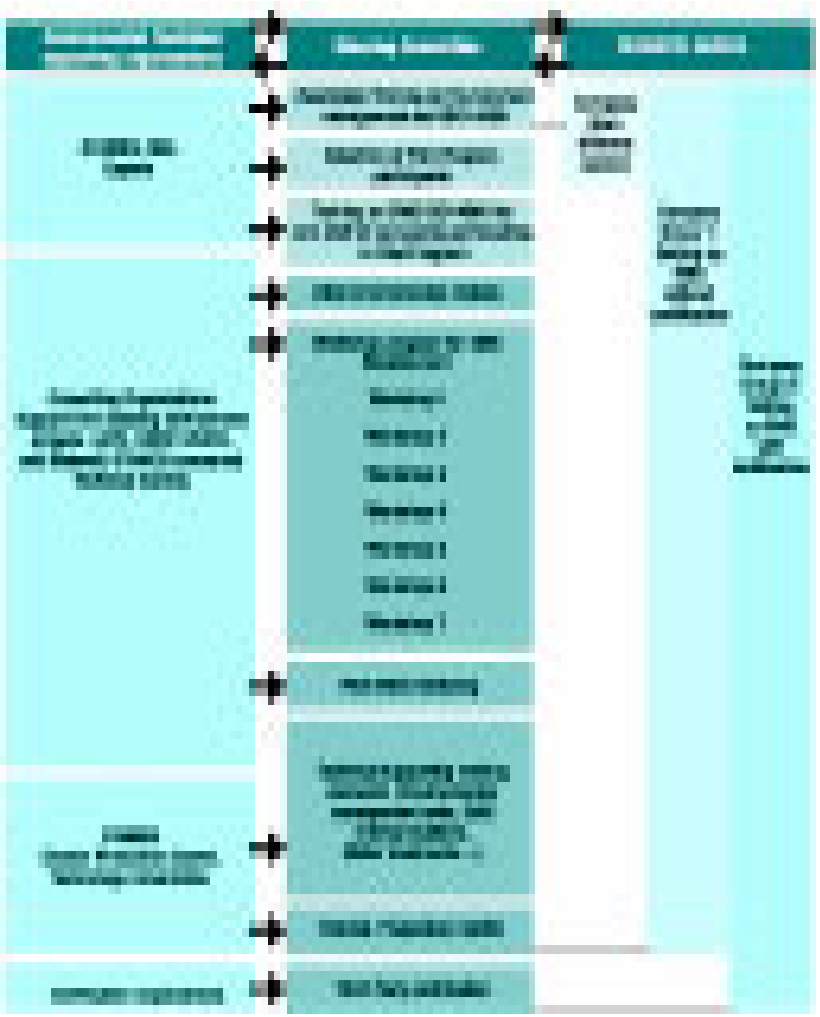
- Ha Noi Leather Shoe Company in Ha Noi

Program participants are now working towards EMS implementation in 2000. A plan for cooperation within the pilot program is also being prepared.

Difficulties of the EMS pilot program

The National EMS pilot program is off to a relatively good start. Eight companies have agreed to participate and some others have expressed their interest in joining. Over about four months of implementation, more than two hundred core staff from about 180 companies and organizations from North and South Viet Nam have been trained in environmental management and ISO 14000.

Fig 1: EMS ISO14001 pilot program



Several seminars and workshops for discussion of ISO 14001 implementation have been conducted for different sectors.

Due to a lack of experience and limited financial and human resources (including finance and manpower) for assisting the pilot companies in their implementation, more than 90 per cent of the implementation costs are being covered by the pilot companies themselves. While funding and therefore the future of the program is uncertain, it is possible that the program may last even longer than planned as a result of this corporate support.

To carry out further activities under the pilot programme the following challenges and difficulties need to be overcome:

- Limited resources for coordination of pilot program activities and assisting the pilot companies in several EMS development items;
- While the steering committee is located in Ha Noi, most participants are in the south and far from each other; A range of different management levels and skills, and different implementation status among participating companies will affect the harmonization of program activities;
- EMS development experience, especially in initial environmental review and development of EMS documentation, are still poor among local experts from both STAMEQ and NEA;
- Some of the participating companies face financial and human resource difficulties in EMS development and operation;
- The time left for implementation of the pilot program is very limited, and much work remains to be completed in the suggested EMS development program;
- Support to the program from government and other institutions is considered small;
- The rate of local participation in the pilot program remains low;
- Some communication problems among pilot program participants need to be improved;
- Some companies have problems in accessing upto date information on relevant legislation and regulation, at both the central and local government levels; and
- There is a lack of qualified consultants who could otherwise assist companies in setting up EMS at a reasonable cost.

Challenges and opportunities for Viet Namese companies in implementing the ISO 14000 series of standards

Implementing ISO 14000 (mainly ISO 14001 and ISO 14004) in most Viet Namese companies, especially in SMEs, is a difficult task. Many companies do not see the relevance of the scheme to their normal business, unless they are affected by regulations or business losses that might be avoided by implementing the standard. The development and implementation of EMS is a daunting prospect to many companies, with significant implications in terms of both the long term manpower and financial resources required. Getting started, however, is not as difficult as may first appear. The most important factor is commitment by the leadership to implement environmental policy and to reach targeted objectives.

STAMEQ experts did some analysis from a trade and development point of view, of challenges and opportunities facing Viet Namese companies, recently. It was only a preliminary study, based on the result of surveys of companies and other concerned people, ISO/TC207 papers and documentation, and other materials. The study focused only on ISO 14001 implementation. Because ISO14000 is still new to most companies, the use of environmental management tools such as eco-labelling, life cycle assessment, and environmental performance evaluation are not yet matters of concern for these companies. These issues will be encountered later, after the companies have an EMS in place.

- **Current status of ISO 14001**

The response of firms to ISO 14001 in Viet Nam in comparison to other developing Asian countries has been small. Compared to Taiwan, South Korea, Japan, China and Malaysia, firms in Viet Nam have been much less enthusiastic. At this stage, national companies play a passive role, responding to outside pressure rather than actively seeking improvement of their environmental and economic performance.

Joint ventures and companies owned outright by foreign investors (100 per cent Foreign Direct Investment (FDI) companies) find it easier to meet the requirements of environmental standards and to implement ISO 14001, but smaller domestic firms, especially SMEs, do not have the same experience. General awareness of SMEs of ISO 14001 was found to be low. They have many difficulties arising from lack of finance, skills, know-how, and experience. Newer firms tend to find it easier to meet environmental standards and to implement ISO 14001 than older firms and SMEs.

The possibility of demonstrating conformity with legislation is considered to be the most important motive for all businesses, including SMEs, to achieve certification. Environmental management systems are believed to provide a means to efficiently meet mandatory standards as well as international environmental legislation. Unfortunately, it is easier in theory than in practice for many companies.

Only seven companies were certified to be in conformity with ISO 14001. All are joint venture or 100% foreign owned firms. These companies sought certification in order to improve their corporate image internationally as well as domestically. The table below shows the current status of ISO 14001 certified companies in Viet Nam up to July 2000.

Table 1. ISO 14001 Certified Companies in Viet Nam

Order	Name of company	Location	Year of certification	Certification body
1	Tae Kwang Vina Co.	Dong nai	1998	ABS Quality Evaluation
2	Toyota Viet Nam Co.	Vinh phuc	1999	BVQI
3	Viet Nam Fujitsu Computer Product Co.	Dong nai	1999	BVQI
4	Ha Noi Daewoo Hotel	Ha Noi	2000	TUV (Germany)
5	Sony Viet Nam Co.	HCM city	2000	BVQI
6	Sanyo Viet Nam Household Electrical and Mechanical Appliance Co.	Dong nai	2000	Quacert/SGS
7	Thang Long Industrial Zone	Ha Noi	2000	BVQI

Why do companies certify to ISO 14001?

The need to maintain and increase market share was viewed by many developing country experts as the main reason why companies certify to ISO 14001. For transnational corporations (TNCs) and large companies this related to export markets, whereas SMEs were more specifically concerned with domestic market share, including increased market opportunities as suppliers to TNCs. In addition, certification to ISO 14001 can be seen as demonstrating compliance with national environmental legislation. Some TNCs liken ISO 14001 to global policy, adherence to which creates a good image of the company to the public and to local authorities. The idea of implementing supply chain environmental management practices of TNCs has not yet been embraced by local companies in Viet Nam.

Foreign customers are an important pressure group, demanding conformity with environmental legislation and environmentally friendly production in general. However, international demand is less important for SMEs. In contrast, domestic consumer demand is not considered strong enough to influence business in general in favour of ISO 14001 certification. Foreign pressure seems to be more important for larger companies, whereas local demand is more important for SMEs. As a consequence, SMEs see less need to implement an EMS. Low commercial returns make the initial cost of implementing an EMS a disincentive for SMEs to incur that cost, compared to larger businesses. There is little promise that implementation alone will increase market share for an SME. In comparison to the arguments related to legal compliance and customer demand, strengthening market share is attributed relatively little importance for most of these companies.

Deterrents to certification

The high costs attached to certification were viewed as a significant deterrent to SMEs, particularly for firms in developing countries such as Viet Nam. However, some were of the view that the lack of technical expertise and manpower was a greater stumbling block for SMEs than certification costs. A lack of awareness of EMS and ISO 14001 is particularly prevalent among SMEs in developing countries. Export-oriented companies demonstrated greater awareness.

In Viet Nam the costs of certification are considered high for companies of all sizes, especially when the cost of a foreign certifier is considered. The following costs for ISO 14001 certification in Viet Nam has been summarized from several sources:

Table 2. Costs of certification (in US dollars)

Certification body	Rate (man/day) assessment cost	Large company (9-10 man/days)	Medium size company (5-8 man/days)	Small company (2-4 man/days)
Foreign and International	700-800	6.500 – 8.000	3.500 – 6.500	2.000 – 3.500
National (Quacert)	About 40% of the foreign cost	2.500 – 3.200	1.400 – 2.600 USD	1.000 – 1.500

Companies consider the costs of setting up an environmental management system to be a main deterrent. While companies have to increase their costs in order to set and maintain the EMS, they don't see any immediate economic benefits. The lack of capacity within a company (both in terms of knowledge and skills, and the need to import the know-how of external consultants) results in an increase in costs.

In Viet Nam, little evidence of international market demand for EMS certification by exporters was found. In local markets, consumer knowledge of EMS or ISO 14001 is limited, so no pressure on producers from that front was evident. Therefore, the perceived need for EMS certification is still very low in comparison with other countries in the region, and compared with the level of awareness of ISO 9000.

Proliferation of certification bodies and the impact on the quality of certification

Experts noted that there is a proliferation of certification bodies at the national, local and international levels, and there was concern that this would have a negative impact on the quality of certification, particularly as some of these agencies are not officially accredited. The Viet Namese government is concerned about the increasing presence of foreign certification bodies. It is estimated that about eight foreign and multinational

certification agencies for ISO 14001 are operating in Viet Nam but only a few of the certification agencies are registered, and none of them accredited (because the accreditation scheme for certification organizations is not yet launched in Viet Nam).

One national certification agency (Quacert) was established recently under STAMEQ. This underscores the need for training at the national level of environmentally competent certifiers. This is a very important issue because only in this way the certification expenses can be reduced to a minimum, thereby encouraging more companies to participate. As noted above, the expense of certification, is one of the main reasons for the low rate of companies certifying to ISO 14001.

Trade and investment impacts

Many experts shared the view that, as there has been little experience with implementation of EMS, it is too early to assess the extent of the trade and investment impacts of ISO 14001. However, it was felt that the inadequate participation of developing countries in standards development might have a direct link with certain adverse trade effects that may accompany the use of ISO 14001. The lack of international accreditation of local certification bodies in developing countries including Viet Nam could also result in trade barriers. Many referred to the importance of mutual recognition and equivalence in this regard. It was suggested that the notion of trade barriers in the context of EMS needs further definition.

In relation to investment, it was suggested that, by employing the same environmental criteria both in operations at home and investments abroad, TNCs could contribute to raising environmental management standards in host countries. Viet Nam can use these advantages to encourage TNCs investing in Viet Nam to work towards this goal, so as to increase the implementation of ISO 14001 in local companies.

Benefits of implementing ISO14001

A recent seminar, organized by STAMEQ for exchange of experiences in implementation of ISO 14001 among pilot and interested companies, showed that the companies systemically implementing ISO 14001 recognize the specific environmental benefits of implementing the standards. While the environmental benefits are quite clear for the companies implementing ISO 14001, the market benefits of meeting ISO requirements are not as obvious.

Environmental benefits that companies gain from implementation of ISO14001 are realized over the long term. Some of the benefits recognized by experts are as follows:

- Prevent pollution and reduce risk of environmental accidents;

- Better response to environmental responsibilities and obligations;
- Systematic improvement of environmental performance;
- Increasing environmental awareness and behaviour of staff;
- Good means for efficiently meeting mandatory standards; and
- The possibility of demonstrating conformity to legislation
- Implementation, certification and accreditation issues

Implementation of the ISO 14001 standard

Overall, it was felt that the implementation of the ISO 14001 standard was only in its infancy. Some countries with existing national EMS are still in the process of analysing the benefits of ISO 14001 as regards its impact on environmental performance of companies, while others were more concerned with the impact that ISO 14001 may have on market access opportunities for developing countries. While it was clearly stated that ISO standards are voluntary tools to be used in the marketplace, concerns were expressed that they may become *de facto* barriers to developing country exports.

Unfortunately, no accreditation body responsible for the formal recognition of competent certifiers is yet established in Viet Nam. The only accreditation activity at present is laboratory accreditation, currently carried out under the Viet Nam Laboratory Accreditation Scheme (VILAS) of the Bureau of Accreditation (STAMEQ). It was also pointed out that ISO 14001 certification does not guarantee compliance with meeting certain governmental regulations for environmental performance. ISO 14001 certification is only for meeting a management standard in which each company sets its own environmental objectives.

The role of the government was seen as important for implementing EMS, although setting standards and accreditation are matters for the private sector in many countries. There was a large convergence of views that the voluntary use of EMS and government regulations were complementary, and that the wider use of EMS did not imply deregulation. While recognizing the potential of EMS to help reduce the environmental impacts of an organization's activities, it must be noted that at present, although the Viet Nam government has adopted a positive attitude towards ISO 14001, the policies and concrete measures to be taken to encourage its implementation are still under consideration by concerned government agencies. There was consensus that in any case, the use of ISO 14001 should remain voluntary.

Another matter that must be addressed by government is improper advertising about certification, as sometimes occurs in the case of ISO 9000.

The difficulties appear to lie in the lack of availability of competent trainers, the lack of available information on environment related issues, and the lack of expertise and qualified workers in locally owned firms in Viet Nam. Concern was expressed with respect to the conflict of interest that may arise in instances where a company offering auditing services is also involved in training, consultation and even trading activities. Therefore, it was suggested that a code of practice for auditors should be elaborated. The need for properly qualified auditors, including those having environmental expertise, was emphasized. A wide range of skills and knowledge are needed for auditing.

Certification, Accreditation issues and Mutual recognition

Mutual recognition of certification bodies is needed to facilitate international trade. It was pointed out that mutual recognition should be based on criteria for certification bodies and accreditation systems. Mutual recognition is not about harmonizing implementation. A rationale for mutual recognition is that all certifying bodies certify to the same ISO 14000 standard. However, some were of the opinion that existing standards for certification bodies are insufficient as a basis for mutual recognition.

Some were concerned that unwillingness to engage in mutual recognition agreements may be based on a deliberate attempt to protect market share. However, there was little empirical evidence of ISO 14001 certificates being rejected by clients in developed countries. Some experts expressed concern over the dominant presence of international certifiers in their domestic market.

It was suggested that the development and adoption of a worldwide accreditation logo, enabling national certifiers to be recognized worldwide, would provide the most appropriate solution in the future. This will enable developing countries like Viet Nam to have more chance to join not only the international markets but also domestic markets equally.

One of the targets for Viet Nam's integration into regional trade activities for Viet Nam is to strengthen the capacity and infrastructure of national certification, and work toward participation in the Association of South East Asian Nations (ASEAN) Mutual Recognition Agreements (MRAs). Leaders of ASEAN countries outlined areas of concern in an ASEAN framework agreement for MRAs, signed at the Ha Noi summit in December 1998.

The costs of building infrastructure for national certification to ISO 14001 may include:

- Cost of training (training for trainers) competent EMS and ISO 14000 series consultants

- Cost of training (training for trainers) environmental auditors and lead auditors
- Cost of information updating system (including training of experts) on environmental and ISO 14000 matters
- Cost of assisting National Certification Pilot Program (for 3-5 companies) with the assistance of international experts

The estimated costs of building basic certification infrastructure is shown in the table below:

Table 3. The estimated costs of building basic certification infrastructure

No	Activities	Training expenses	Other expenses (equipment, international experts, etc)	Amounts
1	Training of Consultants (10 consultants)	20,000 USD		20,000 USD
2	Training of Auditors and lead Auditors (10 Auditors)	25,000 USD		25,000 USD
3	Information updating system	2,000 USD	4,000 USD	6,000 USD
4	Certification Pilot Program	5,000 USD	20,000 USD	25,000 USD
	Total			76,000 USD

Case of SMEs

Reasons for SMEs certifying to ISO 14001

Most companies in Viet Nam are SMEs, so the implementation of EMS ISO 14001 by these businesses is quite important for the country's sustainable development. The needs of SMEs in this regard are, as mentioned earlier, to maintain and increase market share, demonstrate compliance with national environmental legislation, and enhance corporate image. However, it must be noted that SMEs will certify to ISO 14001 not because of perceived savings and lower costs, but rather as a response to pressure from customers.

Needs of SMEs

It was noted that SMEs in both the developed and developing countries face many similar difficulties with EMS and certifying to ISO 14001. The main constraint faced by SMEs is the high cost associated with implementing and maintaining an EMS. Apart from the financial costs, SMEs lack the necessary technical expertise and experience as well as human

resources and management time. In addition, there is a lack of awareness of EMS and ISO 14001. Often SMEs (particularly the smallest enterprises) lack access to the necessary information, and lack resources to participate in meetings related to the formulation of standards. Some felt that the needs of SMEs might not be adequately taken into account in the formulation of ISO standards.

Another view is that it would be counterproductive to develop a separate standard for SMEs, as this could be discriminatory. It may be more appropriate to have a single standard, but at the same time introduce national support systems to assist SMEs. Of course, Viet Nam's solution must be appropriate to the country's particular environmental problems.

One of the main difficulties faced by SMEs in implementing an EMS relate to lack of awareness of environmental issues and how to conduct the initial environmental assessment, devising appropriate policies and programs to implement the EMS, the actual implementation of the EMS, and problems related to environmental auditing.

It must be noted that pressures on SMEs to introduce managerial procedures to obtain ISO 14001 certification could detract from the environmental objectives of setting up an EMS.

Addressing the needs of SMEs

Although there are some existing efforts for promoting information flows to SMEs, such as the intention to use Viet Nam Chambers of Commerce and Industry (VCCI) as focal points and relying on modern communication tools, it was also recognized that these might be difficult for SMEs. Thus, there is a need to devise additional means to improve communication flows to SMEs.

It was noted that there should be increased cooperation between the public and private sectors. Also, SMEs in Viet Nam could benefit from the experience of SMEs in other developing countries (especially countries in the South-East Asia region), and in developed countries. Partnerships between SMEs in developing countries perhaps could also be encouraged. It was also suggested that TNCs could act as mentors in assisting SMEs, as well as in providing additional financial resources for the participation of SMEs in the development of EMS.

Conclusions

The potential of the ISO 14000 series of standards for preventing pollution and accessing markets is becoming increasingly clear. There is an important role to be played by these standards in designing a strategy to achieve sustainability. Joint initiatives with other organizations and government agencies in Viet Nam engaged in this field, such as STAMEQ, NEA, the ministries of Industry, Trade, Fisheries, and Agriculture and Ru-

ral Development, as well as institutions, trade unions, industrial sectors, TNCs, Viet Nam Chamber of Commerce and Industry (VCCI), and other NGOs, might accelerate this critical process. They should contribute and cooperate with each other to disseminate, as widely and as homogeneously as possible, basic information on EMS in order to overcome the difficulties and challenges mentioned above, to guarantee a common ground for achieving the opportunities for a fair development of worldwide trade, and to avoid negative effects that may arise from an inadequate implementation of EMS in Viet Nam.

Recommendations

Because the ISO 14001 standard was only issued recently (Sept 1996) and adopted as national standard in Viet Nam in 1997, more analysis and experience is needed to fully understand its implications. There is also a need to share experiences among companies, and particularly those where there is still a general lack of awareness and understanding of the ISO 14000 standards.

It is recommended that there should be complementarity between voluntary standards on EMS and regulatory measures. There is a consensus in Viet Nam that ISO 14001 should not become mandatory.

It is important to emphasize the important contribution that international standards can, in general, make in facilitating international trade and the development process of developing countries. The importance of enhancing the representation and effective participation of Viet Nam in ISO's work in general, including in the build-up to the revision of ISO's EMS standards should also be recognised. This will require financial and technical assistance as well as better coordination at the national level between STAMEQ as the national standards body, the government agencies concerned, and other stakeholders. Therefore, MOSTE, as the leading government organization in conducting the environmental campaign and assistance of industry in certain problems of standards implementation and environmental legislation, should recommend to the government the necessary policy and concrete measures to encourage the implementation of EMS ISO 14001 in Viet Nam.

Experts recognized that the ISO 14000 series of standards including EMS and eco-labelling could have implications for trade, particularly for developing country exports. Whilst compliance with the ISO 14001 standard may enable certain companies to strengthen market positions, the standard could act as a barrier to trade for companies that find it difficult or costly to comply with the standard. In this regard, it is recommended that appropriate attention should be paid to national implementation issues as well as to international cooperation, to facilitate the implementation of EMS in Viet Nam.

Pressures on developing country suppliers to achieve ISO 14001 certification could result in barriers to trade and/or detract from the environmental objectives of setting up an EMS. The Ministry of Trade may wish to consider the possibility of further cooperation of companies in developed countries with their suppliers in Viet Nam in the area of EMS implementation. TNCs could play an important role in this regard.

It was stressed that certification and accreditation should be fair and rigorous to safeguard the credibility of the ISO 14001 certificate. Therefore, Viet Nam should develop the necessary infrastructure to allow conformity assessment, certification and accreditation harmonized with international and regional activities in these areas. In doing so, the relevant international standards and guides should be followed. In this way possibilities to increase domestic and external market share could be defined for domestic certification bodies and consultants, including through South-South cooperation.

It was recognized that SMEs in both developed and developing countries may face significant constraints in setting up and maintaining an EMS. The need for positive incentives, including technical assistance is important. Of equal importance is cooperation between large firms and SMEs. Similarly, cooperation between SMEs, particularly those in the same sector and geographical area, could help to reduce the costs of EMS implementation.

Governments in developing countries face several policy choices in the context of EMS standards, such as whether or not to adopt a pilot project approach, and whether or not to share part of the cost of EMS implementation with the private sector. In any case, governments could play an important role in providing an enabling environment for the implementation of EMS, particularly in developing countries, for example by promoting the creation of necessary infrastructure and legislation as well as appropriate incentives. In this regard, government agencies need to work together to determine the necessary steps to be taken, based on the results and experiences gained through the current EMS pilot program.

Recent study has identified the requirements of national implementation of the ISO 14001 standard. These recommended actions include:

(a) awareness building among the concerned stakeholders, especially industry;

(b) identification of sources of and dissemination of information;

(c) creation of infrastructure, and training of auditors and consultants;

(d) access to and transfer of environmentally sound technology (cleaner production);

(e) assistance in developing and implementing EMS and related legislation; and

(f) support for participation in relevant fora and for sharing experiences with the implementation of EMS (through the EMS Pilot program in 2000, and other possibilities).

Other tools of ISO 14000 standards could be introduced in Viet Nam

In order to encourage progress in this regard, the appropriate policy measures from the Government Agencies concerned needs to be elaborated. Some technical assistance for solving the legislative and market difficulties also needs to be provided.

CHAPTER 3

SURVEY REPORT ON THE IMPACTS OF QUALITY AND ENVIRONMENT REQUIREMENTS ON VIET NAM'S AGRICULTURE EXPORTS

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INTRODUCTION

Export form one of the main pillars of the Viet Nam economy, accounting for up to 70% of the country's GDP, of which agricultural exports are becoming more and more important.

With tough competition in the world market, exports are now a challenge for every country. Viet Nam has done its best to pave the way for its exports, including by responding to all kinds of trading requirements imposed by its importing partners. In this context, the ability of Viet Namese producers and exporters to respond to environmental requirements is important both to gain access to markets and to ensure environmentally sound export growth.

Besides, economic integration is an ongoing process. In the course of negotiating for accession to the World Trade Organization (WTO), participating in the Association of South East Asian Nations (ASEAN) and the Asia Pacific Economic Cooperation (APEC), Viet Nam has to abide by a large number of obligations, including obligations relating to environmental measures. Such obligations impose certain pressure on Viet Namese firms engaged in export business, compelling them to adjust to meet new requirements of importing countries, particularly requirements on environment standards.

In addition, Viet Nam is member of key Multilateral Environment Agreements (MEAs) that imply the need to implement environment commitments in many economic sectors.

In this context, the Viet Namese Directorate for Standards and Quality, supported by the United Nations Development Program (UNDP) has implemented International Standards Organisation 14000 in Viet Nam. However, to cope with local challenges and to reach sustainability in export growth, further study on the impacts of environmental requirements on market access and export performance is needed. This survey was carried out towards that end.

OBJECTIVES AND SCOPE OF SURVEY

The survey aims at identifying existing environment-related impacts that Viet Namese firms have been facing when exporting their products to international markets, and their plans to overcome those impacts. Due to time constraints, this survey will focus primarily on enterprises exporting agricultural products in the following context:

1. Exports of firm concerned

2. Main destinations of exports

3. Problems with Sanitary and Phytosanitary Measures (SPS) and technical regulations imposed by importing countries

4. Problems with the conformity assessment policy of importing countries

5. Costs of meeting technical and environmental standards required by importing countries

6. Problems with different treatment by importing countries vis-à-vis agricultural exports of SMEs and large-sized enterprises

7. Problems with discrimination by importing countries against agricultural exporting countries

8. Adjustment plans of enterprises concerned to meet international standards and importing countries' requirements

METHODOLOGY

The survey was carried out on 25 enterprises involved in agricultural exports, ranging from national corporations to small and medium sized-enterprises (SMEs) located throughout the country (Ha Noi, Ho Chi Minh city, High central land, central provinces, northern delta provinces, and southern delta provinces). The enterprises surveyed are either mainly or solely engaged in agricultural export, so their export problems would apply to other agricultural exporters as well.

The survey was done in the form of a questionnaire. Interviews and telephone communication exchanges have been made where needed.

GENERAL FINDINGS

■ Most of the enterprises surveyed have very little knowledge of international environmental and technical regulations, even though they abide by many of their customers' quality requirements. For them, SPS requirements, environment standards, technical regulations, product design and packaging are all seen as matters of product quality. Sometimes, improving product quality is simply understood as increasing the use value of products and packaging, not focusing specifically on environment standards, SPS or other technical aspects.

■ All enterprises consider quality requirements by importing countries to be very high. However, there is no specific assessment of the regulations imposed (e.g. the relevance of those regulations, whether they are based on scientific evidence or arbitrarily imposed, etc.). They all do their best to meet importers' requirements.

■ In the case of some agricultural exports, the level of quality is internationally accepted but at a lower export price than quoted on international markets, or lower than the export prices of foreign competitors. The sample cases are coffee beans, which are often sold at US $30 per tonne lower than quotes in the London market. Export prices of vegetables are offered at about 20 per cent to 30 per cent lower than other foreign exporters' prices.

■ A large number of enterprises think that quality and other kind of requirements of importing countries create impacts on their market access in terms of delivery delay, extra transaction costs and compliance costs. Many agricultural products cannot get access to foreign markets due to heavy importing regulations. Some countries have cited certain fruit diseases in prohibiting exports from Viet Nam without providing any scientific evidence.

■ Market diversification exists when access to a certain market is too difficult. Diversification is usually oriented to markets that impose lower requirements, but trading conditions such as payments are more risky.

■ SMEs tend to be hit hardest by those impacts as they often lack good facilities for quality control, testing and management. The costs of installing quality control equipment range from several hundred thousands to millions of US dollars.

■ Quality requirements of importing countries differ among countries. Each has its own standards, with the result that Viet Namese exporters have to adapt to a series of different requirements. This fact in some cases limits the ability of exporting enterprises to extend their market reach, as their production systems are not flexible enough to respond to all kinds of requirements. Furthermore, they often cannot meet intensive investment needs, usually counted in millions of dollars, in order to satisfy those requirements. From industry association sources, we learn that costs of upgrading investments are projected to reach $30 million USD for the coffee industry and $90 million for the tea industry. Harmonizing importing requirements to international standards are strongly emphasized as an effective way for business facilitation.

■ All enterprises see product quality as crucial for their competitiveness in the world market, and pay great attention to improving the quality of their products. So far, the best way they have found of doing so is to adopt advanced technologies and modern quality management systems such as

ISO 9000 (ISO 14000 has not yet penetrated the mainstream Viet Namese SME sector). However, up to February 2000, only about four enterprises in the agricultural sector had been certified ISO 9000, of the total of 110 certified enterprises.

■ Those surveyed generally have no information on MEAs or WTO regulations related to environment. The question of environment is touched upon under the aspect of protecting environment in the production cycle (i.e. waste management, air pollution control, workplace hygiene, etc.). All entrepreneurs must show a certificate of environmental readiness when submitting their request to set up an enterprise, in order to demonstrate their ability to deal with environment issues in their operations.

■ The environmental measures taken vary from one enterprise to another. Some enterprises create their own waste management and air pollution control systems, while others import these services from abroad. However, in order to enhance their productivity effectiveness and competitiveness, some enterprises in cooperation with local authorities may voluntarily upgrade their waste management system. Furthermore, the government has also issued an instruction that all enterprises include sound environmental measures into their short or long term development plans.

■ Awareness of the need to improve product quality was relatively prevalent among the enterprises surveyed. Priority is given to enhancing quality itself (i.e. product taste and use value), increasing shelf life by adopting appropriate post harvest processing and preservation measures. Improving the package of products is also seen as a priority in improving demand.

SPECIFIC PROBLEMS

1.Main exports

Agricultural exports of enterprises surveyed included:

Rice

Nuts: Groundnuts, cashew nuts

Beans: Green beans, coffee beans

Tea

Vegetables: fine herbs, cauliflower, garlic, shallots, bamboo shoots, taro, pumpkin, lettuce, celery, mushroom, etc.

Spices: cinnamon, anise, pepper, onion, garlic, ginger

Canned fruits and vegetables: pineapple, lychee, rambutan, puree, cucumber, asparagus, egg plants

Fresh fruits: dragon fruit

Dried and frozen fruits and vegetables: banana, pea, mango, pineapple, coconut, longan, lychee, rambutan, sapodila, guava, soursop, lime, banana and leguminous vegetables.

Other: Tapioca starches

The survey shows that many categories of competitive, mass-produced Viet Namese agricultural products are either not exported or exported below capacity (such as potatoes, tomatoes, seasonal vegetables and tropical fruits) for the following reasons:

- they can not travel overseas because of insufficient post harvest processing facilities;
- problems with access to certain markets;
- importing countries place restrictions on importation; and
- lack of distribution channels.

2. Main trading partners

Most Viet Namese agricultural exports are bound for the following destinations:

Asia: Singapore, Korea, Japan, Hongkong, China, Indonesia, Philippines, Malaysia, Laos, Chinese Taipei

Europe: France, Germany, Italy, Russia, countries of the former Soviet Union

Middle East: Iraq, Saudi Arabia

America: Unites States of America, Canada

The reach of Viet Namese agricultural exports has not yet extended to Africa, neighbouring Asian countries or Western Europe. Pacific Ocean countries such as New Zealand and Australia are also beyond the reach of most Viet Namese agricultural exports due to high SPS requirements.

3. Problems with SPS and technical regulations

Compliance with SPS and technical regulations is usually stipulated in contracts between importers and exporters. In most cases, agricultural exports have to abide by relatively high requirements imposed by importing countries. Compliance is certified through "Quality Certificates" issued by different bodies. So far, the following certificates are needed:

- For rice, green beans and other kinds of nuts for export: certificate of quality control issued by the Plant SPS Department
- For vegetables, fruits (fresh, canned or dried) and other agricultural products: quality and SPS certificates issued by a designated body

Importers of agricultural products from Viet Nam have to undergo many kinds of formalities and quality control in their home countries. For example, importers must have a letter of recommendation from the Minister of Agriculture or Agricultural Association (a professional organization representing business community involved in agriculture trade and production) if they want to import certain agricultural products from Viet Nam. Those formalities discourage importers from doing business with Viet Namese exporters. Furthermore, in certain markets, most agricultural imports are subject to licensing provisions. A license is not granted automatically, and approval is not based on transparent criteria.

Some countries require that imported agricultural products comply with domestic laws and regulations, such as laws on protecting plants, food safety, food additives and other kinds of standards accepted by the Minister of Health. These laws are not always transparent, coherent or available to foreign exporters, and are applied on an almost case-by-case basis (in other words, they may differ from product to product and consignment to consignment). It seems that ordinary exporters, especially those from SMEs, have difficulty in fully understanding the language of the regulations.

Furthermore, imported products for domestic use must be labelled in local languages with the following compulsory information:

- Name of the product
- Name and address of importing company and its business registration number
- Expiry date or manufacture date
- Weight, volume or quantity
- Main ingredients (at least five must be specified)
- Use and storage instructions
- Place for returning or exchanging goods

Labelling requirements are seen as costly because the label needs to be designed separately for each single importer.

Some countries impose very high quality standards (even higher than international standards) on imported agricultural products, especially fresh vegetables and fruits. In one way or another, high standards are reflected in the following conditions commonly applied in developed countries importing fresh fruits and vegetables from South East Asian countries, including Viet Nam. These conditions are applied not to the product itself, but usually involve production and process methods (PPMs).

PRE-EXPORT PRECAUTIONS

- pre-harvest visits by an entomologist from the importing country should be planned and field control practiced intensively throughout growing seasons. When using pesticides and/or fungicides, due care should be paid to post harvest residue problems

- Precautions as to harvesting, grading and sorting, packing, loading, etc: for any type of fruits and vegetables, harvest operations should be undertaken in good weather conditions. Sorting operations should be conducted with the utmost care to eliminate pest- or disease-infected fruits and vegetables

- Freight containers and packaging materials should be checked before loading for the possible presence of insect pests and disease

PHYTOSANITARY REQUIREMENTS

Area freedom certification

This certification stipulates procedures and conditions as agreed between two designated plant quarantine authorities in both importing and exporting countries. The designated plant quarantine authority in the exporting country must usually provide his counterpart in the importing country with the overall methodology to be used in the monitoring survey, before the survey is actually administered. Some importing countries require further detailed requirements; for example, the Australian Quarantine Agency, while certifying for import of mango fruit, requires a sample size that ensures that if Mango Pulp Weevil or Sternochetes frigidus (MPW) is present in the production area with one percent or more of the trees infested and 15 percent of the fruit infested per tree, the survey will detect the pest 95 percent of the time. The methodology and the timing of the survey will be agreed between local quarantine agency and the Australian one based on the biology of MPW and practical conditions in the areas to be surveyed, including the number of trees and the varieties of mango in each area.

Application of import inspection

In some cases importers must submit a written "Application for Import Inspection" at least one day prior to the arriving date of carrier vessel.

Security of origin

A designated Plant Quarantine Authority of the exporting country must have in place procedures to ensure fruits and vegetables for export to those countries are only sourced from inspected production areas. Produce must be packed securely and their origin identified clearly before being transported to a registered treatment plant in the exporting country. The procedures to ensure security of origin are usually detailed in a Spe-

cific Commodity Understanding (SCU) and will be audited and found satisfactory by an authorized plant quarantine agency in the importing country before exports will be permitted.

Security on arrival at treatment centres

On arrival at the registered treatment centre in the exporting country, an officer of the designated Plant Quarantine Authority to ensure that integrity of the packages has not been compromised will check packages. If the packages are accepted they will be stored in a designated area away from other fruit to ensure their origin. Transfer of fruit/vegetable into treatment trays will be done under the supervision of the designated Plant Quarantine Authority. The treatment trays will be marked indicating that the product is for export only to the designated country. Products for other destinations will not be treated in the same chamber at the same time.

Treatment facilities

Treatment facilities must be registered and approved by a designated Plant Quarantine Authority of the importing country. The requirements of treatment facilities vary from one importing country to another. *Agricultural exporters can therefore only equip themselves to a limited number of treatment facilities and importing market requirements.* Those facilities must usually be designed under the specific requirements of the importing country, for example, prohibiting the entry of fruit flies into areas where unpacked treated fruit is held, and providing that treated fruit be discharged directly into insect-proof and secure packing rooms. The management of the treatment facility will be required to provide details of systems that are in place to ensure isolation and segregation from other products throughout the treatment, packing, storage and transport stages before exports commence. This will be audited for compliance with the requirements of the designated Plant Quarantine Authority in the importing country in the first export season, before exports will be permitted.

After the initial season approval of the registered treatment centres, the Plant Quarantine Authority in the importing country may require the Plant Quarantine Authority in the exporting country to audit the facilities at the beginning of each season to ensure that compliance with requirements before registration is renewed.

The designated Plant Quarantine Authority in the exporting country must ensure the following:

- registered treatment facilities are maintained in a condition that will provide efficacy in treatment programs
- all areas are hygienically maintained (cleaned daily of damaged, blemished or infested fruit), the premises are maintained to exclude the entry of pests from outside, and to ensure treated and untreated products are kept apart

- all measurement instruments are regularly calibrated and records retained for verification
- the movement of products, from the time of arrival at the registered treatment centre through to the time of export is recorded
- the security of products is maintained at all times that product is on the premises
- only registered growers can provide their products for export.

Vapor heat treatment (VHT) requirements

The VHT treatment specified in the SCU has been assessed as effective against all quarantine fruit flies.

An appropriate Plant Quarantine officer of exporting country using a certified thermometer will calibrate VHT sensors. All certified thermometers will be checked annually against a reference thermometer calibrated by the appropriate national standards authority.

The number and location of fruit sensors in each chamber will depend on the make and model of the treatment unit specified in the SCU.

Sensors will be placed in fruit chosen from among the largest size fruit in each chamber load. Placement of probes within the chamber and the method to insert probes will be specified within the SCU.

Treatment time will commence when the pulp core temperature of all probe monitored fruit reaches 46°C, and this temperature will be maintained for 10 minutes.

The designated Plant Quarantine Authority will ensure that copies of the data records of each treatment are forwarded to the Plant Quarantine Authority of the importing country. This documentation will include the Phytosanitary Certificate (PC) and import permit numbers applicable to that treatment. Information regarding the mode of conveyance and port of entry will be included in the relevant sections of the PC. This requirement may be reviewed after one season of operation, to determine whether this provides adequate control.

Packing, storage and loading of treated fruit

The fruit or vegetable is to be packed in new cartons sealed with a competent quarantine agency sticker or seal securely placed across the carton opening. No unprocessed packing material of plant origin is to be used.

All cartons will be marked with the name of the country of destination, labelled with packing date, registered packing house name or number and registered treatment centre establishment name or number.

Fruit inspected and cleared by local quarantine agency for export

must be packed, sealed and stored under security, and segregated from all other fruit in storage until loading.

Inspection and Phytosanitary Certification

An inspection 'lot' can be no greater than all fruits treated for export on one day from one registered treatment centre.

Designated technical expert and the resulting determinations, together with the source, must identify internal feeding insects found in the sampled products and date of harvest, submitted to the importing quarantine agency. No products are permitted to be exported to the importing country while identification is pending.

On arrival inspection

- Designation of port of entry is applied for most imported fresh fruits and vegetables.

- On-arrival inspection for quarantine pests will be carried out by a designated Plant Quarantine Authority on each consignment, in accordance with the sampling plan outlined in the SCU. Products showing damage or punctures may be cut for internal examination.

- In addition to the inspection at ports of entry, some propagating materials are subjected to post-entry quarantine in order to check for pests and diseases such as viruses that are not detectable by the ordinary import inspection. Intensive examinations may be carried out by various techniques such as inoculation test, plants, serological diagnosis, electron microscopy, etc.

Disinfection and destruction

When pest and/or disease are found during inspection, disinfection or destruction is to be undertaken. Methods of disinfection include:

- Fumigation with methyl bromide may sometimes injure the quality of fruits treated,

- Air brushing,

- Insecticide treatment, and

- Sorting.

Any consignment found to be infested will be refused entry, with the options of re-export or destruction. Further shipping of the item will be suspended until the cause for infestation is clarified and the effective countermeasures are established.

OTHER CONDITIONS FOR IMPORT

Usually, agreement to import fresh from a developing country would require the following conditions:

- Products come from registered export and packing facilities, which source products from, registered growers.

- An agreement such as a Specific Commodity Understanding (SCU) document would need to be prepared between designated Plant Quarantine Authorities in the importing and exporting countries, including an approved set of quarantine conditions and operational procedures. Any change in import requirements would require the development of an amendment to the SCU detailing agreed quarantine conditions and operational procedures for one of the above options or equivalent options.

The conditions for import would be reviewed at the end of the first year of trade.

A list of potential pests and diseases associated with fresh fruits and vegetables from South East Asian countries and identified by certain importing countries is annexed.

Problems with conformity assessment policy of importing countries

Most national corporations have their own quality management and control divisions. Some trading partners (for certain transactions) recognize those divisions and allow them to test and certify the quality of products exported. In some other cases, exporters must acquire a quality conformity certificate at a designated body such as the Viet Nam Quality Control Agency (Vinacontrol) or even foreign laboratories. Service fees charged by VINACONTROL depend on products, ranging from several hundred VND (several dozen USD) to 5 million VND (about $350 USD). Sometime fees are calculated on a percentage of about 5 percent of the contract value.

Certain importing countries require that products imported to their territories must obtain in advance certificates of quality issued by designated laboratories in their countries. Those procedures often take time and extra transaction costs. In some cases, a designated body in the exporting country may issue certificates, but testing procedures must follow their instructions and guidelines strictly. They also lead to extra transaction costs and delivery delays for Viet Namese exporters.

Some importing countries require importers of agricultural products to obtain import licenses from certain nominated foreign banks in their countries. These licenses are valid for only a short period of time and usually granted to companies with long business experience. In fact, the short-term import license discourages importation because the importer

hesitates to engage in a long-term contract, which is seen as absolutely necessary for agricultural trade. Agricultural exporters usually rely on long term contracts to plan their production.

Decree number 57/1998/NDCP provides detailed regulations on the implementation of the Commercial Law on Export, Import, Processing Goods and Agencies on Sale and Purchase of goods with foreign merchants. This decree extends import-export rights to all enterprises, e.g. the number of exporting SMEs has increased considerably (from 187 in 1997 to 1020 in 1999). However, most of them have difficulties in quality assessment as they lack good quality control and assessment divisions with modern equipment. Getting quality certificates from other bodies is seen as time consuming and costly.

Cost of meeting technical and environmental requirements

All enterprises pay great attention to improving the quality of their products. A popular method is the adoption of the ISO 9000 system. The estimated cost of such an investment varies from one enterprise to another (depending on how good their productive infrastructure is and how much technical assistance they need). The cost for getting an ISO 9000 certificate ranges from US$ 5000 to US$ 15000. However, the costs for upgrading the infrastructure system of the company, improving the productive management and training workers in order to meet ISO standards are much higher.

Many enterprises consider the trading requirements of importing countries for agricultural products to be very high. Meeting these requirements is usually time consuming and costly (i.e. fines for delivery delay, extra business costs, fees for testing laboratories, lost or undelivered goods due to complicated import procedures, etc.). Some enterprises estimate that extra business costs may account for up to 20 percent of the contract, resulting from:

- Extra treatment facilities;
- Extra documentation costs;
- Hiring more temporary experts;
- Extra expenses for visits of experts; and
- Vulnerability of exported goods.

In addition, delivery delays or rejection is as serious as extra business costs. It can result in broken contracts, loss of business confidence and credibility.

Discrimination between SMEs and large-sized enterprises

The survey shows that different enterprises exporting the same products to the same trading partners may be subject to different requirements (for example, product of company X is required to have eco-labelling, while the similar product of another company is exempted from such requirements). However, this fact is not enough to justify the conclusion that discriminatory treatment exists. More information about specific cases is needed from importers, in order to draw more firm conclusions.

The application of SPS and importing standards also shows that even though there is no discrimination between SMEs and large sized enterprises, SMEs can hardly export agricultural products directly to importers because they lack the facilities to comply with both technical and procedural requirements. The required extra 20 percent contract fee is too much for them.

Discrimination between exporting countries

The main discrimination found is in the area of tariff rates. Some importing countries do not grant most favoured nation (MFN) tariff rates to Viet Nam, therefore Viet Nam exports are less competitive in comparison with other neighbouring countries. If Viet Nam becomes a member of the WTO, this discrimination can be removed. In addition, the fact of not yet being a WTO member restrains Viet Nam from taking part in WTO discussions on trade of products subject to SPS and technical standards. These factors are partly attributable to the current difficulties for Viet Nam exports of agricultural products.

Importing countries also usually classify their exporting partners by certain SPS, environmental and quality criteria. Viet Nam is excluded from some preferential lists, therefore certain agricultural exports from Viet Nam to those markets are prohibited while those of other exporting countries are allowed. No justification from importing countries has been shown so far.

Adjustment plans to meet international standards and importing countries' requirements

Most enterprises consider that intensive investment in quality is crucial to enhance their products' quality and reduce the cost of quality compliance. Some national corporations think they should invest more in modern testing equipment so that they can better ensure the quality of their exports.

Some enterprises also plan to increase their knowledge on international regulations by inviting experts to introduce and update information in this sector.

However, none of enterprises surveyed has made concrete budget for such adjustment plans.

PROPOSAL

All enterprises emphasize their need to increase their products' quality and to meet different requirements of their trading partners. Proposals have been made in the following areas:

1. Free technical assistance in adopting ISO 9000 and 14000 systems.

2. Technology transfer from developed countries to help Viet Nam enterprises to improve their production quality and to upgrade their quality control equipment for better responding to product standards required by importing countries.

3. Organizing courses on international environmental and technical standards for enterprises, including environment-related trade rules under MEAs.

4. Regular information on the importing requirements of major trading partners, especially analysis and assessments of those regulations in light of international regulations.

5. International economic organizations and fora need to take actions to harmonize different importing requirements with international standards so that businesses, especially in developing countries, can more easily set up their production systems internationally, not running up to different or confused standards of importing countries.

ANNEX

Table 1. LIST OF COMMON PESTS AND DISEASES ASSOCIATED WITH TROPICAL FRUITS AND VEGETABLES

(identified by some importing countries)

Species	Common Name
Aleurocanthus woglumi	citrus blackfly
Bactrocera cucurbitae	Melon fly
Bactrocera occipitalis	Fruit fly
Bactrocera philippinensis	Philippine fruit fly
Chlumetia brevisigna	twig borer
Chlumetia transversa	twig borer
Eudocima fullonia	fruit piercing moth
Helopeltis sp.	mosquito bug
Icerya seychellarum	Seychelles fluted scale
Idioscopus clypealis	Mango leafhopper
Idioscopus nitidulus	Leafhopper
Mictis longicornis	twig wilter
Nephopterix sp.	black borer
Niphonoclea albata	twig borer
Niphonoclea capito	twig borer
Noorda albizonalis	red-banded caterpillar
Orgyia postica	Oriental tussock moth
Parasa lepida	blue-striped nettle grub
Planococcus lilacinus	coffee mealybug
Saissetia coffeae	helmet scale
Sternochetus frigidus	mango pulp weevil
Sternochetus mangiferae	mango seed weevil
Thosea sp.	slug caterpillar
Thosea sinensis	slug caterpillar
Typhlocyba nigrobilineata	mango hopper
Cephaleuros virescens	algal leaf spot
Xanthomonas campestris pv. Mangiferaeindicae	bacterial black spot
Alternaria alternata	alternaria rot
Cephaleuros virescens Kunze	agal leaf spot
Cercospora sp.	leaf spot
Cladosporium fulvum Cooke	leaf mould
Colletotrichum sp.	leaf anthracnose
Corticium salmonicolor Berk. & Br. (Syn. Erythricium salmonicolor Br. & Broome) Bursdall	pink disease
Diplodia durionis Sac. & Syd.	Dieback
Fusicoccum sp.	twig blight
Meliola durionis Hansf.	sooty mould
Oidium nephelii Hadiwidjaja	powdery mildew
Pestalotia sp.	leaf spot
Phomopsis sp.	leaf spot
Phyllosticta durionis	leaf spot
Phytophthora palmivora (Butl.) Butler	root rot, patch canker, fruit rot

- *Rhizoctonia solani* — leaf fall, foliar blight
- *Septobasidium sp.* — felt fungus
- *Aspergillus niger* — black mould
- *Botrytis cinerea* — blossom blight
- *Colletotrichum gloeosporioides* — anthracnose
- *Cytosphaera mangiferae* — stem end rot
- *Dothiorella dominicana* — stem end rot
- *Dothiorella mangiferae* — stem end rot
- *Elsinoe mangiferae* — mango scab
- *Erythricium salmonicolor* — pink disease
- *Geotrichum candidum* — sour rot
- *Guignardia mangiferae* — phyllosticta rot
- *Lasiodiplodia theobromae* — stem end rot
- *Macrophoma luzonensis* — grey leaf spot
- *Macrophomina phaseolina* — charcoal rot
- *Mucor circinelloides* — mucor rot
- *Nattrassia mangiferae* — stem end rot
- *Oidium mangiferae* — powdery mildew
- *Penicillium* spp. — blue mould
- *Pestalotiopsis mangiferae* — grey leaf spot
- *Phoma glomerata* — phoma rot
- *Phoma sorghina* — phoma rot
- *Phomopsis mangiferae* — stem end rot
- *Phytophthora nicotianae* var. *parasitica* — phytophthora rot
- *Phytophthora palmivora* — phytophthora rot
- *Rhizopus arrhizus* — rhizopus rot
- *Rhizopus oryzae* — rhizopus rot
- *Rhizopus stolonifer* — transit rot
- *Stemphylium vesicarium* — stemphylum rot
- *Stigmina mangiferae* — stigmina rot
- *Hemicriconemoides mangiferae* — *Coccus* sp. — soft scale
- *Hemicentrus attenuatus Funkhouser.* — horned treehopper
- *Icerya* sp — stem scale insect
- *Mudaria luteileprosa Holloway* — durian seed borer (DSB)
- *Planococcus lilacinus Cockerell* — coffee mealybug
- *Pseudococcus* sp. — durian mealybug
- *Remelana jangala ravata Moore* — fruit eating moth
- *Saisettia sp.* — scale insect
- *Scirtothrips dorsalis Hood* — chilli thrips
- *Setora fletcheri Holloway* — leaf eating caterpillar
- *Spilosoma sp.* — leaf eating
- *Suana concolor (Walker)* — leaf eating
- *Syllepte derogata (F.)* — cotton leaf roller
- *Tetranychus fijiensis Hirst* — Mite
- *Thrips coloratus Schmutz* — Thrips
- *Thrips hawaiiensis Morgan* — Thrips
- *Tirathaba ruptilinea Walker* — fruit boring caterpillar
- *Tiruvaca subcostalis (Walker)* — leaf eating caterpillar
- *Toxoptera aurantii Boyer de Fonscolombe* — citrus aphid
- *Xyleborus fornicatus Eichhoff* — tea shot hole borer
- *Zeuzera coffeae Nietner* — red branch borer

CHAPTER 4

INTRODUCTION TO GENETIC RESOURCES & TRADITIONAL KNOWLEDGE USE AND COMMECIALISATION IN VIET NAM

By Prof. Le Quy An,
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With its diverse climate and ecosystems including fertile plains, forests and mountains, Viet Nam is endowed with a richness of biodiversity, comprising some 275 species of mammals, 800 species of birds, 180 species of reptiles, 80 species of amphibians, 2,500 species of fish and 5,500 species of insects. Viet Nam is also home to 12,000 plant species, of which just 7,000 have been identified so far. As much as forty percent of the flora may be endemic. Viet Nam is considered to be the world's 16th-richest country in terms of biodiversity.

Between 1992 and 1994, three new mammal species were discovered and described; another mammal species was identified in 1997. According to a press release from the Ha Noi Office of the World Conservation Union (IUCN), seven new plant species have been discovered in Halong Bay, the World Heritage Site. All these new plant species are endemic to Halong Bay, and are found nowhere else in the world.

While the new discoveries are exciting, many other species are facing the danger of extinction with over 300 fauna and 350 flora listed as endangered species in Viet Nam's Red Book [1] [2].

The national economy of Viet Nam depends largely on natural capital, especially natural resources. Agriculture still occupies a significant portion of the Gross Domestic Product (GDP), in comparison with other countries in the region:

Table 1. Distribution of GDP among sectors (%), 1998

Country	Agriculture	Industry	Services
Viet Nam	25.8	32.5	41.7
Thailand	14.2	37.5	48.3
Indonesia	18.8	45.7	35.5
Philippines	16.9	31.5	51.6
Singapore	0.1	35.3	64.6

The use of biological resources plays a very important role in agriculture (including forestry and fishery), for ensuring the life of the people and the food security of the nation.

Traditional crops and new hybrids are helping to increase food production, the gross output of which reached 33.8 million tons in 1999. Domestic consumption amounts to only about 21 million tons.

In the health sector more than 3000 medicinal plants, with thousands of applications, have been used by the population for centuries.

This paper will review the use, commercialisation and traditional knowledge of plant genetic resources.

The use of traditional plant varieties and the adaptation of introduced varieties rely on scientific achievements and knowledge of the people

While the Kinh people (Viet Nam's largest nationality occupying 85% of the total population and distributed all over the country) are the main actors in developing and maintaining rich agricultural diversity largely based on wet rice farming, some 54 ethnic minorities living mostly in mountainous areas are equally known as the primary creators and custodians of agricultural biodiversity. A Tay farmer in Son la province identified more than six wild yams in the forest and explained how to utilize each species. He said that there are even more species of wild yams, but grew tired of describing the different characteristics of each. [3]

Indigenous and local communities know how to use countless other medicinal plants and natural products. Several thousands of plant species are utilized for food, medicine, fodder, fibre and raw material. [3]

Most agricultural crops have been domesticated and cultivated for many years. A certain number of varieties are still growing in the wild.

The conservation, use, development and commercialisation of plant varieties rely on research and development (R&D) activity, as well as the productive practices of farmers. Meanwhile, traditional knowledge is commonly used and commercialised to some extent.

Scientific research institutions and Universities and technical colleges used to play a leading role in cooperating with local communities for collecting crop germplasms, and adapting new and introduced varieties and hybrids. (See Annex: List of main Scientific Research Institutes related to Genetic Resources and Plant Varieties).

For example, during the period from 1983 to 1991, the Agricultural Science Institute has collected 5,516 samples of crops and wild plant varieties related to 70 different species. Can tho University's three year collection effort resulted in more than 800 collections which brought its total rice collections to 1,800.

In the framework of the "Community plant genetic resources project," (PGR) Can tho University is also involved in the distribution of traditional rice cultivars to farmers engaged in rice genetic resource conservation and development. One hundred and twenty-five farmers in four provinces were trained in seed conservation, selection methods and field documentation. Five hundred and seventeen rice species were distributed to these farmers.

The materials, which include pure line selection from populations, were initially characterized and evaluated at Can tho University. These were then distributed to the farmers for trials and observations.

The materials given to the farmers were sorted out according to the ecosystems where the seeds are to be grown. For example, 129 species are planted in the Can Giuoc District of Long An Province. Because of the salinity problem in this district and the rainfall pattern, the farmers in the district accepted only short-term maturing traditional cultivars. In another case, 136 medium-term species were managed by selected farmers in the Tan Tru District of Long An Province. These selections were based on the prevailing conditions of the district.

The cultivars are evaluated by farmers who choose, usually during "Farmers Day", cultivars to be subjected to further trials or in a few cases, seed multiplication. Field documentation is conducted by the farmers themselves. Can tho University provides them with a simple descriptive form. Further stages of the project are expected to carry out research in various areas, among which one relates to indigenous knowledge systems. This research is aimed at conserving and strengthening farmers' experiences, traditions and knowledge in PGR conservation and development. It includes the documentation of farmers' experiences in seed selection, storage, cultivation practices, planting material preparation, insect and disease control, biodiversity and the analysis of the scientific basis of indigenous knowledge systems.

These examples show that there is an obvious need to establish a partnership between Science and Technology (S&T) Institutions and Universities, and farmers. On one hand, the study and development of new varieties or hybrids, and the introduction and adaptation of alien varieties are mainly carried out by these institutions in close cooperation with local communities as experimenters, evaluators and potential users. Such partnership is also needed for improving and developing traditional knowledge on a more solid scientific footing.

But on the other hand, S&T Institutions and Universities often benefit from indigenous wisdom in the conservation and utilization of PGR, without any obvious payment or compensation to local communities.

Some S&T institutions continue to produce and supply plant seeds, but market based seed supply systems are developed and maintained by

plant seed companies.

Some regulation does exist for sharing benefits among various stakeholders (see Part. II below), but it works more to the advantage of plant breeders, rather than to the local communities owning traditional knowledge.

The use and commercialisation of indigenous/traditional knowledge is realized in three ways (including the cases of crops and medicinal plants and practices surrounding their use):

a) Traditional use and sharing of knowledge. Agricultural practices often become popular through the incremental and collective development of indigenous and local knowledge, so that it is often difficult to identify a particular person or group of persons as the inventor of a plant-based traditional cure or useful crop variety, [4] (although local communities in many cases are the ultimate protectors and nurturers of biodiversity).

It is quite similar with the traditional use of medicinal plants. Most of them became common and well known through usage and sharing. Dr. Do Tat Loi produced the famous book entitled "Medicinal Plants and Medicinal Ingredients of Viet Nam" in which more than 800 plant species are described with their biological and therapeutic characteristics. The use of traditional knowledge, and consultation with eastern physicians and doctor – herbalists, has permitted him to introduce hundreds of prescriptions for treating many diseases.

A popular feature, especially in rural areas, is the growth of many medicinal plants in family gardens and daily use by the population, for example Paederia Tomentosa, Zingiber officinale, Sophora Japonica, etc.

Other medicinal plants have been domesticated or widely grown for large-scale production, for example: Eleutherinne Subaphylla, Leonureus heterophyllus, Andrographis Paniculata. [3]

The annual harvest amounts of some medicinal plants can be very high, for example: Angelica dahurica (157t (tones)), Polygonum multiflorum (28t), Ligusticum wallichii (37t), and Coix lachryma-jobi (178t).

Many plants can be used in curing common diseases, such as fever, cough, diarrhoea, and influenza.

Sometimes, the combination of traditional and modern medicines is very helpful in treating serious diseases, for example Artemisia annua for treating malaria, and Catharianthus roseus for treating blood cancer. Such achievements are usually developed by S&T institutes and pharmaceutical enterprises, the medicinal products of which are registered under their own trademarks.

b) The multiplication and production of seeds. This is usually done by farmers, mostly for their own use, and partly for exchange. They have the

implicit right to save seeds of new varieties for reproduction for subsequent use or exchange between them, without payment (royalty) to plant breeders.

c) Secrets. In the case of medicinal plants and traditional therapeutic methods, there are many cases in which the know-how still remains secret and held by an individual. Some people hold information and knowledge about a specific plant, its locality of growth, characteristics, therapeutic effects, processing method, use for treatment, etc.

d) Variations. In most cases, as traditional medicinal prescriptions usually contain a large number of ingredients, varying according to the conditions of the patient, one plant can be used in different prescriptions with various doses in combination with other plants, so that there are many prescriptions handed down from ancestors. Such "no-patent-needed, informal-but-recognized" knowledge helps its owner to gain income. The owner may be willing to share the product but not the secret itself. The owner is neither willing to register or to apply for patenting because he/she is afraid that the secret might be let on to other people.

In 1984, there was a decision of the Government (No 317/CP, 15-9-1984) on granting remuneration to people offering to make traditional prescriptions public, but the response was limited. Perhaps the proposed remuneration appeared too modest, in comparison with the income to be generated by traditional prescription to the "owner" of a prescription.

Meanwhile, the Government encourages and facilitates traditional medical practice by promulgating several regulations, such as the ordinance on "Private medical and pharmaceutical professional activities" (26L/CTN, 13-10-1993); the circular of the Ministry of Health dated 15-5-1993 on "Guiding the certification of speciality level on traditional pharmaceutics" (05/BYT-TT); the decision of the Ministry of Health of 12-3-1996 to enact the "Statute on assessing the safety and effectiveness of traditional medicines" (371/BYT-QD); and the decree on 24-1-1991 promulgating " "Regulations on diagnosis and treatment by traditional medicine" (23/HDBT).

The Viet Namese Traditional Medicine Association is playing a very active role in the country. By the decision 508/BYT-QD of the Ministry of Health on 6-9-1989, it has also the right to hold clinics.

It is worth mentioning that this valuable knowledge is disappearing at an alarming rate, together with the loss of landraces and the destruction of habitats. The deterioration of medicinal plant species in general, and precious ones especially, are due to large-scale deforestation and over harvesting. An herbalist-woman of the Muong nationality in Hoa binh Province sadly remarked that the disappearance of forests has caused the loss of many medicinal plants, which cannot be found in tree plantation

areas where fast growing species are cultivated. Her traditional knowledge could not be transmitted to her descendants, because there are no more plants to use. [3] The situation also illustrates the effects on both biodiversity and traditional knowledge of inadequate national policy and regulation.

There still are very few legislative efforts to manage and control the use of genetic resources and almost none on the protection of traditional knowledge

In Viet Nam, the protection of biological objects and methods originated simultaneously with the protection of invention, on the basis of the Government Decree on " Innovations for technical improvement and production rationalisation and on inventions " (31/CP, 23 – 1-1981), according to which:

- Biological methods, including gene modification, are considered inventions and are protected as such; all regulations on application procedures, protection requirements, protection form, and duration of protection of these objects are the same as for invention of other kinds.

- Some biological objects as may be used in agriculture (plant varieties, animal species) are not considered as objects of invention protection, but can be protected similarly. However, the procedures for granting this type of patents are somewhat different from the procedure for other kinds of inventions.

Protection requirements for plant varieties and animal species are: novelty, stability, uniformity and effectiveness.

Applications for protection of plant varieties and animal species are to be lodged with the Ministry of Agriculture. Here, they are subject to examination by the commission of varieties and species, which is responsible for management of new species used in culturing and cultivating. Applications are examined in procedures similar to that for invention application. The duration of examination is eighteen months, beginning on the official filing date.

To date, about 30 certificates have been granted for plant and animal species, of which 27 are plant varieties (rice: fourteen, maize: six, mulberry: two, sweet potato: two, tea: one, tomato: one, peanut: one) and three animal species (pig: one, silkworm: two). The use of these species in culturing practice, together with imported varieties and species, contribute to the development of agriculture in Viet Nam.

The regime for the protection of plant varieties and animal species seems to be outdated. The fact that only the State has the exclusive right to use varieties and species, and the author is granted only a symbolic remuneration, suits only a collectivised agriculture system inherent to a centrally

planned economy. In recent years, in parallel with the transition to a market economy, the objective of farmers has been to produce agricultural goods, and the very species used in agriculture have become a tradable good. In order to encourage creative activity in generating new valuable species, the same problem as that of invention in industry has to be solved.

Since plant and animal species are of a living nature, a completely different situation to invention in conventional industry, there should be specific terms in the protection regime for these species.

Normally, at the initial stage, the creator of a new species generates only a certain number of individuals of the new species. From the source, species are multiplied and supplied to the users (farmers). The objective of the users is to make product from the species obtained.

At times, however, the product of the species obtained from the creator becomes a new specie, thus limiting the role of the creator to a mere supplier. The more stable is the initial species and the easier the multiplication of species, the greater is the possibility that the user will alter the supplied species further. Right after the first harvest, the creator of species is already at risk of losing his position as sole supplier of such species, meaning he will have little chance to benefit from exploiting species in future harvests.

As a preliminary adjustment to the situation, we could refer to the Government Decree No 7-CP dated 5-2-1996 on seed varieties, raising productivity and quality and speeding the multiplication of seed varieties, in which :

a) The overall policy of the Government is to invest for building up the national capacity in conserving, selecting, producing and carrying on the business of seed varieties. (Article 4).

b) Plant genetic resources are considered national property and managed by the State. All organizations and individuals are encouraged to prospect, collect, preserve, utilize and enrich genetic resources for the benefit of the national economy and social welfare (Art. 8). The Ministry of Agriculture and Rural Development (MARD) is the main governmental body responsible for the State management of seed varieties.

c) The State encourages and protects the legal rights of all Viet Namese and Foreign organizations and individuals in their scientific research and business activities (Art.3) and facilitates international cooperation (Art.13) on seeds and breeder plants. Nevertheless, such activities should be licensed and put under the control of MARD (Art.14), and the technical process strictly followed (Art.11).

d) Newly produced, selected or imported seed varieties are subject to tests or pilot production before recognition and larger use (Art. 9).

e) Seed varieties as goods in the market should be sold under trademark, along with a certificate of quality. All illegal and unfair practices in production and trade of seed varieties are forbidden (Art.13).

f) The plant breeder owns the copyright on new seed varieties (Art.10).

Decree No.7-CP provides a legal framework for seed variety management, but at the same time shows a shortcoming in protecting traditional knowledge and ensuring equitable sharing of benefits derived from its use.

Viet Nam has ratified the Convention on Biodiversity (CBD) and is preparing to join the World Trade Organization (WTO). These associations imply the application of CBD and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)

There is a need to understand the contents of CBD and TRIPs, and to seek a way of elaborating a national legislative framework in this domain.

a) The three objectives of the CBD are the conservation of biological diversity, the sustainable use of biological resources, and the fair and equitable sharing of the benefits arising from the use of genetic resources (Art.1). The Convention obliges members to take various steps to conserve biodiversity within their jurisdictions, emphasizing in situ conservation and the role of traditional lifestyles and local communities (Art.8).

"Subject to its national legislation, each Contracting Party shall respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

While the CBD establishes the principle of fair and equitable sharing of benefits derived from the use of genetic resources, specific measures to facilitate benefit sharing are expected to be formulated at the national level, as stated in Art.15: *"Each Contracting Partly shall take legislative, administrative or policy measures with the aim of sharing in a fair and equitable way the results of research and development and the benefit arising from the commercial and other utilization of genetic resources".*

b) The TRIPs Agreement extends the international trade regime to intellectual property rights (IPRs) and obliges WTO members to provide at least a specified level of protection to all the generally recognized forms of IPRs.

The TRIPs provisions seek to globalise the dominant patent paradigm of developed countries at the expense of developing countries, be-

cause these provisions guarantee ownership rights to products made in the laboratories of developed countries, using the knowledge of indigenous peoples and local communities. Using this approach, only the industrial model of innovation is recognised. Meanwhile the cumulative collective system of innovation of traditional communities is excluded by definition in the TRIPs provisions. [4]

c) In 1978, the International Convention for the Protection of New Varieties of Plants (UPOV Convention) covered only the commercial marketing or sale of the protected variety's propagating material. Farmers thus had the "privilege" to use seeds derived from a first crop to plant a second crop, without paying the plant breeders' rights (PBRs) owner a second royalty fee. But the amended 1991 UPOV Convention theoretically extinguishes the farmers' privilege by extending PBRs to all uses (although it does allow member States to limit PBRs in their national legislation). The amended Convention also forbids the use of a protected variety to create a new variety, if the newly created variety contains virtually all of the original variety's genes.

d) The workshop on Traditional Knowledge and Biological Diversity, held in Madrid in November, 1997, highlighted the need to clarify the relationship between the WTO TRIPs Agreement and environmental conventions dealing with compensation to, or benefit-sharing with local communities involved in biodiversity conservation. [6]

e) Being aware of the conflicts between the CBD and the TRIPs Agreement, specialists from many countries, especially from developing countries, have been carrying out studies for bridging the gaps between CBD and TRIPs. [5]

Table 2. Patenting in TRIPs: compulsory and optional exclusion.

Compulsory exclusion	Optional exclusion
■ Inventions that are not new, do not involve an inventive step, or are incapable of industrial application.	■ Diagnostic, therapeutic and surgical methods for the treatment of humans or animals.
■ Failure to disclose the invention in a manner clear and complete enough to be carried out by a person skilled in the art.	■ Inventions, the prevention of the commercial exploitation of which is necessary to protect *ordre public* or morality.
	■ Animals and plants (including plant varieties).
	■ Essentially biological processes for the production of plants or animals.
	■ Failure to provide information concerning corresponding foreign applications and grants

Source: Graham Dutfield (5)

A likely and feasible option for countries may be to incorporate in national patent laws all the exclusions allowed by TRIPs (Table 1).

There are also other proposals in defence of biodiversity and indigenous knowledge. [5]

Mr. Gurdial Singh Nijjar has formulated a new definition of "innovations" which includes "... derivatives which utilize the knowledge of indigenous peoples and local communities in the commercialisation of any product as well as to a more sophisticated process for extracting, isolating, or synthesizing the active chemical in the biological extracts or composition used by the indigenous peoples".

The community should be declared the "owner" of knowledge. It should exercise complete control over the knowledge collectively, and hold it in trust for themselves as well as future generations. The community therefore holds this right as custodians or stewards and it is thus held in perpetuity. No use should be made of the knowledge, save with the consent of the community that is the custodian of this knowledge. Any use of that knowledge should be paid for by the user.

In Viet Nam, MARD is drafting legislation on the protection of new plant varieties. Since the draft regulation is not examined and approved yet, there is formal interpretation of its contents.

However, through workshops and discussions during the process of its elaboration, it will be desirable to reconcile the conflict between CBD and TRIPs, for example by recognizing the rights of the patent holder and at the same time, denying patents in different cases, such as: a) personal and non-commercial use of seed varieties; b) using the product of the harvest obtained by planting the protected variety, for propagating purposes on one's own holdings and c) using the protected material to develop new varieties and for scientific research.

But it would be necessary to mention that genetic resources are diverse according to their uses, and traditional knowledge are often be associated with particular genetic resources.

While there are conflicts between the CBD and the TRIPs Agreement, existing international legal instruments also provide a possible basis of fundamental principles upon which a national regulatory framework can be premised. For example, Agenda 21 and the Forest Principles, with the addition of a few references to local control over genetic resources associated with traditional knowledge could be used for that purpose. The 1996 International Covenant on Economic, Social and Cultural Rights, the 1996 International Covenant on Civil and Political Rights and the 1948 Universal Declaration on Human Rights [7] could also provide some guidance.

• In the Philippines, the President's Executive Order (PEO) was issued in 1995 for regulating biodiversity prospecting, which is defined as "the research, collection and utilisation of biological and genetic resources for purposes of applying the knowledge derived there from to scientific and/or commercial purposes." (President Executive Order No. 247, Appendix A).

The PEO requires that all biodiversity prospecting should be subject to the prior informed consent (PIC) of local and indigenous communities.

• In Costa Rica, the Legislative Assembly passed the Biodiversity Law in 1998, which is seen to date as the most ambitious and elaborate national law to implement the CBD. The overall objective of the Law is to conserve biodiversity, sustainably utilize resources and distribute fairly the derived benefits and costs. It covers a full range of issues, among which is the protection of scientific and traditional biodiversity-related knowledge through intellectual property rights and/or *sui generis* systems.

Developing countries have to create effective sui generis protections for plant varieties in 2000 (2006 for least developed countries).

Viet Nam will need to take advantage of the grace period allowed by TRIPs to devise appropriate IPR laws conforming to national interests.

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6. Bridges between Trade and Sustainable Development
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Annex

List of main Scientific Research Institutes related to Genetic Resources and Plant Varieties

1. Institute of Biotechnology
2. Institute of Oceanography
3. Institutes of Ecology and Biological Resources
4. Institute of Materia Medica
5. Food Crops Research Institute
6. National Institute of Animal Husbandry
7. Viet Nam Agricultural Science Institute
8. Forest Science Institute of Viet Nam
9. Institute of Agricultural Science of South Viet Nam
10. Cuu Long Delta Rice Research Institute
11. Rubber Research Institute
12. Tea Research Institute
13. Research Institute of Marine Products
14. Maize Research Institute
15. Honey Bee Research Center
16. National Institute for Soil and Fertilizers
17. Research Institute of Vegetable and Fruit
18. Institute of Veterinary Medicine
19. Institute of Agricultural Genetics

CHAPTER 5

ENVIRONMENTAL IMPACT REVIEW OF WTO AGREEMENTS —THE CASE OF VIET NAM

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Introduction

Viet Nam launched an open economy in 1986 under the Viet Namese Communist Party's "doimoi" program. This program has brought about progressive economic performance for over the last ten years. One of the main factors causing this economic success was Viet Nam's move to a market-oriented system and greater integration in multilateral talks. For instance, Viet Nam has been a member of Association of Southeast Asian Nations (ASEAN) since 1995, joined Asia-Pacific Economic Cooperation (APEC) in 1998, and is now actively negotiating for membership in the World Trade Organization (WTO).

The government of Viet Nam has been well aware that integration will bring about opportunities but at the same time, will also create challenges for the country's development. For example, integration enables domestic businesses to access advanced technology and management skills, provides favourable conditions for them to participate in world trade, and generates production quality and competitiveness. Integration, however, creates higher competition pressures for Viet Namese firms in both foreign and domestic markets. It is necessary that Viet Nam consider all possible positive and negative impacts of integration in general and from WTO membership in particular.

This paper has been prepared by the authors following a request by the United Nations Conference on Trade and Development (UNCTAD) for input to a United Nations Development Program project report, which focuses on the possible environmental effects of WTO agreements on Viet Nam's goods and services.

The paper contains four sections. The first section presents a summary of the integration process of Viet Nam during the last decade, which has been revealed in a policy of greater openness, foreign direct investment (FDI) promotion measures, and participation in several regional and international organisations and agreements. This section also gives evidence of impacts of this process on the economy in terms of trade expansion and economic development. The second section includes an analysis of the environmental impacts of integration and a description of the pos-

sible environmental impact when Viet Nam becomes a WTO member. The trade and environmental impacts of integration and WTO membership have been demonstrated in detail by way of some examples in section 3, where an analysis of impacts of WTO agreements in Viet Nam's five major exporting industries was undertaken. The paper concludes by making proposals for further studies and analyses of the possible environmental impacts of WTO agreements on Viet Nam's economy.

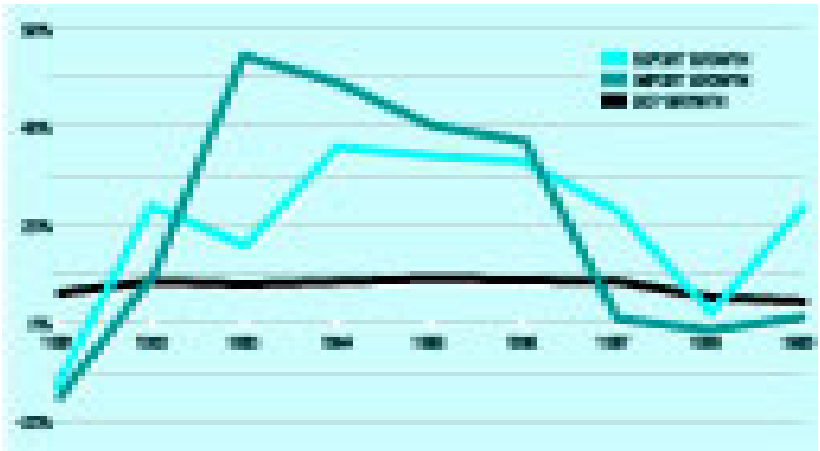
I. Process of International Integration of Viet Nam

In line with the common trend of globalisation over the last decade, Viet Nam has implemented a more open economic policy, gradually integrating into the regional and international economy.

The expansion of international trade has been one of the most important factors in Viet Nam's economic growth. As shown in figure 1, the impressive high growth rate during the period 1993-1996 in Viet Nam came with substantial export growth. Viet Nam currently trades with more than 100 countries in the world, with an average annual export growth rate of 20 percent. In terms of its share of Gross Domestic Product (GDP), export value contributes an important portion, which increased significantly: from 31 percent in 1990, to 36 percent in 1997, and 40 percent in 1999.

The more open economic policy has created opportunities for Viet Nam's domestic products to reach the world market. It has also helped increase flows of foreign currencies, boosting imports of materials necessary for domestic firms. It has also contributed to the increasingly competitive business environment, that in turn promoting the competitiveness of Viet Nam's products, reducing production costs and creating additional jobs.

Figure 1: Economic and Foreign Trade Performance During 1991-1999



After the GSO law on FDI promotion was promulgated in 1987, there was a boost in FDI inflows. By 1999 Viet Nam had granted 2,670 FDI projects, with total legal capital of US$ 35 billion. Foreign invested projects with more advanced technology and business management and market access possibility have made a considerable contribution to economic growth, increased export revenue, and improved the quality of "Made in Viet Nam" products.

The contribution of the FDI sector to GDP has grown rapidly, from two percent in 1991 to seven and half percent in 1995, and up to 10.4 per cent in 1999. Similarly, it contributes an increasing share of exports: five per cent, 22.8 per cent and 22.2 per cent in the same years. In addition, FDI projects have helped to transfer advanced technology to Viet Nam, including environmentally friendly technology. The FDI sector is attractive to Viet Namese workers. At present, more than 300,000 Viet Namese workers are employed by FDI projects.[1]

Viet Nam's international integration process is also revealed in the government's efforts in negotiating for its participation in regional and international organisations during the last decade. After gaining membership in the International Monetary Fund (IMF) in 1993 and signing a cooperation framework agreement with the European Union (EU) in 1995, Viet Nam became a full member of ASEAN and joined ASEAN's Free Trade Area (AFTA) in 1996, a member of APEC in 1998, and succeeded in negotiating a bilateral trade agreement with the United States of America (USA) and preparing conditions for joining the WTO. In doing so, it hopes to enjoy more favourable conditions for expanding foreign trade activities, and not to be isolated or discriminated against in international fora and negotiations. It is important to note that Viet Nam has joined many other regional and international non-economic organisations involved in public health care, sports, and environmental protection. This has helped to increase Viet Nam's prestige and position in international discussions, and given Viet Nam greater access to the benefits of global innovation.

In the integration process, Viet Nam hopes to gain the following main benefits:

- Help in mobilising foreign resources to accelerate economic growth and reforms, and learn valuable lessons for the transition to a market economy.
- Help in avoiding discrimination and unfair practices in international trade. As a participant in multilateral organisations, Viet Nam has a forum to lobby for better treatment for economies in transition or for less-developed economies;
- Provide favourable conditions for expanding international trade, exploiting Viet Nam's comparative advantages of low wages and natural resources and by promoting domestic markets at the same time. By promot-

ing foreign investment, Viet Nam can gain in terms of technology transfer, in the industrialisation and modernisation of the country.

- Accelerate the process of economic structural change and adjustment towards improving economic growth and economic efficiency. Integration can also push economic reforms in a more market-oriented direction, and towards a more effective institutional system.

Can Viet Nam realise these benefits? What obstacles does Viet Nam face in the integration process? This question has been discussed widely among government officials and policy-makers. In these discussions, the following themes are often repeated:

- First, Viet Nam embarked on the integration course when the country was at a very low level of development. Although GDP per capita grew substantially during the last ten years, Viet Nam remains among the poorest countries in the world and at the lowest development level among the ASEAN countries (see Table 1). According to UNDP's Human Development Report 1999 Viet Nam was ranked 110th among 174 countries in terms of the Human Development index (HDI), and at 51st among 92 countries in terms of per capita GDP.

- Second, Viet Nam's economic environment and competitiveness were ranked 49th among 53 countries according to the World Economic Forum (1999). Products of major industries in Viet Nam have very low international competitiveness (except for some product groups where Viet Nam has relatively static competitiveness such as rice, textiles, etc.). Industrial products are now largely protected by very high import tariffs and produced in the less competitive domestic environment. More importantly, tariffs are

Table 1. Rank of Human Development Indicator (HDI) and Hunger and Poverty Indicator (HPI) among ASEAN countries and China

	Longevity (year)	Illiteracy rate (per cent)	School enrolment rate (per cent)	GDP per capital (PPP$)	HDI Rank	HPI Rank
Singapore	77.1	91.4	73	28,464	22	-
Malaysia	72.0	85.7	65	8,140	56	18
Thailand	68.8	94.7	59	6,690	67	29
Philippines	68.3	94.6	82	3,520	77	20
Indonesia	65.1	85.0	64	3,490	105	46
Viet Nam	67.4	91.9	62	1,630	110	51
Myanmar	60.1	83.6	55	1,199	128	55
Cambodia	53.4	66.0	61	1,290	137	-
Laos	53.2	58.6	55	1,300	140	66
China	69.8	82.9	69	3,130	98	30

Source: UNDP, Human Development Report, Oxford University Press, 1999

often adjusted in response to requests by business enterprises, especially big state-owned enterprises (SOEs) and some joint ventures (JVs) with SOEs. This proves that Viet Nam has to confront tough conditions when it opens the economy and decides to integrate into the world market.

- Third, technology and equipment in almost all industries of Viet Nam are one or even two generations obsolete compared with developed countries and newly-industrialized countries (NICs). While the domestic saving rate of the economy is still low (16 -17 per cent of GDP in recent years), it will be difficult for Viet Nam to increase its product quality or reduce production costs in order to be more competitive in the world markets;

- Fourth, Viet Nam is far behind many countries in the process of economic integration. Potential domestic actors are still not efficiently mobilised by a market system. In particular, many domestic enterprises and firms are not yet aware of the integration trend, which requires them to make use of new opportunities and prepare to confront challenges. This will continue to bring about great obstacles for their survival in the context of globalisation. On the other side, the policy framework for economic integration at the macro-level is not yet well formulated, something that will be very important in helping to push domestic firms to compete in the international market.

- Fifth, Viet Nam is now in a transitional period towards a market economy. This means that market mechanisms have not been fully developed and well operated, while the formerly centrally-controlled mechanisms remain in place in many areas. It can be said that Viet Nam still has a dual economy, or as an expert from Harvard called it, a "dark and light economy". In order to become more integrated, Viet Nam must accelerate economic reforms and develop its legal framework in accordance with the international one (this includes the principles of non discrimination, transparent policy, sufficient information acquisition, etc.);

- Sixth, the legal framework of Viet Nam is underdeveloped, insufficient and less effective than it could be. Although the National Assembly of Viet Nam promulgated several laws and regulations during the last ten years, a lot of economic activities are not regulated at all (notably in services, technology transfer, property rights, etc.). This is likely to create problems and limit the international trade of Viet Namese goods and services. It can also lead to rent-seeking activities, which can cause harm to the long term interest of Viet Nam;

- Seventh, limited management skills of managers and poor knowledge on the part of officials can be another obstacle in the process of integration. In international negotiation, this could limit Viet Nam's capability to push for its interests.

In order to prepare for further integration and to be more active in this process, the Viet Namese government has been developing an integration agenda, including: i) studying the experience of other countries in

the process of integration; ii) developing an integration strategy for Viet Nam; iii) accelerating the reform process; iv) preparing and undertaking steps in bilateral and multinational negotiations; v) involving businesses in Viet Nam actively in the country's integration process; and vi) providing more information about integration, the globalisation process, etc[2].

2. Environmental Issues in the Integration Process and Possible Environmental Impacts of WTO Agreements

2.1. Environmental Issues in the Integration Process

The process of international integration in Viet Nam during the last decade has brought about both positive and negative impacts on the environment. The following positive environmental factors can be observed:

- Thanks to integration, especially FDI flows into Viet Nam, the country has been accessing more environmentally friendly and advanced technology. Many FDI projects brought the most up-to date technology, which tends to cause less pollution and use materials more effectively, particularly in the information and communication sector. According to recent investigations, most FDI projects were required to have systems for treating industrial wastes[3].

- By participating in regional and international organisations, Viet Nam can contribute its voice to environmental discussions, gain better access to information, benefit from recent knowledge on environmental protection and be more aware of the inter-relationship between trade and environment. Through integration, Viet Nam can also gain experience from other countries in maintaining harmony between increased international trade and environmental protection.

- Growing overseas development assistance (ODA) in environmental protection is another positive factor of the integration process. At present, 11 per cent of total ODA goes to so-called environmental projects. This helps Viet Nam in strengthening its environmental protection and at the same time, to settle urgent environmental issues such as industrial pollution, water resource quality improvement, environmental protection in coastal areas, forest rehabilitation, protection of endangered species, etc.

The international integration process can increase costs as well. The expansion of international trade during the last decade has brought about the following main environmental impacts:

- The main exports of Viet Nam are natural resources and semi-produced products. The export share of processed goods accounted for only 40 per cent in 1999, which is very low compared with other countries in the region. Among the main exports, in 1999 the crude oil export share was 17.5 per cent, the rice export share 9.6 per cent, marine products 8.5 per cent, and coffee 6 per cent. Among processed goods, the export share of textiles and garments was 14.6 per cent, footwear 12.2 per cent, and

electronics and electrical appliances 5 per cent of total exports. The figures indicate that international trade in Viet Nam is based mainly on natural resource extraction. In the process of industrialisation and trade expansion, there has been evidence of environmental impacts in some sectors of the economy where natural resources were over-exploited (for example, deforestation, over-fishing, and soil erosion).[4]

- Industrial development and expansion of international trade has brought increasing industrial pollution to Viet Nam, especially in industrial areas and large cities. The environment has deteriorated considerably in Ha Noi and Ho Chi Minh City during the last decade. Water pollution, air pollution, and solid wastes have had serious negative impacts on public health in the most populated areas, where some indicators of environmental quality are several times higher than the accepted norms. Reasons for this situation, apart from expanded economic activities, include other factors like the high concentration of industries in many areas; obsolete technology and equipment; poor infrastructure; poor awareness among the population about environmental protection; poor city and industrial zone planning, rural to urban migration; higher consumption of goods, etc.

- Imports to Viet Nam consist mainly of raw materials and semi-finished products. Imported technology comes mainly from Asian countries. Asia provides 65 -75 per cent of the value of total imports to Viet Nam. This implies that production technologies used in Viet Nam are not very advanced. In the FDI sector, there were cases where instead of bringing their most advanced and clean technology to Viet Nam, some foreign investors brought obsolete and polluting technology, already prohibited in their own country. Another issue is illegal imports of used machinery or out of date products, some of which have been prohibited for use in other countries.

- International integration, in the short run, will cause Viet Namese enterprises difficulties in penetrating world markets, especially those markets requiring high quality products at high environmental standards. Many developed countries apply very strict environmental rules (called "green trade barriers") on imported products. This is a big challenge for Viet Nam, whose domestic products are already less competitive than those of other countries in the region, and businesses face financial difficulties because of poor capital markets to invest in more environmentally friendly technology.

- Viet Nam launched its open economy and integration policy when its legal framework was still incomplete and law enforcement inadequate. Weak government control and low supervision of regulatory implementation have caused environmental damage in many cases. For example, during the last few years, government authorities disclosed several practices of illegal smuggling of rare and precious species and wanton forest destruction involving government officials.

The issue of balancing trade and environmental control in Viet Nam has been discussed in many seminars and conferences organised by Viet

Namese and international organisations over the past few years. A recurring finding is that environmental regulations and institutions do not go hand in hand with international trade policies. In many cases, environmental regulations and measures were only implemented after economic or trade activities had already caused serious environmental costs. Secondly, although an environmental protection law was promulgated in Viet Nam in 1993, many of the necessary regulations (concerning environmental monitoring systems, pollution charges, environmental funds, environmental management systems, etc.) have not yet been issued.

While integration is considered an indispensable process, Viet Nam should properly consider the impacts it would cause to the economy, including the environmental impacts.

2.2. Possible Environmental Impacts of WTO Agreements on Viet Nam

This section examines the possible environmental impacts of Viet Nam joining the WTO. It should, however, be noted that the examination is only the starting point for further discussions and investigations. It will look at the impacts at the macro rather than micro level.

The environmental impacts of WTO agreements can be seen in two aspects: first, they can be caused by the increase in international trade and second, WTO Agreements may have environmental aspects which may in turn have effects on Viet Nam.

a) Possible environmental impacts from a boom in international trade

Viet Nam would gain many benefits from being a WTO member. For example, first, Viet Namese businesses would enjoy low tariffs for imports and in turn, be able to reduce production costs, allowing them to expand their export markets. Second, export products and services would be treated equally with the products and services of other countries. Third, Viet Nam would participate in negotiations and push for the benefits enjoyed by other developing countries. In other words, it is expected that Viet Nam's international trade will experience a dramatic boom as a result of WTO membership. However, this process may also cause negative environmental effects like:

- Economic structures will change substantially toward a more efficient economy. Under higher competition pressure, some less competitive industries will disappear while other industries with their comparative and especially, competitive advantages will develop quickly. As an agricultural country, agricultural, marine fisheries and aquaculture sectors of Viet Nam will be downsized in qualitative terms, and will need to become more efficient and developed in quantitative terms. The export value of agricultural products will certainly increase. Other labour intensive industries like textiles, garments, footwear, etc. can also become more important when Viet Nam joins the WTO. However, development of these industries may cause some environmental damage.

One example is a switch to monoculture cash crops for exports, and more intensive farming methods, requiring a high level of fertiliser and pesticide use. This would lead to soil and groundwater quality degradation, pesticide residues on food, and poisoning agricultural workers. A recent analysis by Ministry of Science Technology and Environment (MOSTE) linked a high level of fertiliser and pesticide use on ground water degradation to effects on the health of farmers and communities. For example, in 1997 1,567 cases of pesticide-related poisonings in Viet Nam were recorded; 155 of the victims died.. , Eight hundred and nineteen were poisoned because of consuming foods containing pesticide residues, and another 748 people were affected by selling or using pesticides. In 1998, the total number of poisoning went up by 1.5 times, indicating the seriousness of the issue.

The expansion of agriculture both for cultivation of cash crops and for subsistence agriculture is likely to result in increased deforestation, destruction of wetlands and other protected areas. This practice has accelerated in recent years: forest cover in Viet Nam dropped from 40 per cent in 1948 to 28 per cent in 1995. In recent years, deforestation and destruction of wetlands and other protected areas have become more serious. (See table 2 below)

Table 2. Area of forest burned and damaged during 1995 - 1998

Unit: ha

Area of forest	1995	1996	1997	1998
Total	9,500,000	-	-	-
Area of burned forest	7,457	4,198	1,750	7,408
Area of destroyed forest	18,914	5,527	7,123	10,475

Source: General Statistical Office, 1998

Over-fishing and marine pollution is another environmental impact, resulting from a boom in marine product export, accompanied by the use of illegal or improper fishing methods (such as the use of dynamite or small mesh nets. See box below)

Another issue is the boom in aquaculture activities in coastal and wetland areas, which tend to destroy ecologically vital mangrove forests.[5]

ii. The boom in international trade will accompany faster industrialisation. Given the currently poor state of industrial infrastructure in Viet Nam, greater industrial activity will continue to cause serious industrial pollution. Industrial waste, water pollution, and air pollution are among the most serious problems. Together with strengthened industrialisation, Viet Nam will have to encourage foreign investors with more favourable, more transparent conditions. However, more intensive foreign investment will also increase environmental pollution. Some foreign investors may bring to Viet Nam less environment-friendly technology rather than clean technology, which will cause greater pollution.

Box. Stop Using Dynamite for Marine Fishing

Although the government of Viet Nam adopted a law on the protection and development of marine stocks, including a provision prohibiting using dynamite for extracting fish and other marine products, the authorities of many provinces of Viet Nam have discovered many cases of selling and using dynamite for this purpose. In 1999, 8,515 tons of dynamite and 1,155 mines were retrieved; more than 40 cases involving 135 people were tried in court on charges of trading, transporting or keeping those dangerous things. The practice of using dynamite materials for marine fishing in some coastal provinces like Thanh hoa, Nghean, Quangngai, Khanh Hoa and Thuathien-Hue, has exhausted marine fish stocks in some coastal areas. Those who fish using traditional methods have had to give up their jobs and find new livelihoods; the living conditions of many have become very difficult, as there are few other economic opportunities. Dynamite explosions create extremely high pressure on water that kills fish and other marine creatures.

Source: Nhan Dan Newspaper, Feb.22, 2000

iii) In the process of import expansion, some products banned as unsafe in other countries may be exported to Viet Nam without full information about their environmental and health risks. Because it lacks the information and infrastructure to adequately monitor and regulate trade in these products, Viet Nam may suffer the environmental costs and impacts of this practice on public health. The last few years have seen an increasing practice of smuggling pesticides, chemicals, pharmaceuticals, and colouring or dying materials that are prohibited in Viet Nam. Moreover, some out-dated foodstuffs have also been imported to Viet Nam, causing unexpected negative impacts on public health. More importantly in 1997, an investigation by the Institute of Nutrition and Sanitation showed that 60 per cent of total samples of fresh fruits imported from China contained chemicals at higher levels than allowed, or that have already been banned from use[6].

The list of environmental impacts from trade expansion as a result of WTO membership could grow, depending on how the country manages the link between trade and environment.

b) Possible impacts caused by environmental aspects under WTO agreements

As discussed earlier, Viet Nam is in the process of negotiating for membership in the WTO. Viet Nam applied for membership in January, 1995 and is now in the third stage of negotiation, namely trade policy clarification. By January, 2000 there had been three meetings between Viet Namese authorities and WTO representatives, who determined that Viet Nam has more or less completed this important stage. In 2000 and subsequent years, Viet Nam will start the next step: bilateral negotiations.

As a member of the WTO, Viet Nam will have to comply with both the basic principles and the many agreements made under the WTO (see Appendix 1 of this paper), including those related to environmental aspects. These principles and requirements in many cases cause significant impacts on the trade and environment of the member country. For example, principles articulated in Article XX of the WTO agreement may permit countries to impose environmental standards on their imports. Experience has shown that many countries, especially the developed ones, often use environmental requirements to limit imports to their countries. These requirements, which are addressed in point 1.3. of Appendix 1, will lead to major difficulties for Viet Nam in penetrating foreign markets. Many factors make Viet Nam vulnerable to the environmental aspects of the WTO agreements. These include:

- Given the fact that exports of agricultural and fishery products currently play an important role in Viet Nam's international trade, it is obvious that trade performance would be much affected if importing countries were to impose protectionist measures according to Article XX, or sanitary and phytosanitary measures (SPS) requirements on Viet Nam's products. The effects would be more serious when domestic producers' technology is very poor, and they are not well informed about the regulations and requirements of foreign customers.

- In many sectors, Viet Nam has potential in improving its trade competitiveness. However, lack of financial resources is an important issue, preventing Viet Namese investors from putting their money in more clean technologies to meet environmental norms in importing countries. The current legal framework (both macroeconomic and environmental) is not yet sufficiently developed to pre-empt difficulties and high transaction costs for foreign and domestic investors.

- Resource management and environmental policies in Viet Nam are still very weak. Viet Nam does not currently have resources to monitor or enforce environmental standards and requirements. There is a big gap between what is indicated in the laws and the real practice, especially given weak policy enforcement.

3. Trade Competitiveness of Five Selected Viet Namese Product Groups Under the WTO

The selected product groups for consideration are rice, coffee, marine fisheries and aquaculture, textiles and garments, and footwear. The reasons for our decision to examine their trade competitiveness under WTO agreements are: i) these product groups are considered the main exports of Viet Nam, which together account for about 50 per cent of total export value in 1999; ii) they are considered to be among Viet Nam's most internationally trade-competitive industries (without taking into account environmental impacts); iii) according to experiences from other countries, these products were considered most vulnerable to environmental requirements.

3.1. Rice

a. Rice exports

According to statistics, world rice exports have increased between 1996 (19.7 million tonnes), 1997 (18.8 million tonnes) and 1998 (27.4 million tonnes). The largest rice exporters today are the USA, Thailand, Viet Nam, India, Pakistan and Myanmar (Burma) , which together account for 80 per cent of total world rice exports. The main rice importers include Indonesia, the Philippines, Brazil, the EU, and Iran. Rice import markets can also be divided into two categories: one includes countries of Middle East and South America, Asia, and Africa, all having limited demand for rice imports. Another group of rice importers includes the EU, North America, Japan and Singapore, all with substantial demand including an expectation of high quality.

Over the last decade, rice production in Viet Nam has grown at 4.6 per cent annually. Currently, it has an area of about seven and half million ha for rice production, and is now the fifth largest rice producer in Asia and in the world. Rice production grew dramatically in recent years: from 26.4 million tonnes in 1996, 27.7 million tonnes in 1997 and 27.9 million tonnes in 1998, to 31 million tonnes in 1999. The yield of rice in Viet Nam is 10 per cent higher than the global average.

Viet Nam became a rice exporter in 1988 and is now the second largest rice exporter in the world, with export value increasing year by year (table 2). The main rice export markets for Viet Nam are Asia (33 per cent), Africa (46 per cent), Middle East (13 per cent) and America (8 per cent)

Table 3. Rice exports from Viet Nam

	1996	1997	1998	1999
Rice export				
(thousands of. tonnes)		3,500	3,750	4,200
(Million US$)	868	891	1,000	1,100

Source: GSO, 1999

It is expected that in 2000 and subsequent years, rice yields in Viet Nam will continue to rise, and that rice production could reach 35 million tonnes.

b. Current trade competitiveness of rice export

In comparison with Thailand, its main rice export competitor, Viet Nam has some advantages: i) rice yield in Viet Nam is 1.6 times higher than in Thailand; ii) on average, rice production costs in Viet Nam are less than in Thailand (US$220/ton in Viet Nam as compared with US$250 /ton in Thailand). However, because of lower quality, Viet Namese rice is sold at a lower price than Thai rice. During the last five years, the price of Viet Namese

exported rice was offered at US$265/ton on average, while Thai rice was offered at $352/ton.

In terms of static trade competitiveness, exported Viet Namese rice is internationally competitive. It has been estimated that in 2000, Viet Nam's rice export will continue to grow and may reach a record 4.5 million tonnes. However, the efficiency of increasing Viet Nam's rice exports, and whether Viet Nam should continue to expand land area for rice production, are open questions. It was estimated that in some areas farm households could earn 15 per cent more from vegetable or other crop production than from rice production. However, farmers cannot easily change the crops they produce, since the government wants to protect the food security program by maintaining a minimum level of rice production. In addition, if one takes into account other factors like distribution channels, processing technology, business opportunity, market reputation, consumer demand, etc., the competitive position of rice exports could change substantially.

According to a recent study, the main reason for the low quality of Viet Nam's rice exports was obsolete processing technologies. This means that in order to expand export markets to the US or EU, Viet Nam needs to invest more in improved rice processing technology. Of course, the additional investment would therefore cause an increase in production costs.

According to a recent study conducted by the Ministry of Agriculture and Rural Development (MARD), the processing costs of export rice (for long grain, 5-10 per cent broken grade) is about US$10/ton for milling paddy into polished rice, and about US$6/ ton for milling raw rice into polished rice. Of the total cost, equipment/machinery depreciation accounts for about 23 per cent. However, investment in a new processing technology is estimated to increase the depreciation cost by 2-3 times, which would make the processing cost per ton of export rice increase substantially.

c. Potential impacts on trade competitiveness of rice export under WTO agreements

As discussed above, joining the WTO means that a Viet Namese export industry would face strong competition from other countries because of the removal of protective tariffs. Other member countries might use WTO provisions (like Article XX) to establish "legal" technical barriers to trade (TBT) to prevent exports of Viet Namese rice from entering their country. Such TBTs can be interpreted as "necessary measures" to protect, for example, human health. Often, disagreements over the limits of such rules need to be tested by WTO dispute settlement mechanism, but Viet Nam is likely to be wary of going to disputes.

Should Viet Nam continue to increase the quantity of its rice exports, or should it focus more on increasing the quality of rice in the near future? The former approach would require Viet Nam to expand the area

under rice cultivation, or increase rice yields. However, this would possibly bring about negative environmental impacts including deforestation or overuse of fertilisers or pesticides. At present, the average annual use of fertiliser and pesticides per hectare of rice cultivation in Viet Nam is 313 kg and 4.1 kg respectively, which is lower than in other Asian countries. However, in some areas like the Mekong River delta and the North East, the level of fertiliser and pesticides use is much higher than the average (about 400 kg of fertiliser, for example); this trend continues to increase. This practice, in its turn, will have a negative impact on soil erosion, farmers' health, etc. and on rice yield as well.

As to the option of improving the quality of rice, given the fact that the current quality of exported rice is relatively low, it is important for Viet Nam to consider investing in post harvest technology that would bring about higher value-added to rice exports.

In addition, Viet Nam should pay attention to controlling the use of chemicals (especially pesticides) in planting and processing rice, to avoid the application of TBTs by importing countries.

Another measure to improve the export quality of rice is to extend genetic technology to rice production. At present, the rice research institute in Can Tho province is working on improving rice genes, allowing not only an increase in the harvest, but also an increase in rice quality. Pilot projects implemented in some provinces of Southern Viet Nam have revealed very positive results. This practice is expected to be adapted and expanded to other provinces in Viet Nam in coming years.

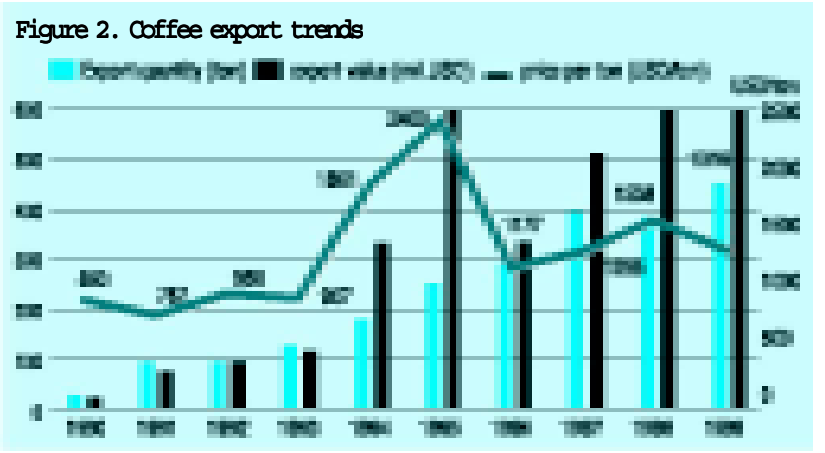
3.2. Coffee

a. Current situation of coffee exports

In 1980 Viet Nam had only 22,000 ha under coffee plantations. This area grew very rapidly during the last decade. The area under coffee plantation was 119,000 ha in 1990, which yielded 92,000 tonnes of coffee. By 1998 this area had increased by more than three times, reaching 370,000 ha with production output at 409,000 tonnes. In 1999, the figures were reported at 385,000 ha and 480,000 tonnes respectively. Viet Nam is now the fourth largest coffee producer in the world, and the largest in the region. Coffee plantation in Viet Nam is concentrated mainly in upland and mountainous areas of Tay Nguyen, which contains 80 per cent of total coffee plantation areas.

Viet Nam exports 90-95 per cent of its coffee production, mainly in green bean or semi-processed forms. Trends in coffee exports during the last decade are illustrated in figure 2 below, and indicate that although exports of coffee have grown steadily in quantity, its value has been subject to world price fluctuations.

Figure 2. Coffee export trends



Source: GSO, 1995-1999

Viet Namese coffee from the 1998/1999 harvest was exported to 52 countries and territories in the world, among which the export share to Germany accounted for 16.7 per cent, to the USA 15.8 per cent, to Italy 10.4 per cent, and to France 7.9 per cent. Export of coffee to ASEAN countries is currently limited to only 2.7 per cent of total exports.

b. Current international competitiveness situation

Generally speaking, Viet Nam's coffee can be considered internationally competitive not only because of its high growth and good yield, but also because of its relatively good quality. In terms of crop production, the average yield of coffee in Viet Nam is three times higher than the world average. In terms of production costs in Viet Nam, it costs approximately US$650-700 for one tonne of coffee, while the cost is US$1,412 in India, US$2,118 in Colombia, US$922 in Indonesia, etc. To ensure its export quality, the Standardisation Committee reviewed TCVN 4193-86 (Viet Nam's Standard) in 1993, and promulgated the new TCVN 4193-93 for green coffee. The methods for measuring moisture of green coffee and defining caffeine content were also established.

c. Potential impacts on trade competitiveness of coffee exports under WTO agreements

As with rice, coffee exports from Viet Nam could be affected by TBT and SPS requirements applied by importing countries. Some problems in coffee processing should be settled; for example: i) harvesting immature coffee cherries; ii) the drying process is sometimes undertaken on the ground, giving the coffee an unpleasant smell; iii) water is not replaced in time during wet processing, or coffee cherries are not processed in time, leading to an unpleasant smell; iv) moisture control in coffee storage and transportation must be addressed, in order to prevent mould formation; v) product packaging must be optimised.

Also, according to a survey conducted by Viet Nam's Coffee General Corporation, the costs for primary processing of coffee cherries usually accounts for 15-20 per cent of the selling price to the export company.

These problems need to be properly considered even before Viet Nam becomes a WTO member in order to increase its coffee quality. However, the industry will need substantial investment and funds in order to undertake measures to improve the quality of coffee exported. According to Viet Nam's Coffee Production Association, the problems cannot all be solved immediately, but rather will be settled gradually with foreign assistance (FDI, ODA etc.). Currently, some coffee processing projects have been implemented in Daclac and Lamdong provinces with the help of FDI. With an investment in advanced technology, they have been able to export their product to "difficult" customers in European markets.

Apart from the above-mentioned impact, there is a potential environmental effect from the expansion of coffee plantation areas as a result of a boom in the coffee trade under WTO membership. Currently, coffee production is considered to be an industry providing substantial profits. However, as coffee production develops both in terms of number of coffee producers and exporters, the marginal profit of this activity will decrease.

In many mountain provinces of Viet Nam (like Daclac and Lam Dong) there has been a tendency of shifting from tea and other crops to coffee plantation, and cutting/destroying forests for this purpose. Local residents anticipated that coffee production would bring more profits, but did not foresee the potential environmental impact of their activities such as flooding destruction of large residential areas downstream. Soil erosion and ground water exhaustion are other possible environmental effects, which in turn have a negative impact on coffee plantation and yields.

3.3. Marine and Aquaculture Products

a) Current production and export situation

The marine fisheries and aquaculture industries of Viet Nam have grown continuously during the last decade. The production from marine fishing increased from 679,000 tonnes in 1990 to 1,137,000 tonnes in 1998. It is estimated that the potential for increasing marine fishing is still high, which could allow production to reach a record 1,670,000 tonnes. The capacity of the marine fishing industry improved from 724,000 CV to 2,428,000 CV[7] during the same period 1990-1998. However, the problem now is the depletion of stocks near the coast, which requires investment in larger fishing vessels in order to move offshore.

Production from the aquaculture industry has grown from 307,000 tonnes in 1990 to 538,000 tonnes in 1998. Production is expected to reach a record 750,000 tonnes in 2000. The area for aquaculture expanded from 492,000 ha to 627,000 ha during the same period and is expected to reach 630,000 ha in 2000. Although the aquaculture industry

has grown at an average of 4 -5 per cent annually, the yield of this industry is still low compared with other countries. The main aquaculture products of Viet Nam are shrimp and prawns, which account for about 80 per cent of total production.

The marine and aquaculture processing industry in Viet Nam developed dramatically during the past few years. Eighty per cent of processing plants locate in the South of Viet Nam, and more than 80 per cent of their number are state-owned companies. Of total production, 70 per cent is exported and the rest is for domestic consumption. The total value of marine and aquaculture exports grew from US$239 thousands in 1990 to US$96 million in 1995, and reached nearly US$1 billion in 1999. Export markets of this industry include 58 countries and territories, of which the EU receives a 25 per cent share, Japan 40 per cent and other ASEAN countries 10 per cent of total export value.

b) Current international competitiveness situation

With annual growth of 12 per cent, the marine fishery and aquaculture industries have shown their potential for international competitiveness. The advantages for this development include the following factors:

- Viet Nam has a long coast, 3,200 km in length, and many rivers and ponds which are favourable for both fishing and aquaculture;
- various tropical marine species;
- tropical climate with many high valued species; and
- tremendous potential for developing the aquaculture industry.

However, the industry is currently facing many challenges. The success of this industry's development depends on the sustainability of marine stocks and the continued development of aquaculture activities.

Marine fishing activities in Viet Nam are generally conducted close to the coast (in-shore fishing accounts for about 90 per cent of the total volume of extracted marine fish). The stock of marine resource in these areas grew smaller in recent years as a result of intensive fishing activities by many companies. Moreover, there have been cases of using dynamite that killed many species in coastal areas. Uncontrolled shrimp cultivation in wetland and coastal provinces of Viet Nam in recent years has also caused depletion of stocks of wild species, and harmed wetland quality.

c) Potential impacts on trade competitiveness of marine fisheries and aquaculture export under WTO agreements

WTO member countries may apply SPS requirements against marine and aquaculture products based on relatively poor technology in processing and poor storage conditions in Viet Nam's marine and aquaculture industry. The industry needs huge investment in order to improve the level of technology, to improve the quality of products, and to reorganise quality control to meet requirements of foreign customers. Some joint ventures

in this industry have invested in advanced technology for processing seafood products, while most seafood processing operations are state-owned, and are still in a state of obsolete technology. In recent years, the Ministry of Fishery has received investment capital of 130 billion VND (equivalent to US$9.3 million) annually. It is estimated that in order to innovate equipment and technology the industry requires approximately (US$50 million).

In order to develop exports of marine and aquaculture products, Viet Nam needs to undertake measures to maintain marine stocks and to ensure the sustainable development of aquaculture. First, the government should motivate fishing companies to invest in larger vehicles for longer-distance fishing and at the same time, undertake necessary measures to control the quantity of marine fish extraction. During the last two years the fishing companies have received preferential credits in the amount of 76.7 billion VND for 256 long distance fishing projects. This amount was spent on the acquisition of 678 new fishing vessels with higher capacity, which has allowed increased harvest and production.

Secondly, Viet Nam has issued policies and regulations on marine stock protection (Decree on protection and development of marine stock, April/1989; Circular No 1/1998/CT-TTg on prohibition of using explosive materials, dynamite or other toxic for marine extraction); however, enforcement of such policies is low. It is important for Viet Nam to enhance enforcement of such policies in the future.

Third, there must be more policies and measures to prevent pollution of coastal areas and to protect wetlands. In this regard, a sustainable development plan for marine production and aquaculture must be developed.

3.4. Textiles and Garments

a) Current production and export situation

The textile and garment industry accounts for an increasing share of Viet Nam's total industrial production output. In 1996 its share was 10 per cent of the country's industrial production; this grew to 12 per cent in 1999[8]. The industry has shown impressive growth at an average rate of 11 per cent every year in recent years. Export value multiplied 7.8 times during the last decade, from US$215 million in 1990 to US$1,682 million in 1999, accounting for about 15 per cent of total export value. The textile and garment industry is relatively labour intensive and provides about 500,000 jobs[9]. The main markets for Viet Nam's textiles and garments are the EU and Asian countries; the USA market became more important in 1999.

b) Current international competitiveness situation

Although the industry has demonstrated progressive performance, its activities and structure reflect uncertain competitiveness. In the process of integration, the industry has encountered difficulties in competing with other countries in region. For example:

Table 4. Comparison of worker's salary in textile and garment industries among selected Asian countries

Unit: USD/year

Year	Viet Nam	China	Indonesia	Malaysia	Korea	Taiwan	Singapore
1995	450	500	930	3,810	12,930	11,620	11,190
1996	550	540	940	3,990	12,700	11,460	11,430
1997	650	550	890	3,840	11,230	11,120	10,890
1998*	690	570	330	2,870	7,820	10,260	10,210

*Note: * As a result of regional financial crisis*

Source: Review of Industrial Competitiveness of Viet Nam, 1999

■ In production costs: in 1995, the average salary per worker in this industry was much lower than that of China. However, in 1999 this figure became 20 per cent higher than that of China. Especially during the Asian financial crisis, production costs in this industry became higher than neighbouring countries like Indonesia and Thailand (Table 4).

■ In labour productivity: Viet Nam's productivity in terms of value added per worker in USD is lower when compared with other competitors like Taiwan, Korea, Singapore, etc., but at the same level compared with China (Table 5).

Table 5. Comparision of value added by workers in textile and garment industries among selected Asian countries

(in comparative price -USD)

Year	Viet Nam	China	Indonesia	Malaysia	Korea	Taiwan	Singapore
1995	1,380	1,490	3,900	9,890	37,870	20,300	16,230
1996	1,720	1,490	4,000	10,450	37,210	22,500	16,270
1997	1,720	1,650	3,700	10,700	33,160	22,900	16,190
1998*	1,770	1,760	1,100	7,980	20,510	21,100	15,560

*Note: * As a result of regional financial crisis*

Source: Review of Industrial Competitiveness of Viet Nam, 1999

■ In equipment and technology capacity: equipment availability and technological level of the industry in Viet Nam is much lower than in other countries. Viet Nam's textile and garment industry's equipment is 5-7 years less advanced and its technology is 15-20 years obsolete compared with Thailand or China. In the textile industry, 50 per cent of equipment has been in use for over 20 years with very outdated technology. In the garment industry, however, equipment has been renewed during the last ten years.

The above factors indicate that when Viet Nam becomes a WTO member, the situation of the industry's trade competitiveness will change substantially. More importantly, there still are some crucial structural problems in this industry. The textile industry has very poor equipment and machinery, and has to import 90 per cent of its input for production. This industry's products are of low quality, with the result that they often cannot meet export quality requirements. As a result, 70 per cent of output is

sold domestically. Meanwhile, the garment industry was well invested during the last decade with comparatively advanced technology. However, the industry is mainly processing for exports (about 90 per cent of its production) according to foreign customers' designs and with imported input materials, which means that Viet Nam gains only limited value added from garment processing. Some foreign partners, after they receive the finished garment products, will re-export to other developed countries.

c) Potential impacts on trade competitiveness of garment and textile products under WTO agreements

As described above, the garment and textile industry of Viet Nam is currently facing competitive pressures, even when Viet Nam is not yet a WTO member. This means that in order to ensure its competitive position in the world market, this industry needs a huge investment in technological innovation. Viet Namese firms have to try to access foreign markets directly. The most important issue is to invest in the textile industry to improve quality of products and to meet requirements of the global garment industry. As a WTO member, Viet Nam will enjoy the same most-favoured nation (MFN) conditions as other competitors. However, according to WTO agreements, the member countries can apply TBTs to ban export of Viet Namese products to their countries.

Another factor affecting the trade competitiveness of Viet Nam's textile and garment exports is China. China is the largest garment and textile export competitor for Viet Nam. With its less advanced technology and less developed industry, Viet Nam will face difficulties in competing with China's textile and garment exports when both countries become WTO members. As mentioned above, the development of the textile and garment industry in Viet Nam has been based on production/technology rather than on market/efficiency. For a labour intensive industry, efficiency should be given more attention.

Another disadvantage of the Viet Namese textile and garment industry as compared with China is its dependency on foreign partners in penetrating world markets. This can be seen in the fact that many garment exporters satisfy quality requirements, but are not dynamic enough in finding new partners, due to a lack of understanding about international markets as well as limited application of new designs and new products.

Regarding environmental impacts as a result of the garment and textile industry's development, it is expected that the textile industry will receive greater investment in the near future. The industry's objective is to increase value added and improve international competitiveness by reducing its dependency on foreign markets for input materials. The rapid development of the textile industry, however, is likely to bring about increasing wastewater pollution. In order to prevent this potential environmental impact, a strategic development plan for the textile industry must be set up including such measures as applying cleaner production tech-

nologies, more strict supervision over environmental quality control systems, etc. In Ho Chi Minh City for example, a UNIDO program on mitigation of industrial pollution was undertaken whereby cleaner production programs were implemented in 2 textile factories. As a result, these factories not only made significant improvements in terms of wastewater pollution impact, but also came up with cost effective results (production costs reduced by 10-15 per cent). The main thrust of cleaner production technology is to apply measures to prevent potential causes of industrial pollution rather to invest in treatment equipment, which usually requires huge investments.

3.5. Leather and Footwear

a) Current situation of production and export

The leather and footwear industry experienced rapid growth in recent years. In 1997, it produced 168 million pairs of shoes, an increase of 34 per cent from the previous year; other leather products recorded a growth rate of 20 per cent or 4,900 tonnes. The export share of the industry continuously increased from US$296 million in 1995 to US$1,031 million in 1998, and reached a record of US$1,400 million in 1999. Leather and footwear products from Viet Nam are exported mainly to Europe, with a share of 63 per cent in 1998 and 69 per cent in 1999. Viet Nam is ranked third (after China and Indonesia) in exports of leather and footwear. The industry currently employs about three hundred thousand workers.

b) Current international competitiveness situation

With the advantage of low labour costs, the industry is considered potentially competitive. However, this trade competitiveness is not stable, given the fact that it depends very much on foreign markets for both the industry's inputs and outputs. According to a CIEM estimate, 60 per cent of inputs required for the leather and footwear industry are imported, which means that the performance of the industry is very much affected by other countries' economic situations. On the other hand, Viet Namese footwear producers do not export their products directly. They usually have to rely on the traders of other NICs to help find customers for their products in international markets. Moreover, Viet Nam lacks qualified technicians and designers working in the area. All these factors will limit value added potential to the footwear industry in Viet Nam.

c) Potential impacts on trade competitiveness of leather and footwear products under WTO agreements

As discussed earlier, the footwear industry of Viet Nam is considered to be potentially competitive. The Viet Nam's Union of Leather and Footwear Corporation expected that in the year 2000, exports of these products could reach a record US$2 billion. Because of its dependency on foreign input materials, if Viet Nam continues to depend on foreign input suppliers, the trade impacts under WTO agreements will not be obvious.

However, in its development strategy, greater value added for the industry will depend on substituting imported with domestically made materials. This is a potential issue when Viet Nam becomes a WTO member The possibility exists that European countries, for example - the main importers of Viet Namese leather and footwear products - would ban imports from Viet Nam for high chemical content in leather. Alternatively, they could apply regulations relating to dyestuffs in leather.

4. Conclusions and Policy Recommendations

4.1. Conclusions

Viet Nam is one of the transitional economies where environmental degradation has occurred as a result of rapid economic growth, international trade liberalisation and integration. While international integration has brought the country positive impacts that contributed to the impressive economic performance during the last decade, this process has also caused negative environmental impacts like deforestation, increasing industrial pollution, overuse of natural resources, etc. It would appear that the trade-off between international trade expansion and environmental protection is already being experienced. An underdeveloped and ineffective legal environmental framework, a poor environmental protection system, and limited institutional capacity are also important factors confronting Viet Nam in the process of international integration and ensuring sustainable development.

In the economic development strategy for the next decade, it was clearly indicated that Viet Nam would accelerate the process of economic integration into the world economy and continue negotiation for WTO membership. However, Viet Nam should consider the impacts this process would have on the national economy, and carry out necessary policy measures in order to be well prepared before it becomes a member of this organisation. The policy measures can include the following:

4.2. Recommendations

a) Recommendations at macro level

- Institutional reform and improvement is one of the most important areas to which the Viet Namese government should pay attention in the integration process. In order to be accepted in an international organisation like the WTO, a member country must satisfy certain basic requirements. These relate not only to physical infrastructure like transportation, communications, technology, etc., but also to other areas, including the regulatory and institutional frameworks. These requirements ensure that when the country becomes a member, its regulations are stable, equitable, transparent and consistent with international regulations.

- Capacity strengthening is another key issue for Viet Nam in the process of integration. There are many aspects to this issue. For example, i) there is an urgent need to train Viet Namese officials and experts working in the

area of international trade and integration on issues of trade and environment, to study and understand other countries' regulations and requirements relating to trade and environment. This would give them sufficient knowledge to work for the country's interests within the international frameworks, and avoid making decisions that might harm domestic producers and consumers; ii) it is very important to improve the infrastructure to inspect and control quality of exports and imports in order to meet other countries' requirements, as well as to implement the necessary sanitary measures in protecting public health. On one hand this measure enables Viet Nam to avoid foreign SPS measures that could be imposed on its exports of agricultural products and foodstuffs; on the other hand, it could help to ban imports of products which could cause harm to domestic customers.

- The existing trade and environment legal framework of Viet Nam should be examined, to identify areas to improve regulations so they comply with WTO regulations.

- In order to undertake the above measures, Viet Nam will need technical assistance and transfer from international organisations. Viet Nam should work closely with UNCTAD and WTO working groups on trade and environment, to identify priority issues. It will be useful to learn the experience of other developing countries in preparation for WTO membership (here, China's experience could be useful). In addition, it can also encourage developed countries to fulfil their Agenda 21 promises to provide additional financial and technical resources through environmental friendly projects to be carried out in Viet Nam.

b) Policy recommendations to ensure sustainable development of Viet Namese industries in the context of integration, and to assist exporting industries to meet environmental requirements of importing countries

- The government should undertake policies to promote industries to invest in environmental friendly technology and clean production, and consider the possibility of applying appropriate instruments to ensure industries comply with environmental regulations. However, there is currently a fear that this measure would reduce the industry's competitiveness in the world market. The argument is that environmentally friendly technologies are generally produced in developed countries and are not appropriate for developing countries or will entail high costs. This argument can be countered by the fact that some successful clean production projects with international assistance have proved to bring about benefits and profits to enterprises in Viet Nam, by reducing inputs and increasing production efficiency. As Viet Namese businesses are currently facing competition pressure, they will be forced to upgrade technology in many sectors for purely economic reasons. This will provide an opportunity to incorporate environmentally friendly technology on a larger scale.

- Encourage industries to adopt International Standard Organisation (ISO 14001) and eco-labelling for products relating to the environment, by providing the necessary information about this system. In order to do so, the industries should work actively with ISO and related international organisations to seek their technical assistance.

- Small and medium scale industries in Viet Nam face special difficulties in adopting environmentally friendly technology and/or ISO 14000. In terms of export, SMEs in Viet Nam account for about 34 per cent of export value and play a very important role in the economy. However, given many disadvantages as compared with large enterprises, SMEs in Viet Nam have fewer incentives to implement cleaner production methods. In addition, Small and Medium Enterprises (SMEs) in Viet Nam are not well aware of environmental regulations and international standards, making it more difficult for them to access the world market, especially when Viet Nam becomes a WTO member. In this regard, there must be specific measures (both technical and financial) to assist SMEs to integrate in world markets. Many developing countries have experience in encouraging SMEs to develop in an environmentally sustainable ways, from which Viet Nam could draw lessons.

- Industries that are most likely to suffer from WTO membership should analyse the possible impacts on their international competitiveness, including impacts caused by environmental aspects of WTO agreements. This could enable them to develop their own strategy and prepare responses to mitigate these impacts.

ANNEX

WTO and Its Basic Regulations

The WTO was formally established on 1st January 1995 following the General Agreement on Tariffs and Trade (GATT) 1947-1995, and as the result of the Uruguay Round of negotiations. At the time of its establishment, 128 countries and territories were WTO members. There are now 135 member countries, and another 30 countries have applied or are negotiating for membership.

During the life cycle of the GATT, world trade grew by 15 times in quantity and by 66 times in trade value, and reached a record of about US$5,000 billion annually. The WTO plays a key role in the world economy. It aims to promote the improvement of the investment environment and trade exchange among countries, create new jobs and accelerate economic growth. One of the basic principles of the WTO is to abolish discrimination in world trade.

The WTO is an institution of the multilateral trading system and carries out the following functions:

- First, it manages and supervises 28 multilateral and plurilateral agreements which form the framework the WTO Agreement;
- Second, it operates as a forum for a series of multilateral trade negotiations;
- Third, it operates as an organisation to solve trade disputes among its member countries;
- Fourth, the WTO examines and approves the trade policies of its member countries;
- Fifth, the WTO cooperates with related large international organisations on issues of management of global trade;
- Finally, the organisation assists developing and transitional economies in helping them to realize the potential benefits of the multilateral trading system.

The operation of the WTO is based on a comprehensive series of regulations and rules relating to many aspects of trade. However, all the regulations and rules of the WTO follow basic principles.

A. Basic principles of WTO

- MFN means that WTO members must apply the same trading conditions to all fellow members. If a country reduces its tariff for one nation, the same tariff reduction must be also applied to all other WTO members.

- National treatment (NT) requires an equal treatment (non discriminatory) of domestic or imported goods and services, which means that imported goods may not be discriminated against in favour of domestic goods with respect to external taxes and duties, technical directions, etc.

- Trade of the country must be progressively liberalised through negotiations. This means that once a trade or non-trade barrier has been reduced or abolished, it cannot be increased or re-applied again by the country.
- Predictability: the trade policy of the member country must be transparent and clear to all WTO members. Any change in a member's trade policy must be well communicated to other member countries in advance.
- Creating competitive and fair environment means that the WTO promotes fair trade competition between its members; application by a country of trade biases like dumping, export price subsidies or technical restriction should be punished.
- Preferable conditions for developing countries. This principle allows WTO developing country members some exceptional conditions and rights not to comply with some obligations, or to delay aspects of implementation for a certain time.

B. WTO's regulatory framework

The regulatory framework of the WTO is made up of several parts. The core is the GATT, which contains the basic trading policy rules and principles for the trading of goods. There are also other new regulatory systems established after the WTO's formulation, namely the General Agreement on trade in services (GATS), and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), which contains minimum standards for various intellectual property rights (patents, copyrights, trade marks, etc.).

For a country, foreign trade is subjected to a range of trade policy measures which can be divided into tariff and non-tariff trading barriers. However, GATT agreements require member countries to reduce their tariffs and to abolish application of protectionist measures through non-trade barriers (quotas, import regulations, product standards, anti-dumping regulations, domestic subsidies, etc.). In particular:

- The TBT agreement regulates the creation and application of technical directions and standards, plus the procedure for determining compliance with technical regulations (certification, accreditation). According to this agreement, technical regulations must not create unnecessary obstacles to international trade. Nor shall they be more restrictive to trade than that which is necessary to meet legitimate aims. These include both health and environment protection.
- The SPS agreement came into effect through negotiation at the Uruguay Round, and contains regulations on health and safety directives which cover the trade of foodstuffs, animals and plants. According to the SPS agreement, these measures must be based on scientific principles, and may not be upheld without adequate scientific evidence. Moreover, such measures must be based on international standards, guidelines and recommendations where such exist. Higher national demands than those established by these organisations are permitted if they are based on scientific grounds and internationally- recognised risk assessment methods.

- The Agreement on Trade Related Investment Measures (TRIMs) was discussed at the Uruguay Round, and prevents members from applying investment measures that violate national treatment principles and limit trade of goods. These measures can, for example, require a share of domestically-produced components in investment projects, or measures requiring enterprises to balance exports and imports in terms of their value.
- The General Agreement on Trade in Services (GATS) was discussed for the first time at the Uruguay Round. GATS aims at accelerating trade liberalisation in services among countries, and requires member countries to commit to open their markets for services by abolishing restrictions over the importation of services. Foreign service suppliers are to be treated on an equal basis with domestic suppliers (i.e. the national treatment principle). GATS excludes some kinds of services that are considered the functions of the country's government (that is when the government is the only supplier of the service).
- The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) came into force on 1 January 1995. According to TRIPs, whilst members are required to implement the provisions of TRIPs, more extensive protection and enforcement of intellectual property rights (IPRs) are not precluded. The subject matter of TRIPs is licences and other licence-related rights, product labelling, innovation, protection of secret information, etc. The main principles of TRIPs are national treatment and most-favoured nation. However, there are also some exceptions that member countries can rely upon for failure to comply with TRIPs obligations.

C. Environmental aspects in the existing WTO agreements

Consideration of the relationship between trade and environment has held an important place in the WTO for some time. A Ministerial Declaration at the Marrakech meeting established the Committee on Trade and Environment (CTE) with a broad mandate to examine the relationship between trade and environment in the multilateral trading system. The CTE has the responsibility to identify the relationship between trade measures and environmental measures to promote sustainable development, and to make recommendations on whether modifications to the provisions of the multilateral trading system are needed in order to meet environmental objectives. The CTE has developed an agenda of ten issues that address many aspects of environmental provisions in WTO agreements. These provisions are important to developing countries, including LDCs in many cases; they affect both environmental policy and market access. The environmental aspects of existing WTO agreements are reflected in five agreements: Article XX of GATT 1994; the Agreement on TBT; the SPS; the agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) and the Agreement on Subsidies and Countervailing Measures (SCM).

I) Article XX of GATT 1994 allows WTO members to impose measures that would otherwise contravene their WTO obligations where, among

other things; they are "necessary for the protection of human, animal or plant life or health" (Ex.) or "relating to the conservation of exhaustible natural resources" (Ex.). Article XX provides the overall guideline that these measures must not, be applied in a manner that causes "arbitrary or unjustifiable discrimination between countries where the same conditions prevail," or causes "disguised restrictions on international trade".

The terms quoted above have been the subject of repeated consideration, interpretation, controversy and concern. No definite criteria have evolved to determine the "necessity" of applying measures; however, it is clear that the "necessity test" is required for Article Ex. measures. For Article Ex., however, it is said that the "necessity test" is not required, only the nexus between trade measures and the conservation of the exhaustible natural resource is to be established. But both these types of measures have to satisfy the condition that there should not be arbitrary or unjustifiable discrimination between countries having similar conditions, and the measures should not be disguised restrictions on trade.

ii) The Agreement on TBTs provides for formulation and enforcement of technical regulations affecting goods, for the protection of human health or safety, animal or plant life or environment. The Agreement, however, aims at minimising the impact of national technical regulations, standards and conformity assessment procedures on international trade. It states that technical regulations including packaging, marketing and labelling requirements must be no more trade restrictive than necessary to achieve legitimate government objectives, taking into account the risks that non-fulfilment would create.

The environmental requirements, most of which are covered by the TBT agreement, may present difficulties to developing countries seeking to penetrate foreign markets. They are as follows:

- Technical regulations and standards, such as the requirements that textiles be free of certain environmentally unfriendly dyes, may affect access to developed country markets by setting strict environmental requirements, or oblige developing countries to submit their products to complex testing and certification procedures.

- Packaging requirements may affect exports of developing countries where packaging is considered environmentally unfriendly, or cannot be recycled in the importing country;

- Eco-labelling schemes, both voluntary and compulsory, can affect exports to developed country markets. While labelling has also been used effectively by some developing countries as a marketing tool to improve trading opportunities, complex-labelling requirements may affect market access.

- Process and production method (PPM) requirements may affect market access of developing countries. Here, the main controversy has been about the coverage of PPMs by the principles. The Agreement on TBT says that "related" PPMs will be covered, which so far has been interpreted to mean

that only those PPMs having an impact on the content and the characteristics of the products will be covered. But environmental lobbies are aiming at extending the coverage of PPMs that, although not affecting the contents and characteristics of the products, adversely affect the environment at the place of manufacture in the production process.

- Buyers' requirements in developed countries may impose obstacles on exports from developing countries. Requirements relating to the environment, child labour, and human rights have affected trading opportunities of developing countries in the past.

iii) The Agreement on SPS covers measures to protect human and animal life or health. Among other matters, it provides for protection from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages and foodstuffs, as well as for prevention of the establishment or spread of pests. The SPS agreement aims to ensure that national health and safety regulations (SPS measures) do not unduly restrict international trade. It requires that SPS measures that exceed international standards be based on risk assessment and scientific evidence. It also states that the measures must not be more trade restrictive than required to achieve the Member's chosen level of sanitary protection.

iv) The TRIPS Agreement requires that a country may or may not patent plants and animals, but must provide for patents of microorganisms and non-biological as well as micro-biological processes for production of plants and animals. Countries are also obliged to provide for the protection of plant varieties either by patents or by an effective sui generis system, or by a combination of both.

These provisions have important implications for the environment. The conservation and expansion of biodiversity is crucial to the preservation of a healthy environment for life on Earth. And it will depend a good deal upon how these provisions are interpreted and implemented.

v) The Agreement on Subsidies and Countervailing Measures (SCM) makes subsidies given to entities for adaptation to new environmental standards non actionable within certain limits. Thus, it encourages and supports industries to adopt environment-friendly standards.

1 See Appendix 2, Table 2.1. for more information about FDI performance.
2 Drafted International Integration Agenda prepared by …..
3 This, however, does not ensure their compliance with environmental standards.
4 See Appendix 2, Table 2.2. for more details about main exports and imports of Viet Nam.
5 This practice has recently been observed in the Mekong River Delta.
6 Suc Khoe va Doi song Newspaper, February 24, 1999
7 Chevaux - horse power
8 Apart from its development, another factor of its increased share in industrial production was stagnation of other industries during 1999, especially in the state's heavy industries.
9 This does not include new jobs the industry may create indirectly.

Table 6. Main Exported and Imported Commodities of Viet Nam 1990-1999

USD million | as per cent of total

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total export:	2404	2087.1	2580	2985.2	4054.3	5448.9	7255.9	9185	9361	11523
	100	100	100	100	100	100	100	100	100	100
Coal	32.72	47.7	62.0	52.0	75.1	88.9	114.3	111.8	102.2	96
	1.4	2.3	2.4	1.7	1.9	1.6	1.6	1.3	0.1	0.8
Crude oil	468.4	581.0	805.0	861.0	976.0	1031.8	1345.0	1423.7	1230	2017
	19.5	27.8	31.2	28.8	24.1	18.9	18.5	16.0	13.1	17.5
Rubber	66.4	53.3	67.0	74.7	134.0	157.0	149.9	195.9	127.4	145
	2.8	2.6	2.6	2.5	3.3	2.9	2.0	2.2	0.1	1.2
Rice	304.6	187.6	300.0	363.0	405.7	546.0	853.0	868.3	1020	1035
	12.7	9.0	11.6	12.2	10.0	10.0	11.8	9.8	10.8	8.9
Cashew nuts	21.5	26.0	41.0	44.0	72.5	97.7	95.0	133	117	94
	0.9	1.3	1.6	1.5	1.8	1.8	1.3	1.4	1.2	0.8
Coffee	25	74.0	92.0	110.6	328.2	595.5	333.8	507.6	595	592
	3.4	3.6	3.6	3.7	8.1	10.9	4.6	5.7	6.3	5.1
Marine products	239.1	13.7	11.9	14.3	13.6	11.4	651.0	782.0	858	979
	10.0	13.7	11.9	14.3	13.6	11.4	9.0	8.6	9.1	8.4
Textile and garments	214.7	158.0	220.0	335.0	554.0	850.0	1150.0	1502.6	1540	1682
	8.9	7.6	8.5	11.2	13.7	15.6	15.9	14.7	16.4	14.5
Footwear	14	8	16.8	68.0	122	296.4	530.0	965	1031.8	1406
	0.5	0.3	0.7	2.3	3	5.4	7.3	10.5	11	12.2
total imports	2752.4	2338.1	2540.7	3924	5825.8	8155.4	11144	11592.3	11495	11636
	100	100	100	100	100	100	100	100	100	100
Electrical machinery	-	29.7	39.7	116.9	104	113.8	184.8	-	-	639
	-	1.3	1.6	3.0	1.8	1.4	1.7	-	-	5.4
Steel	-	25	85	233	211	365	529.2	487	523.6	588.8
	-	1.1	3.4	5.9	3.6	4.5	4.8	4.3	5	5
Fertilizers	9	236	237	205	247	339	341.1	419	474.7	473.1
	0.3	10.1	9.4	5.2	4.2	4.2	3.1	3.7		4
Petroleum products	432	485	615	687.4	701	830	1079	1111.6	826.4	1033.3
	15.7	20.7	24.3	17.5	12.0	10.2	9.7	9.9	7.2	8.8
Fabrics for textile...	-	42	13.8	60	81	199	158	897	717	1097
	-	1.8	0.5	1.5	1.4	2.4	1.4	7.7	6.2	9.4

Source: National Commission for ASEAN, 1997 & GSO 1998,1999

Table 7. FDI Summary, 1991-1999

FDI performance	1991	1992	1993	1994	1995	1996	1997	1998	1999 (e)
Registered capital (US$ mil)	1388	2271	2087	4071	5516	9212	5548	4827	1566
Implemented capital (US$ mil)	221	398	1106	1500	2652	2371	2950	1900	1519
The number of licenced projects	155	193	272	362	404	501	479	312	308
The number of withdrawn projects	38	48	34	58	56	52	77	95	-
Capital of withdrawn projects (US$ mil.)	293	401	79	217	477	1024	334	-	-
The number of projects with increased capital	6	10	51	73	122	134	143	-	123
Increased capital (US$ mil.)	7.7	49	222	504	1247	684	1095	638	554
Exports (US$ mil.)	112	211	352	440	786	1790	1982	2200	2590
Share in GDP (percent)	2	3.6	6.1	6.4	6.3	7.4	9.1	10	12.2
Employment (person)						250000	270000	285748	300000

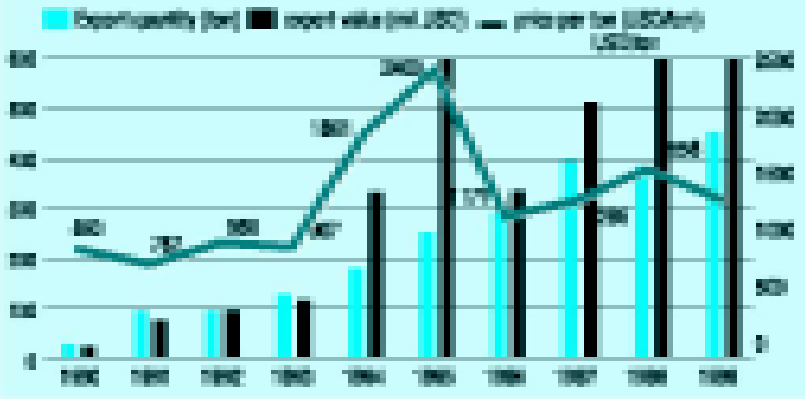
Source: Ministry of Planning and Investment, MPI

Table 8. Use of Chemical Fertilisers and Pesticides in Viet Nam, 1998
(by crop type)

	Rice	Other food crops	Vegetable	Annual industrial crops	Multi-year industrial crop	TOTAL
1. CHEMICAL FERTILISER	**2,193,072**	**227,473**	**98,285**	**210,160**	**193,165**	2,922,155
1.1. Urea						
• Total use	1,021,113	94,527	52,191	56,726	84,136	
• kg/ha						
1.2. Phosphate						
• Total use	85,874	99,803	40,711	43,541	85,002	
• kg/ha						
1.3. Potassium						
• Total use	313,485	33,141	5,383	109,893	25,027	
• kg/ha						
2. CHEMICAL PESTICIDES	**28,306**	**1,257**	**1,692**	**2,332**	**4,331**	37,918
2.1. Insecticides						
• Total use	15,735	701	1,252	1,384	2,534	
• kg/ha						
2.2. Anti-disease pesticide						
• Total use	6,343	489	377	828	1,408	
• kg/ha						
2.3. Anti-grass pesticide						
• Total use	6,224	67	63	115	389	
• kg/ha						

Source: MOSTE and own calculation

Figure 3 Viet Namese external trade as share of GDP



Source: Ministry of Planning and Investment, MPI

CHAPTER 6

SUMMARY OF THE DISCUSSIONS OF THE PROJECT LAUNCH WORKSHOP

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OPENING SPEECHES AND BACKGROUND

On behalf of the organisers, the Directorate for Standards and Quality (STAMEQ) welcomed the participants and introduced the project VIE/98/036 entitled "Trade, Environment and Development - Policy Implications for Viet Nam".

The project VIE/98/036 was meant to contribute to the accession of Viet Nam to the World Trade Organisation (WTO), providing information regarding the impact of environmental requirements on trade, and the impact of trade regulations on the environment. The project also became a part of the international debate leading up to the 10th session of the United Nations Conference on Trade and Development (UNCTAD X).

The United Nations Conference on Trade and Development (UNCTAD) was warmly thanked for providing technical assistance for this useful project, as well as the United Nations Development Programme (UNDP) for providing financial support.

The National Environment Agency (NEA) representative recalled two previous related events, which provided important inputs to the project by way of recommendations:

- the Workshop on Trade and Environment organised in Ha Noi City in April 1998 by STAMEQ, in collaboration with UNCTAD; and
- the Conference on International Trade and Environment, organised in Ha Noi in April 1999 by the SEMA project of the NEA with the financial support of the Swedish International Development Agency (SIDA).

The issues to be addressed during this workshop and discussed amongst governmental agencies and participants from the business sector, the Viet Namese Chamber of Commerce and Industry (VCCI), the World Conservation Union (IUCN) Viet Nam Office and the World Wide Fund for Nature (WWF) Indochina Programme, were summarised by the representative of UNCTAD as follows:

- Difficulties in applying for International Standards Organisation 14000 certification and other Environmental Management Systems (EMS)

- Stricter environmental requirements faced by Viet Namese export companies
- The need to increase competitiveness of Viet Namese products and improve their market access
- Trading opportunities for environmentally friendly products

It was expected that lessons learnt by other countries in the region will assist Viet Nam in identifying opportunities for production and export of environmentally friendly products such as organic agriculture, the role of traditional knowledge, commercialisation and benefit sharing in conserving bio-diversity.

Finally, the project VIE/98/036 was intended to give key recommendations to decision-makers and business on how to meet environmental requirements of foreign markets and make use of the opportunities from globalisation. In this respect, the workshop gave some concrete recommendations and steps for action in facilitating the integration of Viet Nam into the global economy.

The theme for Viet Nam in 2000: "Environmental Millenium: Time to Act" was also recalled.

Presentations

1. ISO 14000 Implementation

The first presentation addressed the importance for Viet Namese enterprises to consider and implement the ISO 14000 series and other EMS. Related experiences of farms in Viet Nam were also described.

- ***Main market and environmental benefits of using ISO 14000 standards***

Implementation of the ISO 14000 series will prevent environmental pollution, reduce production costs, facilitate trade and maintain and increase market share on national and international markets of certified products. The need for adaptation is especially great for Small and Medium Enterprises (SMEs), in order to maintain their market share and meet the demand created in part by transnational corporations and bigger firms to contribute more environmentally friendly products on international markets. For a firm of any size, there is potential to attract greater foreign direct investment and enhance the image of the corporation. Viet Namese enterprises are not sufficiently aware of the costs and benefits of ISO 14000 certification, and lack information on the EMS requirements of international markets. Due to lack of awareness of local consumers, there is no pressure for certification from them except where it is generated by transnational corporations.

• ***Compatibility between national environmental standards and ISO 14000***

The ISO 14000 scheme is voluntary, while governments tend to establish mandatory standards; both are complementary. In practical terms, ISO 14001 commits enterprises to the establishment of an appropriate EMS and compliance with national environmental requirements is a minimum requirement. ISO14000 certification might therefore be a way of demonstrating compliance with national environmental legislation.

• ***Certification and accreditation costs***

Certification and accreditation costs are usually high and constitute a barrier for enterprises. Therefore, an internationally recognized national certification agency should be established to bring down the costs of certification. National certifiers should be trained and capacity should be built.

• ***Particular situation of SMEs, joint ventures, and 100 per cent Viet Namese companies***

SMEs, the most numerous enterprises in Viet Nam, could learn from the experiences of certified transnational corporations. For them particularly, the costs of certification constitute a heavy burden, and absence of certification might constitute a barrier to trade. Funds are often unavailable in SMEs to upgrade production techniques and technology and to train unskilled workers. SMEs should collaborate to implement EMS.

• ***Lessons learned from the national pilot programme***

Viet Nam participated in ISO Technical Committee 207 and established its national secretariat, STAMEQ. STAMEQ hosted several workshops on the ISO 14000 series to inform the business sector and in 1999, together with NEA, set up a pilot programme for ISO 14001 EMS implementation in eight firms. Through the Pilot Programme, awareness training will be conducted, ISO 14001 will be implemented in selected companies, and experience and information on implementing ISO 14001 will be exchanged during workshops. This pilot programme will allow the identification of implementation difficulties, such as financial resource shortages and human resource shortages. Policy-making should also improve as a result of this participatory consultation.

Five enterprises have received the ISO 14001 certification to date. All are either 100 per cent foreign - owned enterprises or joint ventures - joint ventures received assistance from their parent companies from Japan, Korea, USA, and could share useful experience with their Viet Namese enterprise partners.

2. Environmental Standards and Their Impact on Trade

This presentation focused on the experience of Viet Namese enterprises exporting agricultural products - mainly rice, cashew nuts, coffee

beans, and canned fruits - to foreign markets with high environmental standards. Viet Nam is part of (Association of South East Asian Nations) ASEAN and (Asia Pacific Economic Cooperation) APEC, and will soon accede to the WTO. Membership in these organisations requires compliance with environmental requirements (including the agreement on TBT, SPS, TRIPS etc.). Similarly, Viet Nam is party to the main Multilateral Environmental Agreements.

- ***Response to external environmental laws, regulations and standards***

To Viet Namese enterprises, the difference between environmental and quality measures is not always easy to distinguish; they are likely to assume that the best way to meet environmental requirements of foreign markets is to increase the value of the products and obtain an ecolabel. Therefore, greater attention is often paid to ISO 9000 as a modern quality management system, and ISO 14000 is neglected. Several agricultural products have good export potential (-such as pineapples), but they are not exported because do not meet the environmental requirements of foreign markets.

- ***Transactions costs increase because of differences in the environmental regimes of importing countries***

As the environmental standards of countries importing Viet Namese agricultural products are not harmonised, adaptation costs and working time increase. These costs have not yet been estimated. As exporters cannot easily adapt to all of these requirements, extending exports to other markets is difficult. An additional problem is differences in standards among exporting countries.

- ***Cost increases, fines for delivery delays, fees for testing, loss of undelivered goods due to complicated procedures***

Strict and complicated procedures, the necessity to receive import licenses from foreign banks and/or a quality control certificate attesting that the product abides by the national sanitary and phytosanitary regulations of the country (which are sometimes higher than international standards), all increase transaction costs. Some importing countries recognize quality management and control from exporting corporations; others request a quality conformity certificate from a designated national or international body. All these increase the costs of compliance.

- ***Compliance with non-transparent and possibly unnecessary requirements because of lack of information***

Information regarding the environmental requirements of countries and international rules (concerning plant protection, food safety, food additives, etc.) are generally not known by the business sector. In addition, as Viet Nam is not currently a member of the WTO, its exports receive no preferential treatment regarding SPS, environmental and quality requirements. Similarly, some importing countries do not apply the MFN

tariff rates to Viet Namese exports, preventing competitiveness. Decisions of importing countries regarding Viet Namese products are never questioned or assessed by exporting Viet Namese enterprises.

Therefore, in order to meet the environmental requirements of foreign markets, Viet Namese enterprises need to increase their understanding and awareness and invest in adapted production and quality control equipment. Adequate information on environmental standards, WTO regulations and MEAs related to trade, technical assistance, and transfer of technology will be necessary.

3. Environmental Impact of Accession to the WTO Agreement

In the process of accession to the WTO, many requirements will have to be met. However, in acceding to the WTO, Viet Nam will also obtain the benefits of MFN and trade prospects may improve as demonstrated in this presentation.

- Some benefits are known as a result of the ASEAN integration process, but environmental effects are still not fully assessed.
- On the basis of environmental and competitiveness effects of different product groups, Viet Nam can determine the pace of liberalization for each product group.

Some products are more internationally competitive than others. Such products may be better able to meet environmental requirements. However, the effects of expanded production for trade have yet to be analysed.

4. Organic Agriculture

The next presentation stated that traditionally, Viet Nam is an agricultural country. Agricultural exports now account for 50 per cent of the national annual export turnover. In the future, agriculture should ensure food security, provide employment, bring in foreign currency and regularise the balance of payments, improve rural purchasing power for industrial goods, and contribute to maintaining the cultural diversity of Viet Nam.

- ***Most Viet Namese agriculture is organic***

For thousands of years, Viet Namese farmers reclaimed large areas of cultivable land, constructed irrigation works for wet rice fields, built terraced fields on sloping hillsides to prevent erosion, and used slash and burn techniques to produce ash for fertilizers, among other purposes. They also used animal and human faeces, urine, soil and green compost made with plants (azolla, senna and/or tephrosia). The French colonisers introduced chemical fertilizers (containing nitrogen, phosphorous and potassium or "NPK"). However, organic fertilizers remained dominant.

Later, organic agriculture failed to feed people living in the midland, highland, coastal and remote areas and more chemicals were used.

Throughout the country, 33.1 million hectares became infertile due to intensive agriculture practices. The restoration of these hilly and mountainous lands will require organic additives, animal faeces, compost and green compost, and the practice of multiculture rather than monoculture, in order to promote sustainable agriculture. The Viet Namese government is currently investing in the restoration and development of forests, long-term cash crops, and evergreen fruit trees, in the waste and barren lands of the country.

- ***Importance of defining "Organic Agriculture" and to align it with international standards***

Viet Namese farmers still use primitive agricultural methods, which might not comply with national sustainable development norms and international market requirements for organic products. Soil fertility should be restored, and the systematic use of organic fertilizers should be promoted. The Viet Namese government is assisting organic farmers with subsidies, but the processing industry also needs to be developed. In addition, market access for organic products is likely to improve if organic agriculture is nationally certified and if importers recognise the certification.

- ***Cost and price premiums in export and domestic markets***

In the domestic market, prices of agro-products are unstable and decreasing, the food price is lower than the consumer good price index. The conventional consumers of local agricultural products and other agricultural raw materials were state-owned enterprises, which are no longer able to absorb the expanded production. Although local purchasing power is limited, the supply of some commodities does not keep up with demand (e. g. sugar, milk, cotton, etc.). Some Viet Namese agricultural products are less competitive than their imported equivalent (e. g. oranges, mandarins, etc.), obliging farmers to lower their prices.

For some agro-products, including rice, coffee, tea, rubber and cashew nuts prices are internationally competitive. In general, Viet Namese agricultural products are less expensive than those of other countries. However, there is no marketing strategy in Viet Nam for commercial agricultural products, either organic or not. Therefore, market demand has not been fully explored and production is not adjusted in terms of quantity and quality, preventing farmers to reach effective production rates and improve the competitiveness of their products. Viet Nam needs to use multilateral mechanisms for price support.

- ***Trade-off between productivity and quality and how to achieve it***

One possible solution for local farmers is to improve the quality of their products and decrease their costs of production. Viet Nam also needs to maintain its food output and export turnover. The productivity of do-

mesticated varieties of plants and animals can be improved through scientific research and technological development, such as breeding native crops with exotic ones, use of genetic technology, cell and tissue culture, the use of microbial fertilizers, the development and use of environmentally sound pesticides and fertilizers.

5. Genetic resources, Use and Commercialisation in Viet Nam

Viet Nam is endowed with a rich biodiversity. For instance, it was estimated that up to 40 per cent of the flora might be endemic. Plant genetic resources are considered by law as national property and are managed by the Ministry of Rural and Agriculture Development (MARD).

- Viet Nam has a large base of traditional indigenous knowledge on medicines, species, food and fodder, fibre and raw material. Up to 2,300 species have been in use for decades for these purposes.

The 54 ethnic minorities of Viet Nam, living mainly in mountainous areas, are the main holders of knowledge of agricultural biodiversity, medicinal plants and knowledge of other uses of natural products. They usually ignore the value of their knowledge. Many plants can be used in curing common diseases, such as fever, coughs, etc., and can be combined with modern medicine to help in treating serious diseases such as malaria, blood cancer, etc. Unfortunately, plants and related knowledge are disappearing because of the destruction of ecosystems and loss of habitats.

- Willingness to disseminate knowledge is limited as no commercial benefit can be obtained from it and it has no legal status in terms of intellectual property

When traditional knowledge such as popular agricultural practice is commonly known and used, it is difficult to identify the inventor of a useful crop variety for instance. Traditional uses of medicinal plants are usually well known, and in some case described in books (the biological and therapeutic characteristics of 700 plant species are described in Dr. Do Tat Loi's book, for example). These plants are grown in family gardens, or domesticated and/or harvested on a large scale by science and technology institutes and pharmaceutical enterprises, which register medicinal products under their own trademark. Farmers for their own use and/or exchange do seeds development, and any of them can reproduce and use new varieties of seeds without paying royalties to the original plant breeders.

Detailed medicinal plant use and traditional therapeutic methods remain in many cases an individual secret. Traditional medicine prescriptions involve many plants and are transmitted as family secrets from generation to generation. Therefore, no comprehensive survey of this traditional knowledge has been conducted so far. Such knowledge is a source of income for its owners who are not willing to share it with other people, even under a registration or patent.

- ***No sharing of benefits between universities and traditional knowledge holders***

Scientific and technological research institutions, universities and technical colleges cooperate with local communities for collecting crop germplasms and adapting new or alien varieties and hybrids. Resulting cultivars are then tested and evaluated by selected farmers, as tests or pilot production are necessary before recognition and larger use.

(Government Decree No 7-CP, Art. 9). Information regarding indigenous knowledge systems (farmers' experiences in seed selection, storage, cultural practices, planting material preparation, insects and disease control, biodiversity, etc.) and the scientific basis of this knowledge will also be investigated. However, those institutions are not paying adequate compensation to local communities for their service and knowledge. Regulations for benefit sharing amongst various stakeholders work to the advantage of plant breeders, rather than to the local communities owning traditional knowledge. According to Government Decree No 7-CP, plant breeders own the copyright on new seed varieties (Art. 10), and seed varieties should be sold in the market under trademark with certificates of quality (Art. 13).

- ***Potential of bio-piracy***

Foreign organisations must receive a license from and are under control of the MARD for their scientific research and business activities (Government Decree No 7-CP, Art. 14).

- ***Alignment with international standards is not appropriate for Viet Nam, e. g. UPOV91, WTO, (Trade Related Intellectual Property Rights) TRIPs, etc.***

Viet Nam has very little legislation on the management and use of genetic resources and the protection of traditional knowledge. An adequate legislative framework is even more necessary now that Viet Nam has ratified the Convention on Biodiversity (CBD) and is in the process of acceding to the World Trade Organisation, and will apply the TRIPs Agreement. The CBD emphasizes the necessity to ensure, at the national level, the equitable sharing of the benefits arising from the use of genetic resources and recognition of the role of indigenous and local communities. The TRIPs Agreement obliges WTO members to protect all forms of IPRs. TRIPs recognizes the industrial model of innovation, but not the cumulative collective system of innovation of traditional communities, which is excluded by definition. The International Convention for the Protection of New Varieties of Plants (UPOV Convention) extends Plant Breeders' Rights (PBR) to all uses of a protected variety, even to plant seeds derived from a first crop.

Discussions

Discussions were conducted in the form of a round table, and participants had the opportunity to introduce their own experiences and concerns about trade and environment issues.

Concerns were expressed about strict European Union (EU) requirements on chemical dyes used in the textiles industry. Low-priced Chinese dyes are restricted, and European-compatible dyes currently represent too heavy a burden for Viet Namese enterprises. Difficulties regarding the disposal of solid waste from the leather and chemical industries were discussed, since traditional recycling methods are currently forbidden and facilities for treatment are still not available. Similar problems are faced by the packaging industry, whose companies are often too small to invest in environmental assessment and waste treatment plants. High amounts of lead and chemicals in semi-processed food such as green beans, peanuts and sesame, was presented as an obstacle to access regional markets. For joint-venture companies, investing in environmental management and certification allows production cost savings, and contributes to improved corporate image and credibility, an important element for attracting consumers. Joint ventures often impose environmental requirements on their own suppliers, with assistance from their parent company.

Participants expressed their willingness to learn more about the steps in ISO 14,000, and the procedures, costs and benefits, as they consider certification practically mandatory. In general, the costs and benefits of environmental standards for trade and the environment, as well as related responsibilities for the government and civil society, are not yet well understood by Viet Namese exporters.

Information about the environmental requirements of foreign markets, as well as about national and international standards and suitable channels to display such information, is still missing in Viet Nam. Another important step toward the protection of the environment would be to raise awareness of corporate staff, including managers.

It was recognised that Viet Namese regulation and national requirements have to be met by Viet Namese enterprises as a first step toward the granting of international certification, and that this is easier for newly-established companies than for old companies and SMEs. Therefore, national enterprises should follow a phased approach, tailored to their particular situation, to the implementation of environmental standards.

Recommendations

STAMEQ summarised the recommendations made by participants as follows:

1. Set up a consultative mechanism within the framework of VCCI for disseminating information on environmental requirements in specific sectors;

2. Establish a "mainstream" source of funds for SMEs for meeting environmental standards;

3. Mobilize technologies and provide technical assistance for waste treatment;

4. Build a database on traditional knowledge and evolving mutual benefit sharing schemes.

Next steps of action

UNCTAD described the next steps of action following this workshop as being the preparation of its proceedings; the organisation of two subsequent workshops on organic agriculture and traditional knowledge; and the publication by the UN of the background papers prepared by the national experts as a set of national case studies on trade, environment and development and the policy implications for Viet Nam.

Concluding speeches

NEA thanked the organisers and participants for their active and lively discussion, despite the limited amount of time available that ensured the success of the workshop. The participation of more than 70 enterprises was recorded during the meeting, demonstrating the importance of sustainable development for the Viet Namese business sector. It was hoped that additional meetings focusing on particular production sectors would contribute to the creation of a competitive environment in Viet Nam.

SECTION II

TRADITIONAL KNOWLEDGE

- **Chapter 7** Role of traditional medicine in Viet Nam,
  by Prof. Hoang Bao Chau

- **Chapter 8** Basic issues in developing, growing, tending, processing and utilizing Medicinal plants as a Sideline Occupation in a Traditional Village in Viet Nam –
  by Mr. Nguyen The Vien

- **Chapter 9** Some opinions on the Current Status and Directions toward completing Viet Namese Legal Regulations on Protecting Genetic Resources and Indigenous Knowledge
  by Dr. Doan Nang

CHAPTER 7

THE ROLE OF TRADITIONAL MEDICINE IN VIET NAM

By Prof. Hoang Bao Chau,
Former Director Viet Nam Traditional Medicine Institute

THE DEVELOPMENT OF VIET NAMESE MEDICINE

Viet Namese medicine developed over a long history. It can be summarized as follows:

The Hung Kings and Van Lang Era (2879 BC - 179 BC)

There are no written documents but oral teachings about healthcare and natural therapies survive.

The Chinese Domination Period (179 BC - 938 AD)

Chinese culture maintained a dominating role and Chinese medical practitioners provided treatment to the ruling class. However, during this same period traditional Viet Namese forms of healthcare continued to develop.

The Period of Independence and Sovereignty (938-1884)

The North medicine or Sino-Viet Namese medicine (Chinese medical practices adapted by Viet Namese physicians) was used in the royal court. Exchanges of knowledge and experience continued with China.

The South medicine or Viet Namese medicine was still practiced (and improved upon) among the people (non-ruling classes).

The combination of Sino-Viet Namese and Viet Namese medicines at different levels was referred to by Tue Tinh in his medical treatises (Efficacious Viet Namese Medicine, Medical Treatises - 14th century) and by Le Huu Trac in his medical book (Treatise of Medical Knowledge of Hai Thuong - 18th century). P. Huard and M. Durand referred to the attention they paid to both scholarly medicine and popular medicine as Viet Nam's medical encyclopedia, 18th century (P. Huard: Hai Huong Lan Ong et la médicine sino-Viet Namienne, Bulletin de la société des études indochinoise, Ha Noi, 1953).

The Period of French Colonisation (1884-1945)

Missionaries brought western medicine to Viet Nam in the 18th century, and step-by-step infiltrated to the Nguyen royal court. After the French occupied Viet Nam in 1905, Western medicine started to dominate the

practice of medicine. From that point on Sino-Viet Namese and Viet Namese medicines were referred to as Oriental medicine and they lost their leading role.

The French colonialists slowly expanded Western medicine and practice to provide medical treatment to the ruling class and mandarins. Some Western medical doctors (for example, P. Huard: Hai Huong Lan Ong et la médicine sino-Viet Namienne, Bulletin de la société des études indochinoise, Ha Noi, 1953) began to study Oriental medicine.

During the 1930s, Medical Associations were set up in the north, central and southern zones of Viet Nam to protect the interests of Oriental medicine. The practice of Oriental medicine continued to provide care to people in the plains, the midland and upland rural areas, and the urban centres of Viet Nam.

The Post-Colonial Period (1946-1954)

The Democratic Republic of Viet Nam (DRVN) came into being on September 2, 1945. The resistance against the French began on December 19, 1946. Western and Oriental physicians cooperated to serve the resistance and Western medical doctors had an opportunity to use Oriental medicinal herbs to ensure the supply of medicinal drugs in providing healthcare service to people and soldiers. In the liberated zones, Western and Oriental medical practices were combined in health centres and clinics.

In short: During the Chinese domination period, Viet Namese physicians came into contact with Chinese medicine; During the period of independence and sovereignty, both Sino-Viet Namese and Viet Namese medicines were developed and they were combined in medical treatises written by Tue Tinh (14th century) and Le Huu Trac (18th century); During the French colonisation period, Viet Namese physicians had a chance to learn from Western medicine; and during the post-colonial period, they began to combine Western and Oriental medical practices. Certainly Viet Namese medicine has learned from its exposure to foreign medical practices and has benefited by combining them with their own.

THE DEMOCRATIC REPUBLIC OF VIET NAM'S NATIONAL POLICY ON MEDICINE

Since October 10, 1954. Viet Nam began to build a new life in the northern part and continued its struggle to reunify the country.

President Ho Chi Minh, in a letter sent to the medical workers' national conference on February 27, 1955, wrote, "We have regained independence and freedom and medical workers should help the people and the government build a healthcare system meeting people's needs. Medicine should be base on the scientific, national and popular principles.

Our ancestors had many experiences in using Viet Namese and Sino-Viet Namese medicines. In order to broaden the medical scope and scale, you should pay attention to study and combine Oriental and Western medicines."

The Communist Party of Viet Nam, in every political report delivered at its National Congress (from the 3rd National Congress in 1960 to the 8th Congress in 1996), invokes the "Combination of traditional and modern medicines in building a Viet Namese system of medicine."

The 1980 Constitution, Article 44, Chapter III states: "Building and developing a Viet Namese medicine in the preventive direction, and combining modern with traditional medicines."

The 1992 Constitution, Article 39, Chapter III states: "Building and developing Viet Namese medicine in the preventive direction, combining prevention and treatment, developing and combining traditional with modern medicines, developing public and private health sectors, realizing health insurance, creating favourable opportunities for everyone to access healthcare services."

The Law on People's Healthcare issued in 1988, Chapter V (Articles 34, 35, 36, 37) defines the inheritance, promotion and development of traditional medicine and its application in people's healthcare and protection. In 1993, the State President issued an ordinance on private health practice.

Government directives and resolutions on organizing the implementation of the above mentioned national policy on medicine.

In the years 1956, 1957, 1966, 1967, 1975, 1978, 1984, 1991, 1994 and 1996, the Government issued directives specifying work to be done and measures to be taken. It can be summarized as follows:

Work to be done

- On the scientific basis inherited, promote traditional medicine, boost the study and application of traditional medicine, modernize it, combine traditional with modern medicines, thus strengthen the people's capacity for disease prevention and treatment, there by improving Viet Namese medicine.
- Make a comprehensive study, combining theory and practice in the whole healthcare network, from ideology, personnel organization and training, disease prevention and treatment, drug production and scientific research.
- Based on the results of traditional medicine in disease prevention and treatment, use modern science to prove and improve traditional treatments, pay particular attention to popular experiences, cures handed down from ancestors, and herbal medicine of ethnic minority peoples.
- Resolutely carry out the study and application of traditional medicine.

- Modernize traditional medicine and its production chain.

- Identify which diseases is can be cured by traditional medicine, which by modern medicine and which by a combined method; and build Viet Namese medicine in this direction.

- The implementation process must be done both from the bottom up, and the top down. Practitioners need to be cautious and should not criticize or reject any method without careful study; they should make further study to gain a solid scientific understanding before drawing any conclusions; and they should learn the good and dispose of the bad.

Major measures

- Ideological awareness. To identify the value and position of traditional medicine.

- Firmly comprehend the importance of inheriting and studying traditional medicine and combining traditional and modern medicines.

- Identify the obligation of health workers in carrying out these tasks.

- Build, consolidate and develop all organizations in the traditional medicine network (the State, the Association of Traditional Medicine).

- Make full use of capable traditional physicians to promote the training of those health workers practising traditional medicine.

- Define the content and strengths of the traditional medical inheritance (capable physicians, people's experience, experiences handed down from ancestors, mountain herbalists and traditional medicinal treatises).

- Boost the study of traditional medicine, and the combination of traditional and modern medicines.

- Support traditional pharmacies and modernize the traditional medicine production chain.

- Include traditional medicine in the public healthcare service.

- Implement the policy on treatment among herbal physicians and any other policies relating to traditional medicine.

Results

Organization and Management: The Ministry of Health has under its authority the Traditional Medicine Department and provincial and city health departments.

Medical state sector

Five Institutes: the Viet Nam Institute of Traditional Medicine; the Institute of Acupuncture; the Army Institute of Traditional Medicine; the Institute of Materia Medica; the Ho Chi Minh City (HCMC) Institute of Traditional Medicine and Pharmacy;

- 42 provincial and city traditional hospitals (61 in all);
- 265 traditional medicine sections in modern hospitals;
- A traditional medicine department in the Ha Noi Medical University and another in the HCMC Medical and Pharmaceutical University; other Medical Universities, each with a traditional medicine section;
- A middle level traditional medicine school in Ha Noi and another in HCMC.
- Currently 22 professors and assistant professors; 20 doctors and candidate doctors; 25 masters; 48 specialized doctors of 2nd level; 331 specialized doctors of 1st level; 1,384 doctors and 1,678 assistant doctors of traditional medicine; and some thousands of doctors and pharmacists trained in modern medicine have now been instructed in traditional medicine and are working at these institutes, departments and hospitals. They directly apply traditional medicine, combine traditional with modern medicines, and use modern medicine to prove correct theories and experiences of traditional medicine.

Working Procedure

The work procedure of herbal physicians (state employees) working at national, provincial and city hospitals is as follows:

The herbal physician receives the patient whom the physician thinks can be cured by traditional medicine. The physician then diagnoses and provides treatment using traditional medicinal herbs, acupuncture, setting (bones) in place and splinting. Then the doctor of modern medicine sets up a case history and diagnoses by modern method. The modern M.D. monitors the development of the case. If the trouble becomes worse or if the treatment is not effective, he will employ modern medicine to cure it, or combine modern medicine with traditional medicine, then review and evaluate the clinical results.

The herbal physician prepares the medicinal herbs; he also guides the pharmacist in identifying the herbs, preparing each type of medicine, and making final products. The pharmacist learns from the herbal physician, keeping the preparation process hygienic and then reviewing and evaluating the preparation methods.

The herbal physician compiles and translates training materials; gives lectures to the trainees who are doctors, assistant doctors and pharmacists

of modern medicine (in short and long-term courses); and provides materials for publication.

The doctors, assistant doctors and pharmacists of modern medicine organize workshops to evaluate in an objective way the popular experience and experiences handed down from ancestors on curing specific diseases. After they've gained certain knowledge of traditional medicine, they systematically review and evaluate the practical value of traditional medicine, and step-by-step use modern medicine to explain and prove the positive results of traditional medicine (in both theory and practice).

The following are some specific results

The Qigong method in curing gastroduodenitis and ulcers and neurasthenia has been practiced for centuries. MD Nguyen Van Huong, former Minister of Health applied this method on himself in curing a cerebral vascular accident and achieved good results. He then developed Qigong into a Vitality Preserving Method to help elderly people protect their health, live longer and live a useful life as well as helping to prevent and cure diseases. After 10 years of study and training on more than 2,000 elderly people using the Vitality Preserving Method, he found that the method helps them improve their health, better adapt to the physical environment, and improve their mental state. Their cortex, the respiratory, circulatory, movement and metabolic systems functioned better; their chronic ailments were reduced and they could follow the law of nature better. The Vitality Preserving Method was recognized by the Ministry of Health and accepted by the elderly. Currently the elderly practice it across the whole country.

Many acupuncture forms such as acupuncture, auricular, acupuncture, knocking with needle acupuncture, electric acupuncture, and aqua acupuncture and massotherapy in order to cure many acute and chronic diseases have been used. Positive results have been observed. For example, acupuncture has achieved 72 per cent success; auricular acupuncture (for acute diseases), 90 per cent; knocking with needle, 65 per cent; electric acupuncture, 71 per cent; massotherapy, 71 per cent; aqua acupuncture, 51per cent.

Viet Namese ancestors paid much attention to reducing pains, particularly acute pains. Acupuncture has been used in curing pains due to contracting muscles (acute lumbago, torticollis, myalgia and arthralgia); pains at the nerves (sciatic nerve, trigeminal nerve, causalgia); pain caused by internal troubles (gastroduodenitis and ulcers, colitis); pains caused by acute inflammation and pains caused by trauma and fracture.

Acupuncture analgesia has also been used to reduce pain for operative patients in about 60 diverse surgical procedures from the head and neck to the four limbs. On average it can help 90 per cent of patients recover safely from an operation.

Functional regulation is considered to be the main benefit of acupuncture. In addition to the above-mentioned problems, acupuncture can be used in treating other functional disorders such as: neurasthenia, facial paralysis, enuresis (in children), dumbness as a result of war trauma, rectal prolapse and other diseases. Acupuncture can help patients with Japanese encephalitis, acute anterior poliomyelitis, cubital neuritis as the result of leprosy, cerebral vascular accident (and related complications) provided that they receive acupuncture in time. Once the neurons have been destroyed, acupunctue is not effective.

From these positive results, the Ministry of Health has considered acupuncture one of the most effective measures for primary healthcare. The Ministry has guided (community health station) to use 80 acupuncture points to cure diseases such as influenza, angina, asthmatic crisis, toothache, diarrhea colic, dysentery, rectal prolapse, headache, facial paralysis, sciatic neuritis, lumbago, whooping cough, uticaria, etc.

Clinical results have initially made clear the effect of acupuncture and massage. The excitation caused by acupuncture and massage on the selected acupuncture points, depending on the disease and specific condition of the patient, creates a reaction necessary to encourage the latent capacity of the body to regulate the functional disorder. On that basis the body will by itself address the deficiency, and rule out factors leading to diseases.

The method of using traditional drugs has also been practiced in Viet Nam for many years. Curing diseases with medicinal herbs is the strength of herbal physicians. They have treated both acute and chronic diseases, and those both easy and difficult to cure. Basically there are two ways of using medicine. The first way: the physician analyses the symptoms then gives a prescription suited to the patient and the stage of the disease, subject to certain principles (this method is often used by highly-educated physicians). The second way: the physician uses a certain kind of medicine to cure a particular type of disease (this method is often done by physicians with experience handed down from ancestors or people with popular experiences).

Traditional medicine has been used in internal medicine (rheumatism, rheumatoid arthritis, renal insufficiency, chronic glomerular nephritis, gastroduodenitis, beriberi, acute hepatitis, chronic hepatitis, cirrhosis, diarrhea, dysentery, hypertension, neurasthenia, cerebral vascular accident and its sequela, influenza, coughing, angina, bronchitis, and so on); pediatrics (acute diarrhea, prolonged diarrhea in children, malnutrition, menningitis and its consequences, enuresis, acute nephritis of children, and adult related disease); gynecology (adhexites, cervicitis, vaginitis, uterine prolapse, abortion, common abortion, dermatology (eczema, acne); against epidemics (whooping cough, dengue fever, hemorrhagic fever); treatment of social diseases (drug addiction); ophthalmology (cornea helcoma caused by pseudomonas aeruginosa, eyeball bleeding caused by

trauma, and retinitis). Working teams (consisting of herbal physicians and medical doctors) have come to communities to help local health stations use traditional medicine and to cure common ailments (fever, influenza, coughing, arthritis, diarrhea, dysentery, menstrual disorders, etc). The introduction of traditional medicine and acupuncture to the community level has provided first aid to many people and soldiers in all our provinces during the war against the United States (1965-1973).

In the traditional method of treament of fracture a fracture is set in place by using laths to fix the fracture, letting the upper and lower joints move early, putting medicine at the fracture and taking oral medicine. This method is very effective for closed fractures, causing less deviation and thus being very suited to children and elderly people. However, it is not very effective for open fractures with significant deviation in adults, especially femoral fractures. Fractures healed using this treatment take less time to heal, and with fewer complications than with a plaster. Studies provide findings similar to clinical results.

In 1975, Viet Nam was reunified and since then it has had many favourable opportunities to promote traditional medicine.

On the basis of reviewing the practical value of traditional medicinal methods (particularly those experiences of using traditional medicine in treatment), in 1975 the Ministry of Health issued Regulation No. 186 on clinical testing to promote step by step evaluation of the scientific value of traditional medicine. From 1981 to 1986, Ministry of Health studied and evaluated 9 prescriptions used in curing 6 common diseases (such as influenza, coughing, dysentery, diarrhea, athritis). More than 3,000 patients received treatment and 83 per cent were effectively cured. Studies provide findings similar to clinical results. A national program on medicinal herbs and a research project on the combination of traditional and modern medicines in each 5-year plan has been carried out since 1985. In order to improve the research quality, in 1996 the Ministry of Health issued Regulation 371/1996, defining specific contents in pharmaceuticals, standards of products, toxicology, pharmacodynamics, clinical study using random sampling, with and without a control group. Cooperation between scientists, institutes, hospitals and schools, and between research and production has been boosted. The scientific value of many medicinal herbs and traditional prescriptions has been defined. Many prescriptions have been allowed by the Ministry of Health to be put into production and marketed in Viet Nam and abroad.

Traditional medicine still maintains its own character in the public healthcare system. However, it has now been combined with modern science and technology and is developing well. Its application has been expanded and its practical and scientific value has been defined. In short, traditional medicine now has a modern character.

Private Sector

The Viet Nam Traditional Medicine Association was established in 1957. In its initial stage it had only 12 Traditional Medicine Teams with 596 practitioners. The State allowed members of the Association to organize private clinics, and encouraged the establishment of people-founded traditional medicine cooperatives. A number of herbal physicians have been invited to work at public hospitals, and the remainder work privately, subject to specific regulations. (Meanwhile there are not any private modern medicine clinics).

According to statistics, in 1965 the Association had 373 members, and in 1969 it had 643 members working at hospitals and other medical facilities. From 1965 to 1975, there were 4,000 herbal physicians working at community health stations. In 1983, 47 per cent of professional herbal physicians from communes upwards worked at community health stations and hospitals. In 1991, there were 501 clinics belonging to the Association, 1,371 private clinics and many clinics managed by charity organizations. In 1997, the Association had a membership of 25,000. In 1996, the Association provided diagnoses and treatment on 30 million occasions. It provided free medicine to 8 million patients, equivalent in value to VND 10 billion.

According to a report by the Ministry of Health, in 1999 about 8,000 private and collective traditional medical facilities provided diagnoses and treatment and produced traditional medicine. They enjoyed looser regulative control than modern medical hospitals. Experiences handed down by ancestors have been maintained and brought into play in these traditional medicine clinics.

It is safe to comment that the State itself has inherited and promoted traditional medicine, combined traditional with modern medicines and created favourable conditions for traditional medicine to develop in the whole country. As a result, traditional medicine has been involved in practically diagnosing, curing and providing first aid to people in both war - and peace- time, particularly in areas where State-owned clinics have not yet been established. Every year, about 30per cent of patients receive diagnoses and treatment by traditional medical practioners. However, traditional medicine practised in State-owned hospitals and clinics bear a modern character while in the private sector, it remains more traditional.

Pharmaceuticals

In Viet Nam, we have inherited traditional pharmaceutical practices, including the preparation of toxic medicine.

We have conducted studies, collected and planted pharmaceutical herbs to provide medicines for clinical treatment, and for large-scale production and export.

The State allows both public and private traditional medicine clinics to produce a certain number of medicines to be used for their own purposes. They must bear the responsibility for their patients and for the state of their medicines. Some facilities produce 5 to 7 types of medicines; some others produce 25 to 30 types. This management method has helped them maintain and promote their precious tradition-based experiences.

The State allows both public and private clinics to produce traditional medicines for domestic use and export, and entrusts the Ministry of Health to control this activity within certain regulations. The Ministry has licensed 1,047 traditional medicinal products to circulate on the open market.

The State asks national and provincial pharmaceutical companies to provide sufficient pharmaceutical herbs for: traditional medicine clinics (about 20,000 tons a year); the production of medicine from herbal plants to be used in modern medical clinics (500 to 1,000 tons a year); and the production of pharmaceutical cosmetics (a recent development).

According to the Ministry of Health, besides State-owned enterprises, there are nearly 1,000 private traditional medicine enterprises and pharmacies, the production chain of 170 of them are industrialised and semi-industrialised.

According to the Pharmaceutical Corporation, the traditional medical enterprises currently use from 62 to 144 pharmaceutical herbs in their products. Clinics and hospitals use about 100 types of herbs to treat patients and produce their own products. At private clinics, the number of pharmaceutical herbs depends on the physician, but on average, it is about 240. Property rights of all pharmaceutical products are protected by the State (both public and private). This protection has two aspects: permission by the Ministry of Health for producing and selling of products (a producing license must be obtained from the Ministry of Health for producing tonics and treatment medicine) and the producer has rights to register his copy-rights at the Department of State Industrial Property and the copy-rights are protected by state law. Thirty to 50per cent of total production is tonics. Traditional tonics have proven to be preferable products. Traditionally, both tonics and normal medicines are used for curing patients. Tonics are used to provide materials that patients are lacking. Other medicines are used to treat diseases, get rid of the causes of ill health and improve the condition of the patients at the same time. Exports account for 3 to 17 per cent of the total products, of which more are tonics than other medicines.

Pharmaceutical products are exported to Eastern Europe, China and Hong Kong. Former markets for export were Russia and other East European countries. Exports are made according to specific agreements. The

proportion of exported pharmaceutical herbs and products to those imported is 7:3. However, import and export product statistics do not differentiate between raw material and finished products.

Pharmaceutical products are imported mainly from China (68.5 per cent) and Hong Kong (23.5 per cent) under permission from the Ministry of Health. However, the management of import-export quotas is not perfect and medicines are still illegally smuggled across borders. The activities of middlemen and sailors are still uncontrolled. As a result, it is difficult to identify which products are officially imported and which are smuggled. After examination, drugs or medicines of bad quality are confiscated and prohibited by the Ministry of Health.

International Relations

In addition to import-export of traditional medicines and pharmaceutical herbs, traditional medicine physicians have been sent to work long-term in Angola, Algeria and Cuba. They have been invited to give lectures on acupuncture in many countries.

In 1988, the Viet Nam Traditional Medicine Institute was recognized by the World Health Organization as a "WHO collaborating centre for traditional medicine".

In the coming period, there will be a focus on the study of the applications of traditional medicine, modernizing traditional medicine, and combining traditional with modern medicines, training a large contingent of physicians (particularly leading physicians), and strengthening equipment, medicine and funding for traditional medicine.

Some proposals

That the State issue a clear-cut and consistent policy on the use and development of traditional medicine, the combination of traditional with modern medicines, and on treating traditional medicine as equivalent to modern medicine in the public health sector.

The State should develop clinics with credible herbal physicians and modern medical doctors working together to establish the foundation for the implementation of inheritance, inheritance-application-development, and inheritance-study-combination policies. These clinics should be provided with sufficient funding, equipment and staff, and should develop plans for each period.

The State should create favourable opportunities for traditional medicine to develop and modernize, and combine it with modern medicine. Without proper measures, traditional medicine might become prey to modern medicine and eventually it will be annexed by modern medicine.

General comments

It has been proved that traditional medicine in Viet Nam has a practical and scientific value.

Traditional medicine has contributed to the people's capacity for disease prevention and treatment. It is safe to say that the people's health is now addressed by 3 methods: modern medicine, traditional medicine and the combination of traditional and modern medicines.

Traditional medicine has provided many practical experiences of scientific value to the development of Viet Namese medicine at present and in the future.

Provided that traditional medicine is well organized and receives sufficient investment, its role in taking care of the people's health will be much improved.

CHAPTER 8

BASIC ISSUES IN DEVELOPING, GROWING, TENDING, PROCESSING AND UTILIZING MEDICINAL PLANTS AS A SIDELINE OCCUPATION IN A TRADITIONAL VILLAGE IN VIET NAM

By Mr. Nguyen The Vien,
Farmer, Nghia Trai Hamlet

(A RESEARCH DOCUMENT)

This document comprises:

- **Part 1:** Introduction outlining the importance and urgent significance of the cultivation, tending and processing of medicinal plants in view of the need to preserve sources of pharmaceuticals.
- **Part 2:** Basic contents of the process of development – Experiences in growing, processing and utilizing pharmaceuticals.
- **Part 3:** Situation of pharmaceutical sales;

Forms of pharmaceutical sales; and present commercialisation of the pharmaceutical trade.

- **Part 4:** Recommendations.

Part 1: Significance - Importance

"Medicinal plants" is a relatively common phrase in Viet Nam and other countries in Asia.

In recent years, with major advances in medical science, the application of medicinal plants and Oriental Medicine therapies to protect human health has spread beyond the orient. It now has a strong influence on the whole world, particularly in industrially developed countries.

Medicinal plants and "Oriental Medicine" are not only significant in treating common illnesses; they are subject to intensive research by practitioners of advanced medical science. They have proven effective in treating many hitherto intractable diseases of global concern.

Medicinal plants are not only valuable in treating diseases; they are also useful in strengthening human health and rehabilitating various body functions. They can be prescribed for users of different types and different age groups, and can produce long-term results without undesirable side effects.

Their economic values include availability, low cost and popularity. Moreover, the farming and processing of medicinal plants require very

limited use of insecticides, thus contributing to protecting the environment and increasing farmers' income.

Therefore, urgent and proper attention should be given to learning the methods of growing, tending, processing and utilizing medicinal plants.

In order to facilitate further research on medicinal plant production and application, some basic methods and techniques of growing, tending, processing and utilizing medicinal plants are summed up in the following pages. This summary is based on practical knowledge and experience obtained from residents of a village with a long-standing tradition of growing medicinal plants.

Part 2: History of medicinal plant development - Knowledge and experiences in growing, tending and processing medicinal plants

The rural village of Nghia Trai, which in the past belonged to the King Bac region and is now situated in Van Lam district, Hung Yen province, some 20 km east of Ha Noi on Highway 5A, has a long-standing tradition of growing, processing and trading in medicinal plants.

According to the Nghia Trai village annals compiled by Academician Nguyen Binh in 1572, under the reign of King Ly Thanh Tong there were three generals credited with helping the king defeat the *Chiem* invaders, who settled in the village and showed the villagers how to reclaim waste land and grow medicinal plants as a sideline occupation. After their passing away, all the three generals were canonized by the king. To this day they are worshiped by villagers under a royal ordinance as the tutelary geniuses of their village.

While medicinal plant cultivation and trade have spread to other villages and communes, Nghia Trai still remains the only locality where all the stages of the business are in place, from planting and processing medicinal plants to buying and selling pharmaceutical products. With the national economy progressing through different stages, the Nghia Trai medicinal plant growers have experienced untold ups and downs. In spite of the difficulties, however, they remain faithful to this traditional occupation and even propagate it to nearby localities.

Now that the country has shifted to greater economic openness, there is an increase in market demand for herbal-based pharmaceuticals, hence the cultivation and processing of medicinal plants and sale of pharmaceutical products in Nghia Trai have become a driving force behind the villagers' household economy - a decisive factor in improving their material and cultural life.

■ Knowledge and experience

In the diversity of the natural environment, each plant and animal

species including human beings is an independent living organism, which complements the others in a symbiotic manner.

Since time memorial, man has observed animals using certain herbs and leaves to treat their illnesses and learnt from them, such as a tiger healing an injury with "*dot*" leaves, or a monkey has abdominal pains by eating "earth-worms", or a bear eating "honey".

All animals need plant life for their own existence. When a person takes an Oriental medication, he or she has to abstain from certain kinds of food. When sour crab soup is eaten, cockscomb mint is indispensable, but this aromatic herb is never eaten with chicken. Ginseng is an extremely tonic tuber, but it can be lethal if prescribed for a person who catches a cold.

Human beings have discovered different medicinal properties in other beings that can be exploited to protect and improve human health.

■ **Experiences in growing and tending medicinal plants**

Nghia Trai village is situated in an area of temperate climate with four clear-cut seasons. Adverse weather conditions in recent years greatly influenced local farmers' medicinal plant growing, tending and processing activities.

The great majority of medicinal plants were originally wild plants. Their medicinal properties were discovered, researched, tested and summed up by traditional healers who then showed farmers how to grow them in their kitchen gardens or in the field in accordance with their needs.

Farmers then classify medicinal plants into different types and species according to their medicinal properties, so that each of them can be grown in the most suitable season and soil type.

For instance, the yellow chrysanthemum is sown in June and grows very fast in the cool breezes of July and August. At the time of harvest in December when the weather is dry, its flowers, put out to dry in the sun, will have a reddish-yellow colour and a special scent.

In terms of soil types, there are rules to follow: low-lying fields are reserved for water-resistant plants; tuberous plants require sandy soils; in fields on higher elevations, drought-resistant plants such as mugwort, ginger and oppositifolius yam should be grown; and different crops should be rotated in the same field to achieve high yields.

There are more than 100 different medicinal plants available in Nghia Trai village, the majority of which are grown on a small scale, either in kitchen gardens or around houses, or picked from the wild. Only about a dozen species are grown on a large scale, including chrysanthemum, plantain, patchouli, cockscomb mint, tephorasia candida, atractylis, and perilla.

Over the past few years, local villagers have gained more income from medicinal plants than agricultural crops. As a result, farmers have approached them from adjacent villages, neighbouring communes or even from other localities, who want help in developing the medicinal plant business in their own places. Nghia Trai villagers have given assistance with seeds and young plants as well as farming and processing techniques.

Nghia Trai villagers even go to other localities and invest in growing one or two highly valuable medicinal plants on a large scale under contract. They grow the plants that are in demand at high prices and stop when sales drop; this short-term transition from one crop to another impairs the ability of this farming business to be developed on a wide scale.

As a result, villagers have established only limited areas of specialized cultivation of such medicinal plants as angelica, opposititolius yam and atractylis in Me So and Da Nguu communes in Khoai Chau district.

Nghia Trai villagers are faced with three main constraints: lack of proper farming techniques, lack of markets for their products, and lack of suitable land.

So far, the cultivation of medicinal plants in Nghia Trai and other localities is still spontaneous by nature, with the area under each type of plant totally depending upon the investment capacity of each family household and the market demand. No significant investment has ever been made by the Government (during the 1960's-1970's, the cultivation of medicinal plants was concentrated under investment from small-scale cooperatives).

In the 1990's, medicinal plants were cultivated elsewhere by a number of establishments such as the Hai Hung medicinal nursery or the Central Pharmaceutical Materials Institute. In 1999, the Institute of Ecological Economics made some investment in Vinh Tuong commune (Vinh Phu province) so that the latter could grow a number of southern medicinal plants, but this investment was made under a gene protection project and not for the purpose of development of medicinal plant markets.

- **Tending techniques**

Each medicinal plant has a different growth cycle, requiring different soil and weather conditions, and hence requires a different tending technique.

Nghia Trai farmers, having grown medicinal plants for generations, have accumulated their experiences and established traditional techniques imparted orally from generation to generation.

With the advances of modern science and technology, local farmers are now able to apply new soil-preparing techniques, change the timing of

cultivation and spray a limited amount of pesticides to protect their crops, and use fertilizers and growth hormones to stimulate newly planted crops.

For instance, they use Wafatok, Itolel, Sofik, and "Thien Nong" leaf-fertilizer to get rid of thrips on chrysanthemum and plantain leaves and flowers.

In 1997, they tried chemical preparations code-numbered G-2 and G-3, which were introduced by Prof. Nguyen Lan Dzung for agricultural crops, on their medicinal plants. Their medicinal crops developed strongly at first but later became deformed and the use of chemicals was dropped.

For most of the other medicinal plants cultivated by Nghia Trai farmers, there is no need to use insecticides.

Tending medicinal plants is a time-consuming job requiring experience, good timing and meticulous preparation. Care should be taken in all stages of cultivation, from selecting seeds and preparing soil, to planting young trees or sowing seeds, and tending crops. Improper techniques in any of these stages will likely cause the plants to wither or productivity to drop.

For instance, when selecting atractylis seed-tubers, the tubers must look intact, with light skin colour and without any rotting spots, and must be planted in well-drained, high-lying fields; otherwise, only plants and not tuberous roots can be harvested.

Before planting *Dia lien*, it is necessary to apply anti-fungal techniques; otherwise, in later stages, the plants will wither away and the crop will be lost.

Regarding chrysanthemum, growers must know exactly when to pollard and prune their crops.

In short, to cultivate medicinal plants, those who are familiar with their farming and tending techniques will find it as easy as sewing a button; those who are not, will not be able to achieve the desired results, no matter how much they invest and how hard they work.

A number of plant diseases, for which no effective treatments are yet available, are of concern in tending medicinal plants. These diseases continue to present a threat of damage to crops.

■ Processing of medicinal plants

Processing of medicinal plants is a very important job that decides the quality of the final products. It is carried out regularly and continuously throughout the year, from the time of harvest to storage.

While processing techniques vary from plant to plant, they can be divided into three main stages applicable to all medicinal plants as follows:

- Harvesting fresh crops from the field and semi-processing,
- Sorting, drying, slicing, dehydrating and curing for storage, and
- Roasting, soaking with other substances and preparing medications.

Processing of medicinal plants is a time-consuming job that requires meticulous care. Right at the time of harvest, particular picking, cutting, hoeing, uprooting and transporting methods are required to ensure the quality of products, and are also important factors for increasing productivity and keeping seeds for the following season.

Certain medicinal plants should be put to dry in the sun while others should be dried in a dehydrating kiln. According to local practice and the recipe used, the plants can be sliced when still fresh or when dry, across the grain or diagonally, thickly or thinly.

Roasting and soaking final products with other substances and preparing medications require extreme care and experience. These stages cannot only help in preventing damage to the final product by moisture and fungi; they also help plants retain their medicinal properties and pharmaceutical potency.

Manual methods are traditionally employed in the processing of medicinal plants. A number of machines have been used in slicing and grinding final products, but these are far from totally substituting human labour.

In short, the cultivation, tending and processing of medicinal plants are closely connected and inseparable stages of the production process. They require that farmers provide not only labour and invested capital, but also a certain level of scientific and technical knowledge combined with practical experience.

Part 3: Forms of pharmaceutical sales

Present commercialisation of pharmaceutical trade

In parallel with growing and processing medicinal plants, Nghia Trai villagers have a long-standing tradition of practising Oriental Medicine, using the medications they prepare to cure other people (according to statistics, there are so far more than 150 native Nghia Trai villagers practising traditional medicine either in their home village or elsewhere in the country). By doing so, they can both sell their products and render services to their fellow-countrymen.

Whether they do business in their home village or in other localities, the traditional healers from Nghia Trai always use the word NGHIA as the first word of the names of their consulting-rooms or oriental pharmacies, and are motivated more by charity than profit. Some of them run such businesses in Lan Ong and Thuoc Bac streets in Ha Noi.

A number of number of traditional medicine producers in Nghia Trai carried their products in small quantities to other localities for sale from time to time.

Following the restoration of peace in northern Viet Nam in 1954, under the Government's Oriental Medicine development policy, traditional pharmaceuticals were in demand in the country. This in turn stimulated the cultivation of medicinal plants and the emergence of different forms of marketing in Nghia Trai village.

Until the late 1980s, when Viet Nam's economy was operated with the system of government subsidies, provincial and central pharmaceutical enterprises procured a number of traditional pharmaceutical products from Nghia Trai. A system of trading cooperatives played the role of middleman in the countryside. Agricultural tax was calculated in terms of paddy rice, and paid with pharmaceutical products in paddy rice equivalent.

After 1990, particularly following the application of Resolution Nº 10 on allotting agricultural land to peasant households, and the greater use of market mechanisms, the aforesaid systems of pharmaceutical procurement were abolished. The intermediary role was shifted from the cooperatives to private traders.

Since 1990, with the development of market mechanisms, buying and selling medicinal plants relied mainly on middlemen. However, in December 1996, due to increasing exports, the Central Pharmaceutical Materials Institute, a government agency, decided to sign a contract with Nghia Trai village authorities to buy dry "ma de" – plantain (*Plantago major*) leaves and stems.

The contract included the following terms:

1. Nghia Trai farmers will grow and harvest leaves, sell them to the Central Pharmaceutical Materials Institute. The leaves must be dry (humidity must be lower than 5 per cent), uncrushed and should be still green instead of a dark colour;

2. In 1997, dry leaves production reached 10 tons.

The Institute did not provide initial financial assistance or deposit. Since the market price of plantain seeds was low in the market, farmers planned to gain more benefits from selling leaves than seeds. Therefore, despite the lack of experience of the two parties in drying plantain leaves, the contract was signed. Unfortunately, the contract was cancelled after 5 months of implementation due to the following reasons:

- The State-owned land was allocated to farmers during fixed lease periods that didn't fit with the contract. Furthermore, due to inappropriate harvesting methods and other inadequate conditions, such as inappropriate spaces

dedicated to the drying of the production, leaves didn't meet the quality standards agreed in the contract.

- After this experience, the Institute decided to buy fresh leaves and dry them in-house, but the leaves were crushed during transportation and turned to a dark colour. Once again, production failed to meet the quality requirement.

At that time, the price of plantain seed in the market increased from 3 to 4 times the price at the time of the establishment of the contract. For these reasons farmers concentrated their production on seeds, and leaves were no longer sold to the Institute.

To overcome this situation, Nghia Trai authorities required the Institute to invest in the building of drying stoves in the village, and to assist farmers in harvesting and drying the leaves in order to make competitive advances in the market. This proposal was not accepted and the contract was cancelled.

The main channel for marketing pharmaceutical products is still from the producers to processing establishments and traditional healers through the intermediary role of private traders. Most products from Nghia Trai and other villages are traded privately.

The state also buys a large amount of the production. It is estimated that more than a half of the total production is exported from Viet Nam. Mainly raw material is exported to China through the two border gates of Lang Son and Quang Ninh. Part of the production is exported to Ho Chi Minh City and sold to Chinese businessmen as well as to other countries in South East Asia.

Trading is not regulated, and fluctuates according to the demand for medicinal products. Some middlemen conduct their business directly with foreigners, exporting Viet Namese traditional medicine and importing Chinese medicine to be sold in domestic agencies.

Domestic production of medicinal plants relies considerably, therefore, on foreign markets. Farmers concentrate their production on rare plants with high demand in order to maximize their benefits. Trade is always vulnerable to international market prices, which if they drop due to over-supply, farmers would suffer from low income and possible bankruptcy.

Figure 1- Trading Forms

There are three trading forms as follows:

1. Producers selling their pharmaceutical products directly to processing establishments (hospitals, pharmaceutical companies and traditional healers) or directly prescribing traditional medicines in recipes to patients – (this form is not common).

2. Producers selling their pharmaceutical products to private traders.

3. Villagers procuring medicinal plants from other places, then processing them and selling the final products (both fresh and dry) to private traders.

With such trading forms, there exist in the village three types of private traders:

1. Major wholesalers who carry commodities over long distances and conduct transactions under licence with procuring agents in major urban centres or foreign countries (like China), and whose turnover amounts to hundreds of million Dong per consignment.

Traders of this type are not engaged in retail transactions. They usually work through the intermediary networks to procure commodities in quantity for wholesale.

2. Medium and small traders who market farm produce only for subsistence farmers, control only a small amount of capital, and are not required to apply for licences.

Traders of this type sell commodities mainly to state-owned pharmaceutical processing establishments and hospitals as well as small agents, traditional healers and private pharmacies in northern provinces. They trade in small quantities and transport their commodities to buyers by motorcycles, public passenger-cars or rented trucks, depending on the size of consignments. They are usually engaged in procuring and processing raw materials and selling dry products, and compete with one another on prices that may fluctuate from 1,000 to 5,000 Dong per kilogram over the floor-price. Their capital is in the range of several dozen million Dong each.

3. Couriers who are in charge of procuring pharmaceutical materials from producers for major and medium traders.

Couriers go from house to house bargaining with producers to earn price margins ranging from 200 to 1,000 Dong per kilogram against the prices agreed with the wholesale buyers. They need only a small amount of capital or no capital at all.

This form of procurement is very convenient to producers in that they do not need to carry their products to buyers, and can sell them whenever they wish for spot cash. However, there are chances that their selling prices may be lower than market prices by 2,000 Dong or more per kilogram.

The total volume of trade conducted by these three methods may amount to several thousand tons per year.

In order to meet such a huge market demand for their pharmaceutical materials, Nghia Trai villagers have to exploit the following sources of goods:

1. Pharmaceutical materials produced in the village: there are 300 households in the village engaged in growing medicinal plants on different types of agricultural land. The pharmaceutical materials they produce meet only about 25 percent of market demand.

2. Raw materials purchased from other localities: whenever a pharmaceutical product is in season, young Nghia Trai villagers go to neighbouring villages and communes as well as northern mountainous provinces to buy and transport it by truck to their home village. They may process it themselves if they want more profit, or sell it to other households for processing. This source makes up more than 50 percent of the total volume of annual transactions in the local market.

3. Northern pharmaceutical materials (imported from China through different channels, processed in the village and sold to traditional healers or other traders): this source accounts for about 25 percent of the total volume of the village's pharmaceutical trade.

Conclusion

The above description merely provides man overview of how medicinal plants are cultivated, tended, processed and marketed as a traditional sideline trade in Nghia Trai village, which has so far been regarded as one of the four major producers of pharmaceutical materials in the country.

While this report does not cover all activities of a village with a traditional trade of growing and processing medicinal plants, it does document how age-old experiences and techniques have survived. This heritage of folk know-how is extremely valuable and should be applied and developed in service of the national and world systems of Oriental Medicine.

Part 4: Recommendations

1. The role and importance of medicinal plants in protecting human health have been increasingly recognized in the international arena.

While many studies on the exploitation and application of medicinal plants have been conducted, very few if any have focused on the scientific methods of growing, tending and processing medicinal plants.

Local villagers cultivate and prepare medicinal plants on the basis of their own experiences and without formal scientific training. They are therefore faced with many constraints in improving productivity and quality, and are unable to prevent or control a number of fungal diseases.

We are badly in need of a science-based methodology for growing, tending and processing medicinal plants. Those equipped with practical know-how are ready to cooperate with all agencies and individuals who are concerned about this issue.

2. At present, there is no specific Government policy aimed at encouraging the development of medicinal plants. Although pharmaceutical materials produced by the villagers are being marketed in different forms, they are floated in the market at the mercy of private traders.

The villagers are of the view that in a market mechanism, the Government does not provide subsidies, but that the Government should formulate regulatory plans and directly procure from producers such materials needed by its medical and pharmaceutical institutions.

For instance, the Government should instruct concerned government agencies, medical and pharmaceutical institutions and state-owned enterprises having capacity for investment and cooperation with foreign countries, to join hands in finding stable outlets for pharmaceutical products. Subject to available capital, the Government should also set up a centre in or near Nghia Trai village to procure and process medicinal plants, and to provide medical treatment with oriental medicines.

3. Pharmaceutical materials are floated in the free market in terms of both price and quality.

For preservation purposes, the majority of pharmaceutical materials are treated with sulphur, which is hazardous to the environment and human health. After treatment using rudimentary tools and methods, pharmaceutical materials are mixed with impurities and sulphur residue. A number of profit-craving private traders even substitute real pharmaceutical products with fake materials. Such activities are directly harmful to the health of consumers, discredit producers and destabilize market prices.

To protect the legitimate interests of both producers and consumers and to ensure law and order in the market, the Government is recom-

mended to appoint a competent agency in charge of quality control regarding pharmaceutical products, and promulgate specific regulations governing the aforesaid issues.

It is further suggested that a specialized office from the State be established to undertake the following responsibilities:

1. Gather and record information on domestic consumption of medicinal products, including national and international demand.

2. Manage medicinal plants harvesting and cultivation in the domestic market. This includes setting up the amount that should be produced by farmers and harvested in the wild, and the selection of suitable lands for cultivation of medicinal products.

3. Plan and regulate cultivation according to national demand, and coordinate import quantity and quality.

4. Invest part of the budget in the improvement of the processing methods at the farm site, so those products meet quality standards. Alternatively, processing and distribution centres could be established.

5. Monitor quantity and quality of products sold in domestic and international markets.

CHAPTER 9

SOME OPINIONS ON THE CURRENT STATUS AND DIRECTIONS TOWARDS COMPLETING VIET NAMESE LEGAL REGULATIONS ON PROTECTING GENETIC RESOURCES AND INDIGENOUS KNOWLEDGE

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Viet Nam has a rich and diversified ecological system, with various plant and animal species and an abundant heritage of resources. For thousands of years, the Viet Namese people have relied on natural resources, especially biological resources. This dependence will continue indefinitely into the future. In Viet Nam and most countries in the world, agricultural, forestry and aquatic produce are exploited from biological diversity.

Today, all countries in the world, including Viet Nam, understand the enormous economic, scientific, cultural, and social values of biological diversity in the development of each nation and all mankind. At the same time, countries are fully aware of their heavy responsibilities in protecting biological diversity, which is being seriously deteriorated throughout the world.

Many nations have ratified the Convention on Biological Diversity and have set up national action plans on biodiversity protection.

Protecting genetic resources and indigenous knowledge is one of the key tasks in biological diversity protection in each nation.

With this paper, I wish to provide some views on the current status and direction toward completing the legal system in Viet Nam in protecting genetic resources and indigenous knowledge.

I. Current status of Viet Nam's legal regulations on protecting genetic resources and indigenous knowledge

In the early years after the liberation of North Viet Nam, in parallel with restoring the economy in the post-war period, the State of Viet Nam took the first official steps to preserve nature. Tens of thousands of people were employed as forestry rangers in every part of the country. Many plant and animal protection measures and development programs for agriculture, forestry and aquaculture were implemented.

In the following years, especially during the implementation of the renovation policies, general measures to protect the environment were

taken, including those to protect biological diversity. In 1985, the national conservation strategy was drafted and in 1991, the Government adopted the national plan on environmental protection and sustainable development for the period 1991-2000. After the State of Viet Nam ratified the Convention in 1995, the Government promulgated the Action plan on Protecting Biological Diversity in Viet Nam.

In addition to these strategies and plans, matters related to the setting up of competent state bodies to ensure implementation were also addressed, for example the establishment of the Ministry of Science, Technology and Environment (MOSTE) at the central level and the Departments of Science, Technology and Environment in centrally administered provinces and cities.

In the above-mentioned measures, strategies and plans, the necessity to protect genetic resources was directly or indirectly affirmed.

The protection of biological diversity in general and genetic resources in particular have been reflected at different levels and in different forms in many legal documents issued by competent State authorities. Among the current legal documents on or related to the protection of genetic resources, the following should be noted:

- The 1989 Ordinance on Aquatic Resources Protection and Development, and a host of legal documents to guide implementation of the Ordinance;

- The 1991 Law on Forest Protection and Development, and a host of legal documents to guide its implementation.

- The 1993 Ordinance on Phyto-sanitary Protection and Quarantine, and a host of legal documents to guide its implementation.

- The 1993 Ordinance on Veterinary Practice, and a host of legal documents to guide its implementation.

- The 1993 Law on Environment Protection, and a host of legal documents to guide its implementation.

The following are the main contents of the above-mentioned legal documents:

1. Aquatic resources protection and development

The legal documents on protecting and developing aquatic resources have made clear that:

- Organizations and individuals have the right to exploit natural aquatic resources in accordance with the law, and are allocated defined waters on a long or short term basis in order to breed and appropriately exploit aquatic products so as to protect and develop aquatic resources;

- Any act that causes harm to the resources and habitat of aquatic creatures, contrary to the protection and development of aquatic resources is prohibited.

- Any act of damaging aquatic resources or polluting the habitat of aquatic creatures is prohibited;

- Fishing is prohibited in mating, nursing and rearing areas of aquatic creatures;

- Catching or selling aquatic products that are of high economic value, are precious or scarce, or in danger of extinction (on the list of protected species) is prohibited.

- The import of new aquatic breeds into Viet Nam, moving and domesticating aquatic breeds may be done only by permission of the Ministry of Fisheries.

- Organizations and individuals engaged in producing and trading aquatic products can benefit from the material value that they have created, can transfer or sell their work, and are responsible for protecting and developing the aquatic resources, paying the relevant taxes and abiding by other legal obligations.

The legal documents have also made clear the responsibility of state agencies at various levels, and of organizations and individuals in the protection and development of aquatic resources, including measures establishing reward and punishment to encourage the observation of state regulations on protecting and developing aquatic resources.

2. Forest protection and development

The legal documents on protecting and developing forests have the following main contents:

- Every state agency, organization and individual has the duty to protect and develop the forest, as well as to protect the ecological environment.

- Any act of damaging forestry resources is prohibited.

- Agencies at the central level and people's committees at all levels are tasked with the management of forests; social and economic organizations, people's armed forces, private enterprises, cooperatives, production groups and individuals are also allocated forest land in accordance with the State's plans and policies.

Responsibility for forest protection is identified as follows:

- People's committees at all levels have the duty to organize the management and protection of forests, prevent and fight against any violation of laws in this connection, conduct measures to protect, breed and develop

forest plants and animals, protect water resources and forest soil, and resist erosion.

- The exploitation of forest plants and animals must comply with the state's regulations on the management and protection of forest plants and animals.

- Any act of destroying forests such as illegal burning, trespassing or exploiting forests, illegal trading and transportation of forestry products and animals or grazing cattle is prohibited.

- Forest owners must prevent and control forest fires, and are to be held responsible for fires that do occur; they must undertake steps to prevent and control insects that bring diseases to the forest.

- Long-term activities in the forest or any act that might be harmful must be authorized by the forest owner, and any damage must be compensated.

- The Ministry of Agriculture and Rural Development (MARD) must approve any act of exporting forest plants and animals.

- Any act of importing forest plant seeds and animal breeds must comply with biological principles, follow quarantine regulations, must not cause harm to the ecological system, and must be approved by MARD.

With regard to forests for special use

Forests for special use are mainly for the preservation of nature and specifically the preservation of forest genetic resources. They are to serve scientific research, protection of historical and cultural heritage and vestiges and famous sights, as well as tourism.

There exist regulations with regard to forests for special use, under which permits are required before certain activities can take place. The management boards of the forest give permission, and their terms are set out by regulation. If there is need to take samples of plants and animals in the forest for research purposes, approval from the state forestry management body must be sought.

With regard to forests for production purposes

All forestry bodies at the central and local levels have the duty to plan and build the national forest system and forestry areas in which the selection, breeding, crossing, multiplication and import of necessary plant seeds for production are carried out; the exploitation of specialties in forests for production purposes as well as in other forests must follow the State's regulations on the management, protection, development and use of forest specialties.

Forest owners' rights and obligations include the following:

■ They must use the forest on a long-term and stable basis, according to their own production and business plans and in conformity with the provisions of the law.

■ They are entitled to be compensated for their work and investment. They can pass on, transfer or sell the achievements of their work and investment in accordance with the law.

■ They are entitled to compensation or refund when the allocated forestry area or land for planting forest is taken back.

■ They are entitled to be provided with technical instructions, financial support and to benefit from public projects for protecting and upgrading forests and lands for afforestation.

■ They are entitled to protection by the State of their lawful rights and benefits arising from their role as forest owners.

3. Phyto-sanitary protection and quarantine

Legal documents on phyto-sanitary protection and quarantine provide the following measures to prevent harm by and to control creatures that cause harm to the fauna and flora, people's health and the ecological environment:

• The State encourages organizations and individuals to invest in the prevention and control of creatures that cause harm to the fauna and flora, as well as in the production and trade of *plant protection chemicals*.

• Any act that causes harm to the fauna and flora, people's health and the ecological environment is prohibited.

• Detailed regulations on the rights and obligations of agencies, organizations and individuals that own the flora have been issued in order to prevent and control creatures causing harm to the flora.

• Measures, procedures, rights and obligations in the field of phyto-sanitary quarantine are stipulated.

• Any act of bringing into Viet Nam or spreading plants appearing on the published list of those species of products that are subject to phyto-sanitary quarantine among regions in the country, or other harmful creatures is prohibited.

• Conditions and procedures for the production, trade and control of *plant protection chemicals* are provided.

• Measures of reward and punishment with regard to the observation of legal rules on phyto-sanitary protection and quarantine have been stipulated.

4. Veterinary practice

Legal documents on veterinary practice include stipulated measures for the prevention and control of animal diseases, animal and animal products quarantine, control over slaughter and sanitary inspection of animal products, control of medicines and micro-organisms used in veterinary practice.

Animal quarantine is applied to both wild and domestic animals. In the field of veterinary medicine, modern scientific achievements are used in combination with traditional experience.

The responsibilities of agencies, organizations and individuals, owners of domestic animals, and carriers in the prevention and control of animal diseases, as well as measures of reward and punishment with regard to observing legal regulations in the veterinary field, have been made clear in the laws.

5. Environmental protection

The Law on Environmental Protection provides that organizations and individuals are responsible for protecting species of wild plants and animals to maintain biological diversity (i.e. the diversity of genes, plant and animal breeds as well as the natural ecological system); the exploitation of plant and animal resources must comply with regulations on timing, place, methods and means, and must ensure the recovery of plants and animals in terms of density and species, and must not cause any ecological imbalance.

The Environmental Protection Law affirms that fauna, flora and the ecological system are parts of the environment and need to be protected. In fact, protecting all other parts of the environment such as soil, water, air, forests, mountains, rivers, lakes, the sea, natural areas, etc., contributes to the preservation of biological diversity and the ecological system.

The system of documents to guide implementation of the Environmental Protection Law is aimed at putting the regulations into concrete terms and ensuring the implementation of these regulations, including those on the protection of biological diversity and the ecological system.

In the system of regulations on biodiversity protection, the role of the "Action Plan on biodiversity protection in Viet Nam", adopted by the Prime Minister in his Decision No.845/TTg and dated 22nd December 1995, needs to be highlighted.

The Plan made an impartial assessment of the real situation in the protection of biodiversity in Viet Nam.

The Plan's long-term objective is to protect the diversified and typical biodiversity in Viet Nam.

The immediate objective is to protect those representative Viet Namese ecosystems that are vulnerable to contraction or destruction as a result of humankind's economic activities, to protect components of biodiversity that are under threat due to overexploitation or ignorance, and to develop and identify the values of biodiversity components on the basis of sustainable development of natural resource values in support of economic targets.

The main contents of the Plan cover a series of measures on:

- Policies and laws
- Establishing and managing conservation areas
- Improving public awareness
- Promoting potentials and training cadres
- Scientific research
- Addressing social and economic issues of the plan, and
- International cooperation.

Among these measures, special attention needs to be paid to the following:

- Set up banks of floral genes, domestic animals and micro-organisms.
- Supply genetic materials for cross-breeding and selection of breeds in support of economic targets, as well as for protection of natural genetic resources.
- Enhance capacity for zoos so that they can become places for sightseeing, training, raising environmental awareness, scientific research, conserving wild animals in danger of extinction and if possible, returning these kinds of animals to natural conservation areas.
- Increase measures to protect agricultural biodiversity, bringing into force "farm conservation" models so as to attract farmers to common protection efforts. Special attention should be paid to protecting traditional plant varieties and animal breeds which have long adapted to geographical conditions and local climate, and are popular throughout the country.

6. Management of plant varieties

This issue is provided for in Government Decree No.07/CP dated 5th February 1996 on the management of plant varieties.

It was affirmed in this Decree that:

- Genetic resources for selection of breeding and cross-breeding are national property and under management by the State, and shall be protected through the efforts of assigned scientific research agencies.

- The State encourages organizations and individuals to seek, exploit, exchange, protect and further diversify genetic resources that are helpful for national well-being.

- The Ministry of Agriculture and Rural Development (MARD) stipulates a list of rare and precious genetic resources, and administers regulations on the exchange, exploitation and utilization of those included in the list.

- MARD stipulates, and periodically makes public, the list of precious and rare plant varieties and breeding materials which are not allowed for export.

- MARD manages the collection and conservation of genetic resources, conducts research on the selection of breeds and breeding, recognizes new breeds and varieties, carries out quarantine measures, controls the quality of plant varieties, and is responsible for organizing activities related to plant varieties- throughout the country.

- MARD has submitted a plan on the management of genetic resources. This plan will set Viet Namese standards on plant seeds and seedlings.

The decree also defines specific responsibilities of competent agencies at all levels, organizations and individuals involved in production and business activities, and the rights of the creators of new plant seeds to be registered with the Ministry of Science, Technology and the Environment for patent protection in accordance with the law.

Based on the contents of the above-mentioned documents, some preliminary comments are appropriate as follows:

- The State of Viet Nam has paid attention to the protection of biodiversity in general and genetic resources in particular. State policies have been formulated and reflected in legal documents at an early stage, and have since been made more comprehensive and concrete.

- In the past, the subjects of biodiversity protection and genetic resources have been addressed by legal documents in many fields, but are now concentrated mainly in documents relating to the protection and development of marine resources, forestry, phyto-sanitary protection, management of plant and animal varieties and environmental protection.

- The current legal provisions on the protection of genetic resources in each field are general and set out principles only; they include insufficient detail and there are some overlaps and contradictions among them. This must be addressed so as to ensure consistency and efficiency in implementation.

- Legal documents made to date mention very little about the protection of indigenous knowledge, and there are no specific guidelines for such protection.

- The genetic resources contained in Viet Namese medicinal herbs have great potential. However, some gaps exist in the issues regulated by the Ministry of Health. For example, existing laws regulate only with regard to general plan orientation and principles. Also, there are no legal documents or guidelines specifically designed to regulate exploitation, utilization and preservation of medicinal herbs in accordance with their specific conditions, or to meet the need to protect and harness the traditional knowledge of medicines of all ethnic groups located in the Viet Namese territory.

- The issue of authorship rights protection for individuals and organizations that create new varieties is not adequately provided for in current legal documents so as to encourage and protect the legitimate rights and interests of authors. Relevant legal papers set only general principles and mention the authors' rights of organizations and individuals that create new plant seeds, but not the authors' rights of those that create new animal varieties.

- For various reasons, current legal documents still do not mention the issue of intellectual property rights for new animal and plant varieties and micro organisms - the products of biotechnology and indigenous knowledge. This is one of the biggest gaps in the current Viet Namese law on the protection of genetic and traditional knowledge.

- In some fields, such as the development and management of forest and marine resources, legal documents stipulate the linkages between biodiversity protection and communities, organizations, and individuals. However, benefit sharing as currently practiced among communities, organizations and individuals results in inequities.

II. The direction for completing the Viet Namese law on protection of genetic resource and indigenous knowledge

As stated in Part I, the system of legal documents of Viet Nam on the protection of biodiversity in general, genetic resources and indigenous knowledge in particular should take into account the following fundamental factors:

- Legal documents should be integrated, comprehensive, synchronized, rational, clear, concrete and appropriate to the specific conditions of each field.

- The functioning of state management should match market mechanisms and meet the demands of the commercialisation process.

- Each sector, locality, organization and individual should be linked with the relevant activities aimed at protecting biodiversity, genetic resources and indigenous knowledge, on the basis of proper handling of relations between the state and the local community.

- The effectiveness and efficiency of the system of legal regulations must be ensured; severe penalties must be imposed against violations of the Law on biodiversity protection, genetic resources protection and indigenous knowledge.

- National interests should be protected; at the same time, international commitments on biodiversity and environment protection must be fulfilled.

In line with the above-mentioned guidelines, the following concrete measures must be studied and taken as early as possible

- In the immediate future, amend and supplement the Ordinance on Protecting and Developing Aquatic Resources, the Ordinance on Forest Protection and Development, the Ordinance on Phyto-sanitary Protection and Quarantine, and the Veterinary Ordinance, in order to provide clearer and more adequate regulations on protection of both plant and animal genetic resources, and the protection of local knowledge.

The need to upgrade these Ordinances into Law is not urgent; however, it is necessary to update some articles in order to meet practical demands.

- Quick work must be done to ask the Government to issue the Decree on the protection of property rights and intellectual property over new plant breeds. Attention should be given to drafting the Decree on the protection of property rights and intellectual property over new varieties.

The question of the protection of intellectual property rights over new plant and animal varieties, although recognized nominally, needs to be addressed more concretely. If these rights are to be recognized, it may be desirable to encourage creativity and investment in producing useful new varieties.

However, relevant legal regulations must be issued so that advantage cannot be taken of this issue. For example, owners of rights should not be allowed to use new breeds carelessly, so that negative impacts on environment, biodiversity and genetic resources protection are avoided.

- These changes should be submitted to the Prime Minister for approval at the earliest possible date, so that the Regulation on safe management of genetic modification of animals and their products can be introduced.

Research and development, management, transfer, transport, utilization and animal genetic modification as a result of advanced biotechnology and their products, might cause an adverse impact on the preservation and sustainable utilization of biodiversity, as well as on environment and human health. Therefore, strict rules for the management of these activities must be prescribed in a legal document.

- In order to respond to urgent situations, a decree on herbal protection and exploitation and knowledge of traditional medicine should be pre-

pared for submission to the Government. In the long run, codes on this important issue need to be developed.

Viet Nam is endowed with abundant plants that its people have been using and can use as medicine. This is a valuable natural resource. However, for various reasons herbal medicine has not been reasonably exploited and utilized.

Over past decades, hundreds of medical herbals have been continuously exploited in the absence of an afforestation plan. As a result, many species of medical herbals have become extinct. Forest fires and increasing deforestation led to an unfavourable environment for many species to exist; biodiversity of medical herbals is being phased out.

It is therefore necessary to issue a legal document in this regard. At a minimum and for immediate needs, a quick governmental decision is required so as to allow administrative decisions to meet urgent needs.

After several years of implementation, this document will be changed into an Ordinance or Law. The legal document must include the protection of rights and interests of local populations and individuals to grasp knowledge on medical herbals and traditional medicine.

Further studies must be conducted to continue improving the legal system on environment protection, including regulations on biodiversity protection. The possibility of drafting and introducing an Ordinance or Law on biodiversity should be raised.

Active political support, an adequate legal framework and legal guarantees (defining, for example, who may legally grant a license) will be conducive to successful implementation.

The formulation of macro policies such as a national biodiversity inventory, information management systems, investment in science and technology and priorities for action, will provide a more favourable scenario for biological prospects.

The current Law on Environment Protection remains at a basic level, with content that is too general. Special cases are not stipulated in existing legal documents; others are mentioned but not implemented. Furthermore, some cases are not likely to be implemented due to lack of enforcement systems.

In the course of drafting legal documents and guidelines to implement the Law on Environmental Protection, we found that the responsible Government Ministries or branches have not concretised many issues. It is necessary to issue some regulations at the higher level (i.e., by the National Assembly) in order to address these matters, as well as to synchronize them with the organizational structure of the State. The State law and code should regulate these issues.

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CHAPTER 10

ORGANIC FARMING IN VIET NAM: THE CHALLENGES AND OPPORTUNITIES

By Prof. Nguyen Van Bo,
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Introduction

Organic agriculture has attracted increasing attention over the last two decades in the developed countries, because it has the potential to provide benefits in term of environmental protection, conservation of non-renewable resources, and improved food quality that meets market standards.

Some European governments encourage the adoption of organic agriculture by providing direct financial support or assistance for research and marketing initiatives.

In spite of great efforts, the organic agriculture sector is still very small, comprising less than 0.5 per cent of the agricultural output in most countries; for example, in both Germany and Austria the figure is 2 to 3 per cent. The main consumers of organic agricultural products are (in terms of value expressed in 1997 USD) the USA: $4.2 billion, Germany: $1.8 billion, Japan: $1 to 1.2 billion, France: $720 million, England: $450 million, Denmark: $300 million and Sweden: $110 million.

What is Organic agriculture?

Organic agriculture is an integrated system of crop management, allowing the components of the production process (soil, water, energy, nutrients and the biological cycle) to interact optimally in order to produce not only products of high quality and hygienic standards, but also high income for farmers, while keeping the production system sustainable in terms of environment, economic and social factors. According to this definition, organic agriculture can be understood as ecological agriculture.

"Organic farming is an approach to agriculture where the aim is to create integrated, humane, environmentally and economically sustainable agricultural production systems, which maximize reliance on farm-derived renewable resources and the management of ecological processes and interactions, so as to provide acceptable levels of crops, livestock and human nutrition, protection from pest and disease, and an appropriate return to human and other resources employed". (N.H. Lampkin, 1994)

As such, the focal point of organic agriculture is sustainability (meaning both conservation of non-renewable resources - soil, minerals, and energy - and economic, social, and environmental sustainability). The

term "organic" refers not to the type of input (mostly fertilizers) used, but to the concept of the farm as an organism, in which all the components, including soil minerals, organic matter, micro organisms, insects, plants, animals and humans, - interact to create a coherent whole. However, in Viet Nam there is a misunderstanding about the differences between "ecological" or "safe" agriculture and "organic" agriculture. Up to now there is no official definition of these terms. For scientists, it is accepted that organic agriculture is a component of ecological agriculture.

The key characteristics of organic agriculture are as follows:

- Protecting the long-term fertility of soils by maintaining organic matter levels, fostering soil biological activity.
- Providing crop nutrients indirectly by using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms and nutrients from the soils and irrigation (alluvium).
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock wastes.
- Nutrients can be served in organic manuring, organo-mineral complex form through root or soluble form thought the leaves.
- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, biological pesticides and resistant varieties.
- Careful attention to the impact of the farming system on the wider environment, and conservation of wildlife and natural habitats.

According to these criteria, Viet Nam was, until the 1960s a country of organic agriculture. The main organic sources used as fertilizers are farmyard manure, ash, azolla and other green manure, and crop residues. In addition, irrigation with alluvium water is also a good measure for providing nutrients for crops and sustaining soil fertility.

Organic agriculture: Challenges and Opportunities

Challenges:

Land resources in Viet Nam are limited in quantity and soil fertility has been severely reduced, especially on uplands.

During the second half of the 20th century Viet Nam's population increased threefold, reaching 77.6 million people in 2000 with an annual growth rate of 1.8 per cent. It is expected to reach 100.8 million in the year 2015. Because of the high population growth rate, over the last 20 years (1980-1999) the per capita agricultural land area and rice-growing area decreased by 18.7 per cent and 47.7 per cent, respectively. The same tendency can be seen over the world.

Farmers are reluctant to convert to organic agriculture because of

the high cost of production, lower incomes due to unsustainable premium markets for organic agriculture products. This mainly relates to low content of nutrients, the high transportation cost of organic fertilizers and high demand of crop in fertilization. For meeting crop requirements (mostly now high yielding varieties), farmers have to apply high volumes of organic fertilizers in replacing chemical ones. According to our estimation, on average, recommended dosage of chemical nutrients for rice is 200kg an equivalent amount of nutrients would be obtained from 25-30 tons of farmyard manure (FYM), that nobody can afford. In addition, in some seasons (winter and early spring), the decomposition rate of organic fertilizers is very low, so there will be a deficit of nutrients in the beginning of the growth period, leading to low yield. For some crops a zero yield is possible if chemical fertilizers are not used, even for highly fertile soil (see appendix 5). At the same time, there is no guarantee on organic product pricing, so farmers are not able to sell their product at a high price.

Cropping systems are changing more and more towards maximum yields, leading to more intense nutrient input-output balances, with the result that only combined organic-inorganic fertilization can sustain high crop yields. The best ratio of nutrients from organic and inorganic sources is 30 to 70 per cent. Our estimation shows that, organic fertilizer (FYM) can increase paddy yield by only 0.5 tonnes compared to 1 to1.7 tonnes in the case of chemical fertilizer application or 1.8-2.5 tons in case of chemical and organic fertilizers combined.

Complicated and expensive systems of product certification also have negative impacts on the development of organic agriculture.

Organic agriculture, like other farming systems can have harmful effects on the environment through accumulation of heavy metals, toxic micro organisms (e.g. ascarid eggs, or spread of e.Coli when farmers use uncomposted farmyard or human manure), and eutrophication of lakes, bays and flowing water bodies. Long-term studies show that, the sources of most nitrate leaching are organic matter and crop residue (rice straw, corn stalks or legume stem and leaves) is used at a high rate and for a longer time.

Based on the above, will organic agriculture help ensure food security and export targets for Viet Nam? Research seems to indicate that the answer is "no". In 2000, Viet Nam produced 35.7 million tonnes of food in rice equivalent, 1 million tonnes of sugar, 700,000 tonnes of coffee and 70,300 tonnes of tea. We exported 3.47 million tonnes of rice, 733,900 tonnes of coffee (including reserve), 273,400 tonnes of rubber (dry latex), 76,200 tonnes of groundnuts, 55,600 tonnes of tea, 37,000 tonnes of pepper and US$213 million worth of fruit and vegetable. Of this amount, very little consisted of organic product.

In order to fulfil targets for food security and export, Viet Nam has been using more than 5 million tonnes of chemical fertilizers annually, of which, 3.2 million tonnes is imported (e.g. urea and NPK). Providing this amount of nutrients in form of organic fertilizers is impossible. Based on estimates of total animal heads in Viet Nam (2.95 million buffalo, 4.06 million cows, 18.86 million pigs and 179 million poultry), a maximum 60 million tonnes of farmyard manure can be produced, enough for approximately 20 per cent of the total nutrient demand of all crops. China, with its very long history of organic farming, has also had to increase the rate of use of inorganic fertilisers.

Opportunities for organic agriculture in Viet Nam

Organic agriculture cannot ensure food security, but it can contribute an increasing role in providing some safe product for local consumption and export, especially when the Government has a target of diversified agricultural production and increasing the value of production.

While Viet Namese farmers have a long history of organic farming, they also have a habit of using many kinds of inorganic fertilizers for crops. Eating vegetables containing pesticide residues has poisoned increasing number of people. In response, the Ministry of Agriculture and Rural Development, and departments of agriculture and rural development in big cities such as Ha Noi, Ho Chi Minh City, Haiphong, and Dalat have launched programmes for producing organic and safe vegetables. The area of safe and organic vegetables of Ha Noi, Ho Chi Minh City, and Haiphong accounts for 5.46 per cent, 1.42 per cent and 0.3 per cent of the total vegetable growing areas of these cities respectively (table 9).

Unbalanced and overuse of inorganic fertilizers cause threats to ecological safety. In the coffee and vegetable growing areas, research results show the symptoms of nitrate accumulation in ground water.

Health concerns over pesticide residues and other food quality issues are the daily problem of Viet Namese people.

Recognizing the comparative advantages of agro-ecological conditions, potential organic products are as follows:

- In urban areas: Vegetables, fruits, spices and flavour vegetables, animal husbandry products (meat, eggs and milk).

- In the mountainous provinces: Tea, coffee, pepper, fruits, medicinal plants, forest specialties and husbandry products.

For the purpose of ensuring production of organic products in Viet Nam, the following conditions are needed:

- Creation of crop and animal varieties of high productivity, good quality, high resistance to pests, diseases and unfavourable conditions.

- Organic recycling should be rigorously applied (by means of inclusion of a green manure crops in cropping systems, rotation with leguminous plants, planting green manure plants as hedgerows and incorporation of crop residues of the former crop in subsequent crops).

- Increasing organic sources through the use of mineral fertilizers, especially on uplands.

- Use of integrated crop management (including integrated soil management, integrated water management, integrated pest management and integrated nutrient management) with emphasis on application of microbial fertilizers (nitrogen fixation, phosphorous and cellulose decomposing fertilizers), slow release fertilizers, biological pesticides and natural predators.

- Establishment of an organization for organic product certification.

Conclusions

For centuries, Viet Namese farmers have been using organic fertilizers like farmyard manure, night soil, composted crop residues and different kinds of green manure for improving their fields. It is clear that organic fertilizers are an irreplaceable factor in improving soil fertility, creating an appropriate base for obtaining high crop yield, and increasing product quality.

However, due to high population pressures and limitations on available cropland, organic farming is not guaranteed to ensure Viet Nam's food security. Viet Namese agriculture has turned from a soil/organic fertilizer-based system to an energy/chemicals-based system. Intensive farming has made remarkable progress in the last two decades, transforming Viet Nam from a food-importing country to the second-largest rice exporter in the world.

In a long-term strategy, in order to ensure food security (at the national and household level) and export targets, Viet Nam will have to continue implementing intensive farming. However, due to some advantages of agro ecological conditions, the appearance of new technologies and markets for organic agricultural products, Viet Nam should also produce some organic products. Although many difficulties still have to be overcome, there is still a future for organic agriculture in Viet Nam.

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Tables

Table 1. Changes in per capita land area in Viet Nam (hectares)

Item	1980	1990	1999
Agricultural land	1,292	1,056	1,051
Paddy land	1,042	620	545

Source: General Statistical Office of Viet Nam

Table 2. Rice Variety and their nutrient uptake

Variety	Yield,	Uptake, kg/ha		
	Tonnes/ha	N	P_2O_5	K_2O
Chiem chanh	1.40	25,2	9,6	
Chiem bau	1.13	19,3	6,9	
Ba trang	0.86	14,6	5,7	
Mo	1.07	16,8	7,5	
DT10	5.0-5.5	100-120	40-50	100-120
Hybrid	6.5-7.0	150-180	70-80	180-200

Source: Program 02A-06-01, 1990; NISF, 1995

Table 3. Organic fertilizer efficiency for rice on alluvial soils in 1959-1961 (low yield traditional variety)

Rate of farmyard manure	Yield, tones/ha		
(FYM), ton/ha	1959	1960	1961
No fertilizers (bare plot)	1.74	1.75	1.50
10 ton FYM	2.58	2.50	2.50
20 ton FYM	2.94	2.59	2.50
50 ton FYM	3.44	3.39	3.00

Tran An Phong, 1963

Table 4. Fertilizer efficiency for rice (improved variety) on alluvial soils

Treatment	Yield, tonnes/ha	
	Spring season	Summer season
No fertilizers (bare plot)	4.14	3.74
FYM	4.73	4.22
NPK	5.78	4.74
FYM + NPK	6.53	5.37

Table 5. Fertilizer efficiency for maize

Treatment	Yield, tonnes/ha	
	Alluvial soils	Degraded soils
No fertilizers (bare plot)	0.45	0.44
FYM	0.40	0.45
NPK	3.45	4.21
FYM + NPK	4.33	4.79

Table 6. Nutrient sources in China

Years	Total $N+P_2O_5+K_2O$ million tons	Source of nutrients	
		Organic fert.,%	Inorganic fert.,%
1949	4.34	98.6	1.4
1956	8.78	97.4	2.6
1965	9.13	89.7	19.3
1975	16.03	66.4	33.6
1983	28.62	42.0	58.0
1990	37.66	38.0	62.0

Source: Linbao, 1995

Table 7. Fertilizer consumption in Viet Nam, 1999

		1000 MT
1.	Urea: Total	1,940
	- Local Production	50
	- Import	1,890
2.	SA (import)	500
3.	DAP (import)	545
4.	NPK	1,134
	- Local Production	1,000
	- Import	134
5.	MOP (Imported)	712
6.	SSP/FMP (Local production)	1,050
7.	Plant Protection Chemical	34.3

Source: MARD

Table 8. Chemical fertilizers consumption in Viet Nam

Year	Total cropped area, 1000ha	Consumption, 1000tonnes			$N+P_2O_5+K_2O$ kg/ha
		N	P_2O_5	K_2O	
1990	9,040.0	450.3	53.8	24.6	58.5
1995	10,496.9	775.5	348.0	141.2	120.5
1999	12,663.0	1,176.5	605.0	517.7	181.5

** Average for 1 ha cropped of all agr. crops*
Source : Agricultural Statistics of Viet Nam and MARD

Table 9. Vegetable area in some cities (1998)

City	Total vegetable area, ha	Of which: area with safe vegetable	
		Ha	% of total
Ha Noi	7,700	421	5.46
HCM city	10,600	151	1.42
Haiphong	9,000	28	0.31
Danang	1,600	12	0.75
Dalat	-	14	-

Source: Research Institute of Fruit and Vegetable (unpublished)

CHAPTER 11

DEVELOPING ORGANIC AGRICULTURE IN VIET NAM

By Dr. Nguyen Dac Hy and Dr. Tran Hong Ha,
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Viet Namese agriculture, with its 4000 year history, is organic agriculture by its very nature. Before 1954, except for some French run farms that used machines and mineral fertilizers, Viet Namese farmers didn't know how to use chemical fertilizers and pesticides.

All crop varieties were local and traditional. They included:

- Tall rice varieties that did not require much fertilizer, but were resistant to pests and diseases, tolerant to local climatic conditions, and were of high quality. Examples include Tam Xoan, Du, Di Huong, Yellow Flower sticky rice, etc. Most of these varieties were more or less aromatic.
- Specialty fruit species such as cased longan in Hung Yen, Thieu litchi, Doan Hung pomelo, Ngu banana, mango, durian in the South.

Mainly organic fertilizers were used such as muck, compost from human manure, night soil, unrine and many green manures such as azolla, lowland sesbania, and upland legumes. Besides, Viet Nam farmers also used mud from ponds to manure fruit-trees, and alluvial water to provide nutrient for crop plants.

Since 1960, especially after the liberation of South Viet Nam, intensive farming with new crops and crop varieties have been promoted. As irrigation systems were developed, the irrigated area increased. The usage of mineral fertilizers and pesticides has increased rapidly. As a result, the yield of rice and other crops has also increased from year to year. During the last two decades, as a consequence of better management, food production in Viet Nam has doubled from 14.4 million tones in 1980 to 31.85 million tones in 1998, when Viet Nam become the second biggest rice exporter in the world. These achievements in agricultural production have increased the prestige of Viet Nam in the international arena.

The introduction in the 1960's and 1970's of short culms wheat and rice varieties in Latin America and Asia, often referred to as the "green revolution", allowed a seven-fold increase in food production and a four-fold increase in irrigated rice. However, the green revolution has also had negative influences, which give useful lessons to scientists, managers and policy makers.

The popularisation of a few wheat and irrigated varieties has caused the loss of many local traditional varieties, decreasing biodiversity and

increasing the crop losses caused by pests and diseases. In the last years of the twentieth century the number of rice varieties grown in 75 per cent of all rice areas was twelve; in 70 per cent of the Philippines' rice area, the number is three to five. In Viet Nam, the diverse local traditional rice collections consisting of hundreds of varieties in the Red River delta were replaced by some ten to fifteen "improved" and hybrid rice varieties.

The misuse of mineral fertilizers and agrochemicals had a negative effect on the environment. As estimated, crops use only about half of the total fertilizers; the other half is lost due to vertical penetration, evaporation and run-off, causing environmental pollution and contributing to global warming and climate change. For the same reason, a large amount of pesticides do not reach pests and diseases, instead cause soil, water and air pollution.

These pesticides stimulate the formation of pesticide-resistant races or strains. The most direct and dangerous effect is food contamination, poisoning millions and killing hundreds of people.

To overcome the shortcomings of the green revolution and industrialized agriculture, very recently many countries have begun to return to organic agriculture, which is gaining an important position in society and in the market. Organic agriculture ("OA") is also sometimes called "ecological agriculture" (EA) Lower amounts of chemicals and higher amounts of organic matter are used. Besides, organic agriculture tends to use more economic techniques like mini tillage, shallow plugging, conserving soil texture, and using inputs effectively to reduce production costs and increase product quality.

The central point of OA is to create conditions for farmers to initiate agrarian systems suitable to ecological conditions in their localities. Domestic Producer must produce safe food and increase the quality of life for the farmers, provide food for consumers, as well as a healthy environment.

Viet Nam's definition of organic agriculture

As mentioned above, Viet Namese traditional agriculture was organic. However, up to now no commonly agreed definition of OA exists in Viet Nam. Various authors have proposed different definitions.

Mr. Nguyen Van Chuong (1997) considers traditional Viet Namese agriculture as authentically organic, because all basic and vital elements for cultivated species were provided by application of organic materials.

Mr. Nguyen Van Man wrote that OA is a clean and sustainable agriculture that ensures sustainable economic development and makes little distinction between rich and poor, conserving natural resources, ecological environment by application of indigenous knowledge (IK) with the most advanced modern technologies in biology and biologically intensive

cultivation, minimizing the use of agrochemical, as well as bearing deep cultural and humanitarian characters, creating opportunities for all society members to develop their talent most.

Mr. Nguyen Thanh Hien and Mr. Peter Stewart (1997) demonstrated the various aspects and merits of OA like maintaining humus level of the soil, balancing necessary nutrients, protecting farming ecosystems from contamination with toxic residues, especially pesticides, heavy metals and nitrates, by using integrated pest management (IPM) to produce clean and safe products.

Mr. Bui Tam Trung (1997) indicated that "organic agriculture being also biological agriculture" is a sustainable approach to agriculture because it tends to maintain and improve soil fertility, which also means increasing yield in an area unit.

Other authors like Mr. Duong Hong Dat, Mr. Ton That Chieu and Mr. Nguyen Viet Pho have expressed OA variously as ecological agriculture, clean agriculture, sustainable agriculture, and traditional agriculture.

Thus, according to prestigious scientists in Viet Nam, organic agriculture is an ecological approach to agricultural production characterized by safety, sustainability, high quality and high productivity, requiring integrated application of indigenous knowledge (IK) and advanced technologies. It makes appropriate use of organic and inorganic matter, local tradition, improved and/or introduced germplasm, and biotic and abiotic factors which are environmentally friendly. Together these factors ensure prosperity for humankind and appropriate management of natural resources, thus maintaining a clean and healthy environment.

Does organic Agriculture and organic agricultural products exist in Viet Nam

Ancient Viet Namese cultivated rice in water and bred domestic animals for living. Two main methods of cultivation were farming rice on flat land where rice seedlings were transferred and cleaning sloping land, and mountainous areas for cultivation of rice. In fact "Red river" Civilization was based on organic agricultural civilization, depending on closely-knit villages and an embryonic state structure.

Thus, it is possible to affirm that organic agriculture appeared very early. This monoculture and fully - worked out organic agriculture has existed and developed along the length of Viet Namese nation's history, until the end of XIX Century, meeting demand of food and Cereals of Viet Namese people.

Industrial revolution contributed to the breaking of monoculture, and organic agriculture in Viet Nam. Initially, NPK nitrogenous fertilizer of France was transported to coffee plantations and rubber plantations in Viet Nam, which was a Colony of France at that time.

However, the process of changing the inherently organic natural Viet Namese agriculture was not rapid. It can be explained that, it is not easy to abolish traditions, which had lived for a thousand-years.

However it must be recognized that organic agriculture has one weak point- i.e. productivity of plant and animals is limited at low levels according to this method. Increased population pressure and increased demand for food led to an increased use of chemical fertilizer. It has to be recognized that, because of domestic pressure, Viet Namese agriculture has grown rapidly since 1954, by which food security for a Country of 78 million people and even exports were made possible.

The following table presents the output levels for Organic Agriculture in Viet Nam:

Table 1. Quantity of Organic Fertilisers used

Kinds of plant	Organic fertilizer quantity of the Delta	Organic fertilizer quantity of the mountainous areas
Water rice	80 - 120 kg/ha	20-30 kg/ha
Milpa rice	No	0 kg
Farm produce	20 - 25kg/ha	0 - 15kg/ha
Vegetable	160 - 180 kg/h	80 - 85 kg/ha

It can be seen that:

1. Viet Namese agriculture does not have a very high level of productivity as in many other countries of the world.

2. Productivity varies according to regions, territories and kinds of plants and animals. Use of organic fertilizer of the Delta is higher than one of the mountainous areas.

The mountainous areas of Viet Nam practice organic agriculture eagerly. About 50-55 per cent of agriculture is still organic. However, as stated above production of organic agriculture is very low and availability of organic manure is limited.

Disadvantages of organic and ecological agriculture in Viet Nam

Even though organic agriculture in Viet Nam has expanded, the growth rate is still low, Intensive cultivation has destroyed the ecological balance of the country.

- The productivity of crops as well as livestock breeding has been increasing at low rate due to backward cultivation techniques (destroying forest, clearing up land by burning for cultivation, piercing holes and sowing seeds, livestock breeding by leaving unbridled and earning livelihood

by themselves etc.). It is even lower in the mountainous areas. Mountainous areas with deserted lots and bare hills now cover 13 million hectares leading to serious ecological imbalances. The rate of covered land areas with vegetation sheets is much lower than ecological safety requirements in most production areas. In addition, there are many areas especially in the mountains where food needs are not met.

Organic agriculture would not be able to meet food security needs in midlands, mountainous and seaside areas. People who live in highland and remote areas may even face serious problems of food safety besides food security.

The only way in which the degraded mountain land can be used is by fortifying and upgrading gradually the soil fertility.

As regards the soil in mountain areas

Approximately 25 million hectares occupying nearly two-thirds of total natural land area in Viet Nam has reduced its organic content, fertility and humus due to intensive cultivation of some crops. This led to a series of degeneration of soil physics, water-storage regime and destroyed the nutrient form of soil. In order to restore the mountainous land areas, it is necessary to supplement a quantity of new organic nutrient into the soil such as manure, excrement, green fertilizers and plant remnants at a rate of about 10 or 15 tons per hectare.

It is also necessary to convert multiple cropping which will increase the organic circulation in soil. This is actually a guarantee for stable and long-term land use.

As regards the soil in flat country

Approximately 7 million hectares occupied 21per cent of Viet Nam natural land areas particularly land areas cultivated with wet rice has been degenerating at a much lower rate in comparison with the mountainous land areas. However nutrient content of the soil is limited and normally about 30 to 40 kilograms of Nitrogen, 15 to 25 kilograms of phosphate, 205 and 40 to 70 kgs of nutrient are needed per hectare for rice cultivation.

In the rice area of Red river Delta, organic manuring has just recovered about 30 per cent of the organic nutrients in the soil.

Organic fertilizer has been shown to recover humus order, improve structure, water order and decrease heavy metals. This can be observed from the fact that in intensively cultivated household gardens there is hardly any evidence of soil degeneration as organic manure is used.

Since 1960s, the farmers applied many organic fertilizers (such as: night-soil, muck compost, green manure, azolla etc.). For example in 1965, in Red river Delta area, azolla covered 250.000 hectares. "Azolla, green

manure tree", "clean village, rich field" movement had really increased millions of tons of organic fertilizer. People, everywhere (even in the high mountainous area) also developed cultivation system of intercropping, crop rotation especially of the small red bean tree in water, potato, sweet potato, cassava, peanut, sesame... they harvested the grain only and left leaf, trunks... on the field and buried its roots under soil. Farmers in hollow areas, floating rice area, used to begin sowing rice from April (starting rainy season) and harvest the grain only in October. After that, they buried straw, root, and leaves on the field to make fertilizer. They also practiced rotation of crops by which the field was fertilised by itself.

Since 1982 agriculture extension services have paid more attention to increased use of chemical fertilizers for plants and forest. Azolla and other green manure trees were not used for improving and recovering fertility any more. That may have been a serious blunder in agricultural practices.

Viet Namese agriculture must be oriented in an ecological and organic way for sustainable development

A firmly developing agriculture is one that not only satisfies the existing demands of the present generation but also does not cause harm to the ability for satisfying demands of the next generation. (Professor Theodore Panayotou, Havard International Development Institute, 1994).

Soil is the basis of agricultural production, it must be kept firm. Natural resources (such as: land, forest, climate, hydrography...), human resources as well as man made resources must be increased with time, and used at the same time to improve the rate of growth of GNP.

Viet Nam is still in a very difficult situation: poor country, increasing population pressure, decreasing natural resources, and an unbalanced ecology in all of Viet Nam's territory. Firstly, agriculture must be developed, including for exports (rice, coffee, rubber, tea, vegetables, meat, fish). It is necessary to fertilize and improve degenerated soil at the same time, and use all 13 million hectares of land areas with deserted lots and bare hills, reforest by way of bringing into harmony forestry and agriculture in order to restore the ecological balance in the areas of agricultural and forestry production, raise the rate of covered land areas with vegetation sheets, guarantee that agriculture will develop in an organic and ecological way (adapted from the multistage forest form in humid tropical zones).

The Government must invest thousands of billion Viet Nam dong in order to restore, strengthen and develop forestry, long-term industrial crops and fruit tree with covering canopy of leaves for the whole year, which could cover all 10 million hectares of land areas with deserted lots and bare hills over the country.

Agriculture must be expanded in a comprehensive organic and eco-

logical manner with complete coordination between agriculture and forestry if Viet Nam wishes to develop in a sustainable manner in the 20th and 21st centuries. Chemical agriculture (energy agriculture) could only play a role as a complementary element to organic and ecological agriculture.

Establishing the support system for organic agricultural production in Viet Nam

Support system for organic agricultural production in France and Germany

As we know, IFOAM (International federation of Organic Agriculture Movement) was established in 1972 in France with two members Countries, France and Germany. By now, IFOAM has 600 organizations from 120 Countries.

In France and Germany, government agencies participate in the organic agricultural support system through national standard committees, water and land management institutes, etc. Supporting organic agricultural production is considered one of the important tasks of Agencies evaluating and granting certificates of product quality. Non-governmental organizations in these countries also participate in supporting organic agricultural production.

The German government and Chinese Government have created a Joint Venture fund to invest in projects with a total capital of 500 million DM in organic agriculture.

Viet Nam's effort to establish a support system for organic agricultural production

In 1999, Viet Nam ranked second in the world in rice exports. Exporting marine products earned revenue of approximately US$ 1 billion. This was a great achievement of Viet Namese agricultural production. However, Viet Namese managers and scientists realized that with this achievement came a heavy environmental price. The problem is that methods of agricultural production must be changed, ensuring high productivity and little damage to the environment. New thought on methods of agricultural production must meet two targets of organic agricultural production with high productivity - as suggested by the guiding principles of IFOAM.

Organic agricultural development in Viet Nam should involve government agencies, such as: the general Department of measurement, Standard and quality, Department of environment (ministry of science, technology and environment): agricultural scientific Institute (the ministry of rural and agriculture development) the following activities could be undertaken to promote organic agriculture in Viet Nam:

- Development of standards of organic agricultural products;

- Make a list of organic finished products, which is forbidden for use in Agricultural production.

- Publish scientific research, clearly pointing weak points of abusing organic finished products in Cultivation and animal husbandry.

Implement and develop research projects, support organic agricultural production: (Technology of micro organism fertilizer; Technology of destroying insects...). Farmers warmly respond these research projects because they are cheap, take advantage of existing local materials and are easy to use.

- Mass media should have many more programs guiding farmer to clean agricultural production.

However, the above-mentioned activities are only initial steps. In future, it is necessary to have one official agency delegated by Viet Namese government to support organic agricultural production, and this organization should become a member of IFOAM.

Estimated expenditure for establishment of support system for organic agricultural production in Viet Nam

* Firstly, the agency supporting organic agricultural production, if established, must have enough rights and obligations in order to make changes with the participation of 78per cent of Viet Namese population.

The full members of VFOAM (Viet Nam federation of organic Agriculture movement) must include:

- The Ministry of Agriculture and Rural Development
- The Ministry of Public Health
- The Ministry of Culture and Information
- General Department of Measurement, standard and quality
- National Environment Agency
- Viet Namese Farmers association

In order to save expenditure, network of VFOAM should be organized simply, effectively by widening the functions of existing local organizations. For example, the functions of farmers association; the gardeners association, Agricultural and fishing encouragement organization etc. could be enhanced.

* It is necessary to determine the priority projects for implementation and completion in the first two years.

- Project: Establishment of VFOAM office
- Project: supplying information

- Project: Application of high technology on germplasm generation and animal husbandry.
- Project: process of using fertilizer, organic plant protection mixture
- Project: Using organic finished products.

Total expenditure for these above-mentioned projects is estimated at about US$ 90 million based on current prices in Viet Nam.

Promoting solutions to form the structure of organic agricultural product quality inspection

There are 3 things that need to be done

- Putting forward the quality standard
- Setting up the inspection agencies
- Monitoring system through public participation

In Viet Nam there is a need to decentralize inspection bodies to local areas.

At present, the inspection agency system of Viet Nam is not only weak with poor professional skills but also its work is unsuitable for the new responsibilities.

Setting up the organic agricultural product market in Viet Nam

Developing Organic Food Markets

For the last few years, Viet Namese Government has paid attention to agricultural production and rural socio-economic development. A lot of new incentive based policies promote agriculture development. However, farmers have still to bear many burdens especially arising out of a mismatch between the price of agricultural products and their consumption.

- The prices of Agricultural products are still unsteady, the comparative rate of prices between agricultural and industrial product have not moved in favour of agriculture.

For example in comparison with 1990, the food price index in 1994 was lower than the consumer goods price index. If the base Price index in 1990 is taken to be 100, the price index of services in 1994 was 237; of industrial consumer goods were 219 while the price index of agricultural products was only 195.

As regards forestry products consumption

While the production of both agricultural and forestry commodities has grown the market was unstable. In the home market, purchasing power is limited but some articles such as sugar, milk, and cotton remain in short supply. Some products are uncompetitive in comparison to prod-

ucts like meat; vegetable and fruits still need to be imported to meet the demand from foreign customers, especially in hotels.

In the international market, a number of Viet Namese products such as coffee, tea, rubber, cashew nuts, shrimp, crab and aquatic products are sold through markets which are not certain or stable. Farmers are always worried about the consumption of their goods and commodities.

In general Viet Nam has not drawn up a strategy for marketing agricultural products and the management of marketing activities do not catch up with the growth rate of production. However, some producers are closely connected with the market demand both in terms of quality and quantity. The agricultural products of Viet Nam have a low competitive ability in the foreign market.

In the meantime almost all state-owned enterprises have severe shortages of capital and labour. In addition to that, bank interest rates are high. The state-owned enterprises cannot procure most of the agricultural products so that in a great many zones farmers must directly contact private businessmen. The farmers frequently fall into a situation where their prices and grades of products are squeezed. Most enterprises are not interested in setting up regular suppliers of raw materials either.

Upgrading quality and reducing prices of Viet Nam's agricultural products in order to strengthen its competitive ability in the world market is one of the most important priorities of agricultural, forest and aquatic production.

Market trends of organic agricultural foodstuff in Viet Nam

From the end of 1950's despite the fact that cereals and foodstuff production increased because of the increasing use of NPK fertilizer, prevention of epidemic in plants and animals, as well as better post harvest and processing facilities, a harmonius and reasonable combination based on maximum use of organic fertilizers, cattle manure, general microbiological manure, chemical fertilizer and organic insecticides has led to the production of diverse organic cereals, and foodstuff production accepted by domestic consumers and the export market. The actual result of nearly 20 years of renovation in agriculture together with major growth in exports of foodstuff and cereals to fastidious markets in Europe, Japan, and ASEAN countries is evidence of the acceptance of organic agriculture of Viet Nam.

Therefore, it may be concluded that:

In Viet Nam, the types of cereals and products manufactured under the organic method in which the production processes of each specific type of product had reasonable amount of inorganic manure has been successful.

However, the process of catching up with modern agriculture has led to excessive intensive farming, inorganic manure chemicals abuse, or

the abuse of one or more steps of manufacturing process, resulting in unsafe products, environment pollution, high surplus of insecticides, and harm to consumers' health.

Viet Nam will continue to develop organic agricultural product commercially in order to meet domestic and overseas demands.

Support for production and consumption of organic agricultural products

The construction of modern organic agriculture is a long-term process including strategies for the short, medium and the long term. The basis for implementation should be a series of institutions, common and specific policies for each type or group of products. Concurrently, an active and efficient support of finance, bank, credit and capital is needed.

The commercialisation of organic agricultural products requires focused research. A consolidation of the state management system to boost organic agricultural development is primarily needed. The State should carry out functions of inspection, test, supervision, certification, training, education, information provision, and research for organic agricultural development. State also has to set up standards for organic agricultural products including international standards. State must set up monitoring units to inspect and supervise product quality as well as safety for consumers.

Work on analysing cost and benefit of some models, in order to encourage farmers to shift from conventional agricultural production to organic production under IFOAM's criteria, show that:

- **Ha Noi fresh vegetable production model**

- Social Benefits attained by the State due to the shift to organic agriculture is equal to VND 4.08 million per ha.
- Production lost in the process was VND 1.1 million per ha.

- **Thai Binh paddy rice production model**

- Social Benefits attained by the State due to the shift to organic is equal to VND 2.09 million per ha.
- Production lost in the shift was VND 400 thousand per ha.

Therefore, in general, there is no loss in shifting, if we consider the social benefit aspects.

Individual benefit of the producer will be adversely affected during the time of shifting to organic cultivation, as the time for plant growth increases and consequently the productivity decreases.

In order to balance the social benefit with the private cost to the producer, State should have a policy of price subsidy for agricultural producers. According to calculations of some Viet Namese experts, the level of price subsidy for shifting the present agricultural production model to

the organic agricultural production is about 3 per cent of total GDP of Viet Nam originating from agriculture.

If so, the price subsidy level given by the State should be as follows:

- Agricultural GDP 2000: VND 106809.1 billion
- Subsidy level: 3 per cent. VND 1068.09 = VND 3204.27 billion.
- That is equal to USD 220 million

This absolute amount sounds rather large, but it is not over 30 per cent of the social benefits attained from organic cultivation.

Table 2. GDP of Viet Nam in agriculture, forestry and fishery

Details of the Red River Delta (Current prices)

Unit: Billion Viet Namese Dong

	1997	1998	1999	2000
Total GDP in agriculture, forestry, fishery of the country	77520,0	93072,0	101723,0	106809,1
1. GDP (agriculture, forestry, fishery) of the South East area	*8873,3*	12065,9	13039,6	13822,1
% Compare to the country	11,4	12,96	12,82	12,94
2. GDP (agriculture, forestry, fishery) of the Cuu Long River delta	*23706,6*	27617,5	29819,8	32096,7
% Compare to the country	30,6	29,67	29,31	30,05
3. GDP (agriculture, forestry, fishery) of the Red River delta	15100,3	18129,6	19015,4	32096,7
% Compare to the country	19,48	19,48	18,69	19,17
Ha noi	913,0	950,0	1037,5	1094,6
Hai Phong	1454,9	1589,3	1710,5	1840,5
Ninh Binh	777,0	1001,0	972,6	1026,1
Ha Nam	783,0	912,4	919,2	1029,9
Nam Binh	1806,1	2116,2	2206,8	2345,5
Thai Binh	2410,4	3172,7	3111,8	3298,2
Hung Yen	1338,7	1589,6	1694,8	1844,9
Hai Duong	1712,0	2036,0	2200,0	2335,8
Bac Ninh	964,0	1097,0	1188,9	1295,9
Vinh Phuc	945,0	1065,7	1165,3	1252,7
Ha Tay	1996,2	2599,7	2808,0	3109,6

Note: Collective data from General Statistic Department

Chapter 12

CURRENT USE OF PLANT PROTECTION CHEMICALS FOR ORGANIC CROPS PRODUCTION AND INTEGRATED PEST MANAGEMENT

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The problem of agricultural pests presents serious constraints to agricultural production in Viet Nam. In recent years, the National Institute of Plant Protection (NIPP) under the Ministry of Agriculture and Rural Development (MARD) has carried out a number of research and extension projects on plant protection. NIPP's studies are mainly focused on the surveillance of pest development, outbreaks and epidemics in various regions of the country.

Research results are used for the establishment of adequate methods of control, and help to determine Integrated Pest Management (IPM) strategies. The aim is the achievement of sustainable agricultural development and food security in Viet Nam using intensive farming systems and substantially increased inputs in agriculture.

Chemicals currently used to protect crops in Viet Nam, and their impact on the environment

Agricultural production has recorded great achievements during the process of economic renovation. Agricultural production in Viet Nam currently occupies about 25.0 per cent in Gross Domestic Product. In addition to rice, which is the main income-generating crop, other crops are cultivated for local consumption and export. In parallel with the introduction of new high yielding varieties, the application of different agricultural practices, together with the introduction of biotechnology, have increased yields and productivity. The safe, efficient use of pesticides in agricultural production has contributed significantly to productivity not only in Viet Nam, but also in many other countries in the world.

Pesticide use in Viet Nam can be divided into two main periods:

a) the period before 1990 and b) the period after 1990. Before 1990, several government companies were designated to import pesticides and distribute them to the cultivated cropping areas. In this period, the annually imported quantity of pesticides varied from 13,000 to 15,000 tonnes annually. The Government normally subsidized 20 to 30 per cent of the price for farmers' consumption. The Government considered pesticide management as a centralized mechanism for distribution and application by the use of

subsidies Many kinds of toxic pesticides have been used, such as Aldrin, Endria, Heptachlor, Methyl parathion, and other compounds.

In the second period, beginning in 1990, Viet Nam has been engaged in the process of economic reform, in order to transform the economy from centralized planning into a market-based economy. Pesticides are now imported and distributed according to market demand. Since early 1991, the Ministry of Agriculture and Rural Development has had a clear policy on special management of pesticides, from registration, export/import, manufacture, formulation, repackaging, sale and use of pesticides.

Table 1. Status of pesticides used in Viet Nam

Year	Quantity (tonnes)	Value (million US$)
1990	10,300	16.1
1991	20,300	22.5
1992	23,100	24.1
1993	24,800	33.4
1994	20,400	58.9
1995	25,700	100.4
1996	32,800	124.2
1997	30,400	131.4
1998	33,000	145.0

Source: PPD

Although the data are only approximate for the first nine years of economic renovation, it is clear that the quantity of pesticides used has increased rapidly from year to year. The volume of production has nearly tripled and the value increased nine-fold.

Table 2. Types of commercial pesticides used in Viet Nam

Year	Insecticide	Fungicide + bactericide	Herbicide	Rodenticide	Biopesticide	Repellent	Microorganisms	Snails	Termites	Wood treatment	Storage treatment	Total
1991	37	27	11	2								77
1992	64	54	25	3	0							146
1994	174	78	56	6	5							319
1996	229	159	124	6	16							534
1998	267	216	160	12	26	2	36	1	2	4	3	729

The kinds of pesticides used have increased rapidly in recent years. From 1991 to 1998, the total use of pesticides increased by 9.5 times. Use of insecticides increased by 7.2 times, fungicides by eight times, herbicides by 14.5 times and others, by 41.5 times.

The case study conducted by NIPP in four crops in different provinces (Ha Noi, Hai Phong, Bac Ninh, Ha Nam, Thai Nguyen and Ninh Thuan) has shown that only 30 to 40 per cent of the pesticides used in the market are distributed through Government organizations and cooperative farms. This means that the private sector plays an increasingly important role in the provision of pesticides and other toxic products requiring tight Government control. The study also indicated that the number of chemical applications per crop season always exceeded technical guidelines. A very small percentage (5.1per cent) of chemical users were found to wear proper safety equipment (including gloves, clothing and mask).

- ***Environmental pollution***

The misuse of pesticides and mineral fertilizers has led to the contamination of canals, ponds, lakes, rivers and underground water sources.

Improper storage and use of pesticides without adequate guidelines and regulations on environmental safety has also led to waste problems in many localities. The results of a survey of 156 farm households in rice-growing areas of Tien Giang province, 200 households in Dan Phuong, and 200 households in vegetable- growing areas of Tay Tuu village (Ha Noi city) indicated that 80 per cent of farmers simply discarded packaging and empty bottles directly in crop fields following pesticide application. This has led to a contamination of water resources and the environment, and risk of poisoning of humans and cattle. In Tien Giang, Duy Tien, Tay Tuu, Dan Phuong, and Le Linh localities, 51 per cent of farmers were found to have sold empty pesticide containers for other uses.

In the central part of Viet Nam where land is drought- degraded and pests are considered a big threat to agriculture, farmers use a lot of chemical pesticides. Pesticides popular with farmers are Wofatox, Monitor and HCH. These pesticides are highly toxic and persist in the environment.

The results of analysis of pesticide residues in parts of Khanh Hoa province included:

- Of 423 soil samples, 59 per cent contained pesticide residues exceeding the maximum residue level (MRL) by 2 to 40 times;
- Of 144 air samples 55 per cent exceeded MRL by 2 to 10 times;
- Of 120 water samples, 36.6 per cent exceeded allowable pesticide levels by 2 to 50 times; and
- Of 728 vegetable samples, 24.7 per cent exceeded MRL by 2 to 6 times.

A survey conducted in several villages showed that 80 per cent of vegetable products were sold in the market within three days of spraying.

By contrast, a majority of the farmers surveyed said they maintain a special plot for vegetable growth for family consumption with minimum or zero chemical pesticide application. In fields of crops grown for market purposes, a lot of pesticides are used, and guidelines for pesticide-free intervals are not followed.

An analysis of pesticide residues in 25 samples of green beans and grapes, collected in five central markets of Ha Noi city, five vegetable-growing villages of Ha Noi (in 1993- 1994) and five big markets in Ha Bac province (in 1994), indicated that residues of Methamidophos (Monitor) exceeded the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) maximum allowed residue of 0.05 mg/kg.

The National Institute of Plant Protection has carried out surveillance of pesticide use in Thai Nguyen, Hanam, Bac Ninh and Hai Phong provinces. Two thousand five hundred households were surveyed.

Data indicate high levels of chemical pesticide use in agricultural production. The instances of unsafe distribution, usage and storage of pesticides include the following:

- Only 30 to 40 per cent of pesticides are provided through government or cooperative networks. The private sector thus plays an important role in pesticide delivery, a function that is supposed to be monitored strictly by the Government. Pesticide application was often found to be ten to forty-five times higher than permitted.

- After spraying, farmers in many places dispose packing bags incorrectly. Knapsack sprayers were found to have been washed near drinking water sources.

Table 3. Location of washing sprayer after use (%)

Washing place	Share of different crops			
	Rice	Vegetable	Tea	Grape
1. Drinking water wells	4-16	5.2	33.8	-
2. Pond, lake, river, stream	20-23	56.0	58.0	-
3. Field, canal	50-76	68.0	-	60.0
4. Other*	0	0	06.4	0

** Includes places not listed above, such as mountain springs*

Farmers growing rice, tea, and vegetables were regularly found to keep pesticides in toilets, cattle cages and occasionally, even in kitchens and houses.

Because of a lack of knowledge of proper techniques of pesticide use, spraying is often done two or three more times than required. In many cases, the pesticide isolation interval before harvesting is too short, leaving

products with residues exceeding the MRL. For instance, 0.06 mg/kg of Padan residue was found in rice grain; 0.3 mg/kg of Thiodan on grapes; 0.67 mg/kg of Monitor on cabbage and 0.007 mg/kg of Monitor in fresh tea buds.

Residues of Monitor were detected in soil and water samples collected in tea-growing areas, in the amount of 0.01 to 0.003 mg/kg and 0.006 mg/kg respectively.

■ ***Activities and pilot demonstrations toward environmental safety***

Several pilot demonstrations on the use and management of pesticides have been set up in various representative localities of Viet Nam under the coordination and technical assistance of NIPP.

In each pilot project, there is a managing committee comprising technicians and village members.

■ ***Training activities for farmers include the following steps:***

• Distribute and explain how to complete questionnaires; interview each group of farmers; divide farmers into 3 categories: good, fair and poor pesticide practices.

• Field monitoring aims to handle overall agricultural production and choice of field for pilot demonstration.

• Seven day monitoring of key pest dynamics, that are the basis for farmer decision-making in pesticide usage. Also, the natural enemies of tea and grape pests have been shown farmers, to enable them to recognize and naturally use them in crop fields.

• Farmers are trained to:

■ **Recognize major pests, natural enemies and timing of pesticide application.**

■ **Understand the advantages and disadvantages of chemical methods. Learn pesticide handling techniques, proper methods of handling, storage and use, first aid, etc.**

■ **Learn technology for intensive farming and IPM.**

■ **Results obtained from pilot demonstration models.**

• Knowledge of farmers in pesticide use, handling and storage techniques has increased by 70 to 100 per cent

• Number of farm households using restricted or banned pesticides has dropped from 19.2 to 5.1 per cent.

• The number of farmers aware of pests and safe handling techniques has increased by 76 to 100 per cent.

• Efficiency has improved: in pilot fields crop yields increased or stayed

the same but with lower pesticide usage and significantly reduced spraying. Pesticide application on grapes was reduced by 30 times as compared to farmers' practices. Subsequently, production costs were greatly cut, contributing to improved human health and less environmental pollution.

- Potential increase of pest tolerance to pesticides

Since 1999, rice production in Viet Nam has increased remarkably. Many new cultivars of rice with high productivity and good quality have been widely planted in place of traditional rice that are susceptible to pests and have low-yields. However, increasing investment inputs in agriculture have led to subsequent outbreaks of key pest epidemics and incresed pest tolerance to pesticides. In the past, the areas infected by such pests as Brown plant hopper, leaf roller, rice blast, greening, and Plutella sp., have expanded. Farmers often apply a double and even triple dose of pesticides in order to combat pests with highly developed tolerance to the chemicals.

For example, pesticide use led to increased pesticide tolerance of the diamond back moth (DBM). The frequency and overuse of pesticides at increased dosages on vegetables have led to the rapid development of chemical tolerance of DBMs. Research on the chemical resistance of DBMs to pesticides use was conducted by NIPP in various vegetable growing areas of Ha Noi City.

Table 4. Pesticide resistance of DBMs to commonly used chemicals (Tuliem-Ha Noi)

Pesticides	Lang Son	Tay Tuu		Mai dich	
	LC_{50}	LC_{50}	Ri	LC_{50}	Ri
Wofatox	55	1150	21	1008	18
Monitor	46	1196	26	1228	18
Ddi	31	589	19	434	14
Padan	26	234	9	312	12
Polytrin	19.4	440	23	503	26
Sumicidin	23.2	62.6	27	548	15
Sherpa	21.4	235	11	393	18

$$Ri = \frac{LC_{50} \text{ in pesticides tolerance area}}{LC_{50} \text{ in non- tolerance area}}$$

LC_{50} : An essential concentration of pesticides to kill 50 per cent insects

Ri: Resistance index, R< 10: Pests are not resistant to pesticide and

R > 10: Resistant to pesticide

Other impacts of pesticide use in Viet Nam have been observed, including impacts of pesticide residue on human health, and secondary pest outbreaks because of disturbed ecosystem balance.

Opportunities to extend the use of alternative protection techniques and chemicals

NIPP has conducted demonstration projects on safe pesticide use, including combining alternative management methods in several localities in 4 selected crops, namely rice, vegetables, tea and grapes.

Table 5. Activities carried out in a 1996 demonstration of alternatives to pest control

Criteria	Rice growing area	Vegetable area	Tea growing area	Grape growing area	Total
Acreage (ha)	5	4	6.8	6	21.8
No of participatory farmer households	100	42	12	60	214
No of training courses					
• Planned	6	6	6	6	24
• Completed	7	9	6	6	28
No of participants					
• Planned	300	300	300	300	1,200
• Implemented	431	450	311	350	1,542
Literature/documents distributed	1,500	1,500	1,200	1,500	5,700

The measures for proper pesticide use and storage have been analysed with the participation of scientists and farmers through demonstration models. A short description of the activities of different working groups in the demonstration models is given below:

- Distribution of surveying cards, guidelines on how to fill in these cards and interviews conducted with groups of farm households divided into "good," "mediocre" and "poor" groups (7-10 days).
- Periodic survey conducted (every 7 days) to observe prevalence of major pests and diseases, based on which guidelines on timely use of pesticides are given to participants. With respect to tea and vegetables, a survey on the natural enemies of pests is conducted, in order to assist farmers identifying them.
- Training provided to farmers living either within or outside the demonstration areas on the following points:

■ Recognition of major pests, diseases, useful natural enemies and adequate timing for chemical control

■ Advantages and disadvantages of chemical control. Awareness of pesticide toxicity, their usage, storage and first aid treatment of pesticide poisoning.

■ Procedures for intensive farming and integrated pest management (IPM).

- Instruction in correct methods of mixing pesticides, proper use of safety equipment.
- Advice to farmers on avoiding over-use of fertilizers and the benefits of microbial treatments.
- Training in the use of safe pesticides (for example, Trebon, Sagomycin, Rydomil), biological agents (e.g. BT, Spinosad), or botanical pesticides.
- Encourage farmers to set aside a small space for sprayer and unused pesticide storage, and to collect and bury pesticide packages after use.

Table 6. Selected pesticides commonly used in safe vegetable production

Pesticides	Dosage (kg, l/ha)	*Class (kg, l/ha)	Target pests
Biological pesticides			
BT	2.0	IV	DBM
V-Bt	2.0	IV	DBM
Delfin WWP (32 BIU)	1.0	IV	DBM
Dipel 3.2 WP	1.0	IV	DBM
Xentari 35WDG	1.0	IV	DBM
NPV		IV	Spodoptera
Botanical pesticides			
Rotenone	2.5	III	DBM
HCD 95BTN	20.0	III	DBM, aphids
Neem seed	4.0	IV	DBM
Neem suraksha	15.0	III	DBM
Proneem	10.0	III	DBM
Neem bond A	3.0	III	DBM
Chemical pesticides			
Trebon 10EC	1.0	IV	Aphids
Atabron 5EC	1.0	IV	DBM
Normolt5EC	1.0	IV	DBM
Pegasus 500EC	0.5	III	DBM, pod insects, spiders
Sherpa 25EC	1.0	I	DBM, PI, spiders, aphids, diptera
Sumicidin 10EC	1.0	I	Pod insect, DBM
Regent 800WG	0.3	I	DBM, caterpillars
Comite 73EC		III	Red mite
Admire 50 EC		III	Hoppers, thrips
Gaucho 70WS		III	do
Vertimec 1.8 EC		IV	Diptera
Mimic 20F		IV	Spodoptera
Fungicides			
Ridomil MZ 72WP		IV	Downy mildew, spots, powdery mildew
Mancozeb 80WP		IV	Downy mildew, leaf spots, fruit rot
Validacin 3DD		IV	Collar rot
Kamulus 80DF		IV	Fungal diseases
Score 250ND		III	Collectotrichum, leaf spots, rust
Anvil 5SC		III	Powdery mildew, leaf spot, rust

*The higher the class the more toxic the chemical.

Botanical pesticides as alternative crop protection technique

The NIPP, in collaboration with the provincial institutions, has conducted surveys on availability of pesticide-containing plants throughout the country. The first set of results indicated that fifty-three species of plants containing substances poisonous to pests were found in Northern Viet Nam. Trials on the efficacy of the sixteen most toxic plant species to pests (such as Plutella xylostella, Pieris rape, Spodoptera exigua, Chlorita flavescens and Helopelthis teivora) have been conducted. It was found that ten of the plants are good pesticide resources for directly controlling or repelling pests.

On the basic of the investigation four species were studied in detail, including Derris spp. Yam bean (Pachyrrhizus erosus), Melia azedarach and Nicotiana tabacum. The procedure for growing, collecting and manufacturing solution and powder formulations from these species were carried out. Production and use of these species can contribute to the suppression of pest outbreaks.

Cost and benefits of using organic plant protection chemicals

The following indicates progress in farmer awareness of proper use and storage of pesticides:

- the number of farmers aware of proper use and storage of pesticides has increased by 70 to 100 per cent;
- the number of farmers using prohibited or limited pesticides has decreased from 19.2 to 5.1 per cent; and
- the number of farmers aware of pest control measures has increased by 76 to 100 per cent

The indications of the high cost-effectiveness of these changes include: sustained or increased crop yield, accompanied by considerably reduced pesticide dosages and number of applications (for example, 30 fewer pesticide applications on grapes), thanks to which production cost is decreased, and commodity health and environment protection are promoted (please see table 8).

Table 7. Indicators of economic and technical effectiveness of demonstration models

Criteria to be evaluated	Rice area		Vegetable area		Tea area		Grape area		Note
1. Pest population density (Unit)	1.0	3.5	0.7	3.5	9.8	10.4	51.6	82.9	
2.No of pesticide application/ cropping season	1.5	2.05	2.2	7.0	3.0	8.0	31	61	
3. Quantity of a.i. used (kg/ha)	0.90	1.95	1.0	4.2	0.6	1.5	12	17.5	
4. Labour costs for pesticide application/season	5.7	9.5	6.0	45.0	27	70	310	640	
5.Plant protection labour costs (VND million/ha)	0.057	0.095	0.09	0.675	0.405	1.05	6.2	13.2	
6. Plant protection material costs (VND million/ha)	0.140	0.250	0.81	1.78	0.24	0.60	2.7	2.8	
7. Yield (t/ha)	4.32	3.91	21.6	21.6	0.468	0.455	11.3	10.9	
8. Harvest value (VND million/ha)	0.820	0.789	43.2	43.2	11.722	11.385	50.8	49.0	
9.Economic profit (VND million/ha)	0.179	-	1.555	-	1.347	-	8.9	-	

Table 8. Improvement of agri-product environment in the demonstration models

Demonstration models	Pesticide residue (mg/kg)						Note
	Agri-products		Soil		Water		
	Demons-tration	Un treated	Demons-tration	Un treated	Demons-tration	Un treated	
Rice growing area							
Padan	0	0.06	0	0	0	0	
Bassa	0	0	0	0	0	0	L.LO.002
Wofatox	0	0	0	0	0	0	
Monitor	0	0	0	0	0	0	
Vegetable growing area							
Monitor	0	0.65	-	-	-	-	L.LO.002
Grape growing area							
Thiodan	2	3	0	0	0	0	
Ridomil	1	1	0	0	0	0	
$CuSO_4$	0.432	0.583	3.125	4.263	0.004	0.005	L.I4.000
Aliette	0	0	0	0	0	0	
Sherpa	0	0	0	0	0	0	
Tea growing area				0.001-			
Monitor	0	0.007	0	0.003	0	0.006	
Sumicidin	0	0.040	0	0.080	0	0	L.I2.0
Trebon	0	0	0	0	0	0	

In order to prove the results of IPM program on safe and productive pesticide use, the areas under the program have been enlarged in the localities of Dong Anh, Tu Liem, Gia Lam (Ha Noi), Melinh (Vinh Phuc), Bac Ninh town (Bac Ninh), and Kim Bang (Hanam). The data given in table 8 show some results of that research and extension model.

Table 9. Results of IPM implementation in cabbage production

Criteria	Model field	Farmer field	Relative increase/ decrease
Disinfection of field (Lab./ha)	25.0	8.5	+ 17.5
Seedling treatments	1.0	0.0	+ 1.0
Total sprays per ha	6	11	-5
- Selected pesticides (Class III, IV)	6	4	+ 64%
- Toxicity pesticide (Class II)	0	7	-100%
- Biopesticide	3	1	+ 41%
Quantity of pesticides used (kg/ha)	4.5	13.5	+ 8.0
Input for sprays (M.D/ha)	1.125	1.35	-0.225
Yield of fresh cabbage (T/ha)	41.0	40.5	+ 0.5
Total output (M.D/ha)	36.90	36.45	+ 0.45
Costs of crop protection (M.D/ha)	1.175	1.367	-0.192
Output remaining (M.D/ha[1])	35.725	35.083	+ 0,642
Impact on environment:			
- Percentage of IBM parasitized (%)	4.55	0.75	+ 3.8
-Total spiders (number/plant)	1.98	0.65	+ 1.33
- Pesticide residue (PR) (% of samples containing PR)	0	28.0	+ 28

2 In Table 8, 9, and 10 Lab./ha means that a number of daily labour units spent per ha for fieldwork. M.D means that million Viet Nam's dong.

These figures indicate that the key action in IPM toward safe vegetable production is to properly and effectively use pesticides against pests. The total input and yields are almost similar in two fields. However, the produce obtained is of a high level of quality, meet safe production standards, and are safer for consumption and the environment.

Integrated pest management policy and practices in Viet Nam

Viet Nam has been an official member of the inter-country program (IPC) in South and South East Asia on integrated pest management (IPM) since 1989. Along with the assistance of the IPC, the Government of Viet Nam has given its strong support and the IPM program has been implemented with great success. The objectives of the IPM national programme are as follows:

- To review the status of pesticide use in pest management, their constraints and challenges.

- To train crop protection officers, technicians and farmers in IPM principles, based on the following criteria: a) healthy plants; b) regular field monitoring with recognition of key pests, plant growth stage, ecological and environmental factors, climatic factors, etc.; c) conservation and main-

tenance of natural enemies as "farmers' friends," aiming at maintaining control of their role in pest control; d) farmers as experts in crop and pest management with trained knowledge of pest status, to encourage appropriate decision-making action in pest control and the proper and timely use of pesticide sprays against pests to avoid damage.

- The Government of Viet Nam, through MARD, has allocated significant resources to the IPM program. In each province, an IPM committee is established, with representatives from the plant protection service, agro-forestry extensions, policy makers, etc. At the district and village level, farmers have formed IPM clubs or linkages with other organizations and associations.

- The IPM program has been implemented in all provinces and cities of Viet Nam. In 1999, the FAO supported IPM training courses as follows: 383 classes on vegetables, 11 classes on groundnuts, 22 on cotton, 9 on soybeans and 20 on rodent management techniques. With local contribution and support, 800 IPM training courses were conducted in different provinces for farmers in rice and other food crops. The total number of farmers trained in 1999 is about 79,350 persons. About 1,500 trainers in IPM have been trained. 400,000 farmers have been trained in farmers' field schools (FFS) in 61 provinces. An IPM community campaign has being started in 19 provinces. There are several IPM programmes funded by non-governmental organizations (NGOs) and international organizations such as Danish Aid Agencies, FAO, and Swiss Development Corporation.

- The IPM program has moved to the new concept of the "IPM community". To date, 16 provinces have such a program, with the aim of building the IPM knowledge of farmers, who participate in different actions including training, conducting surveys and research of crop protection methods and development.

Issues for further research and extension on safe pesticide use (SPU)

Social issues of safe pesticide use

- Educating farmers on safe-pesticide use
- Government sponsorship for mass communication of such programs
- Reorganization of agricultural land allocation structure and policy
- Training in benefits and costs of SPU
- Providing information on technical aspects of SPU
- Enhance research and extension capacity
- Training of key staff
- Enhance linkages between research and extension programs

Management issues

- Formation of SPU, IPM and other Councils, Committees, Boards
- Formation of IPM community with participation of key scientists.

Viet Namese products in comparison to IFOAM standards

1. The IFOAM standards should be the baseline for all kinds of organic agricultural products produced in Viet Nam. The producers wishing to export their products to EU markets should accept its standards in all aspects. They should be required to follow testing procedures for the relevant commodities.

2. For local markets, greater development of so-called semi-organic agricultural products (meaning products that can be produced with a certified programme of minimally harmful or harmless pesticides, for example, deriss root extract, neem products, Melia azedaras product, and yam bean, and greater use of biologically-based pesticides like herbal and microbial products like Trichoderma fungi and natural enemies) should be considered.

3. For each crop or group of similar crops, especially vegetables, a specific technical guideline should be developed, based on criteria that will ensure that products are safe and meet IFOAM standards. Authorized organizations in IFOAM standards testing should be established in Viet Nam in order to give producers certificates in organic agriculture.

CHAPTER 13

SUMMARY REPORT ON RESULTS OF 3 YEARS' IMPLEMENTATION OF SAFE VEGETABLE PRODUCTION PROGRAM IN VINH PHUC PROVINCE (1997 – 1999)

By Mr. Truong Quoc Tung,
Director, Plant Protection Department of Vinh Phuc Province, and
Safety Vegetable Production Programme of Vinh Phuc Province

Since early 1997, following a decision by the Peoples' Committee of Vinh Phuc province, an integrated pest management (IPM) and safe agriculture program (SAP) with a main focus on safe vegetable production (SVP), has been implemented. What follows are some initial results after 3 years' implementation of this program.

Targets, contents and characteristics of safe vegetable production program in Vinh Phuc

1. In recent years, the issue of safe agricultural production in general, and production and consumption of safe vegetables in particular, has become a global problem because of the negative effects of overuse of pesticides and fertilizers on environmental and human health.

In this context, SVP is not only an urgent need in the interest of individual and public health; it is also a requirement of producers in order to improve the quality of their products in competitive markets.

2. Vinh Phuc Province in Viet NamViet Nam has also shown due concern for SVP. The survey results from locations throughout the country, especially from fruit and vegetable production centres, indicate that up to 60 per cent of fresh vegetables consumed in the market fall below safety standards. In some cases, residues of pesticides, Nitrates (NO_3) and heavy metals were up to 100 times higher than permitted levels.

Analysis of vegetables sampled in Vinh Phuc during 1997-1998 showed pesticides above safe levels in 71.5 per cent of samples; of NO_3 in 85.8 per cent of cases, and of pathogenic microbes in 60 per cent of cases.

It is extremely urgent that suburban provinces develop sustainable agriculture that produces safe fruits and vegetables, in order to meet the demands of urban, tourist and export markets.

3. Main elements of the safe vegetable program in Vinh Phuc in 1997-2000.

3.1. Research and formation of Integrated Pest Management (IPM) and production models for major local vegetables, in view of farmer production capacity.

3.2.Train farmers in techniques of SVP.

3.3. Identify markets and grow safe vegetables at scale of 500 to 1000 hectares (ha), producing 10,000 – 20,000 tonnes of produce per year.

3.4. Research the use of bio - products as substitutes for toxic chemicals in pest control.

3. 5. Develop production of safe mushrooms for both domestic consumption and export.

4. Characteristics of SVP program in Vinh Phuc.

The following are the main characteristics of the safe vegetable program in Vinh Phuc:

First: local people can produce safe vegetable in large scale. Safe vegetables are understood as being produced with limited use of toxic chemicals, minimum pesticides, NO_3 and pathogenic microbe residues, as required by the Ministry of Agriculture and Rural Development (MARD) regulation. ("Safe vegetable" is not intended to be understood here as "organic vegetable").

Second: Aim to achieve SVP on a large scale. The intention of the program was to assist farmers with cultivation techniques rather than supporting material facilities. This approach corresponded to the financial capacity of Vinh Phuc province.

Third: The production of safe vegetables must bring benefit to both producers and consumers. The proceeds from safe vegetables must ensure that at least the production costs are covered. For the consumer, the product quality must be high, but at a reasonable price (not over 20-30 per cent higher than in conventional production).

Fourth: The production of safe vegetables requires advanced technology; however, the method of technology transfer needs to be simplified and presented simply through five SVP regulations. The "five regulations" model is based on field research and can be easily adopted by farmers. If the five regulations are fully implemented, products will be likely to achieve safety standards.

Fifth: The quality of the product is controlled through the production process instead of the product because it is easier to manage the full implementation of regulations regarding restrictions on chemical use.

The research methodology and technology of SVP in Vinh Phuc have been studied and considered effective and feasible by National and International Organizations and Agriculture Extension Programs.

Initial results of implementation 1997-1999

1. Research and set-up of SVP technique models

On the basis of surveys of the soil potential, farmers' experience, pest infection in vegetables, documents and help from national and international organizations and neighbouring provinces, the Plant Protection Sub Department (PPSD) of Vinh Phuc has set up nine SVP models for crops such as cabbage, penny cress, bulb onion, potato, legume, morning glory, cucumber, kohlrabi and mushroom. Application in ten production areas has proven the scientific feasibility of the models. The major elements of the models include:

First: The cultivation techniques should be well-suited to traditional practices and the demands of SVP, such as:

- Applying manual cultivation to land preparation, planting, harvesting and non-chemical soil restoration processes.
- Adjusting planting time to avoid peak pest periods, and using manual labour and non-chemical products to control them.
- Proper arrangement of some vegetable varieties in the field.

Second: Current cultivation techniques must be suited to the requirements of SVP, such as the use of new varieties with high yields, and appropriate mix of N - P - K (nitrogen, phosphorous and potassium) and pesticides.

Third is the application of bio-products:

- Using bio-insecticides to control pests, especially in legumes.
- Using microbial rodenticide (BCS) to replace toxic chemicals.
- Applying microbial technology to clean surrounding production areas and to improve the effectiveness of manure.

Fourth: Follow the principles established by the Food and Agriculture Organization (FAO) for IPM. (IPM is considered a key technique of SVP, and it has been implemented widely in Vinh Phuc.)

Fifth: Implement fully the rules in SVP:

- The use of fresh manure is not permitted. (1)
- The use of polluted water is not permitted. (2)
- The use of Nitrogen-fertilizer over 200kg/ha is not permitted. (3)
- The use of restricted and banned pesticides is not permitted. (4)
- The use of industrial chemicals (including fertilizers and pesticides) is not permitted for 10 days before harvesting. (5)

It is easy for farmers to adopt, remember and implement these rules. The contents could be arranged in a logical order according to the needs of each crop before being transferred to farmers. The models are also adapted and amended after every crop season.

Planning a safe vegetable production area in Vinh Phuc

On the basis of initial surveys of water resources, soil type, traditional cultivation, pest damage, production, consumption and investment capacity, the status of agro-chemical use, farmer knowledge as well as demand of SVP, 500 ha were planned for planting safe vegetables, with the participation of 7,200 farm households from cooperatives supplying 2,000 tonnes of product per year. A demonstration area was also established covering about 120 ha, attracting 2,000 farmers and supporting 4,000 tonnes of product per year, of which crucifer comprises 40 per cent, bulb onion 20 per cent, potato 20 per cent and others, 20 per cent. In late 1999, it was planned to plant a 130 ha area, with the participation of 150 farm households to support 4,000 tonnes of product per year. Thus, the total area under SVP in Vinh Phuc to date is 630 ha, located in 16 cooperatives and 9,000 farm households.

Each cooperative formed a Guide Committee (GC) and authorized an SVP schedule plan and management mechanism. One technician is nominated and paid a monthly salary to set up the technology. Farmers are required to apply to participate in the SVP. At the District level, the Vice Chairman of the Peoples' Committee is to be a Leader of IPM and SAPP. The Provincial GC authorizes decisions regarding the establishment of safe vegetable areas, and provide technical guidance. This Committee must also organize monthly meetings with district and cooperative Leaders.

The planning may be amended according to the yearly survey, to decide whether the area under SVP should be increased.

Results of demonstration

The results showed that crop yield decreased by 1 to5 per cent; however, savings in nitrogen fertilizer and pesticide costs were found to range from 25 to 45 per cent respectively. As a result, the total costs decreased by 3 to 5 per cent, leaving a surplus profit.

So far 83 training classes in IPM and SVP have been held, with the participation of 5,865 farmers including 65 per cent of farm households and 16 technicians in the program area. Farmers were trained in both the theory and practice of vegetable physiology at various stages, cultivation techniques, surveys and ecological analysis, pest control measures, pesticides and bio-products, utilization of ecological checks and balances, three key standards of safe vegetables, the rules outlined above, and technical models for vegetable cultivation. Farmers were also assisted in laying out experimental sites. As a result of these activities, 90 to 95 per cent of farmers interviewed in the region knew about cultivation techniques, and knew how to implement the SVP regulations.

Research and application of bio-products in SVP

In order to assist the *in situ* development program for safe fruit, vegetable and mushroom production and to meet the demand of neighbouring provinces, Vinh Phuc has built a Pilot Biofactory in a biological center for plant production that is operated and managed by PPSD. This is not only a research installation but also a centre for receiving new bio technology transferred by national and international research institutions. The Bio factory also organizes production, and transfers techniques to farmers through demonstrations, training classes and the supply of bio-products. The activities of the factory are not intended to result in profit. Thus far, the factory has successfully produced such bio-products as the growth regulator LUC DIEP TO, the bio-rodenticide BCS, bio-pesticides and five mushroom varieties. On the basis of experiments, technical demonstrations and training classes, farmers as substitutes for toxic chemicals have applied the above bio-products. (As a result, 70 per cent of the area was applied with LUC DIEP TO to assist in partially replacing the pesticide 2-4,D with a mixture of urea, fresh manure, and fruiting treatment in a potato crop). This experiment brought about an increased yield of 3 to 10 per cent, higher quality and improved product appearance.

Bio-pesticides also provide higher efficacy and higher safety levels in controlling pests in about 30 per cent of areas planted with cabbage, penny cress and legumes. The benefit is particularly high at the harvesting stage, because chemical residues can be minimized. Three thousand five hundred kilograms of bio-rodenticide, which has proven efficacy and safety potential of 80 per cent to 100 per cent, was applied, and is considered a promising substitute for banned chemicals.

The yield increased by 10 to 15 per cent while the quality and value of the product was also improved.

Another advantage was a diminished muttony smell and less pest infection in cabbage, bulb onion, piper, and potato. It was found to reduce muttony smell by 70 per cent and houseflies by 40 to 50 per cent. 5,795 and 6,530 farm households for plant production and environmental treatment purposes have applied it respectively.

Primary results of production and sale of safe vegetables

During the period of program implementation, about 5,000 tons of safe vegetables were produced for local markets and for export, of which more than 70 per cent was consumed in neighbouring locations such as Ha Noi, Yen Bai, Phu Tho, Tuyen Quang and Hai Phong.

With two shops in Vinh Yen City Town and one other in Vinh Lac Town, about 200 tonnes of vegetables in 1998 & 1999 combined were sold serving more than 10,000 customers. Customers were guaranteed safe products at less than 20 per cent higher price than normal products, and traders as well as producers were able to claim higher product quality.

The results of products analysed and certified by the centre for pesticide quality control at Plant Protection Department, the National Institute of Chemicals and the Vinh Phuc Health Department, showed that the portion of samples achieving safe standards for pesticide residues, NO_3 and pathogenic microbes were 94.2 per cent, 76.5 per cent and 100 per cent respectively, compared with 28.5 per cent, 14.2 per cent and 40 per cent sampled in normal production.

From these results, it is recommended that these models be duplicated in other regions, and in other Vinh Phuc crops like tea and fruits.

So far, many organizations inside and outside Viet Nam have shown interest in this program. The program has also received the favourable attention of leaders of the Vinh Phuc Peoples' Committee, and scientific delegations from ASEAN, the USA, Germany, Australia and China.

The program has attracted the interest of consumers as well as producers. All comments received on the program affirmed its initial success and creativity, and contributed information for the continuing development of SVP in Vinh Phuc.

Conclusion and points for discussion

1. The current production of Viet Nam "safe vegetable" is close to organic production, with the combination of advanced traditional and modern cultivation techniques contributing to a clean production environment and the creation of "safe" products (having permissible levels of pesticides, NO_3 and pathogenic microbe residues). Agro-chemicals, while not completely excluded, are used in the lowest possible dosages in order to minimize negative effects on human health and the environment.

Profit for the producer is a preliminary condition for extension and development of SVP.

SVP should be organized as mass production units and applied in a vast field site in order to optimise production, and to serve both domestic and export needs.

2. Farmers in Viet NamViet Nam in general and Vinh Phuc in particular already have the basic capacity for growing safe vegetables. The main challenge lies in setting up detailed technical models for appropriate crops, and training farmers in implementation. The best method of technology transfer is training classes and demonstrations.

3. The following are suggestions for steps in the further development of SVP.

a. Establish a National Program for safe agriculture to unite research, production, marketing and exporting activities. In the short term, the program should focus on safe vegetables and fruits.

b. Push investment, including foreign sources, in SVP and establish centralized production regions. Government should authorize a policy for promoting export, consumption and stable market creation for safe agro -products.

c. Strengthen research works and technology activities involved with SVP, as well as technology transfer to farmers.

d. Promote public information campaigns in the use of safe agro-products.

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Director of SVP program of Vinh phuc

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Figure 1. Technical scheme for safe vegetable production in vinh phuc

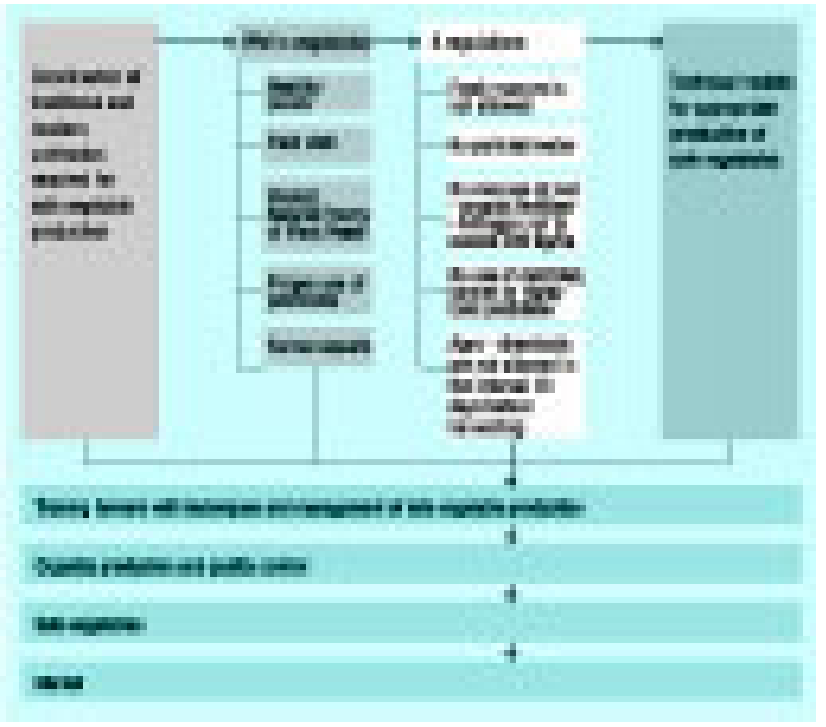

Table 1. Effectiveness of technical demonstration of safe vegetable production in Vinh Phuc, 1998

Cropping season	Crops	Number of demonstration	Yield		Fertiliser cost		Pesticides cost		Cost price	
			Kg/ha	Compared to Conventional Agriculture	VND/ha	Compared to Conventional agriculture	VND/ha	Compared to conventional agriculture	VND/ha	Compared to conventional agriculture
Spring - Summer	Penny cress	1	15,833	100	703,300	77.3	502,800	48.3	492	88.8
	Potato	1	33,360	96.0	278,000	-	2,974,600	58.2	953	95.8
	Legume	1	15,139	92,4	932,400	61.7	788,900	61.7	1,020	95.3
	Average		21,444	96.1	667,900	69.5	1422,100	56.0	821.6	93.3
Winter	Cabbage	4	21,600	97.5	810,000	65.2	405,000	64.4	458	88.2
	Hongkong Cabbage	3	19,440	97.2	475,200	61.5	378,000	56.5	295	88.8
	Legume	1	14,000	100	772,800	66.6	336,000	50.0	707	95.7
	Kohlrabi	2	21,222	98.9	444,000	66.5	277,000	73.8	234	97.0
	Morning glory	1	63,890	100	1,528,000	166.8	88,000	50.0	289	95.8
	Average		28,030	98.7	806,000	85.32	296,800	49.9	414.6	92.9
Average in 1998			24,737	97.4	736,956	77.4		52.9	618.1	93.1

*Comments:

The cost of nitrogen fertilizer and pesticides was reduced by 22.6 per cent and 47.1 per cent respectively, with a decrease in yield of only 2.6 per cent. Thus the cost price was 6.9 per cent lower and profit was 42.9 per cent higher than untreated vegetables.

Residues of pesticides, NO_3 and pathogenic microbe were below safe levels.

Table 2. Results of sample analysis inside and outside safe vegetable sites (1997 - 1998)

#	Year	Crop	Number of samples	Pesticides residue		NO_3 residue	Residue of
				mg/ kg	Type	mg/kg	E. Coli/kg
1	1997	Safe penny cress	2	0	-	115	0
2	-	Safe cabbage	2	0	-	279	0
3	-	Safe potato	2	0	-	106	0
4	-	Safe bulb onion	2	0	-	596.7	0
5	-	Safe morning glory	2	0	-	142.6	0
6	1998	Safe penny cress	2	0	-	2275	0
7	-	Normal penny cress	2	1.94	Diptrex	2666	23
8	-	Safe cabbage	1	0	-	488.2	0
9	-	Normal cabbage	1	5.97	Sherpa	418.5	0
10	-	Normal cabbage	2	0.2	Sadavi	790.5	0
11	-	Safe legume	1	0	-	120.1	0
12	-	Normal legume	1	0.2	Sadavi	224.7	23
13	-	Safe potato	1	0	-	232.5	0
14	-	Normal potato	1	0	-	227	0
15	-	Safe morning glory	1	0	-	403	0
16	-	Normal morning glory	1	0	-	992	9
Total		6	24	-	-	-	-

***Notes: -** Sampling place: Tich Son (Vinh Yen); Dai Dong, Vinh Son (Vinh Tuong); Me Linh, Dai Thinh (Me Linh) - in safe vegetable area

- Sampling times: Dec. 1997 and Dec. 1998

- Institution analysed: The Northern Central for Pesticide Control, Institute of Chemical, Vinh Phuc Centre of Heath Care

***Comments:**

- About pesticides residue: 94.2 per cent of safe samples and 28.5 per cent of normal samples met the safety standard

- About NO_3 residue: 76.5 per cent of safe samples and 14.2 per cent of normal samples met the safety standard

- About pathogenic microbe: 100 per cent of safe sample and 40 per cent of the normal samples were free of pathogenic microbes

Table 3. Demonstration results of Applying Organic Manure in Spring season – 1999

#	Location	Area treated (ha)	Number of farm house holds	Efficacy (%)			
				In house		On the field	
				Good	Fair	Good	Fair
1	**Tho Tang**	50	1,000	100	0	19	81
2	Vinh Son	50	730	77	23	9	82
3	Thuong trung	50	1,000	95	3	95	3
4	Yen Binh	50	952	54	30	41	40
5	Tich Son	50	1,000	84	16	58	34
6	Van Hoi	50	1,000	100	0	96	4
7	Thanh Lang	50	1,000	67	33	54	37
8	Dong Ich	50	1,000	40	52	65	35
9	Dai Thinh	7	1,000	100	0	100	0
10	Dai Tu	55	1,000	100	0	9	91
		462	8,782	81.7	15.7	54.6	40.7

Comments:

Number of farm households using Organic Manure for house treatment: 8,782

Number of farm households using Organic Manure crops: 5,457

High efficacy on the field: 50 per cent to 60 per cent in rice, 80 per cent to 95 per cent in vegetables and flowers

Rice yield increased by 6 per cent, potato: 8.5 per cent, cabbage: 3 per cent and morning glory: 20 per cent

Total households: 8,782

Total cultivated area treated in 1998 and 1999: 1,570 ha.

Table 4. Planning the safe vegetable area in Vinh Phuc 1998

#	**Location (Cooperative)**	**Safe vegetable production area**			**Safe vegetable production area 1**		
		Area (ha)	**N° of farm households**	**Output (tonnes)**	Area (ha)	**N° of farm household**	**Output (tonnes)**
1	Tho Tang	30	408	2,360	5	130	159
2	Dai Dong	41	504	1,758	11	148	489
3	Vinh Son	34	414	2,680	10	176	327
* Vinh Tuong		105	1,326	6,798	26	454	975
4	Tien Phong	100	900	2,974	20	205	500
5	Me Linh	100	1,396	2,230	25	275	557
6	Dai thinh	100	1,375	2,520	15	148	306
* Me Linh		300	3,671	7,724	60	628	1,261
7	Hong Phuong	22	719	620	6	226	246
8	Dai Tu	46	942	2,525	10	237	673
* Yen Lac		68	1,661	3,145	16	463	919
9	Tich Son	9	278	616	5	166	360
10	Van Hoi	20	230	984	6	86	250
Total		**502**	**7,166**	**19,267**	**113**	**1,797**	**3,865**

Table 5. Results of Crop Productivity using EM in Vinh Phuc

Year	Location	Crops	% crop yield increased	Comments
1997	Thuong Trung - V. tuong	Summer rice	15,96	- Plumed and bright seeds
	Dai dong - V. tuong	Hong kong penny cress	26,1	- Softer leaf
1998	Dai dong - V. tuong	Kohlrabi	5,92	- Thicker leaf
	Van tien - Yen lac	Spring rice	8,78	- Healthy plants and bright seeds
	Dai tu - Yen lac	Spring soybeans	13,42	- Multiple flowers and reduced pest infection
	Lien chau - Yen lac	Spring soybeans	12,55	- Multiple flowers and reduced pest infection
	Hong phuong - Yen lac	Round egg plant	13,32	- Reduced pest infection
	Tich son - V. yen	Penny cress	3,45	- Longer blades and flowers
	Dai dong - V. tuong	Potato	5,47	- Shortened growing time and more long lasting
	Tich son - V. yen	Morning glory	13,64	- High quality
	Tich son - V. yen	Rose	15,15	- Long lasting flower

Notes: Spraying EM as FPE formulation 3 - 4 times, Concentration 0.1 per cent equivalent with 20 liters dilution / 360 m²

Guideline on planning of and management in safe vegetable area

Guide Committee of IPM & SAPP Socialist Republic of Viet NamViet
Nam of Vinh Phuc Province Freedom - Independence - Happiness
No: 02/ BCD Vinh Yen Feb. 28th 1997

- Based on the standpoint and plan of IPM Inter - National program.
- Based on the decision No 179/ QD - UB dated Feb. 1st 1997 signed by Vinh Phuc People Committee about implementation of IPM and SAP in period of 1997 - 2000 and the operating regulations of provincial Guide Committee of above program.
- Based on the proposal of District People Committee for participating in provincial safe vegetable areas.

Aim at better planning and management in safe vegetable areas, the GC of IPM and SAP program authorizes the 'Guideline on planning of and management in safe vegetable area" with following articles:

I. General articles

Article 1: The planning of safe vegetable area of Vinh Phuc is aimed at producing commercial products of safe vegetables, achieve national standards, serve domestic consumers, tourists and export markets, and obtain more profit for producers.

Article 2: In the short term, the provincial scale is 500 ha located in 10 - 15 cooperatives in Me Linh, Vinh Tuong, Yen Lac, Tam Dao Dist. and Vinh Yen City Town and focused on cabbage, penny cress, kohlrabi, legumes, potato, bulb onion, morning glory with 20000 tons a year.

Article 3: The provincial GC of IPM & SAP program cooperates with Dist. People Committee to manage activities in SVP area such as: production, quality control, technical assistance, farmer training, materials supply, investment, policy making and linkage between production and consumption. The PPSD will directly conduct this program.

Article 4: In production sites, the People Committee of cooperatives will be in charge of direct management of area, follow the regulations and guidelines from superiors. The Committee also needs to ensure farmers implement regulations of the above program fully.

II. Planning and business in safe vegetable production area

Article 5: The planning area will be implemented as follows:

1. The production area must be located near markets and wherever farmer was cultivating vegetables. Such natural condition as soil, water resource, environment must also meet the requirement of safe vegetable production.

2. The production of safe vegetable is urgent demand of local authorities and people.

3. Comply with all the necessary formalities of planning safe vegetable area.

- The People's Committee of cooperative need to apply for participating in SVPs. The application will be examined and approved by the district People's Committee.
- The producer must also apply for participation and promise to fully implement the regulation 1of the area.
- The plant protection Sub-Department examines the applications.

4. There must be a detailed cultivation and soil map, list of participants and results of soil and water analysis in the above region.

Article 6: Responsibilities and rights of the local authorities and farmers.

1. The people's committee of cooperatives and farm household must implement fully all technical models and regulations of producing and management of safe vegetable business.

2. Local authorities and farmer are given priority to:

- Be awarded certification for product if it meets the relevant criteria
- Can sell products
- Receive advanced techniques, materials loan, training relevant for safe vegetable production.

Article 7: Implementation methods of managing production area.

On the basis of technical models applicable to the province, the local authorities need to select appropriate ones which will be examined and passed by department of agriculture rural development and provincial GC before implementation. Farmers have responsibility to follow and implement fully these models especially guideline on usage of pesticides, fertilizers and irrigation water.

- Selecting one technician to work in each area to conduct demonstration of SVP and to establish a club of safe vegetable producer.
- Checking up periodically the implementation of rules such as: not using fresh manure, no irrigation with polluted water, no overuse of pesticides, no late application of pesticides and urea.
- The checkers are selected from department of Agriculture and Rural Development, Plant Protection Branch of District, local people's committee, and technicians.

Article 8: Management of business in safe vegetable area.

- Each local authority will organize the agency responding for supply of inputs to safe vegetable production especially pesticides. The agency's operation is licenced by PPSD.
- The products which meet the requisite criteria will be awarded quality certification by the program conducted by the Board or province or other nominated authorities for marketing.

• With the assistance of Provincial, District and Local Authorities, participants need to create a marketing network including safe vegetable shops in local towns, big trading centre, high potential consumers such as hotels, restaurant, agro - product export organization etc.

III Organizing implementation

Article 9: Head of program's GC of province, Director of Agriculture and Rural Development Department will take responsibility for cooperating with the Heath Department, People's Committee of Districts and other relevant offices to plan, to conduct and to manage the area.

Article 10: The PPSD cooperates with department of measures and quality control, health care organizations to consult GC about management of techniques, production, quality control and business in these areas.

Article 11: The People's Committee of Districts will guide cooperatives and professional organizations in implementing fully these guideline.

Article 12: This guideline is valid for all SVP regions. The producer, People's Committee of cooperatives and relevant offices are responsible to follow it.

On behalf of Vinh Phuc IPM and SAP program Receiver: Head

- People's Committee and Council of Vinh Phuc
- Premier's office
- Staff of Conducting Board
- People's Committee of Districts
- People's Committee of Cooperatives
- PPD
- NIPP
- Administrative Department

(Signed)

Nguyen Van Hoa

Similarities and differences between practices in Vinh Phuc and IFOAM standards by IFOAM

With reference to the standards of IFOAM, the following comparisons can be drawn from research and experiments in producing organic products in Vinh Phuc:

Similarities to IFOAM

1.1 Principles and aims of organic production

1.2 Do not use technology that changes genetic structures

1.3 Do not use chemical treatment on seeds

1.4 Ensure long-term safety of water resources and soil

1.5 Limit the usage of chemical fertilizers, especially nitrates and any fertilizers containing heavy metals. Promotes the usage of organic fertilizers and mature microorganism fertilizers.

1.6 Protect the insects that are natural enemy of pests and disease.

1.7 Use I.P.M, promote cultivation methods, plants, and biological tools, mechanical tools that prevent disease and minimize the usage of chemical.

1.8 Ensure the good quality of agro-products and is safe to the consumers.

1.9 Do not store, transport and process the organic products together with inorganic products.

Differences

2.1 According to the standards set out in the cultivation of organic products of Vine Puck, a certain level of chemical fertilizers (N.P.K) and breeding stimulus are used in cultivation of product, provided that chemical residues in the product will not exceed permitted levels.

2.2 In addition, certain chemicals for plant protection, which are less poisonous, are allowed to be used, provided that the usage will not leave chemical residues in excess of permitted levels.

Organic Production in Vinh Phuc

CHAPTER 14

ORGANIC AGRICULTURE IN VIET NAM PRESENT STATUS AND FUTURE DIRECTIONS

By Prof. Nguyen Huu Nghia,
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Introduction

Over its 4000-year history Viet Namese agriculture has been by its nature an organic agriculture. Before 1954, except for some French-run farms that made use of machinery and mineral fertilizers, Viet Namese farmers were not familiar with chemical fertilizers and pesticides. All our crop varieties were local and traditional and included:

- Tall rice varieties that did not require much fertilizer but were resistant to pests and diseases, and were tolerant to local climatic conditions. These high-quality varieties included Tam Xoan, Du, Di Huong, Yellow Flower sticky rice, etc. Most of these varieties were more or less aromatic.

- Specialty fruit species such as the cased-longan grown in Hung yen, Thieu litchi, Doan Hung pomelo, Ngu banana, and mango and durian in the South.

Before the arrival of more modern methods, the main fertilizers used in Viet Nam were organic: animal manure mixed with grasses, leaves, rice straw, compost from human waste mixed with rice, straw ash, dry mud, alluvial mud, alluvial water, green mulch from the plant species *Azola pinnata, Sesbania sesban Crotalaria pallida* in the lowlands, and *Tephorosia* and many other legume species in the uplands.

Since 1960, especially after the liberation of South Viet Nam, intensive farming with new crops and crop varieties, and the fostering of a "green revolution" have been promoted. As irrigation systems are developed, the amount of irrigated land is thereby increased. Thus the reliance on mineral fertilizers and pesticides has grown at a rapidly increasing rate, but with the result that the yields of rice and other crops have been increasing for years. During the last two decades of agricultural modernization, the food production of Viet Nam has doubled from 14.4 million tonnes in 1980 to 31.85 million tonnes in 1998. Viet Nam has become the world's largest rice exporter. This great achievement in agricultural production has increased the prestige of our country in the international arena.

During the 1960s and 1970s, the introduction of short culm wheat and certain rice varieties in Latin America and Asia (often referred to as the

green revolution), contributed to a great leap in worldwide food production. Over 25 years, wheat production increased by seven-fold and irrigated rice by four times. However, the green revolution also has negative influences, which offer useful lessons to scientists, managers and policy makers.

The popularisation of a few wheat and irrigated rice varieties has caused the loss of many local traditional varieties, thus decreasing biodiversity and increasing crop losses caused by pests and diseases. In the last years of the Twentieth century, the number of rice varieties grown on 75 per cent of the land devoted to rice cultivation was twelve, while on 70 per cent of the land devoted to rice cultivation in the Philippines, only three to five varieties were cultivated. In Viet Nam, the traditional local rice diversity – consisting of hundreds of varieties in the Red River delta – was supplanted by some ten to fifteen improved and hybrid rice varieties.

The excessive application of mineral fertilizers and agrochemicals has brought about great negative impacts on the environment. It is estimated that only about one half of fertilizers is used by crops; the other half is lost due to vertical penetration, evaporation and run-off, thus causing environmental pollution, and contributing to global warming and climate change. By the same token, large amount of pesticides do not reach the targeted pests and diseases, thus contributing to soil, water and air pollution. Furthermore, these pesticides stimulate the formation of pesticide resistant species or strains of pests. The most direct and dangerous effect is food contamination, which is slowly poisoning millions and killing hundreds of people every year.

To address the pitfalls of the green revolution and industrialized agriculture, recently many countries have begun to return to organic agriculture, which is gaining an increasingly important position in many societies and in the global market. Organic agriculture is also ecological agriculture. The most important characteristic of organic agriculture is the appropriate use of agro-chemicals and the increasing use of organic material in production. Also, organic agriculture tends to use more economical techniques like mini tillage, shallow ploughing (which conserves soil texture), and using organic inputs effectively to reduce the production costs and increase the product quality.

The principal aim of organic agriculture is to foster conditions for farmers to initiate agrarian systems suitable to the ecological conditions in their localities. Organic agriculture must produce healthy food and increase the quality of life for farmers, ensuring food that is beneficial for both consumers and for the health of the environment.

Viet Nam's Definition of Organic Agriculture

As mentioned above, Viet Namese traditional agriculture is organic. However, up to now no commonly agreed definition of organic agriculture exists in Viet Nam. Various authors have proposed different definitions.

Nguyen Van Chuong (1997) considers our traditional agriculture as authentically organic because all the basic and vital elements for our cultivated species were provided by the application of organic materials.

Nguyen Van Man argues that organic agriculture is a clean and sustainable agriculture, ensuring durable economic development with little differentiation of the society into rich and poor. It conserves natural resources and promotes an ecological environment by combining indigenous knowledge with the most advanced modern technologies in biology and biologically intensive cultivation. Also, organic agriculture minimizes the use of agrochemicals. It bears deep cultural and humanitarian characteristics and creates opportunities for all society's members to develop their own talents.

Nguyen Thanh Hien and Peter Stewart (1997) showed that organic agriculture helps to maintain the humus level of the soil, balances necessary nutrients, and protects farming ecosystems from contamination with toxic residues — mainly pesticides, heavy metals, and nitrates used in integrated pest management (IPM) and Integrated Nutrient Management (INM).

Bui Tam Trung (1997) states that "organic agriculture is also biological agriculture" and is thus a viable approach to the sustainable development of agriculture because it maintains and improves soil fertility — which also means increasing yields per hectare.

Authors like Duong Hong Dat, Ton That Chieu, Nguyen Viet Pho, among others, have also expressed their preferences for ecological, clean, sustainable, and traditional agriculture.

Overall, in our view and in that of prestigious Viet Namese scientists, organic agriculture is an ecological approach to agricultural production characterized by safety, sustainability, high quality and high productivity. It requires the integrated application of advanced and indigenous knowledge, the appropriate use of organic and inorganic materials, traditional and improved crop varieties, local and newly introduced germplasm, and biotic and abiotic means which are environmentally friendly. With appropriate management of natural resources, these measures will ensure the long-term sustainability of humankind and a more prosperous life for farmers. These measures will also help to promote a clean and healthy environment for our planet.

Thus, organic agriculture must entail:

- Optimum integration of various production technologies;
- Sustainability both economically and environmentally;
- Safe food in a clean and safe environment;
- Acceptable and stable crop yields;
- Improvement of soil fertility by biological means, especially the cultivation of legumes and nitrogen fixing organisms;
- Biocontrol of weeds, diseases and pests, while taking into account the possible cultural and physical implications of any practices used in meeting this goal; and
- Protection of the environment and conservation of natural resources.

With regard to certified organic products, Viet Namese organic products in the past met all the International Federation of Organic Agriculture Movements (IFOAM) standards because there was no chemical application at any stage of production or distribution. However, at present such purely organic products have been reduced to a negligible amount, and can be found only in mountainous areas, especially in high and remote villages. Of course, some products could meet organic standards of western markets, including upland rice, corn, vegetables and fruits (both wild and cultivated), roots and tubers (both wild and cultivated), bamboo shoots, wild honey, and snow tea, among others. However, to be available in the market, they would have to be produced at a large scale in the same organic manner, and the land would have to be protected from non-organic practices to promote a sustainable organic agriculture. Policy would also need to be enacted to stimulate farmers in organic farming oriented areas and to ensure a profitable market for their organic products.

For the Viet Namese people today, it is more important to produce sanitary and safe products rather than organic products. But, the world markets can always find pure organic products in Viet Nam. In the past, Viet Namese agricultural exports included no organic products, but recently they have dramatically increased thanks to gains in yield, production and quality. In the immediate future, Viet Nam will focus more on boosting product quality and safety by using high-quality varieties and species, and minimizing chemical control of pests and diseases by incorporating genetically resistant crop varieties.

Environmentally Friendly Agricultural Techniques and Technologies Used in Viet Nam

As noted above, Viet Namese agriculture has long been organic by its nature. Before 1954, our farmers had no idea about the existence or use of mineral fertilizers and pesticides, except for some French-run enter-

prises and farms. But even without such manufactured products, in Viet Namese history there is no record of famine except for the one that occurred in 1945 due to war. This clearly suggests that organic agriculture represents a repository of invaluable indigenous knowledge and traditional techniques that ensure safety and sustainability. Inheriting this precious asset, Viet Namese scientists and farmers have made a wonderful leap in yield and production, which has increased more than two-fold in the last two decades. As a result, Viet Nam has become the second largest rice exporter in the world after Thailand. At present, the amount of agrochemicals in Viet Nam is still low, averaging 80 kilograms per hectare (kg/ha) of NPK (nitrogen, phosphorus and potassium). This figure is much lower than the 500 kg/ha of NPK and the 3 kg/ha of pesticides used in France in 1992. However, we must be wary of the potential dangers of a growing dependence on mineral fertilizers and pesticides. Beside environmental pollution, the long-term effects of agro-chemicals directly cause the death of about 20,000 people yearly in developing countries. This is why we must pay more attention to promoting the use of organic material in agricultural production, by reviving our indigenous knowledge and traditional technologies related to organic agriculture.

In the thousands-year history of Viet Namese agriculture, farmers have used technologies suitable to their local agro-ecological conditions. In times past, farmers knew how to adapt their production to climatic and soil conditions by using adaptable varieties and species during suitable growing seasons. Because of this, farmers could reduce fertilizer inputs, increase economic efficiency, and have less impact on the environment. The following are some environmentally friendly technologies used in Viet Nam.

- ***Crop diversification***

In the fields, our farmers grow diversified crops with the principle "for each soil type a plant species". For example, farmers have created very rich and diverse rice collections with very precious adaptive traits (e.g., upland rice, deep-water rice, acid-sulphate-soil rice, winter-spring rice with high resistance to Blast disease, and photosensitive summer rice resistant to Bacterial Leaf Blight). Such adaptive varieties reduced the need for pesticides and fertilizers.

- ***Crop rotation***

Viet Namese farmers also make wide use of varying crop combinations. Methods include intercropping and relay cropping with soil improvement species such as mungbean (*Vigna radiata*), soybean (*Glycine max*), swortbean (*Canavalia ensiformis*), ricebean (*Vigna umbellata*), peanut (*Arachis hypogea*), and black gram (*Vigna unguiculata*). Often farmers alternate crops according to soil type and growing season. Rotating irri-

gated rice with dry land crops helps cut the disease and pest development cycle, and thereby reduces their occurrence in all crops. Rotation with legume crops helps improve soil fertility and texture.

- ***Growing and using green mulch***

Many legume species have been used for cover and mulch, such as *Sesbania, Crotalaria, Tephrosia, Leucaena, Pueraria*. In wild and semi-cultivated areas are *Tithonia diversifolia, Chromolaena odorata, Melia azedarach* and very diverse wild legumes. In the lowlands a famous species, *Azola pinnata,* was widely grown in the 1960s and 1970s. At present, new species are being tried out, such as *Stylosanthes spp, Chamaecrista rotundifolia, Indigofera teysmanii, and Gliricidia sepium*. These are multi-purpose species, which may be used as animal feed, shade for other crops, soil erosion control, and soil improvement. Many of these plants have high contents of nitrogen, potassium and phosphorus.

- ***Production and use of animal and human manure***

Viet Namese farmers raise various animals such as cattle and buffalo for soil tillage. Farmers also raise pigs, chickens and ducks, which consume agricultural by-products and can be sold later as a source of income. The manure of these animals is mixed with rice straw, grasses, or plant leaves, and then incubated for decomposition and used to fertilize crops and fruit trees. Decomposed human waste mixed with rice-straw ash is also used as a very high quality fertilizer.

- ***Soil drying and aeration***

Often the soil is ploughed and left during the winter season. Farmers believe that one piece of well dried and aerated soil is equivalent in productive value to one piece of manure. In fact, soil drying and aeration promote plant growth, reduce pests and disease incidence, and of course, increase crop yield and quality.

- ***Using alluvial soil, alluvial water and dried alluvial mud***

The use of alluvial water to irrigate crops has many advantages and is still used by farmers in the river deltas. Dry alluvial soil can be used to nurse fruit trees to increase yield and quality, and to reduce disease incidence. Also, the mud from ponds and irrigation and drainage canals is used in the same way after being dried.

- ***Field sanitation***

One of the very effective measures of preventing pests and diseases is field sanitation. After harvest, the remaining plant material from the crop is collected and covered with mud for decomposition. The high temperatures created in this process kill pest eggs, larva and disease residues. Clearing embankments of shrubs and grasses and then covering them with

mud has the same effect. Besides, the decomposed plant residues are also good fertilizers.

- ***Making bio pesticides from plant extracts***

Traditionally, farmers have controlled pests with extracts from the leaves of *Melia azedarach, Azedaracha indica, Derris, Croton tiglium*, and from the seeds of yam bean *(Pachyrrhizus erosus), Strychnos nux-vomica*, and chilli pepper, among others.

- ***Using light traps to catch adult insects***

Light traps used to be a very effective way to control pests. The method was used widely in 1960's as part of a mass movement. There were light-traps festivals that attracted the participation of all farmers. Unfortunately, the movement collapsed due to the air attacks during the Viet Nam war. At present, farmers in some regions continue to use light traps. Many farmers now hang a weak light over the surface of fishponds. Attracted by the light, adult insects draw near to the light and then fall onto the water surface where they are consumed by fish in the pond.

- ***Garden - Fishpond - animal shelter (VAC)***

VAC is an excellent example of an environmentally friendly practice. The three components (garden - fish pond - animal shelter) are connected in a waste-free production chain. In this model, the waste of one component can be used as the feed or fertilizer input for another component. In fact, VAC is also a traditional approach that Viet Namese farmers have been following since long ago. At present, VAC is receiving more attention for development and expansion.

- ***Ecological villages and VAC***

It is fair to say that old Viet Namese villages were very ecological. Often, around a village were bamboo barriers that protected the village from winds and robbery or invasion. Bamboo used to be the most popular construction material. Almost all village households have gardens with diverse trees that provide shelter for cows (or buffaloes), pigs and poultry. Households also often have a small or large pond for fish rearing and for washing. Each village had its own regulations for the protection of villagers, animals, plant species and the environment. All organic waste materials were used as fertilizers for agricultural production. So, the villages were very clean, the air was fresh and green cover moderated the temperature. At present, the Viet Namese Gardeners Association (VACVINA) is trying to make VAC more diverse and effective, both economically and ecologically. The contribution of the Institute of Ecological Economy (ECO-ECO) also merits recognition. So far, most of the above-mentioned techniques are applied in lowlands areas. In the uplands, farmers face more problems, so they have more to do. Beside some common techniques

used for both the uplands and the lowlands, there are some specific upland techniques for sloping land agriculture.

- ***Terracing***

Where possible, farmers used to make terraces for long-term cultivation of rice and other food crops.

Uneven terraces can be used for dry-land crops and fruit trees. Applying mulch to mini-terraces in highly sloping fields can make it easier to take care of crops, prevent soil erosion, and create favourable conditions for soil fauna.

- ***Contour or hedgerow planting***

To reduce labour input, farmers plant legumes (e.g., *Tephrosia, Leucaena, and Indigofera*) and multipurpose species in hedgerows to prevent soil erosion and provide green biomass for the improvement of soil fertility.

- ***Cover crop planting and green manure use***

Many legume species such as *Mucuna pruriens, Macroplilium atropurpureum, Centrosema spp, and Pueraria phaseoloides* are excellent cover crops. Some other species are used for intercropping (mostly cultivated) like *Vigna umbellata, Glycine max, Vigna radiata, and Arachis hypogea*. At present, the highlanders still use lots of green mulch. Mineral fertilizers are used in small amounts.

- ***Agroforestry approach***

Diversified and multi-storeyed planting is a good example of traditional agro forestry (AF). At present, different agro forestry models have been established that combine traditional knowledge with modern techniques, and domestic and foreign experience. As its effectiveness is clear, agro-forestry is becoming increasingly important. At present, farmers are applying more and more AF models. Bare hills and fallow lands are being planted with *Eucalyptus spp. and Acacia spp*. since they are drought and poor soil tolerant. Where possible, farmers grow high quality wood species like *Erythrophloeum fordii, Tectona grandis, Chucrasia tabularis, Dipterocarpus spp, Madhuca pasqueri, Burettiodendron tonkinensis*, and various conifers like *Pinus spp. Cunninghamia lanceolata, Fokienia hodginsii, Mangletia glauca, and Styrax tonkinersis*. Various fruit trees are also grown, such as litchi, longan, pomelo, orange and mandarin. Also cultivated are industrial tree crops like tea, coffee, rubber, and medicinal and spice species like *Ilicium verum, Cinnamomum cassia*, etc. Thanks to our common efforts, the forest cover has increased from below 20 per cent in the 1980s to 29 per cent in 1999 and this figure is expected to be more than 43 per cent in 2010. With such measures the ecological envi-

ronment and many natural resources will be restored. It is estimated that in Tuyen Quang and Yen Bai provinces, the forest cover is nearly 50 to 60 per cent. Crop and tree diversification has led to an increase in farmers' incomes, as well as the improvement of the environment and soil fertility.

■ ***Agro forestry in sandy areas along the sea coast***

For the sandy dunes along the seacoast, especially in the central coastal areas, *Casuarina equisetifolia* has been grown for a very long time to create windbreaks. Under the shade of Casuarina, farmers can grow sesame (*Sesamum indicum*), Millet (*Setaria italica*), sweet potato (*Ipoamoea batatas*), cassava (*Manihot esculenta*), taro (*Colocasia spp*), peanut (*Arachis hypogea*), and other crops. Recently, farmers have added other species like *Acacia mangium* and *A. auriculiformis*. At present, Cashew (*Anacardium occidentale*) appears to be very promising in this very arid and fragile ecology. To be more economically effective, the Viet Nam Agricultural Science Institute has strongly recommended the cultivation of grafted cashew, which may provide a good harvest after only one year. "Grafted cashew is a plant for hunger elimination and poverty reduction for the sandy land farmers in Binh Dinh," said To Tu Thanh - the Party Secretary of Binh Dinh province in the meeting organized by Viet Nam Agricultural Science Institute in Quy Nhon, Binh Dinh in August 2000.

■ ***Agroforestry in mangrove forests***

In the mangrove forests, the situation is also improving gradually. The *Rhyzophora spp*. and *Melaleuca cajeputi* forests are being regreened not only in the South but also in the North. The saline rice fields are being converted into aquaculture areas, primarily for shrimp and crab. This is quite in keeping with the government's policy of not increasing rice-growing areas, and of diversifying farm production using suitable species and adapted technologies.

Obviously, the Viet Namese Government is very dynamic in its strategies for sustainable development. Viet Namese agriculture is changing into ecological agriculture.

Biotechnology and engineering in Viet Nam

In the last decade, Viet Nam has also paid attention to biotechnology research and its applications to production. Many research and teaching institutions have established biotechnology laboratories, purchased equipment and increased qualified staffing. However, the results are still modest, especially in the field of genetic engineering. The most active and effective procedures now are in-vitro culture labs, which produce disease-free stocks, and which also, conserve and rapidly multiply rare and precious species and varieties. The labs also maintain sterile materials, creating haploid lines, and selecting diverse and pest- resistant clones, as

well as those tolerant to adverse conditions. So far, nothing has been reported concerning the application of genetically engineered products to agricultural production. It is because Viet Nam has not issued any official permit for the import of genetically modified organisms (GMOs), and Viet Nam itself has not released GMOs so far.

Research and Development of Microbial Technologies

Viet Namese farmers have been using microbial technologies for a very long time. Salted brassica, eggplant fruits, cucumber, onion, shallot, home made soy source and alcohol are traditional products of microbiological technologies. In the fields, farmers have used nitrogen fixing *Azola*, legume species, as a source of nitrogen fertilizer to increase the yields of different crops.

At present, Viet Namese scientists are using microorganisms to produce micro-bio-fertilizers. Some products like Nitrazin (from Rhyzobium) and Azozin (from Azospirillum) are widely used for nitrogen fixation in legumes and rice fields, respectively. Other preparations like phosphate solubilizing, cellulose decomposing and biopesticides are being studied for use.

Very recently, a new field of study that's becoming more and more important is environmental microbiology, which is the search for microorganisms that can clean sewage, decompose wastes and turn them into fertilizers.

Characteristics of Viet Nam's Breeding Program

In all probability there is little difference between Viet Namese breeding programs and those in other countries. They all use almost the same methods and aim at solving the same common problems: high yield, high quality and resistance to pests and diseases, as well as tolerance to biotic and abiotic stresses.

In Viet Nam, before 1945 the rice yield was 1.0 to 1.5 tonnes per hectare (T/ha). All varieties had long growth duration and could be planted only once a year. With the green revolution, the yield of crops in Viet Nam has increased tremendously.

Since 1984, Viet Namese researchers have released 186 improved varieties, of which rice counted for 105, maize 22, sweet potato 7, potato 12 and legumes –24 varieties. As a result, agricultural production has increased at 4.3 per cent per year since 1987. The total food production in 1998 was more than 2 times that in 1980 (31.85 million tonnes as compared to 14.4 million tonnes). Similarly, the yields of many crops have doubled (rice from 2.1 T/ha in 1980 to 4.1 T/ha in 1999; maize from 1.1 T/ha in 1980 to 2.66 T/ha in 1997). To make the most of solar radiation short duration growth varieties were selected to grow 2, 3, 4 and even 5 crops per year.

These figures represent the distinctive characteristics of Viet Nam's seed breeding programs. Other distinctive characteristics include the diversity of agro-ecological systems and the diversity of Viet Nam's ethnic groups (total of 54) — each of which has its own cultural practices, customs and traditions. This makes Viet Namese breeding programs more complicated, requiring our breeders to take into account local ecological characteristics as well as ethno botanical beliefs and practices so that the newly released varieties must be ecologically adaptive and resistant to stresses. This will reduce fertilizer and pesticide inputs. At the same time, the products must be of high quality to increase the economic efficiency of organic agriculture. In many cases, the crop varieties need to be culturally acceptable in the region where they are introduced.

At present, when yield is already high, the question of quality becomes more important. This is a very significant direction in research: helping farmers produce more marketable (i.e., higher quality) products to increase their income, and thus to increase their productivity and standard of living.

Turning Agricultural Production into an Organic Production: How Long and at What Cost?

This is a very important but difficult question to answer. According to Viet Namese researchers, organic agriculture doesn't mean banning mineral fertilizers and pesticides. Rather the problem is how to use them in the most appropriate ways: the right pesticide for the right pests, the right dose at the right time. We can increase the average mineral NPK to 100 kg/ha, but to do so we'll have to increase the amount of organic fertilizers as well as biological and biotechnological products to sustain the increases in yield and quality, let alone protecting the environment.

In this view, Viet Namese agriculture still bears some features of organic production. In many localities, especially in mountainous areas, farmers still use lots of organic material such as animal manure and green mulch as well as small amounts of mineral fertilizers. As discussed above, farmers also know how to stagger cropping seasons to reduce pests and possible hazards due to natural forces. Nonetheless, organic and biological pesticides are becoming more and more important.

If we accept the Viet Namese definition of organic agriculture, it will be possible to achieve organic agriculture, but how long it takes to do that depends on numerous factors. We need to consider the balance between the food demands of the majority of people and the demands of smaller groups of people. We also need to consider the economic returns from organic agriculture, the public awareness of organic agriculture, and, very importantly, the role of policy and decision makers.

If we insist that organic agriculture excludes any amount of mineral fertilizers and pesticides, then we may not be able to achieve it in Viet Nam's main production areas. Yet, pure organic agriculture now exists in certain mountainous regions, which may become more oriented to producing for organic markets if real demands come, and more profits are foreseen.

Again, if the Viet Namese definition of organic agriculture is accepted, its implementation will not cause a remarkable loss of productivity. On the contrary, organic agriculture may help increase the yields and quality of agricultural products. Moreover, organic agriculture helps maintain and improve soil fertility over long periods of time, which translates into sustainability. As Nguyen Viet Pho (1977) showed, in plots treated with organic fertilizers, starting from almost the first year, the yield increased by 150 per cent and eventually over several years increased by up to 380 per cent. Not only was yield steadily increased from year to year, but the soil fertility and texture were also improved over time. Thus organic agriculture will increase productivity, improve and protect the environment, protect human health, and ensure sustainable development.

What are the Markets for Organic Pesticides and Fertilizers?

By nature, Viet Namese farmers do not want to use chemical pesticides. They always try to find alternatives to the chemical control of pests and diseases. Farmers are happy to use organic or biological means of control. Thus, there will not be any market resistance to organic and biological pesticides.

Similarly, the markets for organic and biological fertilizers are unlimited. In the world today, the certified areas for organic agriculture are very limited and occupy only 1 to 2 per cent of the total area under cultivation. For example, areas certified for organic agriculture amount to only 231 280 ha in Argentina, 1 700 ha in Chile, 100 000 ha in Brazil, 50 000 ha in Mexico, 417 000 ha in Germany, 247 500 ha in the UK, 30 000 ha in Hungary, and 10 000 ha in Poland. But market demands are exceeding production, so organic production will definitely continue to grow. This means that there will also be a huge demand for organic and biological pesticides and fertilizers. The problem is, can Viet Nam produce highly effective products that will prove their capacity to increase the productivity of agriculture and protect the environment at the same time?

Conclusions

- Viet Namese traditional agriculture is authentically organic and at present, Viet Namese agriculture still bears many features of organic agricultural traditions.
- Some products from mountainous regions are purely organic, meeting all IFOAM standards, and can pass the organic tests of western markets.
- For various reasons, mostly increasing population pressures, much of the indigenous knowledge and traditional organic agricultural practices have been neglected or are no longer suitable, leaving the way open for the rapid development of inorganic production.
- Organic agriculture has proven its advantages, especially with its safe healthy products for people, its sustainability, and its visible role in environmental protection.
- The markets for organic products are increasing with time.

Suggestions

- Review traditional agricultural practices to document useful techniques and resources, including: rare and precious species and varieties; specialty varieties; cultivation practices like sowing and planting; soil preparation and protection; and organic fertilizers used by our farmers for thousands of years.
- Develop biotechnological and microbiological technologies, combining modern technologies and indigenous knowledge and practices.
- Issue policies to stimulate the development of organic agriculture when there are markets for its products.
- Raise public awareness and demand for organic products by increasing the range and quantity of organic products in domestic shops and supermarkets. At the same time, promote the high-value export of traditional products like aromatic rice, upland rice, fruits, and medicinal materials. This will provide more income to producers and stimulate them to produce more organic products.
- Select and protect areas with ecologically safe conditions (no pollution, little soil degradation) for certified organic agriculture, which will produce clean and safe products.
- Conserve and promote agro biodiversity in the development of organic agriculture. This includes arranging diverse and suitable cropping patterns and cropping seasons, and exploring and applying local traditional varieties in adapting organic agriculture to various niches of the ecological and socio-economic conditions of each locality.
- Encourage the application of heterosis in organic agricultural produc-

tion by making use of the achievements of modern biotechnology, including organic fertilizers, biological fertilizers and pesticides.

- Select and breed crops for pest and disease resistance, and for tolerance to adverse agro-ecological conditions. Promote high quality products to meet export requirements.

- Integrate in the most effective way the use of crop varieties with Integrated Pesticide Management (IPM) and Integrated Nitrogen Fertilizer Management (INM), thereby promoting the use of locally available resources like alluvial soil, alluvial water, green biomass, legumes, etc. This will improve and maintain soil fertility and minimize the use of agrochemicals. This also means maintaining high and stable yields, growing diverse products for domestic and international markets, and promoting and conserving a healthy environment for better human health.

CHAPTER 15

CONCLUSIONS AND WAYS FORWARD

By Dr. Veena Jha

While Viet Nam has been trying to find a way to balance its trade and environment concerns, the global debate has vacillated between attempts at reconciliation and exaggeration of the differences. To give one example, the Seattle Ministerial Meeting of the WTO, held in November 1999, was inconclusive on several issues. On environment, the meeting showed the sharpening divergence of views between some countries of the North and those of the South. Most governments agree, however, that the ongoing discussions in the Committee of Trade and Environment (CTE) at the WTO, which is fairly well structured around distinct agenda items with a well-defined work programme, are being overtaken by events. In fact, CTE, which constituted the cornerstone for most debates on trade and environment for a good part of the 1990s, has become almost redundant in the post-Seattle process. Views on disputes related to trade and environment have been taken up by various WTO committees, and have become more important in the post-Seattle discussions. These panels and the related appellate bodies have subtly but surely changed interpretations of articles of the General Agreement on Tariffs and Trade (GATT). The third stream of influence originates from discussions in Multi-Lateral Environmental Agreements (MEAs) such as the Bio-safety Protocol.

Environment is also emerging as a useful bargaining chip for both developed and developing countries in defining the contours of trade agreements. It is being used to temper otherwise radical free traders. Thus for example, environmental considerations in a proposed Multilateral Agreement on Investment (MAI) and the Trade Related Intellectual Property Rights (TRIPs) Agreement are used to temper aggressive supporters of these agreements. Similarly, aggressive postures on production and process methods (PPMs) can be used for both protecting the environment and protectionist purposes, affecting for example the access of goods like textiles and leather to Northern markets. Of course, the bargaining processes as well as the interest groups that will emerge will not be uniform across issues. It is also becoming increasingly clear that despite the moral high ground of environment, any reconciliation, which exacerbates existing inequities in bargaining powers, will be resisted strongly.

The trade and environment agenda has now become tied inextricably with other anti-globalisation agendas that have dogged the Bretton Woods institutions. States and alliances have moved from the moral high ground into the realm of pragmatic bargaining. Strict north-south lines, which had emerged on this issue, are also lightening. Some developed

countries are willing to go at least part of the way with developing countries on TRIPs if developing countries will buy into their agenda for reconciling WTO rules with MEAs. Similarly, some developed countries (like several developing countries) are of the opinion that WTO rules do not need to be changed to accommodate trade measures pursuant to MEAs.

Continuing battles on agriculture and fisheries are also being fought on the environmental high ground. Developing countries are aligned on either side of the two major trading partners, the EU and the US, depending on where their trading interests lie.

Given this stalemate in the official debate on trade and environment, the dispute settlement process has been incrementally changing the contours of trade and environment rules. Not only have the rules been interpreted, decisions by appellate bodies on environmental disputes have been controversial enough that the very legitimacy of the dispute settlement process has been questioned. Several suggestions on reforms to the dispute settlement process have arisen largely as a response to the political nature of trade and environment disputes.

Some decisions, especially on the PPMs issue, have been taken indirectly on the basis of notifications to the Agreement on technical barriers to trade (TBT). In most cases where product standards based on non-product related PPMs have been challenged, the notifications have been withdrawn (i.e, product standards based on non-product related PPMs have not been implemented).

Some of these views are also reflected in the papers originating from Viet Nam. Concern about green protectionism and more importantly, that quality standard as a whole could emerge as significant non-tariff barriers to trade, is evident from a number of papers. The difficulties of aligning to international standards, including in the case of organic agriculture or on TRIPs-related issues with regard to traditional medicine, are apparent in the papers in this volume. However, pragmatic discussions of solutions appear in the papers too.

Through various discussions with the authors and senior government officials, a few issues are emerging that will be important to any future agenda for Viet Nam on trade and environment. First, Viet Nam's agriculture policy cannot be focused entirely on policies to promote organic agriculture. This is because food security requirements, especially in the case of rice, may make it difficult for the government to convert large tracts of land to organic agriculture. However, higher grades of rice can be grown with less input of fertilizers and pesticides, and fruits and vegetables can be grown in an organic manner. It is important, therefore, to select crops that can be grown in an organic way without significantly reducing yields.

The second important issue is to devise proactive policies that will promote both the production and export of selected crops. In this context too, the Ministry of Agriculture and Rural Development has suggested that there be an emphasis on fruits like mangoes, citrus fruits, lychee, durian, longan and pineapple, and organic coffee and tea. Future projects should concentrate on the following matters:

- Dissemination of information on organic agriculture. Detailed studies on the relationship between quality and input use should be made available to farmers.
- Existing standards should be aligned with international standards as far as necessary. However, it may not be necessary to invest in expensive certification infrastructures unless specific markets require it.
- The entire chain of organic production has to be established and local markets developed. In this context it is necessary to explore the possibilities of supplying to hotels, airlines and specialty shops.
- Standards should be developed locally by standardization bodies such as the Directorate for Standards and Quality (STAMEQ).
- Market information should be obtained on these products as well as the standards in different importing markets.
- Accurate information on market premiums and certification requirements for organic products should be obtained and disseminated.

With respect to trade restrictions on environmental grounds the specific recommendations for future projects were as follows:

- Information on environmental measures at both multilateral and bilateral levels should be made accessible to producers.
- Pilot projects on ISO14,000 should be expanded.
- WTO provisions on trade and environment should be clarified through training.
- Some assessment should be conducted of the possibilities for the transfer of environmentally sound technologies.
- Viet Nam has not studied the issue of environmentally harmful imports and this should be included in future work.

With respect to traditional knowledge the following issues would merit future work:

- A thorough review of Viet Nam's legislation on access and benefit sharing for genetic resources as well as for traditional medicine is needed.
- While Viet Nam has several thousands registered trademarks for traditional medicine, these have not been registered in importing countries. Some work is needed in this direction.

- Viet Nam has to be careful about uncontrolled exploitation of medicinal plants that are threatened with extinction. Domestic legislation within the framework of UPOV 1978 is being developed for this purpose, and should be further strengthened.
- All levels of ownership need to be established under the national law on access and benefit sharing. Genetic resources can be either state- or community-owned.

At a more general level, it was felt that there is a need to increase awareness on environmental issues, especially about its interface with trade. Further learning, generated especially from the experience of other developing countries about how they have effectively coordinated these two interests, would help Viet Nam greatly. A need to know about environmental measures that may be emerging in Viet Nam's major export markets was also expressed. Building task forces of trade and environment experts as well as improving documentation on trade and environment were considered priority matters. The development of national information dissemination networks on trade and environment was considered useful. In this context, training provided through UNCTAD, as well as the work of the UNEP-UNCTAD Capacity Building Task Force would be most useful.

In the end, the trade-environment interface can be perceived as a matter of interest balancing, or as an issue of making marginal adjustments in the choice of policy (e.g., how much free trade, if any, should be sacrificed to get so much more environmental protection). Though absolute values like free trade or a pollution free environment could be identified in theory, any policy debate presumes that in practice all values will be satisfied to varying degrees, with adjustments being made "at the margins". There will be a balance of coercion and consent, which in the context of an international trade regime will be settled at these margins. The WTO appears to be heading towards just such a scenario, with disputes and their resolution being settled at the "margins" of international trade rules.