Department of Research and Development Services
Ministry of Agriculture, Royal Government of Bhutan

Mid-Term Evaluation

INTEGRATED HORTICULTURE DEVELOPMENT PROGRAMME (IHDP)

BHU/97/003 (1997-2002)

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Acronyms, Bhutanese Words and Exchange Rates

Acronyms

8FYP	Eight Five Year (Development) Plan (1 July 1997-30 June 2002)
9FYP	Ninth Five Year (Development) Plan (1 July 2002-30 June 2007)
10FYP	Tenth Five Year (Development) Plan (1 July 2007-30 June 2012)
11FYP	Eleventh Five Year (Development) Plan (1 July 2012-30 June 2017)
12YFP	Twelfth Five Year (Development) Plan (1 July 2017-30 June 2022)
AMC	Agricultural Machinery Centre
AMPU	Aromatics & Medicinal Plants Unit
AMU	Agricultural Marketing Unit
BBS	Bhutan Broadcasting Service
BCCI	Bhutan Chamber of Commerce and Industry
BDFC	Bhutan Development Finance Corporation
CLSD	Crop and Livestock Services Division (of MOA)
CO	Co-ordination Office
DRDS	Department of Research and Development Services (of MOA) (formerly REID)
DSC	Druk Seed Corporation
DYT	*Dzongkhag Yargey Tshogchung* (District Development Committee)
EU	European Union
FASU	Farmer Association Support Unit
FAO	Food and Agriculture Organisation (of the United Nations)
FCB	Food Corporation of Bhutan
FECSU	Farmer Extension & Communication Support Unit
FEZAP	First Eastern Zone Agricultural Project
FSD	Forestry Services Division
FYP	Five Year Plan
GYT	*Gewog Yargay Tshogchung (Gewog* Development Committee)
HDC	Horticulture Development Committee
HRD	Human Resource Development
IFAD	International Fund for Agriculture Development.
IHDP	Integrated Horticulture Development Project
IPMDP	Integrated Pest Management Development Project
IPS	Information and Publicity Section (of MOA)
ITMS	Institute for Traditional Medicine Services (formerly National Institute of Traditional Medicine), Ministry of Health and Education
LUPS	Land Use Planning Section (of MOA) (now LUSS)
LUSS	Land Use and Statistics Section (of PPD of MOA) (formerly LUPS)
MAP	Medicinal and aromatic plants
MIS	Market Information System
MOA	Ministry of Agriculture
MTE	Mid-Term Evaluation
MTI	Ministry of Trade and Industry
MTR	Mid-Term Review
NASEPP	National Seed and Plant Production Programme (now Druk Seed Corp.)
NPD	National Project/Programme Director
NPPC	National Plant Protection Centre

NRTI	Natural Resources Training Institute
Nu	*Ngultrum* (National Currency of Bhutan)
PHU	Post Harvest Unit
PMC	Programme Management Committee
PPC	Policy and Planning Committee (of MOA)
PPD	Policy and Planning Division (of MOA)
PPER	Project Performance Evaluation Report
PSD	Programme Support Document
REID	Research, Extension and Irrigation Division (of MOA) (now DRDS)
RGOB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RNRRC	Renewable Natural Resources Research Centre
SC	Steering Committee
SEZAP	Second Eastern Zone Agricultural Project
SSFPNMP	Sustainable Soil Fertility and Plant Nutrition Management Project.
STCB	State Trading Corporation of Bhutan
TA	Technical Assistance
TPR	Tripartite Review
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
WUA	Water Users' Association

Bhutanese Words

Dzongdag	District Commissioner
Dzongkha	National language of Bhutan
Dzongkhag	District
Geog (Gewog)	Sub-district

Exchange Rates:

1996	35.50 Nu = US$ 1.00
2000	44 Nu = US$ 1.00

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In particular, the team would like to thank the following for their assistance with the mission: Honorable Minister Lyonpo Dr. Kinzang Dorji; Mr. Sherub Gyaltshen, IHDP National Programme Director and Director, Department of Research and Development Services (formerly REID); Ms. Chime Wangdi, IHDP Programme Coordinator; Mr. Dorje, IHDP Fruit and Nut Coordinator (who was Acting Programme Coordinator during part of the mission and responsible for organizing many of the field trip logistics); and the other IHDP sub-programme coordinators and focal persons.

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While the team appreciates the information and other support provided by these colleagues, the MTE Team remains responsible for its own interpretations of that material. This report represents the independent evaluation of the Integrated Horticulture Development Programme. It does not represent the official views of either the Royal Government of Bhutan or the United Nations Development Programme.

EXECUTIVE SUMMARY

1. Introduction

The Integrated Horticulture Development Programme (IHDP) constitutes the national programme of the Royal Government of Bhutan (RGOB) to develop the horticultural sub-sector. For the first phase of the Integrated Horticulture Development Programme (July 1997 – June 2002), UNDP agreed to provide US$ 6.5 million in support for six out of eight sub-programmes: coordination, marketing, post harvest, technology generation (research), extension, and development of aromatic and medicinal plants (both research and marketing).

Between mid-February and mid-March 2000, a three-member independent Mid-Term Evaluation Mission has conducted a review of the programme's progress, performance and impacts to date. This review mission has involved a 15-day field trip across Bhutan, numerous meetings with a wide range of participants, collaborators, and other stakeholders, review of a wide body of documentation, a one-day mid-term review workshop with programme management, and a debriefing meeting with more than 35 participants. In late April – early May, two of the MTE team members served as facilitators for a five-day strategic planning workshop, and to consolidate the workshop output into a revised Programme Support Document (PSD) logical framework.

2. The Programme and Its Development Context

In recent years, the Royal Government has made some major changes in the overall structure of government, with an increasing emphasis on decentralization of planning and implementation of development programmes. Many activities that were previously the responsibility of government are gradually being privatized. The Ministry of Agriculture (MOA), which has responsibility for the Renewable Natural Resource Sector (horticulture, agriculture, forestry and livestock), has been at the forefront in decentralization of activities, with many of the field activities being implemented by the 20 *Dzongkhags* (Districts) and the four Renewable Natural Resource Research Centres (RNRRCs).

3. Programme Concept and Design

The Integrated Horticulture Development Programme builds upon earlier projects, to lay the foundation for long-term (10-20 years) development of horticulture in Bhutan. IHDP was designed to respond to the RGOB's National Policy Objectives for the Horticulture Sub-sector, to increase income, living and nutritional standards of the rural population, and to promote sustainable land use, environment, and employment, mitigating rural-urban migration.

The programme was designed for national execution, with efforts to build government staff capacities. The ultimate beneficiaries are the rural farmers of Bhutan.

Short-term objectives for the Eighth Five-Year Development Plan are to:

1. To increase the range and quality of horticultural produce in the country;
2. To promote export marketing of surplus produce to generate on farm income and assist in relieving of the balance of payment difficulties.

The immediate objectives, one for each sub-programme, are:

1. To improve the coordination of horticultural development in Bhutan;
2. To improve the marketing system for domestic / export horticultural produce;
3. To reduce post-harvest losses of horticultural produce;

4. To provide appropriate and locally adapted management recommendations for horticultural crops and enable growers to optimize their returns from horticultural produce;

5. To develop an effective horticultural extension programme with on the ground demonstrations – growing potential crops in farmers' fields and demonstrating improved crop management practices;
6. Develop existing commercial aromatics and medicinal plants and identify additional species with potential for commercial exploitation generating alternate sources of sustainable income to the farmers;
7. Promote rural agro-based industries through provisions of efficient marketing, processing and quality control services to the producers and exporters of horticulture produce including essential oils and medicinal plant products, starting with lemon grass oil.

To achieve these objectives, an ambitious and far-reaching programme was designed, with 7 sub-programmes, 50 outputs and 244 activities. Several difficulties exist with the current programme concept and design, which need attention to improve programme performance.

4. Programme Implementation

4.1 Implementation and Management Arrangements of the Programme

The programme is being nationally executed by the MOA and MTI. While overall implementation has been reasonable, some difficulties have arisen with respect to reconciling the differences between government and UNDP's fiscal calendars, and between centralized vs. decentralized implementation. Efforts are ongoing to improve this situation.

Although the pace of implementation was initially slow, it has increased in recent months. By 30 June 2000, an estimated $3.1 million (48 percent) of the total budget will have been spent. In terms of sub-programmes and budget categories, by the end of March 2000, expenses were as indicated below:

IHDP Expenses through 31 March 2000 by Sub-Programme and by Budget Categories.

By Sub-Programme:		By Budget Category:	
Coordination	$ 310.555 (11.49%)	Non exp equipment	$ 883,408 (32.68 %)
Tech Generation	$ 920,859 (34.07 %)	Exp equipment	$ 292,584 (10.83 %)
Extension	$ 381,715 (14.13 %)	Fellowships	$ 248,735 (9.20 %)
Post Harvest	$ 613,797 (22.71%)	Other trainings	$ 448,027 (16.58 %)
Marketing	$ 163,783 (6.06%)	Sub-contracts	$ 212,325 (7.86 %)
MAP – Research	$ 257,419 (9.52%)	Technical assistance	$ 566,114 (20.95 %)
MAP – Marketing	$ 54,478 (2.02 %)	Miscellaneous	$ 51,413 (1.90 %)
Total	$2,702,606		

4.2 Implementation of Sub-Programmes

Sub-programme 1: Coordination
The Coordination Sub-Programme was designed to produce four outputs: (1.1) improved coordination capacity, (1.2) public participation in formulation and implementation of horticulture development programmes, (1.3) increased baseline data, and (1.4) legislation to support horticultural development.

The coordination capacity has been increased, in terms of providing overall logistical, administrative and financial management for the entire horticulture programme, and the various sub-programmes. These efforts are being further supported by current work to establish

information technology systems. Although planning and reporting are being handled, overall monitoring of programme performance and impact needs to be improved. The coordination office has organized a number of workshop, as per the programme document. Greater efforts are needed, however, to increase public participation by a wider range of stakeholders in the design and implementation of horticulture programmes. Increased baseline data is available: such information now needs to be organized to make it useful for monitoring trends. Support has been provided to drafting of legislation and regulations.

Sub-programme 2: Marketing
The Marketing Sub-Programme was intended to achieve six outputs: (2.1) improving the technical capacity of the Agricultural Marketing Unit (AMU) within the Planning and Policy Division (PPD), and creating farmer awareness on export potentials for horticultural crops; (2.2) improving local market systems; (2.3) improving export marketing systems; (2.4) improving the market information collection and dissemination system; (2.5) improving institutional linkages; and (2.6) formation of farmer groups or associations.

Staff technical capacity has been improved. Support to construction of weekly market shed has made a visible impact in several *Dzongkahgs*. Export marketing linkages are being established, and trial marketing shipments of apples to Sri Lanka have been undertaken. Collection of domestic market information is being increased. Efforts are needed to improve linkages with other marketing efforts in Bhutan, and to improve information on regional market prices.

Sub-programme 3: Post-Harvest
The Post-harvest Sub-Programme has nine intended outputs: (3.1) building technical capacity of the Post-Harvest Unit; (3.2) building and making operational storage facilities; (3.3) establishing packing and grading systems for few selected products; (3.4) recommendations on harvest maturity guides and harvesting methods; (3.5) recommendations on appropriate post-harvest treatments; (3.6) demonstration of refrigerated transportation of fruits and vegetables; (3.7) improving home-level processing; (3.8) establishing small-scale processing units; and (3.9) establishment of a post-harvest laboratory.

Technical capacity of the PHU has been established, with the construction of a PH laboratory. Operational storage facilities have been constructed. Some work has been done on harvest maturity guides and harvesting recommendations for apples. Work on improving home-level and small-scale processing has focused primarily on development of simple, cost-effective dryers, and assistance in setting up a small-scale potato chip factory. Refrigerated transport of produce has been postponed until the cold store becomes operational.

Sub-programme 4: Technology Generation
The Technology Generation Sub-Programme has twelve outputs: (4.1) capability building to strengthen horticultural research; (4.2) structured research programme; (4.3) database on traditional and introduced horticultural cultivars and their ethnobotanical use; (4.4) germplasm screening and evaluation; (4.5) fruit nursery activities; (4.6) adaptive crop management practices; (4.7) on-farm trials on integrated crop management; (4.8) blue prints for the major horticultural crops; (4.9) detailed economic crop analysis; (4.10) kitchen garden demonstrations; (4.11) off-season vegetable production; and (4.12) provision of adequate information (computer) facilities.

Technical research capabilities are being improved, through staff training and provision of research equipment and facilities. A list of priority horticultural crops has been prepared, with priority areas for each crop, mainly on germplasm evaluation and insect control. Studies have been conducted on a variety of crops, which can be incorporated into future databases to be developed. Research activities have been initiated on screening and evaluation, fruit nursery activities, adaptive crop management, on-farm trials, kitchen gardens, and vegetable production. An economic crop analysis study was undertaken covering a number of crops. Work is ongoing to develop an intranet to link the research centres with each other and with the Ministry. Work on development of crop blue prints awaits clearance of research results.

Sub-programme 5: Extension
The Extension Sub-Programme aimed to reach seven outputs: (5.1) improving the technical capability of the extension service; (5.2) better communication among farmers, extension and research; (5.3) effective monitoring and evaluation of the horticultural extension programme; (5.4) adequate facilities provided for the horticulture extension programme; (5.5) quality horticulture seeds and planting materials readily available; (5.6) achieve increased farmer awareness of horticulture production practices through study tours; and (5.7) farmers encouraged to adopt/replicate new technologies through on the ground demonstration/promotion programmes conducted in the farmers' fields and further replicated by other farmers after seeing the success cases.

The technical capacity of agricultural extension agents in horticultural topics is being improved, and increased equipment has been made available to support their activities. Some work has been ongoing in development of extension materials, to improve research-extension-farmer communication. The Extension Section, with assistance from the Extension Support Project, is working on improving overall monitoring and evaluation of extension effectiveness. The increased availability of seeds and planting materials has been primarily through the promotional programmes. Some training and support has been provided to private nursery operators. To date, limited farmer study tours have been organized. Although demonstrations and on-farm trials are being conducted in farmers' fields, it is not clear to what extent these have encouraged others to replicate these approaches.

Sub-programme 6 (a): Aromatic and Medicinal Plants – Research
The AMP-Research Sub-Programme has 8 outputs: (6.a.1) improved technical capacity; (6.a.2) portable resin distillation unit; (6.a.3) identification of alternate markets for resin and turpentine; (6.a.4) lichens; (6.a.5) alternative potential crops for essential oil extraction; (6.a.6) development of naturally occurring medicinal plants; (6.a.7) support to improve chirata (*Swertia chirata*) marketing; and (6.a.8) support to improve pipla (*Piper spp*.) marketing.

Research technical capacity is being improved, with improved training and facilities. Work is ongoing on domestication of several species of medicinal plants, with some on-farm trials, and work to improve sustainable harvesting and management of wild plants. National research collections of medicinal and aromatic plants are being established, including an interesting medicinal plant trail in a rehabilitated forest adjacent to the research sub-station in Lingmethang. Exploration of alternative crops for essential oil extraction is being supported on an ongoing basis. Support has been provided to improve chirata and pipla marketing, through studies, improved drying methods, and market linkages. The outputs related to resin, turpentine, and lichens have been dropped for justifiable reasons.

Sub-Programme 6 (b): Aromatic and Medicinal Plants – Marketing
The AMP-Marketing Sub-Programme has 4 outputs: (6.b.1) increased technical capacity; (6.b.2) standardized production of quality lemon grass oil; (6.b.3) repair and maintenance workshop for distillation units; and (6.b.4) improving the marketing system for export of lemon grass oil.

Staff training has been supported, and standardized production of lemon grass oil is being achieved. The workshop has been established, but not yet operational. Improved marketing of lemon grass oil has been promoted. Producer associations will be promoted once the enabling legislation is in place. Further support to the revolving fund is needed.

Programme Results

Progress towards Achievement of Outputs
The coordination sub-programme has played a vital role in supporting all the other horticulture sub-programmes, in terms of administrative and logistical support. Overall strategic planning for the horticulture sub-sector, however, still needs further attention, including efforts to promote

public participation. Increased baseline data is now available, but needs to be organized so that it can be used to monitor progress. Some progress has been made on policy and legal issues.

The marketing sub-programme's main visible contributions to date are the physical marketing sheds in the rural areas. A good start has been made towards exploring alternative export markets, especially for apples. The post-harvest sub-programme's main achievements to date are the ambient stores for fruits and vegetables, and the simple dryers for the rural areas that can be used for both home-level and market-oriented processing.

For the technology generation sub-programme, most research activities have been initiated, most planned training conducted and equipment procured. The overall coordination and framework of adaptive horticulture research, and adaptive fruit and vegetable crops management techniques, need to be strengthened. Research support is needed for production of large-scale nursery outputs. The range of available germplasm needs to be increased, including new crops. Closer integration should be developed with the Extension Division, the National Plant Protection Centre, the Soil Service, and the RNR Engineering (formerly Irrigation) Division.

The effectiveness of horticulture extension efforts has been increased, through training for extension staff and farmers, and some production of extension materials. Monitoring and evaluation of extension efforts have been very limited. A large number of planting materials have been purchased and distributed through promotional programmes. Efforts to promote private nurseries, provide training on production of seeds and planting materials, and certification have begun, but need greater attention and support, especially to improve the quality of planting materials. The horticulture extension sub-programme has promoted a number of demonstration activities, but their effectiveness has not yet been assessed.

The aromatic and medicinal plant research sub-programme is making good progress. More rationalised cooperation between the two research stations, and with the National Institute of Traditional Medicine, would improve the effectiveness of implementation, regarding training of extension officers, promoting sustainable collection of wild plants and promoting cultivation of domesticated species. The lemon grass oil marketing efforts are the most successful within the horticulture programme, in terms of increasing rural incomes. Further increases in income from other aromatic and medicinal plants can be made once markets are secured.

Broader Programme Impacts and Contributions

The MTE Mission believes that overall impacts to date are as follows:

- Increase in horticultural planting materials throughout the country, both in the research stations (RNRRCs) and on farms, but such materials vary in quality;
- Increase in horticultural knowledge and skills, among horticultural researchers, government staff and farmers;
- Increase in range and quantity of horticultural produce;
- Some increase in quality of horticultural produce; and
- Some increases in incomes and/or nutrition due to increased horticultural produce, improved post-harvest processing and marketing.

Due to the lack of monitoring of specific indicators, however, it is not possible for the MTE Mission to quantify such probable impacts.

Commitment, Ownership and Sustainability

The horticulture programme is highly relevant in the Bhutanese context, and will remain a priority for national development for years to come. It has been accorded high priority in the current Eighth Five Year Plan (1997-2002), which is expected to continue in the forthcoming Ninth Five Year Plan (2002-07). The Ministry of Agriculture demonstrates a clear sense of "ownership" of this nationally executed programme. The MTE Mission was favourably impressed by the personal commitment of the government staff. The sustainability of activities is growing, as more farmers and others in the private sector become engaged in horticultural activities and enterprises. The human resource development efforts to build up staff capacities also are

contributing to the long-term sustainability of efforts to develop the horticultural sector. To adequately develop horticulture over the next 10-20 years in Bhutan, considerable additional support will be needed, from the Royal Government, donors, and private investors.

6. Recommendations

6.1 Short-Term Recommendations

1. **Strategic Planning:** The Integrated Horticulture Development Programme, as currently designed, is broad and fairly ambitious. Nonetheless, development of horticulture in Bhutan is a long-term endeavour that will require at least 15-20 years of support. Therefore, more attention is needed to strategic planning, in terms of deciding on priorities for the remainder of the current programme, and activities for the coming phases.

2. **Improving Overall Coordination**: Overall coordination of the horticulture programme, its research and extension activities, needs to be improved. This issue should be addressed by 30 June 2000.

3. **Information Management, Monitoring and Evaluation Systems:** The horticulture programme needs to better organize and manage the information being generated from its research and technical assistance inputs, as well as to put into place a monitoring and evaluation system to adequately track indicators of the programme's performance and impacts. This effort should be facilitated by the ongoing information technology development.

4. **Focusing Research Strategies:** The research activities conducted in the RNRRCs on all horticultural crops, including medicinal and aromatic plants, need to be more focused on strategic priorities, with more comprehensive planning and execution, sound research protocols, and clear division of responsibilities among research staff and research stations. Overall, the RNRRC horticultural, medicinal and aromatic research staff need to develop and begin to implement a more focused research strategy, with competent technical advice, no later than 30 September 2000.

5. **Defining Extension Approaches:** The extension strategies for promotion of horticulture need careful review and reformulation, to increase the horticulture technical competence of staff and farmers, and improve overall effectiveness of extension. All of these efforts will require close collaboration with the Extension Support Project, and should be ongoing by 30 September 2000.

6. **Post Harvest:** Post-harvest activities, which are being initiated for the first time in Bhutan, will need overall direction in designing and planning both for the medium and long term. Collaboration with the private sector can help raise awareness of post-harvest techniques for better marketing.

7. **Marketing:** Improvement of local and export marketing of horticultural produce, medicinal and aromatic plants, and value-added products will require not only improvement of domestic markets, but also greater attention to domestic and export market information, development of marketing strategies, particularly for niche export products and development of agro-eco-tourism potentials within Bhutan, and improving linkages with all ongoing marketing efforts and collaborators. Marketing studies are needed to find viable markets for alternative essential oils and medicinal plants.

8. **Strengthening Collaboration with a Broad Range of Stakeholders:** Development of horticulture in Bhutan involves a broad range of stakeholders, in addition to farmers and government staff. The MTE Mission endorses the plan to **create a Horticulture Development Committee**, to involve representatives of private sector stakeholder groups.

9. **Addressing Problems of Horticulture Inputs:** A major focus must be placed on improving the private sector production and supply of horticultural inputs, especially high-quality seeds and grafted seedlings. The Horticulture Development Committee should carefully examine these issues, and develop strategies to build capacity among the providers of these inputs. A strategy needs to be developed soon, ideally by 31 December 2000.

10. **Providing Adequate Technical Guidance:** Recent graduates need technical guidance and supervision by more experienced professionals to provide further on-the-job training and to improve overall implementation of the programme. If such expertise is not currently available in country, then international and regional technical assistance should be procured.

In addition to these major overall recommendations, the Mid-Term Evaluation Mission has provided more detailed technical recommendations (areas of corrective action) for each of the IHDP sub-programmes.

6.2 Longer-Term Recommendations

11. **Possible Future UNDP Assistance:** Considering the potential of horticulture in the development of Bhutan, UNDP should consider providing further support during the second CCF/ Ninth Five Year Plan.

12. **Strengthening National Execution of the National Horticulture Programme:** Further efforts are needed to build support for the national horticulture programme. Efforts should be made to further strengthen the programme approach to horticulture development, working closely with other UN projects and with other donors currently engaged in related areas. UNDP's efforts in donor co-ordination need to continue not only at the headquarters/policy level, but also at the field implementation level.

13. **Focus on Areas of Comparative Advantage:** Bhutan should build upon its efforts to date to exploit areas where it has comparative advantage and immense potential exists for high-value, low-volume export crops, i.e., essential oils, medicinal plants, mushrooms, processed agro-products, and organic horticultural produce.

14. **Upstream work on policy issues and a regulatory framework** to create a supportive enabling environment for the future development of horticulture will remain a priority area for RGOB action, with assistance from UNDP and other development partners.

7. Lessons Learned

1. In designing a new major sub-sectoral programme under national execution, it is vital to assure that adequate technical expertise is available to launch the activities. If many of the government staff are young and recently trained, and/or being sent outside of the country for training during the initial stage of the programme, then long-term and short-term technical assistance may be required for the initial few years of the programme, before being gradually cut back.

2. Cumulative progress reports and internal evaluation reports need to be prepared by the programme management prior to any external evaluations. To facilitate the preparation of such reports, the programme needs to develop an adequate monitoring and evaluation (M&E) system. Such monitoring and reporting will not only serve evaluation purposes, but also more importantly serve as an ongoing management tool.

1 INTRODUCTION

1.1 The Integrated Horticulture Development Programme

The Integrated Horticulture Development Programme (IHDP) constitutes the national programme of the Royal Government of Bhutan (RGOB) to develop the horticultural sub-sector. As such, it is an integral part of the overall programme of the Ministry of Agriculture to develop and sustainably manage Renewable Natural Resources (RNR), which encompass agriculture (including horticulture), livestock and forestry. The Integrated Horticulture Development Programme was developed to provide the framework for horticulture development during the country's Eighth Five-Year Plan (July 1997-June 2002), and beyond.

For the first phase of the Integrated Horticulture Development Programme (July 1997 – June 2002), UNDP agreed to provide US$ 6.5 million in support for six sub-programmes: coordination, marketing, post harvest, technology generation (research), extension, and development of aromatic and medicinal plants. When IHDP was designed in 1996, it was envisaged that the Japanese government would support mushroom production: this other donor support, however, has not materialized. The United Nations Capital Development Fund (UNCDF) supported infrastructure development, i.e., feeder roads, in Eastern Bhutan, through BHU/TRP/0018, which ran from 1993 to 1999. RGOB is providing support in kind, such as government staff salaries and some operational expenses, estimated in 1996 at 192.36 mil. Nu, equivalent to $5.42 million.

IHDP is nationally executed by the Ministry of Agriculture (MOA) and the Ministry of Trade and Industry (MTI). The MOA is responsible for implementation of most of the sub-programmes, but MTI has responsibility for promotion of export marketing (lemon grass oil). The RGOB has tendered a contract for 34 months of short-term technical assistance to a U.K. firm, High Value Horticulture, most of which has been completed. RGOB has directly contracted regional technical assistance. It has also received technical assistance through United Nations Volunteers (UNVs).

IHDP constitutes the largest programme currently being supported by UNDP in Bhutan. It comprises a major contribution to UNDP's efforts to support Sustainable Livelihoods, as well as also contributing to promotion of Governance and Environment.

1.2 The Mid-Term Evaluation

The Royal Government has already conducted its own internal mid-term evaluation of progress towards achievement of the objectives of its national development plan, the Eighth Five-Year Plan (8FYP). As such, it has reviewed the progress to date on the horticulture programme.

An independent, external team has been selected to conduct a mid-term evaluation of the programme between 14 February and 15 March 2000. Dr. Paula J. Williams, Dr. Maria Gabriella Sandini, and Mr. Dawa Penjore are consultants engaged by UNDP and RGOB to evaluate the programme in accordance with Terms of Reference agreed to by UNDP and RGOB (Annex 1). The Mid-Term Evaluation (MTE) Mission has also endeavoured to take into consideration issues raised in the December 1999 Steering Committee meeting, as well as comments on the TOR received from UNDP's regional office in Bangkok (Annex 2). The MTE Mission was also asked to assess the possible needs for technical assistance through FAO.

To assess the programme performance and impacts to date, the team has met with a wide range of programme participants, stakeholders, and collaborators, and endeavored to review a large amount of documentation. Between 17 February and 3 March, the team undertook a field trip ranging from Thimphu all the way east to Trashigang and Trashiyantse, south to Samdrup

Jonghar, and southwest to Paro. These visits included: the four Renewable Natural Resource Research Centers (RNRRCs) in Yushipang, Bajo (Wangdi), Jakar (Bumthang), and Khangma, as well as sub-stations in Lingmethang and Mongar, and the Post-harvest Marketing Unit in Paro. *Dzongkhag* officials, *Dzongkhag* and *geog* extension staff, farmers, private producers and semi-private corporations were visited. In Thimphu, consultations were held with numerous units within the Ministry of Agriculture, UNDP, FAO, the National Institute of Traditional Medicine, and other relevant parties. The team also held a one-day workshop with programme management on 7 March 2000, to discuss future visions ("Horticulture 2020"), indicators for assessing programme performance and impact, progress to date, and future plans.

The MTE Mission greatly appreciates the efforts made by Programme staff, researchers, extension agents, farmers, and other collaborators to facilitate its work. The team was favorably impressed by the hard work, commitment, and enthusiasm of all the Bhutanese working on horticultural development, whether in the public or private sector.

It should be noted, however, that the MTE Mission was scheduled during a difficult time, which made the evaluation difficult for both the MTE Mission members and the Programme management. First, as it is still winter in Bhutan, the team was not able to see much active horticultural production during its field visits.

Second, the team's visit also coincided with the Programme management's work to prepare its draft annual work plan and budget for the RGOB. The team was not able to meet with either the Programme Coordinator or the Programme Director until it returned from the field.

Furthermore, the Programme has generated a vast amount of documentation, but it has not organized this information in a systematic way nor has it yet compiled the existing baseline data into a database for monitoring purposes. This situation made it extremely difficult to evaluate the programme performance to date within 4 weeks available for the mission.

As a result of this situation, the Mid-Term Evaluation Mission recommended that a Strategic Planning Workshop be conducted, to help refocus the programme, further develop indicators, and agree upon the work plan and budget for the remaining 2.5 years of the existing UNDP programme support. This proposal was endorsed at the Debriefing Mission held on 10 March 2000.

In late March – early April, one MTE Mission member, Dawa Penjore, served as a member of a team undertaking an overall review of the UNDP Country Programme. This Country Review included an examination of some larger and cross-cutting issues with respect to major UNDP programmes, including IHDP.

The IHDP Strategic Planning Workshop was held 20-24 April in Bumthang, with 35 participants. Two of the three MTE Mission members, Paula J. Williams and Dawa Penjore, served as facilitators for this workshop. A small debriefing on the workshop results was held on 28 April.

The Mid-Term Evaluation Mission's report was finalised in early May 2000, after the workshop. All three team members participated in the finalisation of the report, with Maria Gabriella Sandini making contributions via electronic mail.

2 The Programme and Its Development Context

2.1 Overall Development Context in Bhutan

The Royal Government of Bhutan is pursuing a middle path, trying to balance development with conservation and promotion of its unique culture. In recent years, the Royal Government has made some major changes in the overall structure of government, with an increasing emphasis on decentralization of planning and implementation of development programmes. Many activities that were previously the responsibility of government are gradually being privatized.

The Ministry of Agriculture (MOA), which has responsibility for the Renewable Natural Resource Sector (horticulture, agriculture, forestry and livestock), has been at the forefront in decentralization of activities, with many of the field activities being implemented by the 20 *Dzongkhags* (Districts) and the four Renewable Natural Resource Research Centres (RNRRCs).

Late in 1999, RGOB's Royal Civil Service Commission began a process of reorganization of government. In February 2000, the Ministry of Agriculture announced a restructuring of its organizational chart (organogram). As indicated in Annex 3, the Ministry has replaced the Research, Extension and Irrigation Division with the Department of Research and Development Services, and the Irrigation Section has been replaced by RNR Engineering. Although not shown on the organograms, MOA will continue to maintain central programmes, such as the Horticulture Coordination Unit, the National Plant Protection Centre, and the National Mushroom Production Centre.

In line with the policy of gradual privatization, it is envisaged that eventually the semi-private government corporations will become completely privatized. Similarly, the units under the Department of Agriculture and Livestock Services may eventually be privatized. The Crop Production Division, for example, includes the Agricultural Machinery Corporation (AMC) and the unit dealing with plant quarantine.

2.2 The National Context for Horticulture

The Integrated Horticulture Development Programme was designed to implement Bhutan's national Master Plan for Horticulture Development. The Horticulture Master Plan was developed in 1994 to provide guidance for the horticultural sector during Bhutan's Seventh Five-Year Plan (July 1992-June 1997) and beyond. The Master Plan preparation was an effort undertaken by the Integrated Horticulture Development Project, which was assisted by the United Nations Development Programme (UNDP) and the Food and Agriculture Organization of the United Nations (FAO).

Subsequently a draft Strategic Action Plan for Horticulture Development was prepared in 1996. It served as the basis for formulation of the Integrated Horticulture Development Programme in 1996, which also constitutes the horticulture development sub-programmes for the Eighth Five Year Plan (July 1997-June 2002). A FAO consultant worked with a national task force to develop a draft programme document, which was subsequently revised and endorsed by government. The horticultural programme was developed with eight major sub-programmes.

The Integrated Horticulture Programme builds upon the efforts of past and ongoing projects, which include:

- Integrated Horticulture Development Project (BHU/87/016, 1991-94)
- National Mushroom Development Programme (BHU/82/025, 1982-91) [followed by some support from JICA & UNV]
- Essential Oil Industry Project (BHU/AGR/0104, BHU/92/008, 1993-98) [interim support under IHDP I (1991-93)]
- Kitchen Gardens for Better Nutrition (TCP/BHU/6611, 1996-98)
- First Eastern Bhutan Agricultural Project (BHU/ARE/0011, 1992-99)
- Punakha-Wangdi Phodrang Valley Development Project (BHU/ARE/0015, 1989-97)
- Permanent Works for Feeder Roads in Eastern Bhutan (BHU/TRP/0018, 1993-99)
- Cultivation of Medicinal Plants for Traditional Medicine (ALA 92/22, 1995-99)

As currently implemented, IHDP has links to other UN-assisted projects: UNCDF feeder road project, UNDP/UNCDF governance project, UNCDF micro credit project, UNDP/HELVETAS skills development project under the UNDP-assisted cottage, small, and medium-scale industries development project, and UNDP/PDP/GEF Small Grants community-based projects, and the UNDP Jigme Dorji National Park Project, especially with respect to work on medicinal and aromatic plants.

IHDP also collaborates with and complements the efforts of other projects and programmes, including: IFAD's Second Eastern Zone Agricultural Development Project (SEZAP), European Union's Extension Support Project (ESP), Australian support to integrated pest management (IPM), Dutch support to soil and plant analysis, International Potato Centre (CIP, Lima) work on potatoes, Taiwanese support to cultivation of wasabi, possible Japanese support to mushrooms, Swiss/Helvetas support to the Renewable Natural Resource Research Centres (RNRRCs), possible future EU support to traditional medicinal plants, and the ongoing National Biodiversity Project.

3 Programme Concept and Design

3.1 Design Process

A previous Integrated Horticulture Development Project, with UNDP and FAO assistance, had worked with the RGOB to develop a Horticulture Master Plan in 1994. To implement this plan, the Integrated Horticulture Development Programme was prepared in 1996, to be implemented during the Eight Five-Year Development Plan (July 1997-June 2002).

A FAO consultant worked with a national task force between June and August 1996, to draft a strategic action plan for horticulture development. This draft document was subsequently revised as the UNDP Programme Support Document. The horticultural programme also figures in the national development plan (8FYP).

The target ultimate beneficiaries, the rural farmers of Bhutan, did not participate directly in the programme design process. The earlier process of developing the Horticulture Master Plan, however, had involved participation of a wide variety of stakeholders through a series of workshops.

3.2 Programme Concept

Key Issues / Problems to be Addressed

When the horticulture programme was designed in 1996, horticulture covered 7% of the cultivated land area of Bhutan, but contributed an estimated 50% of the value of the agriculture sector.

At that time, it was estimated that 85 percent of the Bhutanese population are rural farmers, with average family sizes of 7 members and land holdings of 0.51 hectares (1.27 acres). With the population growing, the available arable land per family will be decreasing in size. Therefore, the Ministry of Agriculture believes that a major strategy to improve household incomes and sustain rural livelihoods is to intensify land use through promotion of horticulture.

Analysis of the horticulture sub-sector indicated that in the past, horticulture has been developed in an *ad hoc* manner. Therefore, the issues to be addressed included strengthening of technically well-developed horticultural practices and their adoption, improvements in post-harvest processing and marketing, and overall improvement in coordination of the sector.

Long-Term Objectives

The RGOB's National Policy Objectives for the Horticulture Sub-sector are defined as:

1. To increase income, living and nutritional standards of the rural population.
2. To promote sustainable land use, environment, and employment, mitigating rural-urban migration.

To achieve these results, a long-term programme on horticulture development is needed. It is anticipated that 10-15 years would be needed for many activities to lead to the desired results.

Medium-Term Objectives

The Development Objectives for the Integrated Horticulture Development Programme are:

1. To increase the range and quality of horticultural produce in the country;
3. To promote export marketing of surplus produce to generate on farm income and assist in relieving of the balance of payment difficulties.

Strategies

During the Eighth Five-Year Plan, the horticulture development strategies are to:

1. Increase production of horticultural commodities in the interest of the national economy and environment;
2. Exploit location specific comparative advantage through diversification and intensification of horticultural production;
3. Provide market to horticultural commodities through developed market infrastructure and small and medium horticulture based industries;
4. Strengthen public sector institutions and encourage private sector initiatives to link production to market.

Programme Participants, Stakeholders and Beneficiaries

The ultimate beneficiaries of the programme in the long run are the people of Bhutan, especially the resource-poor farmers of Bhutan, including women-headed households. During the initial five years of the programme, immediate benefits will be derived through kitchen gardens. Those farmers already owning orchards of fruit and nut trees could benefit through improved orchard management techniques.

Additional beneficiaries are government staff who will receive training and support for horticultural activities, participants in the marketing system who will benefit from improved infrastructure and information, and farmers who will benefit from increased availability of inputs. In addition, where rural feeder roads are supported through UNCDF, the local population will benefit.

Objectives, outputs and activities

For the Integrated Horticulture Development Programme, the short-term Immediate Objectives for Phase I (8FYP, 1997-2002) are:

1. To improve the coordination of horticultural development in Bhutan;
2. To improve the marketing system for domestic / export horticultural produce;
3. To reduce post-harvest losses of horticultural produce;
4. To provide appropriate and locally adapted management recommendations for horticultural crops and enable growers to optimize their returns from horticultural produce;
5. To develop an effective horticultural extension programme with on the ground demonstrations – growing potential crops in farmers' fields and demonstrating improved crop management practices;
6. Develop existing commercial aromatics and medicinal plants and identify additional species with potential for commercial exploitation generating alternate sources of sustainable income to the farmers;
7. Promote rural agro-based industries through provisions of efficient marketing, processing and quality control services to the producers and exporters of horticulture produce including essential oils and medicinal plant products, starting with lemon grass oil.

To achieve these objectives, an ambitious and far-reaching programme was designed, with 7 sub-programmes, 50 outputs and 244 activities.

Sub-programme	Outputs	Activities
1. Coordination	4	25
2. Marketing	6	26
3. Post-harvest	9	28
4. Technology Generation	12	58
5. Extension	7	38
6 (a). Aromatic & Medicinal Plants – Research	8	52
6 (b). Aromatic & Medicinal Plants – Marketing	4	17
Total	**50**	**244**

Programme Budget

The programme was designed with $6.5 million in support from UNDP, and an estimated $4.65 million (165.17 million Nu) of support in kind from RGOB. For UNDP funds, budget allocations were as follows: personnel costs, including technical assistance, 20.1%; sub-contracts, such as studies, 1.6%; training, primarily of staff, 32.8%; equipment, including vehicles, 42.6%; and miscellaneous, 2.9%.

Implementation Arrangements

This programme is being nationally executed by the Department of Research and Development Services within the Ministry of Agriculture. The sub-programme dealing with the marketing of aromatic and medicinal plants is being implemented by the Essential Oil Development Programme of the Ministry of Trade and Industry, with respect to export marketing of lemon grass oil.

The MOA national execution works through central programmes, the Renewable Natural Resource Research Centers (RNRRCs) and *Dzongkhag* (District) extension services. The majority of the activities were to be housed in the MOA's Research, Extension and Irrigation Division (REID) (now renamed the Department of Research and Development Services, or DRDS), with the REID Director as the IHDP Program Director. Three new units were proposed to be created for programme implementation: the proposed Horticulture Section (which did not materialise, although a Horticulture Coordination Unit was created), the Post-Harvest Processing Unit and a unit to conduct research on Aromatic and Medicinal Plants (subsequently moved under the Research Section) in REID.

Other sub-programmes were to be implemented through existing organizational structures, i.e., horticulture marketing to be handled through the agricultural marketing unit of the Policy and Planning Division, horticulture extension to be handled through REID's extension section, and horticulture technology development through REID's Research Section. The marketing of aromatic and medicinal plants was to be implemented through the Industries Division of MTI, and the processing aspects for medicinal plants through the National Institute of Traditional Medicine (NITM) under the Ministry of Health and Education.

The original programme design called for a Programme Management Committee (PMC) to oversee routine implementation and management issues, and a Horticulture Development Committee (HDC) to guide overall programme implementation and policy.

Reporting, Monitoring and Evaluation Systems

The programme design called for routine technical reporting every six months as well as an annual UNDP Project Performance Evaluation Report (PPER). The Horticulture Development Committee was to undertake an annual review of the programme, approve annual work plans, and amend any activities. In addition, an independent mid-term evaluation was called for, in addition to routine Government mid-term review of the five-year development plan. At the end of five years, there would be a terminal in-depth evaluation and impact assessment report.

The programme design did not specify indicators or success criteria for measuring either performance (achievement of outputs) or impacts (achievement of objectives), and thus no system to monitor indicators has been developed. It did include benchmarks, most of which reflect the programming of activities over the five-year period. The document specified, however, that a baseline socio-economic study was to be conducted during the first year, against which impacts could be assessed during the Mid-Term Review and Final Evaluation.

3.3 Adequacy of Programme Concept and Design

Several difficulties exist with the current programme concept and design. These issues need attention, to improve programme performance.

First, the programme is trying to reconcile several competing objectives. For example, it aims to promote nutrition (domestic consumption), yet it also aims to increase incomes and exports (horticultural cash crops). It places an emphasis on building institutional capacity of RGOB (long-term HRD, other staff training, equipment), while also promoting horticultural production, which involves the private sector (individual farmers, growers' and producers' groups, private enterprises working in food processing, traders, etc.). Furthermore, with the emphasis on capacity-building, government horticulture officers are abroad for long-term studies, yet there is a need for staff to remain in country to implement the programme activities.

Second, the programme has a highly complex design, e.g., extension and training activities are found throughout all the sub-programmes.

Third, the Programme Support Document should have considered further the separate financial management, work planning, and reporting requirements of the Royal Government and UNDP, with different financial years (RGOB: 1 July – 30 June; UNDP: 1 January – 31 December).

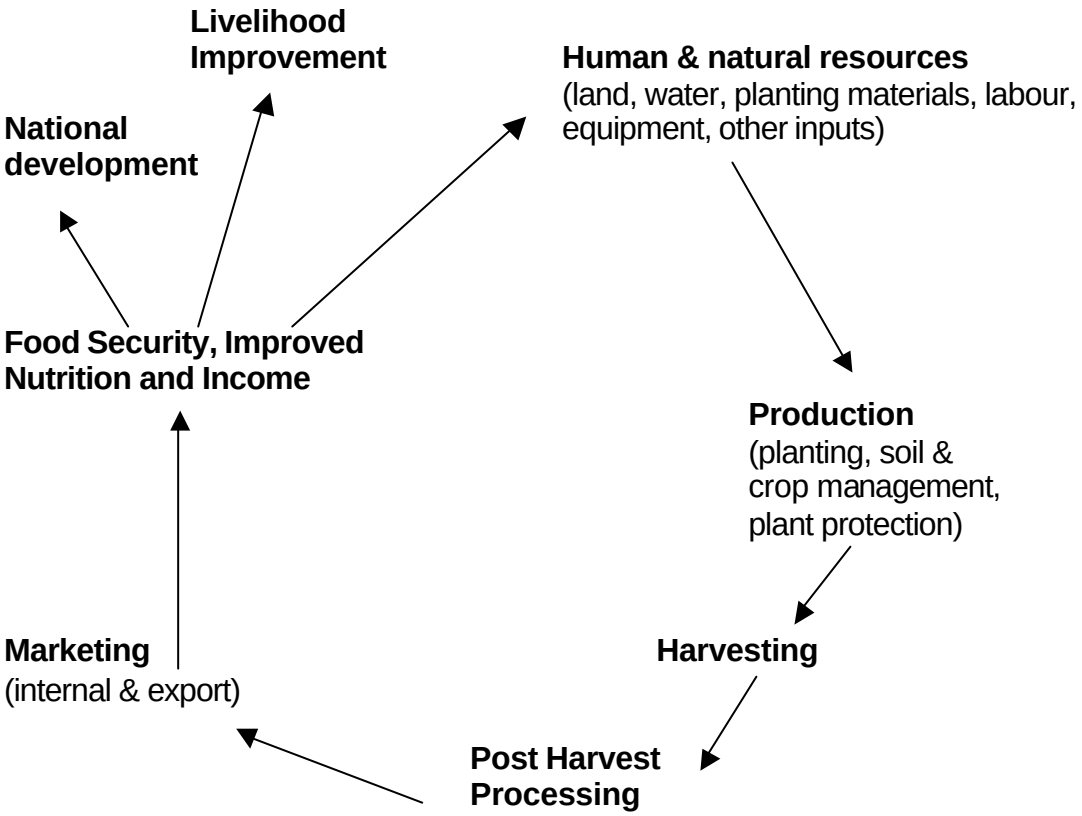
Fourth, the programme was designed only for 5 years, to coincide with the RGOB's Eighth Five-Year Development Plan and the UNDP Country Cooperation Framework for Bhutan. As a result, the programme has been too ambitious – too many activities and outputs were proposed, with the aim of trying to tackle too many things at once. Since horticultural development requires a longer-term perspective, it would have been preferable to have a 15-20 year planning horizon, with a series of 5-year phases and indicative targets for each phase.

Fifth, the programme needs to more adequately consider how various elements fit together in horticulture development (Figure 1), and the relative roles to be played by the public and private sectors (Figure 2).

Finally, although the programme design considered other possible donor support for horticulture, it needs to consider further the possible collaboration with related institutions, other projects, and private or semi-private sector organizations. Such collaborators include, among others, the National Plant Protection Centre, the Second Eastern Zone Agricultural Development Project (SEZAP), the Third Forestry Project, Druk Seed Corporation, and Agricultural Machinery Corporation.

Figure 1.

HORTICULTURE DEVELOPMENT:
AN INTEGRATED CYCLE

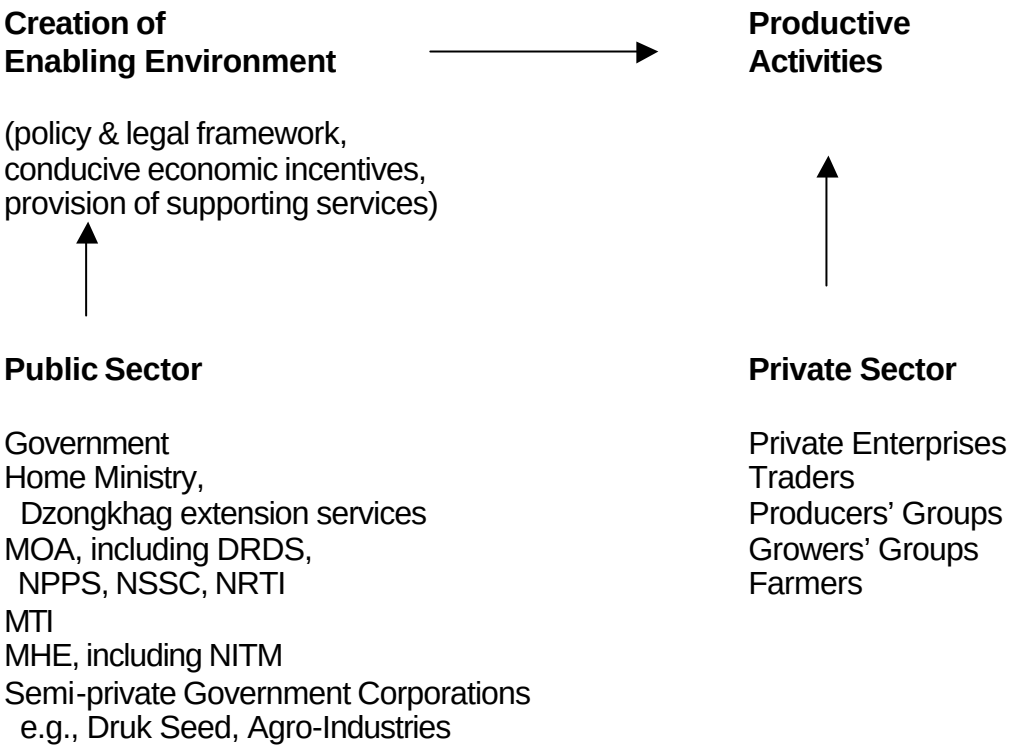


CROSS-CUTTING ACTIVITIES:

- **Research**
- **Training and Extension**
- **Coordination**

Figure 2.

COLLABORATION: ROLES OF PARTNERS



4 Programme Implementation

4.1 Implementation and Management Arrangements of the Programme

National Execution arrangements

The Programme is being nationally executed, with the National Programme Director and Programme Coordinator responsible for overall coordination of activities. Although most of the sub-programmes are implemented by the MOA, one sub-programme is being implemented by the Ministry of Trade and Industry.

The proposed Horticulture Section within REID has not been formed, although a Horticulture Coordination Unit (Office) has been established. There is a Programme Management Committee (PMC) as well as a Steering Committee (SC), which reviews annual progress, work plans, and budgets for the UNDP support. The proposed Horticulture Development Committee has not yet been established, although it was agreed in December 1999 to create such a committee in the near future. Whereas the Steering Committee is responsible for oversight of the current five years of UNDP support, the Horticulture Development Committee would have the mandate to look at the long-term (i.e., 20-year) vision for horticulture development in Bhutan. It is also intended that the HDC will have representatives of the private sector stakeholders, such as private enterprises and farmers.

Overall work planning, budgeting and financial management

Annual work plans and budgets
The Royal Government of Bhutan operates on a financial calendar that runs from 1 July through 30 June. Therefore, the Ministry of Agriculture must prepare its draft annual work plan and budget in March of each year, for submission to the Ministry of Finance. The horticulture sub-programme coordinators each prepare a draft budget and work plan, and these are then discussed at a PMC meeting.

UNDP operates according to a different financial calendar, which runs from 1 January through 31 December. Therefore, separate work plans and annual budgets must be prepared for submission to UNDP. This arrangement has been very cumbersome and onerous for the programme management. Ideally, in the long run, it would be desirable if UNDP and other donors could support the government's own work planning, budgeting, and reporting systems. Such an approach would be in line with the overall spirit and intention of national execution of the programme approach. Although UNDP has been moving towards increasing national responsibility for the programme approach, UNDP still has its own internal requirements for budgeting and reporting.

It is vital, therefore, that RGOB and UNDP discuss whether or not it might be possible to adopt a rolling planning process, so that work plans and budgets could be prepared to cover the needs of both parties. Two alternative approaches could be considered. One approach might be to develop an 18-month rolling planning and budgeting system, whereby a plan would be prepared to cover the period from 1 July through 31 December of the following year. Alternatively, a work plan and budget could now be prepared to cover the remainder of the initial five-year programme.

Decentralised implementation vs. centralised planning and budgeting
Another key problem that has been noted is that the field activities in research and extension are conducted through a decentralized system. The research activities are conducted by four regional Renewable Natural Resource Research Centres (RNRRCs) and their respective sub-

stations. The extension activities are conducted by the extension staff in the 20 *Dzongkhags* (Districts).

The four RNRRCs are required to prepare annual work plans and budgets for all their activities, which encompass not only horticulture (fruits, nuts, and vegetables), aromatic and medicinal plants, but also field crops, forestry, and livestock management. For horticulture, they have submitted their ideas to MOA's Chief Research Officer, who also serves as the Technology Generation Sub-programme Coordinator.

Field staff needs to be made more familiar with the IHDP Programme Support Document and its logical framework of objectives, outputs, and activities. Rather than seeing IHDP as the national horticulture programme, there is a tendency to view it simply as a UNDP project, which provides funds for purchase of inputs. (This tendency is further compounded by the fact that previous UNDP support was provided to the Integrated Horticulture Development Project, which many people refer to as IHDP I, whereas the current programme support is referred to as IHDP II.)

The RNRRCs need to be more clearly informed as to what is finally agreed upon in the budget, and what proportion of the research funds will go to each center.

When the RNRRC staff members need funds to carry out an activity, they need to submit paperwork to the Coordination Office in Thimphu and get an advance, then afterwards submit additional paperwork to clear the receipts. The current procedures are not a major problem for the Bajo RNRRC, as they consolidate requests in order to get a large advance, and also since Wangdiphodrang is only a few hours' drive from Thimphu. For the Khangma Research Centre, however, it is a two-day drive to Thimphu, so the staff feels that such procedures are quite onerous and time-consuming.

During the Mid-Term Evaluation mission, this issue was discussed with staff at two RNRRCs, as well as central management. The staff at RNRRC/East in Khangma proposed that operational funds for the regions (including extension activities) should be released to the RNRRCs, upon approval of annual work plans and budgets. Each RNRRC could then provide the *Dzongkhags* in its region with the funding for extension activities. Central management, however, believes that the RNRRCs would have difficulty in handling the accounting that would be required.

The IFAD-assisted Second Eastern Zone Agricultural Development Project (SEZAP) currently provides funding to support develop in the six *Dzongkhags* in the Eastern Region. Funding is provided through a Project Facilitation Office, which also oversees implementation of the Forestry Project, which receives assistance from the World Bank and SDC. Funds are directly deposited into a bank account in Tashigang, and subject to annual audit by the Royal Audit Authority.

Procurement problems

Additional difficulties occur with procurement for the field. As currently conducted, the Coordination Office handles all procurement. When items arrive, the Coordination Office staff must unload the deliveries, take inventory of the stock, then repackage the items and ship them to the field. A recent shipment of laboratory glassware arrived at the RNRRC/East in Khangma with considerable breakage. Some other items, such as furniture, could be obtained locally, rather than procured in Thimphu, which would reduce transportation costs.

Financial management

The Integrated Horticulture Development Programme was designed with five years of UNDP support. The initial budget was prepared in such a way that most of the funds - $5.37 million, or 82 percent - would be dispersed within the first half of the programme period. Due to delays in procurement, technical assistance, and training, financial disbursement has been slower than originally planned. By the end of 1999, only $2.39 million, or 37 percent, of the UNDP funds had been disbursed.

Figure 3. Integrated Horticulture Development Programme Expenses to Date.
(UNDP grant funds, US dollars).

Sub-Programmes	Total Expenses 1997 through 31 March 2000	Total Budgeted For Entire Programme (1997-2002)	Remaining Funds for April 2000-June 2002
1. Coordination	310,555	486,000	175,445
2. Marketing	163,783	632,750	468,967
3. Post Harvest	613,797	1,401,000	787,203
4.Technology Generation	920,859	1,937,100	1,016,241
5. Extension	381,715	1,384,100	1,002,385
6a. Aromatic & Medicinal Plants – Research	257,419	419,800	162,381
6b. Aromatic & Medicinal Plants – Marketing	54,478	239,250	184,772
Total	2,702,606	6,500,000	3,797,394

By the end of the first quarter of 2000, the expenditures had increased to $2.7 million, or 41.5 percent. Programme management estimates that an additional $0.4 million will be spent during the period from April to June 2000. Thus, by 30 June 2000, an estimated $3.1 million (48 percent) of the total budget will have been spent.

In terms of sub-programmes and budget categories, by the end of March 2000, expenses were as indicated in Figure 4.

Figure 4. IHDP Expenses through March 2000 by Sub-Programme and by Budget Categories.

By Sub-Programme:		By Budget Category:	
Coordination	$ 310.555 (11.49%)	Non exp equipment	$ 883,408 (32.68 %)
Tech Generation	$ 920,859 (34.07 %)	Exp equipment	$ 292,584 (10.83 %)
Extension	$ 381,715 (14.13 %)	Fellowships	$ 248,735 (9.20 %)
Post Harvest	$ 613,797 (22.71%)	Other training	$ 448,027 (16.58 %)
Marketing	$ 163,783 (6.06%)	Sub-contracts	$ 212,325 (7.86 %)
MAP – Research	$ 257,419 (9.52%)	Technical assistance	$ 566,114 (20.95 %)
MAP – Marketing	$ 54,478 (2.02 %)	Miscellaneous	$ 51,413 (1.90 %)
Total	$2,702,606		

Backstopping and technical assistance

Technical assistance has been provided through a contract to a U.K. consulting firm, High Value Horticulture. This contract has covered 34 months of short-term technical assistance, involving six consultants in horticultural economics, nut tree and nursery specialist, agro-processing, post harvest, chemist (aromatic oils), and a specialist on food safety standards. Most of this TA input has already been supplied, but the assistance of the nut tree and nursery specialist and the chemist are to be finalised within the coming eight months.

Other international technical assistance has been provided through direct contracts with individual consultants in the region. These short-term inputs have included: a financial management and

procurement specialist; an extension communication specialist; a computer consultant; and another walnut specialist. Additional technical assistance to date has been provided through three UN volunteers, working on aromatic and medicinal plant research; horticultural research on vegetables; and information technology.

Many members of the Bhutanese programme staff have stated that they were satisfied with the technical assistance received. Efforts to train Bhutanese to produce grafted walnuts have been problematic, but this issue seems to be related primarily to equipment problems.

The Mid-Term Evaluation Mission has noted, however, that there seems to have been little done in terms of systematic follow-up on the reports and recommendations submitted by the consultants. At the RNRRCs, the MTE Mission did not find any reports from the United Nations Volunteers on their work, so it was difficult to assess the impact of their contributions. (The UNV Coordinator in Thimphu, however, has copies of UNV reports.)

The Royal Government of Bhutan has emphasized its interest in minimizing expensive long-term expatriate technical assistance, i.e., experts. Where long-term assistance is needed, the preference is to utilise volunteers, such as UNVs. RGOB has stressed the need to build up Bhutanese capacities, through long-term overseas training of staff.

In implementing the Integrated Horticultural Development Programme, these issues have repeatedly been discussed. For example, Programme management has been considering replacing some of the technical assistance originally proposed in the Programme Support Document with long-term overseas training for staff.

The Mid-Term Evaluation Mission agrees that human resource development (HRD) in horticulture should be a priority. It is vital, however, to recognise that long-term training by itself cannot replace competent experienced technical assistance. Young graduates, who have just finished a B.Sc. or M.Sc. in horticulture, return to Bhutan with current theoretical and some practical training. They are ready to begin their professional careers, but may need guidance in their activities from more senior and experienced colleagues. Many staff members told the MTE team, for example, that while they feel confident in handling routine issues, when problems arise – such as disease or pests – their training and experience is inadequate. Similarly, such staff may need guidance in overall planning and monitoring of the activities in their respective sub-programmes.

Furthermore, while such staff members are absent from Bhutan, their positions often rest vacant. As a result, fewer staff members are available to actually implement the national horticultural programme activities. This factor was not adequately taken into consideration in designing the programme and its implementation schedule.

The MTE Mission was asked to consider whether additional technical assistance is needed for the horticultural programme, and more specifically, whether or not the Food and Agriculture Organization of the United Nations (FAO) could play a useful role in providing such technical guidance. (This issue is discussed further under Section 6, Recommendations.)

UNDP Backstopping

The local UNDP Country Office has provided considerable backstopping to the programme. The Programme Officer for Sustainable Development devotes approximately half his time to this programme. Besides providing administrative support, he also provides technical suggestions, as he previously worked as an agricultural research officer for RGOB. In December 1999, for example, he served as a member of a mission visiting the remote village of Shingkhar Louri, in Samdrup Jongkhar in eastern Bhutan. The team went to assist villagers with improving their methods of drying and marketing their major cash crop, *Swertia chirata*, a medicinal plant.

Reporting, monitoring and evaluation

To date, the programme management has prepared five semi-annual progress reports. Each sub-programme prepares its own report, which are then compiled by the Programme Coordinator. The quality of the reporting needs improvement. The Programme Coordinator has difficulty in getting the reports submitted in a timely manner, so that she can compile them. The reports from each sub-programme vary greatly in detail, the degree to which they address implementation of the elements of the logical framework, and format. Decisions have been made to drop, or add, some outputs and activities, or move them from one sub-programme to another.

As needed, the Programme Management Committee meets to prepare work plans and budgets, and discuss changes needed in the overall implementation. For financial management, quarterly financial reports are submitted to government and to UNDP. The programme management and UNDP update the UNDP budget twice a year, through formal budget revisions.

Similarly, it would be most helpful if an updated version of the Programme Support Document (PSD) logical framework were available, to facilitate adequate planning, monitoring, and evaluation of programme implementation performance and impact. As UNDP headquarters has developed PSD software, the latest revision of the logical framework and budget could be entered into this software, then updated as needed.

As of early 2000, the RGOB is thinking of adopting a rolling planning and budgeting system, wherein work plans and budgets would be prepared to cover a 2-year period.

4.2 Implementation of Sub-programmes

Sub-Programme 1: Coordination

The Coordination Sub-Programme was designed to produce four outputs: (1.1) improved coordination capacity, (1.2) public participation in formulation and implementation of horticulture development programmes, (1.3) increased baseline data, and (1.4) legislation to support horticultural development.

Programme Performance (Activities). To improve **overall coordination (Output 1.1)**, the coordination sub-programme was given responsibility to establish a Coordination Office, to prepare detailed work plans and common management procedures, provide management and computer training, and facilitate all training programs. In collaboration with PPD, the coordination sub-programme was also to devise a programme performance monitoring system and to review programme performance. It was also to establish a Programme Management Committee and Horticulture Development Committee. In addition, a regional study tour was to be organized for PMC and HDC members, to look at post-harvest and marketing potentials, and to initiate networking with potential regional partners.

A Coordination Unit has been established. This unit consists of one professional officer - the Coordination Sub-programme Coordinator, who also serves as the overall Programme Coordinator, working under the National Programme Director. The Programme Coordinator, who has a M.Sc. in horticulture, spends much of her time compiling work plans, budgets, and reports, organizing training and procurement, and providing other support to the other sub-programmes. The work planning and budgeting are extremely time-consuming, as they are done twice a year – to meet the requirements of both the national government and UNDP, which have different financial years. (RGOB uses a 1 July – 30 June financial calendar, whereas UNDP operates on a 1 January – 31 December financial year.)

The financial management of the programme activities was originally handled through the MOA's Administrative and Finance Division (AFD). Due to lengthy delays incurred, a decision was finally made to place a full-time accountant in the Horticulture Coordination Office to improve financial management. Everyone has noted that this change has improved processing, although the procedures for disbursement are still cumbersome. It is also difficult for a single accountant, who cannot go on leave as there is no one to provide additional support.

The Programme Coordinator now has the assistance of two secretaries / computer operators. Just recently, since late February 2000, a NRTI graduate has been working with the Programme Coordinator to assist with administrative issues. As a result, the Programme Coordinator has very limited time available for strategic planning or technical guidance to the overall programme.

The Programme Management Committee (PMC) has been formed. It held its eighth meeting on 4 March 2000. It deals with issues such as preparation of work plans and budgets. In addition, a Programme Steering Committee (SC) has been created, which has met twice, with the most recent meeting in December 1999.

The Horticulture Development Committee has not yet been formed. Initially it was felt that the HDC's mandate might overlap with that of the Eastern RNR Research Center in Khanga, which has the national mandate to coordinate horticulture research activities. Later it was argued that a HDC was not needed, since the Programme Steering Committee had been created. In December 1999, however, the Steering Committee finally endorsed the idea of creating an inter-ministerial Horticulture Development Committee, to include private sector representation, to provide guidance on long-term, i.e., 20-year, development needs of the horticulture sub-sector.

As the HDC has not yet been formed, no study tour has yet been organized for PMC and HDC members. If the HDC can be formed in the near future, however, then the study tour would be organized for the coming (2000/01) fiscal year.

The Ministry of Agriculture's Policy and Planning Division is currently working on developing a Renewable Natural Resources monitoring system, whereby field staff will be required to routine submit data so that certain key indicators can be tracked. The system being developed, however, reportedly will not provide detailed enough information to adequately monitor the performance and impacts of the horticulture programme. Consequently, work to develop a monitoring system for horticulture remains to be undertaken.

To promote **public participation (Output 1.2)**, the Programme Support Document indicated that the Coordination Office is to facilitate the organization of 13 workshops and seminars – on crop diversification, horticulture extension, kitchen gardening, grading standards for export, horticulture research, and market potentials. (Many of these meetings fall under other sub-programmes, but the Coordination Office has the responsibility to undertake the logistical organisation.) In 1998, workshops were held on crop diversification, policy for effective horticultural extension, market potentials, kitchen gardening, grading standards, and the annual horticultural research coordination workshop. In 1999, training was conducted on crop budget analysis, and a seminar on food quality standards was organized. These workshops have been primarily for government staff and technical officers, so they have not provided much opportunity for participation of the broader public working in the horticulture sub-sector, such as private entrepreneurs and farmers.

To improve **baseline data (Output 1.3)**, the Coordination Office was to conduct a rapid socio-economic survey, and then use the results to establish well-defined benchmarks and baseline data. The original aim was to refine / update this data during the MTE, and then to repeat the survey in the fifth year of the programme to assess impacts. A socio-economic survey was contracted to the Natural Resources Training Institute, which undertook the study and produced a report in 1998. Teams of NRTI instructors and students undertook the study, which involved a rapid rural appraisal in two geogs in each of 8 different *Dzongkhags*, covering a sample population of 365 households, or 2836 individuals. As discussed under the Technology Generation Sub-programme, a horticultural economist worked with staff in the MOA's Policy and Planning Division (PPD), to undertake and analysis a crop budget survey.

Although such surveys have been conducted, the results have not been used yet to create a database for the baseline situation, against which any changes or impacts could be measured. The Programme has not yet elaborated "objectively verifiable indicators, " or "success criteria, to use for monitoring either performance (progress towards achieving the outputs) or impacts (progress towards achieving the immediate objectives). During the Mid-Term Evaluation Mission, in mid-March, a one-day workshop with Programme staff was held, which included initial discussions on possible indicators. In the subsequent Strategic Planning Workshop in late April, further work was done to develop indicators and means of verification.

The Programme has generated a vast volume of documentation, but such information needs to be organized, compiled and synthesized. The Coordination Office needs to create a list of programme documents, such as a numbered series of technical reports and a numbered series of administrative reports. A central library of all horticulture programme documentation should be established, and then key reports made available through the computer information network (horticulture web page) under development.

The Coordination Sub-programme was also given responsibility to work on policy and legal issues, in terms of coordinating **drafting and enactment of legislation (Output 1.4)** related to seven topics – formation of growers' groups, export grower registration, regulation of fruit purchase contractors, levys on horticultural produce, grading standards for export, certification of seeds and planting materials, and food safety specifications and standards.

The MOA's Policy and Planning Division has responsibility for working on policy and legislative issues within the RNR sector. In late 1999, PPD has created a Policy and Legal Section (PLS), which is currently staffed by one agricultural economist who has training in policy analysis. He has attended some workshops on drafting legislation, which were hosted the Home Ministry and UNDP (through UNDP's support to development of local capacity).

This staff member has worked with a consultant, fielded through the Extension Support Project, who has worked on drafting a Cooperatives Enabling Act. Work is also ongoing to draft a Non-Governmental Organisations (NGOs) Act. Currently draft legislation for a Seed Act and a Pesticides Act are before the Cabinet for consideration, and are expected to be discussed in March 2000. Once they have been reviewed, revised, and approved by Cabinet, they would be submitted to the National Assembly, for consideration during its next session (June-July 2000).

The IHDP has supported a consultant who worked with PPD on food safety and standards issues. The RGOB Cabinet has given responsibility for drafting of the relevant legislation to the Ministry of Health and Education.

The PPD policy and legal specialist has requested that IHDP consider funding a United Nations Volunteer (UNV), to assist with work to finalise the framework for the Policy and Legal Section, review legal documents in the sector, and conduct workshops and training courses. The volunteer would also be expected to work on the contract system of purchasing fruits, grading standards for export crops, and bylaws for food safety, standardization of horticultural produce marketed, producers cooperatives and farmers' groups.

When the Programme Support Document was prepared, outputs and activities related to **computer / information technology** were seen in terms of improving technology generation (Output 4.12), and improving extension communication (Outputs 5.3 and 5.4). Provision was made for a one-month consultancy in computer programming / networking, to examine how the RNRRCs and marketing agencies could be linked to create a Wide Area Network (WAN). A consultant was fielded in 1999. Based upon the consultant's recommendations, IHDP is now supporting efforts to link all staff within the MOA into an intranet and provide access to email, as well as working on linking together the RNRRCs. [While three of the four RNRRCs currently have good access, Khangma has had communication difficulties as it only has one telephone line for the entire research center – despite having requested additional lines over 3 years ago.] Once the infrastructure is in place, then staff will be trained to use it. Subsequent plans involved the development of databases and Web pages for the MOA, DRDS, and IHDP. As these plans are realized, information flow and communication within the MOA in general, and the horticulture programme in particular, should be greatly improved. A UN Volunteer, recruited and supported through IHDP, arrived in December 1999 to support these activities for at least one year.

Effectiveness of Implementation.

The Coordination Unit seems to have been reasonably effective in handling much of the logistical coordination, especially since an accountant was posted to the unit. The Programme Coordinator, however, has been primarily occupied with administrative matters, and thus has had little time for substantive coordination or long-range strategic planning activities. Limited public participation and involvement has occurred in the formulation and development of the horticulture programmes. Although some baseline surveys have been conducted, the information has not been organized or analysed in such a way that the data could be used for monitoring purposes. The programme lacks an effective monitoring and evaluation system for assessing programme performance (achievement of outputs) and impacts (achievement of objectives). Some progress has been made on policy and legal issues, but many of the proposed topics remain to be addressed.

The Programme Coordinator has repeatedly proposed that additional staffing is needed to more effectively carry out the responsibilities of the Coordination Unit. In late February 2000, another

technical officer was posted to the Coordination Unit, who has provided some assistance with administrative duties.

Efficiency of Implementation.

Initial 5-year sub-programme budget:
$486,000 in UNDP support and 14.25 mil. NU in RGOB support

Amount spent through 1999:
$278,617

Areas for corrective action.

The coordination office needs to be strengthened, in terms of its staffing, coordination and management procedures, authority and decision-making powers. Additional technical staff is required to support the programme coordinator, in terms of long-term strategic planning, substantive coordination among sub-programmes, and monitoring of implementation. In addition to increasing the staffing levels, management training is needed, so that appropriate management procedures can be developed and implemented.

To handle administrative matters, such as logistical support, procurement, handling formalities such as travel orders or consultant's visas, the office needs a trained administrator. This individual could be hired outside of the civil service, to serve as a contract employee for the duration of the UNDP support to the programme. The administrator could also work closely with the accountant to improve the overall financial management and monitoring of the programme, and assist the programme coordinator in compiling overall programme reports.

Implementation of the remaining two years of the current programme can be facilitated through a comprehensive strategic planning exercise, to review the proposed outputs, activities, work plans, and budgets. For this purpose, the Coordination Office organized a workshop held in Bumthang between 20 and 24 April 2000.

Efforts to increase broad-based public participation in the formulation and implementation of horticulture development in Bhutan are urgently needed. Greater attention should be given to building collaboration with farmers, producers, agro-processors, marketers, and others in the private sector. The formation of a Horticulture Development Committee, with representation of private sector stakeholders, should be an urgent priority.

The existing baseline data needs to be organized into a database for effective monitoring. Between mid-March and late April 2000, work has been undertaken to develop indicators and means of verification to assess the performance and impact of IHDP. This work needs to be followed up, completed, and finalised into a monitoring system wherein the agreed-upon indicators will be routinely measured. If needed, technical expertise should be obtained to develop an effective and efficient monitoring and evaluation (M&E) system. This work needs to be carried out in collaboration with other units in the MOA responsible for monitoring, such as the Policy and Planning Division (PPD) and the new Information and Publicity Section (IPS).

In collaboration with the Policy and Legal Section of the Policy and Planning Division of the Ministry, the Coordination Office needs to continue to work to promote a conducive legal and regulatory framework for the development of horticulture. In addition to areas already under consideration – such as seed and seedling certification, food safety, cooperatives and non-governmental organizations – other policy areas warrant careful analysis and review for their impacts on horticulture development, such as land use policies or government staff transfer policies.

In terms of long-range planning, the Coordination Office should take the lead in preparing medium- and long-range plans. During the Strategic Planning workshop, participants discussed some ideas of future development for the different sub-programmes. During the next two years, the Coordination Office can build up these ideas, to articulate a well-focused strategy for horticulture development in the next national development plan, the Ninth FYP (2002-07).

It would be desirable for the programme management to prepare a final programme report to be ready no later than 31 March 2002, to be available before the final evaluation mission. Such a report should not only highlight the programme's achievements, but also clearly articulate how the horticulture programme will move ahead in the future.

Areas of potential success

The Coordination Office is supporting the overall coordination of horticulture development, especially with respect to providing support to the various sub-programmes through organizing meetings, training, technical assistance, procurement, and other logistical support.

Ongoing development of information technology within MOA, DRDS, and IHDP has great promise to dramatically improve the overall monitoring of horticulture development, transfer of research findings into results that can be used by extension, farmers, producers, private sector entrepreneurs and potential buyers of Bhutan's horticultural produce and products. To the extent that baseline surveys and other baseline data can be incorporated into the IT network, monitoring of trends, production and market information will become more feasible.

Efforts to update the programme design, activity plans and budget, and to monitor its performance and impact, should be greatly eased through the use of the Programme Support Document (PSD) software.

Identification of policy and legal issues, and resulting work to support policy, legal and regulatory reform, also holds great promise for development of horticulture activities as an economically viable private sector enterprises.

Sub-programme 2: Marketing

Programme Performance (Activities)

The main objective of the marketing sub-programme is to improve the marketing system for both domestic and export markets for horticultural produce. To meet the main objective, the programme document identified 6 outputs with 26 activities designed to be carried out over the programme period. Of these 26 activities (4 activities dedicated to improving the technical capacity of the Agricultural Marketing Unit (AMU) within the Planning and Policy Division (PPD), and creating farmer awareness on export potentials for horticultural crops (Output 2.1); 5 activities were dedicated towards improving market systems for the local markets (Output 2.2); 3 activities were aimed towards improving the marketing systems for export (Output 2.3); 5 activities towards improving the market information collection and dissemination system (Output 2.4); 4 activities for improving institutional linkages (Output 2.5); and 5 activities for the formation of farmer groups or associations (Output 2.6).

Overall the programme has made good progress with reasonable success in implementing its activities.

The **technical capacity at the AMU (Output 2.1**) is now enhanced after all the required office equipment is in place and with the completion of training for two staff members, both in market information and management. The unit now has a full staff of 4 qualified officers in place along with the required office equipment (computers, printers, slide projectors and furniture) and logistical support in the form of one vehicle (Toyota Hilux pick-up truck). Two more staff planned for MIS training has not taken place as yet. They still lack a key staff member for managing incoming data and analysing it into usable forms, as the individual already trained for work has been transferred elsewhere. It is not clear if more work has been done on creating farmer awareness for exports on horticulture crops, as the market study tour for horticultural producers has not taken place.

Work on improving the marketing systems for the local markets by building of the market sheds have gone well. More *Dzongkhags* are now demanding assistance to build such sheds.

The programme has **improved the local markets in several Dzongkhags (Output 2.2**) New Sunday markets are now established in Gyelpozhing Mongga with four sheds completed (in Dramtse, Lingmithang and two at Yadi). The old market of Samdrup Jongkhar is now re-built with proper structures that will provide both clean space and shelter both for horticultural and other food items. These sheds have incorporated distinctive Bhutanese architectural features, which give a unique quality that could be replicated to other future sheds. The orange depot at Nganlam was reported to be about 50% complete. This depot will benefit the orange growers of three Dzongkhags (Mongga, Samdrup Jongkhar and Pema Gatshel). More market sheds in Luntshe, Kanglung Trashigang, Tshongdue Paro, Haa, and Chamkhar Bumthang are being built in the next one and half years.

Some Dzongkhags were slow in submitting proposals for the marketing sheds, while in other cases, such as Trashiyangtse, the town is still awaiting its new town plan prior to allotting any space for a weekly market. Work on establishing the fruit and vegetable stalls has been slow mainly due to the policy of the city corporations in each *Dzongkhag*. The city corporations are not willing to immediately take-up these ventures without first looking at their own overall town planning objectives.

A series of activities have taken place for **improving the marketing system for export produce (Output 2.3**). They include a trial marketing of apples to Sri Lanka; promotion of products at the SAARC expositions; marketing study tours to Bangkok and placement of trade attaches to Dacca, Delhi, Geneva and Bangkok. The important market study of Indian and Bangladeshi markets highlighting the potential entry points for Bhutanese horticultural produce was completed and

circulated to the relevant organizations. The regional embassies of Sri Lanka, Singapore, Bangladesh stationed in Delhi were visited to explore market information and contact points.

Market information collection is now being increased (Output 2.4). Previously data was only collected from the six major markets and the auction yards. Now data is being collected from more of the *Dzongkhags*. A national-level workshop was held to discuss major constraints and opportunities of marketing, particularly agricultural marketing issues dealing with input supply problems and transport constraints. A new format and methodology is being developed for the Market Information System (MIS) to cater to the increased data collection efforts.

Dissemination of market information is still being largely done using radio broadcasts on a daily basis during the export seasons. More needs to be done in the area of information technology, especially with hosting of web pages for certain specific high-value products, like mushrooms, lemon grass oil, or other aromatic and exotic plants.

Other marketing units in the different ministries and offices of ITMS, AMU (MOA), Druk Seed Corporation, FCB, BCCI, MTI (Trade Export Division) are collecting and disseminating information for their own use. The latter also publishes an Export Newsletter circulated fortnightly to the private sector. How much effective collaboration takes place between these units is not very clear.

In Shingkhar Lauri in Samdrup Jongkhar Dzongkhag, farmers have been exporting Chirata to India for the past 20 years. They still do not have any idea of what the crop is being used for, how it is processed or packaged across the border. Perhaps if they went on a study tour to India, to witness something of the processes involved, some ideas of small-scale processing can begin to take shape by themselves at the village level.

Effectiveness of Implementation

Despite lack of any external technical assistance, the sub-programme was executed fairly well. Now increased capacity is being built. Impacts will be felt by the direct target groups and beneficiaries, especially the private sector exporters and entrepreneurs for the immediate programme period, and the rural businesses and farmer groups in the longer term.

Special mention needs to be made for the landmark achievements to explore alternative markets: in addition to the traditional markets in Bangladesh, apples have been marketed in Sri Lanka using the cold chain effects. The initiation of new Sunday markets and up-grading of old ones has been most effective, in creating a forum where farmers can bring their produce and meet buyers at a designated time in the week.

Efficiency of Implementation

Overall the sub-programme has implemented its activities fairly efficiently. In the earlier stages, however, the performance of activities was slow due to lack of technical staff. It has been most efficient in the tasks of building market sheds and initiating the new Sunday markets. It needs to be more active, however, in getting market data translated to usable information for particular users.

Initial 5-year sub-programme budget:
US$ 632,750 in UNDP support and 11.52 million NU in RGOB support

Amount spent through 1999:
US$ 163,710

Areas of Corrective Action

The Marketing Sub-Programme needs to explore increased or multi-uses of the marketing facilities (market sheds and collection depots) with further expansion for facilities such as storage rooms, bulletins or areas for information display and toilet. Bhutanese architecture needs to be incorporated as much as possible for the remaining construction of the marketing sheds and collection depots: a good example is the current construction in Samdrup Jongkhar market (with the protruding Bho Phana).

The budget for Samdrup Jongkhar marketing sheds (specifically for the 8 remaining platform sheds) needs to be increased as the market caters to the entire 6 Eastern Dzongkhags. Current progress is already over 60% complete and the suggested increase in budget is required to complete the construction. Detailed estimates for the expansion are being sent for approval to headquarters.

A more holistic approach needs to be adapted to build internal and external markets. Agro-eco-tourism potentials could be developed by exploiting the regional/location specific specialties (handicrafts, organic farming, high value crops like mushrooms, lemon grass and medicinal plants) in the diverse regions and localities spread across the country. (See Annex 10 for further details, ideas and clarifications).

Greater coordination is needed with other marketing offices to help find markets, either locally or in the region, for the unsold honey and apple juice in Bumthang.

The gap left at AMU office for the post of data entry and analysis need to be filled in urgently as possible. This staffing vacancy can impede any future work towards efficient data management and its use for planning purposes.

The reports of the various market study tours, especially their main analysis and conclusions, need to be further communicated. The target audience is the growers and the exporters, who are the key players in marketing of horticultural produce.

Planned study tours of selected growers, and or exporters, to the main markets in India and Bangladesh to explore potentials for export needs to be conducted. The growers in certain pockets of production (mushrooms, mangoes, citrus, medicinal plants) who show more interest and have taken initiative can be given this valuable opportunity to enhance their knowledge and views of the prevailing markets.

It is vital to speed up release of budgets and approvals for the proposals from the *Dzongkhags* for market construction. During the field visits, the MTE Mission heard concern expressed regarding the slow processing and delays in the budget approvals. This situation can be speeded up for the remaining programme period.

New fruit and vegetable vendor stalls are difficult to create, given the complex problems of land availability and structures permitted according to the existing city corporation laws in each area. Nonetheless, existing vendors can be given support to carry more varieties, and some training with hygiene and storage.

Efforts are needed to involve more of the private sector (more progressive farmers, village exporters, and entrepreneurs) in all marketing activities. Although perhaps ignored in the past, the village entrepreneurs, small shopkeepers and progressive farmers are a key target for many marketing ventures. Logistically they are easier to reach than the farmers in the remote areas. They often have sharp business sense and know their market constraints and opportunities.

These entrepreneurs can facilitate marketing of produce. They are also key in farmer group formations and associations, as they are often aware of situations far beyond the fringes of the

village and *geog*. In terms of opportunities for small-scale processing and identifying internal market supply and demand gaps, they would be the best persons to contact, as in many cases they buy and sell local produce from one area to another. In many ways, they are an indirect and the most economical way to reach the grassroots level, given the difficulties for any development effort to reach remote areas.

The main sub-programme objectives need to be re-evaluated. Does the Marketing Sub-Programme deal only with policy issues, as the unit is within the framework of the Ministry's Policy and Planning Division, or should it focus mainly on the co-ordination of various agents (MTI, FCB, ITMS, BCCI, Druk Seed etc), or is the sub-programme also required to actually initiate and implement marketing activities?

Areas of Potential Success

Increased marketing facilities (Sunday markets and sheds) have been constructed in the *Dzongkhags*. These facilities are among the more prominent impacts of IHDP success and outreach. Many facilities are well built and in some cases with personal supervision by the district administrators. The review team visited the sheds of Trongsa, Drametse, Yadi and Limithang in Mongar, and Samdrup Jongkhar.

While it is too early to state the potentials for success, it is quite evident that the construction of market sheds for new Sunday markets and the upgrading of the existing markets in the different Dzongkags will be a much needed boost for farmers to sell their produce at designated areas and time in the week when they can find the demand for their produce.

A spin-off effect has been the opportunity given to local contractors to enhance their skills and expertise in such construction. The Bhutanese architectural emphasis (protruding Bo Phana), as was done at the market sheds in Samdrup Jongkhar, can be replicated elsewhere.

Exploration and finding of new markets for apples in Sri Lanka is a potential success story given that exporters are now able to follow-up with the required export standards of proper grading and packaging of produce that the new market demands. Furthermore, the lessons learned from these ventures can now be used to further expand the efforts to other markets in the region and beyond.

Trade attaches have now been posted now in Dacca, Delhi, Geneva and Bangkok to facilitate export marketing, to explore opportunities for exports of horticultural produce and to find niche markets.

Sub-programme 3: Post-Harvest

Programme Performance (Activities)
The main objective of the post-harvest sub-programme is to reduce post-harvest losses of horticultural produce.

To meet the main objective, the programme document identified 8 outputs with 28 activities designed to be carried out over the programme period. Of these 28 activities (5 activities dedicated to establishing the technical capacity of the PHU within the REID framework (Output 3.1); 3 activities were dedicated towards building and making operational storage facilities for the private/public sector (Output 3.2); 7 activities were aimed towards establishing packing and grading systems in place and making operational for few selected products (Output 3.3); 3 activities were drawn up towards designing recommendations on harvest maturity guides and harvesting methods (Output 3.4); 2 activities for designing recommendations on appropriate post harvest treatments (Output 3.5); 1 activity to demonstrate refrigerated transportation of fruits and vegetables (Output 3.6); 2 activities towards improving home level processing (Output 3.7); and 3 activities for establishing small-scale processing units (Output 3.8).

Despite being the first of its kind in the country, overall the programme is being implemented well with good progress made by an efficient and dedicated management team.

Implementation of the main activities has followed the planned schedule, except for the delays of the TA inputs. The placements of the B.Sc. candidates were also delayed by one year, mainly due to the delays in identifying suitable candidates.

One activity cannot be easily implemented currently, which is to have the grading standards and systems in place. According to the technical advisor for food safety standards, more information is needed before such standards can be developed. It also awaits legislation for any kind of enforcement or monitoring of standards.

Several trial shipments have taken place for both apples and potatoes in the regional markets. These trials provided ample opportunity to learn the advantages in **proper packaging and grading (Output 3.3)**. They were used to train extension staff and make the growers aware of the price advantages for employing proper post-harvest techniques.

The **technical capacity of the PHU (Output 3.1)** based in Bondey - Paro has been enhanced with total of 7 staff, including 4 technical staff members. It now has a well-equipped **post-harvest laboratory (Output 3.9)** for conducting post-harvest treatments and trials.

Focal persons at each RNRRC have been identified to carry out post-harvest activities in the regions. Although this task is difficult, due to lack of sufficient staff at the research stations, it is now being pursued as a necessary step to increase field activities. How efficiently the focal persons can be employed and what jobs they will exactly do needs to be determined in an overall plan for the Post-Harvest Sub-Programme.

Two international consultants have been fielded, one for post-harvest technology and another for agro-processing. To get the best results, they were fielded over several missions generating various activities and recommendations that are now being followed up.

Operational storage facilities (Output 3.2) have been developed. The low-cost fruit and vegetables store at the RNRRC-Yusipang has been completed and is now ready for testing. Three ambient stores (10MT each) for potatoes in Trashigang are under construction to help with market or auction prices and also for storage to meet demands during the off season. After conducting a feasibility study, the 50MT cold store is under construction at the PHU complex. It will help with both initial trial marketing of apples, and also for training and demonstration purposes.

In terms of developing **recommendations on harvest maturity guides and harvesting methods (Output 3.4)**, some work has been done on apples. A two-year trial on maturity of the Delicious apple cultivar has resulted in a maturity guide booklet that has been distributed to the Dzongkhags. How well the growers or exporters can use such guides needs to be observed. The prevailing current practice is for growers to sell the entire produce of their orchards to the exporters, who then harvest early or late depending on prevailing market prices in India and Bangladesh, rather than on the basis of fruit maturity. (This issue is further discussed in the following section on the Technology Generation Sub-Programme, under orchard management.)

Activities relating to **demonstration of refrigerated transportation of fruits and vegetables (Output 3.6)** have been postponed until the 50MT cold store is operational, so that use of the cold vans (refrigerated trucks) can be meaningful and efficient in conjunction with usage of the storage facility.

Much work has been done in **improving home-level and small-scale processing** (**Outputs 3.7 and 3.8)** including the fabrication and testing of 6 simple cost-effective dual-energy source dryers in Zhemgang. These dryers have been demanded by the farmers as the technology has proved cost-effective and useful. Technical advice and hands-on training has been provided to setting-up of a small-scale potato chip production in Chapcha.

Effectiveness of Implementation

The sub-programme has been executed reasonably well, with effective use of the two consultants for post-harvest technology and agro-processing. Certain outputs like establishing grading systems will be implemented once the legal framework and backing are in place, prior to setting and enforcing accepted standards especially for the export markets. Also it is important to re-examine the timeliness of having post-harvest treatment guides, given the current practices by apple and citrus orchard owners to sell their produce long before harvest dates to exporters and middlemen. Furthermore, a clear understanding of the economic costs for post-harvest treatments, such as fruit coating, must be made prior to popularizing the benefits.

The demonstration of refrigerated transportation of fruits and vegetables that has been postponed until the completion of the cold store, which should be especially useful during the rainy (monsoon) season when road blockages (due to landslides) often occur.

The post-harvest unit is in its early phase of developing its effectiveness. Nonetheless, some of its outputs, like the dual-energy dryers (for home/small-level processing), and increases in prices with better grading and packaging of potatoes and apples, have already proven their usefulness to the beneficiaries (including the growers/exporters).

Efficiency of Implementation

The sub-programme is well managed, given the constraints of starting from the beginning without any precedents to learn from. Further progress can be made with the guidance of an experienced designer and planner to plan out all future activities.

Initial 5-year sub-programme budget:
US$ 1,401,000 in UNDP support and 11.45 million NU in RGOB support

Amount spent through 1999:
US$ 567,956

Areas of Corrective Action

To have a more focused direction, plan and design of the programme, the MTE Mission recommends experienced input from regional or international technical assistance. This overall plan and design can incorporate both immediate goals for the remaining programme years as well as long-term objectives.

As currently planned, more technical and professional staff will be required to initiate post-harvest activities from the RNRRCs. Technical staff is needed at the field level to carry out various tasks in the pipeline and also for the outreach activities of the RNRRCs. Actual numbers will depend on the plan and design to be developed once the suggested TA is in place.

The administrative capacity of the PHU office needs to be enhanced. Specifically, the administrative assistant needs to undergo specific short-term management training, preferably in India, to help better manage the day-to-day activities of the office and assist the coordinator.

Specialized training and studies are needed in food processing aspects. While the post-harvest aspects are satisfactory, the unit lacks experienced national staff for the more specialized food processing aspects. The specifics have already been proposed in the recent work plan and budget.

More small-scale food processing ventures need to be initiated with interested entrepreneurs or progressive farmers. More ventures should be promoted like the Chapcha potato chip set-up,[1] which is a forum for both training in food processing, packaging and ultimately in marketing. A follow-up on such ventures should reveal a wealth of information on the food chain process leading up to actual sales.

Agro Industries (Thimphu) needs assistance in finding funding, to purchase improved filtration equipment for their apple juice production. Such equipment could improve the quality of the juice produced and thus increase the regional market demands for their apple juice product. The approximate costs are about 500,000 SF. This juice processing directly helps farmers in the Paro, Thimphu and Punakha regions to sell their rejected apples after the superior grades are sold as fresh fruit to Bangladesh and India.

Areas of Potential Success

The establishment and functioning of the first PHU with technical capacity built (and further improved with more technical personnel currently being trained) is the beginning of an important segment within the RNR that has received little attention in the past. The PHU will now play a major role in conjunction with all marketing efforts by all the different RGOB agencies existing in different ministries and departments. Such marketing efforts all have to be later coordinated with the post-harvest unit in some form or another for meeting market demands.

Cost-effective storage and dryer facilities are being built, tested and now demanded by an increasing number of farmers. This trend shows an early indication of the success in small-scale food processing, both for home consumption and for the local markets. For the larger apple orchard growers and exporters, the 50MT cold store currently under construction in Paro will be an important factor for a wide area of post-harvest activities. Use of the facility can later be expanded to other crops. It can be a center to demonstrate the actual functioning of such cold stores and their uses under adverse marketing circumstances such as low export prices, bumper harvests, or road and transport blockages.

[1] This area could also be a productive one for collaboration with other projects and programmes. For example, the Royal Society for the Protection of Nature has a UNDP/GEF Small Grant to assist with conservation of rare black-necked cranes and associated community development in Phobjikha. As the area is known for its potato production, they are interested to explore the idea of potato chip production.

The higher (than average) auction price for potatoes due to improved packaging and grading and the trial marketing of apples to Siliguri and Sri Lanka showed the great potentials that exist for Bhutanese horticulture products. It further demonstrated that the cold chain is feasible, and that with proper care given to harvesting storage and packaging required to meet the specified and acceptable standards, Bhutanese products can have a share of the regional markets. This landmark achievement can be further replicated taking note of the valuable lessons learned as the unit further expands its role in the RNR sector.

Sub-Programme 4: Technology Generation (Research)

The broad objective of this sub-programme is to provide appropriate and locally adapted management recommendations for specific horticultural crops and enable growers optimise their returns from horticulture produce. The sub-programme is executed by the existing research network, coordinated by the Research Division of the Ministry of Agriculture, in collaboration with the Extension Division. Four Renewable Natural Resources Research Centres (RNRRCs), with their sub-stations, cover the country and have specific mandates for horticulture research:

Khangma (East):
- National Coordinator for horticulture
- National coordination for specific topics: potato variety trials, chilli blight control – integrated pest management (IPM), survey on citrus production management and economics, walnut
- Focal centre for potato, medicinal and aromatic plants (MAP), all nut crops, mango, citrus, avocado, pear, with test locations in other stations
- Lead Scientists: nut crops, citrus, high-altitude medicinal and aromatic plants, other sub-tropical horticulture

Yusipang (West):
- National activity for citrus premature fruit yellowing study
- Focal Centre for apple, stone fruits, mushroom, strawberry (germplasm collection)
- Lead Scientists: apple, potato, temperate fruits

Bajo (West-Central):
- National Coordinator for grapes and vegetables
- National mandate for tomato varieties trials, onion varieties trials and sub-tropical apple
- Test location for citrus (substation Lingmethang)
- Lead Scientist: vegetables (except potato); low-latitude medicinal plants (Lingmethang)

Jakar (East-Central):
- National mandate for cardamom variety trials and study on ginger production and economics
- Focal Centre for cardamom, ginger, arecanut
- Test location for pome-fruits
- Lead Scientists: cardamom, ginger and arecanut

Some core funding has been provided by Helvetas (Swiss Development Cooperation) to the RNRRCs in Yusipang and Jakar, whereas Bajo has received some core funding support from both Helvetas and the Canadian International Research and Development Cooperation (IDRC). Khangma does not have any core funding support, although it does have research support through a number of projects and programmes. In March 2000, while the Mid-Term Evaluation Mission was ongoing, a joint Swiss-Bhutanese government delegation was reviewing the overall situation for the national RNR research system, and looking at needs for future assistance.

Besides horticulture, the RNR Research Centres implement a wide range of other activities related to renewable natural resources (agriculture, forestry, and livestock): cash crops, cereal crops, plant protection, soil fertility building, husbandry, fodder crops, forestry, farming systems, post-harvest processing, and training. They are coordinated with other services, such as Plant Protection and Soil Service, Extension Department, Agricultural Machinery Unit. They also implement other projects, involving different sources of funds.

Research Coordination
The sub-programme foresaw the establishment of a Horticulture Research Sub-Committee (Activity 4.2.1), in order to coordinate/oversee the horticulture research programmes within

RNRRC. This committee was not created, since it was decided to give the national mandate for Horticulture Research to RNRRC – Khangma, with National Coordination Meetings held every year. The overall research coordination and linkage with the extension services is thus institutionalised via annual meetings – the National Horticulture Research Coordination Meetings, and four Regional Annual RNR Programme Review and Planning Workshops (one per region).

In these venues, guidelines for a coherent research programme are set, with priorities selected through criteria that include participation of the extension service and reporting of farmers' perceptions through a participatory approach. In the process of selecting priorities, physical, technical, social and economic issues are therefore considered, to ensure that research activities are consistent with regional needs, closely tied with the extension service and limited resources.

Specific assignments have been given, on the basis of regional priorities, on-going research programmes and facilities, and potentiality for expansion of markets.

The main horticultural research activities are:

- introduction and evaluation of germplasm, both native and exotic (fruit, vegetable, medicinal and aromatic plants);
- establishment of nursery facilities and production of fruit planting material;
- land development with demonstration orchards;
- establishment and management of research orchards;
- off-season vegetable production and evaluation;
- certified seed production;
- adaptive research on plant protection;
- establishment of on-farm test sites;
- human resource development, both for the researchers and the extension agents;
- farmers' field days in the Research Centres; and
- data generation and analysis.

Besides research, all RNRRCs have a mandate on training.

Programme Performance

The Horticulture Technology Generation sub-programme was designed with 12 outputs and 58 activities. Most of these activities have been initiated. The Research Centres have been equipped with the planned vehicles, computers and modem and are going to be linked to each other very soon with the wide area network facilities. The various activities for **capability building to strengthen horticultural research (Output 4.1**) have almost all been implemented, with five 4-year long B.Sc. in India, beginning in 2000 and expected to be completed by 2003. Three M.Sc. studies were planned: one was completed in February 2000, and the other two will be completed in mid-2000.

Other activities, partially implemented with the support of international technical assistance and UNVs, include:

Structured research programme (Output 4.2): a list of priority horticultural crops has been prepared, with priority areas for each crop, mainly on germplasm evaluation and insect control.

Database on traditional and introduced horticultural cultivars and their ethnobotanical use (Output 4.3): studies have been conducted on mango, citrus and cardamom. No database has yet been established, since the installation of computer software has just started.

In terms of **germplasm screening and evaluation (Output 4.4)**, a total of 130 fruit cultivars have been established, including rootstock, mainly of apple, citrus and walnut, 40 vegetable varieties and a number of potato varieties (a complete detailed list is not available).

Fruit nursery activities (Output 4.5), adaptive crop management practices (Output 4.6), on-farm trials on integrated crop management (Output 4.7), off-season vegetable production (Output 4.11) and **kitchen garden demonstrations** (**Output 4.10**) have all been initiated.

Some intercropping trials (asparagus, fodder, walnuts) and fruit plant irrigation have been set up in Khangma. A researcher officer who was working on her M.Sc. in Australia started trials on citrus pruning. She came back for one month to Khagma to set up the trial, which she will follow and evaluate as a final report study.

A **detailed economic analysis** survey on some horticultural crop budgets (**Output 4.9**) was prepared and analysed with the international technical assistance of a Horticultural Economist. According to research staff, compilation of **blue prints for the major horticultural crops** (**Output 4.8**) can start as soon as sound technical recommendations will be endorsed by the RNRRCs. This work will require compiling information generated by the researchers, technical assistance, and other IHDP staff, including those working on post harvest and marketing.

Provision of adequate information (computer) facilities (Output 4.12) for the research centers is ongoing. This output has been broadened to encompass development of an information technology (IT) system for the entire Ministry, and moved under the Coordination Sub-programme.

Two UNVs were expected to provide technical assistance, one for nut tree production and the other on vegetable production, for 24 months each. To date, only one position has been fielded: a UNV was posted at RNRRC/Bajo, and worked on vegetable production. He also developed a drying unit, which could be used for horticultural produce (as well as for drying meat). He worked for less than 12 months before submitting his resignation. To date, efforts to recruit a second UNV, to work on nursery management, fruit and nut trees, have been unsuccessful, but the programme has been hoping to locate a suitable candidate in the coming year.

In general the sub-programme progress was delayed, mainly due to the complexity of the research organisation, procurement difficulties and the insufficiently designed framework of work plans, coordination, and execution of technology generation activities. These impediments have been partially compensated for by the high commitment, hard work and strong personal involvement of the officers-in-charge.

Effectiveness of implementation

Work plans, reports, proceedings, progress review and other documents related to technology generation all express a lot of good intentions, but they are needed to be more fully reflected in practical implementation. Some horticulture research staff members are absent at the moment, since they are engaged in on-going studies and specialisations abroad. The long-term staff training substantially reduces the output capability of the RNRRCs on horticultural research in the short term, as the staff positions rest vacant.

The major hindrances on effectiveness of implementation can be summarised in the following points:

Overall Research Programme Planning and Results to Date:

- Although several activities have been recorded in the semi- annual reports, actual compiled data, locations, and results are not available for most of them, such as implementation of trials and outputs, extension training by RCs, exhibitions, field days, on-farm demonstrations, kitchen garden, off-season vegetable demonstrations, varieties release,

etc. This makes it difficult to have a general understanding of the overall situation, to know what has been done, where and by whom, with respect to targets, and if results are satisfactory or need adjustment, in order to build an overall rational research management plan.

- Comparison of different local germplasm locations (e.g. mandarin collection in Khangma and Bajo) and improved varieties tests need to be designed, to speed up and rationalise germplasm evaluation: collection and screening of traditional cultivars has been initiated in a scattered way.
- The programme for off-season vegetable needs to be more rationally defined, including is the identification of early and late varieties, and the introduction of low-cost greenhouses and other materials for off-season/year-round vegetable production in urban areas.

Effectiveness of Technical Assistance

- The economic analysis survey requires follow-up, in terms of comparison between recommended production practices and existing methods.
- The research station did not have any copies of reports submitted by the UNV, with the description of the outputs reached and recommendations to be followed and implemented.
- Reports prepared by the international consultants need to be sufficiently circulated, with their recommendations made available in an easy-to-read format for extension, for implementation and follow-up. The economic study findings need to be incorporated in the research and extension programmes.

Linkages among Research, Extension, and On-Farm Production Practices

- Any significant comparative advantages found through the intensification and diversification of horticultural production need to be documented.
- Preliminary results of horticulture adaptive research need to be seen in farmers' fields, particularly the release of tested vegetable varieties and recommendations on specific cultivation practices (plant protection, irrigation, orchard layout, orchard rejuvenation, water management, soil building fertility, intercropping, nursery management), including more labour-saving alternatives.
- Initiatives to encourage the private sector to link production to the market need to be encouraged.
- Systematic backstopping of extension activities needs to be done by subject-matter specialists from the RNRRCs.
- More sound teaching, training and extension materials need to be developed directly by the Programme, so that research results can be applied to promote horticulture development.

Efficiency of implementation

Initial 5-year sub-programme budget:
US$ 1,937,100 in UNDP support and 46.19 million NU in RGOB support

Amount spent through 1999:
US$ 849,130

Areas for corrective actions

In general, a comprehensive review of the overall horticultural research situation is needed, to know what has been done, where and by whom, with respect to targets, and if results are satisfactory or need adjustment, in order to build a general rational research management plan.

Research Management

Coordination of overall horticulture adaptive research. Due to the complexity of the overall sub-programme, in particular the RNRRCs management, specific implementation of horticultural adaptive research needs to be reorganised in a more rational framework. More focused specific objectives, under an authoritative technical supervision should be developed, to include a more meaningful coordination among various stations and sub-stations, better communication among researchers, monitoring and rationalised comparison of results, common reorientation and protocols of implementation, utilisation and spread of outputs.

Overall, there is a great potential for adaptive research trials to be carried out by the various RCs and sub-stations on horticulture topics. To date, the programme implemented at national level shows a thin spread on various scattered activities, with sometimes not much sound justification and specific technical inputs. Nevertheless, the limited specialised staff, limited space and limited resources should conduct more coordinated, rationalised and focused research, concentrating on critical areas of production.

In the short term, it will be vital for the RNRRCs to focus their efforts on key priority crops, such as vegetables, apples, citrus, mango, and nut crops. As the programme develops in the future, however, potential new high-value, low-volume interesting crops, like star anise, saffron, vetiver, curcuma, flowers, tea, insecticide and repellent plants are worth further exploration, both for cultivation possibilities and market potential.

To support improved research planning, the MTE Mission recommends that MOA consider obtaining technical assistance (TA). Draft Terms of Reference for short-term TA in Horticulture Research Support are provided in Annex 9.

Although the four research centres cover four different regions, the north-south location, extension and morphology of these regions have some similar features. Therefore many trials could be assembled or divided among the centres in a comprehensive framework, following identified priorities, avoiding repetition and ensuring comparison whenever required.

A closer integration, avoiding duplication and contradictory results, is recommended with the National Plant Protection Centre, the National Soil Centre and the RNR Engineering Department (Irrigation), which all have built up a sound experience in their field, that can be readily be applied to horticultural production and integrated to more focused, fine-tuned trials.

Lead Scientists. The appointment of the lead scientists, endorsed during the Second Horticulture Research Coordination Meeting, should help to focus on aspects of specific crops. Focal/Specialist experienced senior researchers should be appointed for specific horticultural crops and sub-sectors, such as walnut, apple, citrus, mango, banana, cardamom, ginger, vegetables, seed production, and nursery management. They could serve as national technical advisors and work closely with related services, i.e. Extension, Training, Plant Protection, Soil Service, Post-Harvest, and the private sector. Their responsibilities could include coordination and validation of various adaptive research aspects, from germplasm evaluation up to marketing of the assigned commodity, identification and development of research proposals, making available findings and recommendations, and contribution to the compilation and production of extension materials for their respective focal areas. If senior and experienced researchers are designated as the lead scientists, they could be a trustworthy reference for other service departments related to horticulture production and commercialisation.

Closer collaboration with private sector. Within the overall horticulture programme, public participation is envisaged as a key element to strengthen horticultural production in Bhutan. A more focused incorporation of the producers' needs, including those identified in the baseline survey and the economic analysis, will help to better fine-tune techniques to be recommended for practical application.

Plant propagation and nursery management

Fruit plant propagation. The RNR Research Centres have established new orchards and nursery facilities, including seven green houses, for propagating planting material and rootstocks. The propagation programme has initiated and includes evaluation and multiplication of imported as well as renowned local varieties (e.g., mandarin in the RNRRCs of Khangma and Bajo). Farmers have expressed a real want from high-quality fruit plants, which are not yet available. The peach variety, Shan-I-Punjabhas, for example, has been positively evaluated, both on station and also through on-farm trials; farmers responded well, but no programme has been envisaged for mass multiplication.

Output 4.5 had foreseen the production of high quality grafted/budded planting material by the RNRRCs. The objective of the RNRRCs is, however, not to produce, but rather to research propagation techniques and to teach and demonstrate through providing basic technology, improved material and training. Mass production should be implemented by private enterprises.

To speed up the privatisation process and the production of quality fruit planting material on a national level, the sector needs to be strengthened in the following aspects:

- developing technical strategies and plans for the production of fruit planting material, taking into consideration the needs of farmers;
- improving basic technical management of fruit saplings, both grown under shade and in open space;
- organising training and workshops, following up of regional field training activities;
- supporting private associations for quality controlled planting material production, in the procurement of improved horticultural seed and planting material, in promoting sale strategies, packaging and management, including nursery certification procedures.

To strengthen this area, the MTE recommends that technical assistance be provided in the area of plant propagation and nursery management. Draft Terms of Reference for this input are provided in Annex 9.

Private nurseries. The Government is encouraging privatisation of nursery production. At present, extension agricultural officers, private nurserymen, seed producers and farmers groups do not have the technical knowledge and practical skills to successfully produce quality plants at a profit. There are no reliable mother plants to serve as a source of improved multiplication material and recommended rootstocks. Besides, private producers are not aware of financial management, prices, costs, threshold production levels needed for economic benefits, etc. Marketing approaches for nursery plants have not been considered; for example, plants are not sold in the local Sunday markets, due to a lack of packaging techniques.

Through the horticulture programme, and in coordination with the RNRRC training course on nut plant propagation, several greenhouses were distributed to private nursery operators (farmers), at a subsidised rate on credit. The technical characteristics of these greenhouses have room for improvement, in terms of their size, quality of covering material, system of ventilation, access from both sides, wind-sheltered location and windbreak. Overall greenhouse management is not well learnt yet, nor is the extension service in the position to give the expected technical support. Backstopping from the Research Centres is almost impossible, since they are not sufficiently staffed. Advice should be given to the Agricultural Machinery Centre on procurement of suitable nursery facilities, including modular, low cost greenhouses, considering low environment impact

covering material, drip irrigation facilities, proper equipment and recommendations for site choice and installation.

A specific programme by financial institutions, particularly BDFC, should be set up in order to help privatisation. A clear policy should be elaborated on selling modalities and prices. Private nurseries, in the form of private enterprises, should be registered with the seed and plant certification programme to be developed following the anticipated adoption of the Seed Act.

Integrated adaptive fruit and vegetable management
Some trials have been set up in the RCs, but sound results are yet to be reported. The National Plant Protection Centre has two full-time Plant Protection Officers posted in the research centres in Khangma and Bajo, while to date no direct collaboration with Soil and Plant Analytical Laboratory has been developed. Critical plant nutrition management strategies and practices have been identified by the Soil Fertility Project, which is now planning to go more in-depth with some independent research activities.

Fruit production. There is large scope for improving the quality and quantity of fruit production.

Apple yield increases have not been as expected in recent years, despite the increasing level of agronomic inputs. The present situation of the apple orchards has good potential for improvement, mainly through appropriate agronomic management. Recommended actions include:

- enlarging the range of germplasm and rootstocks suitable for different types of soil and ecological situations;
- conducting investigations on pollination;
- verifying and improving propagation techniques to have higher quality planting material, both as varieties utilised and physical status;
- carefully selecting establishment sites, verifying the depth of soils, sun exposition, and wind control;
- redress pruning practices to improve quality fruit formation, including green pruning and fruit load;
- verifying the level of nutrients in the soils, by soil analysis, and adjust the fertilisation rates, since due to heavy rainfall and excessive manuring soil acidification is common and micro-elements, like Bo, Zn, and others, may not be available for the plants;
- avoiding cultivation under the trees, avoiding depositing non-decomposed manure around the trunk, and using repeated close mowing;
- improving the harvesting system, by careful controlling the maturation of fruits and by using ladders and picking bags, and avoiding selling the fruit on the trees to contractors, who will not take proper care of plants and fruits during harvesting operations.

If the management of the apple orchards are improved, the incidence of pest and disease will naturally be reduced. The same considerations are valid for other fruits too.

Citrus, the most important fruit crop of Bhutan, currently experiences low average yields (less than 5Mt per ha), long juvenile period (5-7 years), alternate bearing, and heavy fruit insect infestations. This situation is again due mainly to scarcity of quality germplasm and inappropriate orchard management. Irrigation, for instance, is generally not practised except for trees near houses, but it is recognised as a crucial factor in slope sites and in light soils. Nonetheless, water retention capability is not considered among the criteria for orchard site selection.

Fruit growers and extension agents both strongly express the need for more training in orchard management and plant protection. Similar arguments can be made for walnut and mango, which are crops with great potential and promise for the social and agro-ecological situation of Bhutan. It is therefore recommended to strengthen local and imported germplasm evaluation, rootstock suitability and compatibility, adaptive research, demonstration and training, addressing more in depth the above-mentioned aspects.

In order to boost the sector the proposed specific technical assistance is strongly recommended. In Annex 9, draft Terms of Reference are proposed for short-term TA inputs in the areas of temperate fruit production, and mango propagation and production. The MTE Mission also endorses the proposal of programme management for additional TA input in walnut propagation.

Vegetable crop management. It is recommended a general reorientation towards more focused activities on vegetable production, particularly for pilot farmers (on-farm trials, varieties availability, suitable equipment and training), including off-season production, with a closer and more coordinated participation of the National Soil Centre and the National Plant Protection Centre.

The procedures for evaluation and release of vegetable varieties, particularly early and late varieties, could be speeded up. The immediate release of vegetable varieties that have been positively evaluated by the RNRRCs, such as tomato, bottle gourd, onion and asparagus, would help to enlarge the choice of possibilities for wider quality vegetable production.

Cardamom is one of the main cash crops in the West-Central Region providing a good income source and fitting into the existing agro-forestry systems. The yield crop is presently declining, mainly due to lack of proper management and renovation, which made plantations susceptible to viruses, insect pests and diseases. Harvesting is the most labour-intensive operation. Curing is done in an improper way, with inefficient energy utilisation, smoke smelling and over dried capsules, which reduces the prices received in the market. In general, cardamom cultivation has not received any institutional and technical support from the government. It is recommended to support these farmers, through training on cardamom production and management, evaluation of more market-oriented and virus-resistant varieties.

Plant protection. A major complaint of farmers concerns plant protection. The most common problems and potential solutions are well known by now, yet the extension network is weak in providing timely assistance to producers, who are very frustrated when they are not in the position to protect their crops. If the horticulture programme can support the use of good healthy planting material and proper agronomic management, however, the incidence of pests would be significantly reduced.

A much closer and coordinated collaboration with the National Plant Protection Centre is recommended, making use and participation on improvements of the extension horticulture IPM leaflets set recently prepared by the Centre. A regional seasonal horticulture plant protection strategy and plan should be set up, to be able to provide forewarnings of risks, to take preventative measures and to be ready to intervene in case of a disease or pest outbreak.

Training and Links with Extension

Currently training activities on specific technical topics are mainly conducted by the RNRRCs, grouping together extension officers and farmers. In the RNRRCs, training should be conducted only for extension staff. Training of farmers should officially be organised by the extension agents, with the RCs acting as hosts, demonstrators and resources persons for specific technical aspects. Extension agents need in-depth technical training on specific horticultural topics, particularly for critical areas. The overall framework for training of extension agents and development of extension programmes for farmers is being developed by the Extension Division.

The main requirements for training and demonstrations by the extension officers relate to nursery management and fruit production, while farmers are more concerned with fruit and vegetable control of pests and diseases, cardamom management and protection, mango cultivation and quality seed production/availability. There is insufficient awareness, however, that proper agronomic management, quality planting material and suitable varieties will significantly reduce present horticultural production problems and that training should go more in depth in this direction.

In general, the agricultural extension staff needs to receive more training on horticultural topics and updating on new developments. Some are interested to become focal persons for horticulture in the *Dzongkhags*; in particular they request specific practical training for crops grown in the areas where they work (e.g., mango, citrus, cardamom). Extension staff would like to have more reference material from the research centres.

Both farmers and extension agents have strongly requested technically sound extension material. Bhutan is already producing some valuable extension material, which is technically sound and attractively printed, i.e., plant protection posters. It is time that RNRRCs speed up the process of compilation of sound detailed crop production blue prints, with external technical support if deemed necessary.

Areas of potential success

As regard to general targets and expected medium and long-term results, areas of technology generation potential success are:

- Identification of a range of superior germplasm, both for vegetables in the short run and fruit in the long run, suitable for the varied and specific social and agro-ecologic conditions of Bhutan;
- Mass production and availability of improved horticulture seed and planting material, involving profitable privatisation of nursery production;
- Extended season of vegetable production and availability in the markets;
- Higher quality and diversification of fruit production and consumption;
- Significant increase in the availability of horticultural produce of export quality; and
- Creation or reinforcement of growers' associations able to produce export-standard fruits and vegetables in a sustainable way.

Sub-Programme 5: Extension

The horticultural programme relies very much upon extension efforts, to work with the farmers on all aspects of horticultural development, including:

- on-farm trials and participatory assessments of varieties and applied research needs;
- demonstrations, promotions and broader scale adoption of new crops and new varieties;
- soil and crop management, including pest and disease control;
- production of seeds and planting materials;
- post-harvest processing; and
- domestic and export marketing.

Thus, the extension programme is the key link to the farmers, which will enable the other sub-programme objectives, as well as the overall immediate programme objectives, to be reached.

The horticultural extension programme activities are to work through the existing agricultural extension system. Within each *Dzongkhag*, the District Agricultural Officer is ultimately responsible, assisted by one or more District Agricultural Extension Officer(s). They oversee the activities of the Geog-level agricultural extension agent. These government staff members have responsibility for extension on all agricultural activities, including cereal and horticultural crops. The district-level implementation has support from the central Ministry of Agriculture's Extension Division in the Department of Research and Development Services, as well as support from the regional RNR Research Centre, particularly the RNRRC's Extension Programme Officer (EPO).

The horticultural extension sub-programme, thus, is seen as a sub-programme of the Ministry's overall extension programme. Since early 1998, the Extension Support Project (ESP), assisted by the European Union, has been working with MOA to strengthen the overall extension efforts. Following recent reorganization, extension training is now the responsibility of the Training and Skills Development Coordinator within the Extension Division. The Extension Support Project is providing some general extension training, such as in participatory extension skills.

The primary, as well as some refresher, training of extension agents is now the responsibility of the Natural Resources Training Institute (NRTI). The basic 3-year, pre-service training course provides core training for all extension agents, as well as specialized tracks in agriculture, forestry, and livestock management. Within the agriculture curriculum, some training relates to horticultural topics – fruit and nut tree production, vegetable production, mushroom production, and post-harvest processing. NRTI faculty currently prepare "skills cards," which are two-page technical leaflets on various topics, such as grafting. NRTI is interested in working more on production of extension materials and collaborating with the RNRRCs on research. Through the IHDP, NRTI instructors and students were involved in conducting the baseline socio-economic study for the horticulture programme (a sub-contract through the Coordination Sub-programme).

Other organizations within Bhutan also provide extension support, such as training and technical advice to farmers. Among others, these include other government units and semi-government corporations, such as the Plant Protection Service, Druk Seed Corporation, Agro-Industries Corporation, and the Mushroom Centre. In addition, some private processors and producer groups provide extension advice to farmers and/or their members.

An important part of the Extension Section has been the Farmer Extension Communication Support Unit (FECSU), which produces extension materials, such as leaflets, booklets, radio and video shows. With a recent reorganization within the MOA, the functions of FECSU are being absorbed into the newly created Information and Publicity Section (IPS) of the Ministry, which is outside of the Extension Division.

Programme Performance (Activities). According to the Programme Document, the extension sub-programme was designed to develop an effective horticultural extension programme with on

the ground demonstrations-growing potential crops in farmers' fields and demonstrating improved crop management practices. To achieve this objective, seven specific outputs were identified.

For the horticulture extension sub-programme, a regional horticulture extension consultant was proposed for a period of 35 months (1998-2000). This consultant's responsibilities were to include assistance in developing the extension programme, including on farm research, demonstration programmes, farmer and extension agent training, participatory needs assessment, and extension monitoring, reporting, and evaluation procedures. Subsequently, it was argued that such a consultant was not needed, since the Extension Support Project would be providing long-term advisors. The overall need for technical assistance in horticulture extension needs to be re-examined, in light of the progress to date with the extension and outreach activities.

In late 1999, however, horticulture programme management proposed that an Extension Communication specialist be recruited to work on production of extension materials, and placed in the Coordination Office. Subsequently, it has been proposed that although this person should work through the coordination sub-programme, but be placed in the new Information and Publicity Section of the Ministry. Close collaboration will be required with various partners, including, Extension Division, the Extension Programme Officers (EPOs) in RNRRCs, and other organizations, such as the National Plant Protection Centre and the Natural Resources Training Institute (NRTI).

In terms of **improving the technical capability of the extension service (Output 5.1)**, 10 activities were planned, including study tours for District Agricultural Officers (in 1997 and 1998) and extension agents (in 1998 and 1999), training for two NRTI teachers (in 1998), annual two-month horticulture refresher training courses for extension agents to be held at NRTI (beginning in 1998), and training for selected group of farmers (beginning in 1998). In addition, the extension staff was to participate in on-farm trials, and to work in the demonstration planting programme with farmers. Other workshops or seminars for extension staff were to be organized to address topical problems of farmers, and open days conducted at the research centers for extension staff. Regular farmers' training was to be the responsibility of the RNRRCs, extension, NRTI, and the IHDP Coordination Office.

The first study trip for DAOs to visit India has been postponed several times, due to problems in India and more urgent priorities in Bhutan. The idea has been for the DAOs to visit India first, before the extension agents, so the extension agents' study tours have not taken place either. This trip finally took place from 1 to 13 April 2000.

To date, only one refresher training course for 15 extension agents has been conducted at NRTI. This one-week course focused on fruit production, and was conducted in 1999.

One NRTI instructor, who is a crop science lecturer, has been nominated for a three-month horticulture training course. Delays were experienced in identifying a suitable training institute. Currently it is hoped that he may be able to attend a course in Bangkok before June 2000.

The research centers normally hold an annual field day, to which local officials, extension agents, and farmers are invited. This event provides an opportunity for visitors to see and assess different horticultural varieties being tested in field trials at the research centers.

Training for farmers has been conducted in the course of demonstration planting programmes, on-farm trials, and other routine extension support to farmers. Each *Dzongkhag* develops its own extension programme, and is also responsible for identifying its own training needs. When a particular need is identified, the *Dzongkhag* then tries to see whether or not training can be provided by the RNRRCs, NRTI, IHDP staff or consultants, or other resource persons.

To achieve **better communication among farmers, extension and research (Output 5.2)**, Six planned activities were to include on-farm research, technical backstopping for extension staff, consultation with farmers and growers' groups on their priorities, training in communication techniques for extension staff, and production of videos and radio broadcasts.

In 1998, an Indian consultant conducted extension communication workshops at RNRRC Bajo and RNRRC Jakar for a total of 38 extension and research staff, and produced an extension communication manual, which was distributed to all *Dzongkhags*.

Extension staff undertook a survey of apple growers in Thimphu and Paro, and worked to establish an apple growers' registration scheme. [Other efforts to promote growers' or producers' groups were proposed under the Marketing Sub-programme.]

The Farmer Extension and Communication Support Unit (FESCU) was created in 1993. It has been providing support services to extension, through the production of extension materials, booklets, and leaflets, and more recently, audio-visual materials. They try to produce information according to the farmers' needs. Most materials, however, are still in English, as translation into *Dzongkha* is both difficult and expensive. A booklet on apple production, however, has been translated into *Dzongkha*. FECSU has received support from both IHDP and the Extension Support Project.

FECSU has begun working on radio and video extension programmes. To date, some radio broadcasts have already been made concerning topics such as chili blight, cardamom, and apple. Some broadcasts involve interviews with farmers and researchers. They have also begun a Farmers' Quiz programme, which has been quite popular. FESCU staff work with *Dzongkhag* and Bhutan Broadcasting Services (BBS) staff to organize such radio shows: one was produced in Zhemgang, and another in Ha. They are produced live with farmer representatives competing for prizes, then broadcast via BBS. BBS has regular agricultural broadcasts every Wednesday.

In terms of video production, filming has been conducted for production of 5 videos, dealing with plant protection for fruit crops, kitchen gardening, apple production, success cases on mushroom and onion. The filming for these videos, however, has not yet completed or edited. For example, the video on apple production is intended to cover the entire cycle of production: to date, footage has been shot on pruning, harvesting, and marketing, but footage is still needed on planting. Thus, for many crops, FESCU argues that it takes two years to get the material filmed.

The FESCU staff very much appreciates the assistance that IHDP has provided, in terms of procuring a semi-professional VHS video editing suite, as well as some radio equipment. Recently one staff member has been sent to India for training in video production.

Efforts to promote **effective monitoring and evaluation of the horticultural extension programme (Output 5.3)** were intended to be achieved through four activities, which included increased field visits of technical staff to Geog level, and improvement of the overall monitoring, assessment criteria, reporting, and evaluation system, based on the Extension Policy Document. To date, RNRRC and HQ staff make field visits to the Geog and farm levels for specific purposes, i.e., to follow up on on-farm trials. They are unable to undertake routine visits for technical support and/or monitoring of the effectiveness of the extension activities.

The idea in appointing an Extension Programme Officer at each RNRRC is to strengthen the link between research and extension, and provide more follow-ups of the extension agents working at the *Dzongkhag* and *geog* levels within the region. The roles and responsibilities of the EPOs, however, have not yet been well-defined. It is not clear what proportion of their time these extension officers devote to horticulture, as compared with field crops, forestry, and livestock management.

With respect to reviewing and improving the overall system for monitoring, reporting, assessment criteria, and evaluation of extension, the Extension Section is currently working on this activity, with support from the Extension Support Project.

To ensure **adequate facilities provided for the horticulture extension programme (Output 5.4)**, IHDP was designed to complement the anticipated support of the Extension Support Project. The four IHDP activities were to include provision of extension materials, furniture, equipment, 20 motorcycles and budget to cover recurrent operating costs for the motorcycles.

In 1997-98, 15 motorcycles and 5 scooters were supplied in 1997-98 to *Dzongkhags*. Each *Dzongkhag* was also supplied with a set of horticulture kits (e.g., secatures, grafting knife, budding knife, slashing knife, pruning saw). In addition, 196 altimeters were distributed to extension centres. A set of basic office furniture was supplied to 6 *Dzongkhags* that did not have other project support.

Other support to improve extension communication has been provided through the provision of communication equipment, including a PABX telephone system for REID (installed in 1997-98), 2 sets of computers, printers, and CD Roms, 2 automatic voltage regulators, UPS, a heavy-duty photocopier, and 5 radio cassette recorders. IHDP is also providing support for developing the computer systems, with Internet and intranet capabilities for the overall MOA and DRDS.

For **quality horticulture seeds and planting materials readily available (Output 5.5)**, the three proposed activities were to provide training on production of seeds and planting materials for private nursery operators, to promote government-licensed private nurseries, and to initiate certification of seeds and planting materials. All three activities were to be conducted in collaboration with Druk Seed Corporation, but strategies for such collaboration have not yet been developed. The Extension Section has provided training on production of planting materials to farmers in Chukha, Paro and Ha.

In some areas, private individuals or households have taken over operation of (formerly government-run) forestry nurseries. Some training and support has been provided to assist these nursery operators to expand their production into horticultural crops. This year, IHDP is buying horticultural seedlings from these nursery operators, for distribution in the promotional programmes. Field staff told the MTE Mission that next year, however, government would no longer buy seedlings to distribute free in the promotional programme, so the nursery operators will be expected to sell their seedlings directly to the general public. The Mid-Term Evaluation Mission talked with some nursery operators during its field trip: they seemed to be optimistic about the prospects for selling seedlings in the future, but had not received any training or assistance in analyzing their financial business prospects. They did believe that it would be easier to sell fruit or nut tree seedlings than forestry or fodder species.

The majority of extension efforts to promote quality seeds and planting materials, however, seem to have focused on direct provision of inputs. With IHDP funds, the Extension Sub-programme has purchased horticulture seeds and seedlings, from Druk Seed Corporation, private nurseries, or foreign imports. Most inputs have then been provided to the *Dzongkhags* for free distribution as part of the horticulture promotional programmes. The *Dzongkhags* are supposed to distribute these materials in accordance with the guidelines issued by the Extension Section. Some private nursery operators have been supplied with greenhouses (pipehouses covered with plastic) at a subsidized price, which has to be repaid over 5 years, either in cash or in seedlings produced.

Each *Dzongkhag* has its own strategy on how to distribute such materials, e.g., whether to focus on pilot villages, pilot farmers, schools and public institutions, or otherwise. In one *Geog* visited by the Mid-Term Evaluation mission, for example, the agricultural extension agent had distributed promotional planting materials to 12 pilot farmers, out of more than 300 households in the *Geog*.

Some extension agents seem to choose demonstration, or pilot, farmers who they categorize as "progressive farmers," i.e., those who may be more economically comfortable, own larger land holdings, and/or are located closer to the road, believing that such families are better able to take the risk on new crops, and also will serve better as demonstration farmers to their neighbors. In other cases, the pilot farmers may include those from poorer households.

The Extension Section, however, has neither compared nor evaluated the effectiveness of these various promotional and demonstration strategies. The Extension Sub-programme has detailed information available on the inputs provided, but not on how they are being used, in terms of numbers of farmers receiving such inputs. For example, in 1998-99, it reported the distribution of 19,380 walnut seedlings, as well as the distribution of 81,805 soft-shelled walnut seeds (to 14 nursery operators, two RNRRCs, and unspecified others). The seeds were made available to nursery operators to ensure that soft shelled walnut seedlings could be produced, if grafting were to be unsuccessful. The walnut seedlings were distributed through for use in demonstration efforts. More detailed information on the actual distribution of inputs, for what purposes and to whom, may be available at the *Dzongkhag* level, but such information is not centrally compiled.

According to the PPD PLS, the government has adopted a Seed Policy, and Cabinet will be considering a Seed Act in March 2000. Programme management feel that once the Seed Act is in place, then work can proceed on certification and licensing of private nurseries. [A consultant on seed certification is proposed under the Coordination Sub-programme, and planned for the coming fiscal year, between July and December 2000.]

To achieve **increased farmer awareness of horticulture production practices through study tours (Output 5.6)**, the proposed activities were 3 study tours to India for growers to see fruit and vegetable production. These study tours to India have not taken place. A few local study tours, however, have been arranged. In 1997-98, 12 farmers from Tashiyangtse went on an in-country study tour. Another in-country study tour was conducted for 30 farmers in Ha. Two farmers and one extension agent have attended a Farmers' Fair conducted in India.

Finally, **farmers encouraged to adopt/replicate new technologies through on the ground demonstration/promotion programmes conducted in the farmers' fields and further replicated by other farmers after seeing the success cases (Output 5.7)**.

The eight planned activities were to include demonstration of greenhouse production of year-round vegetable production, kitchen garden demonstrations, demonstrations of pre- and post-harvest orchard management techniques, on farm-demonstrations of fruit and nut trees, and on-farm demonstrations of beekeeping in orchards. To enable these demonstrations to take place, IHDP was to facilitate provision of inputs through liaison with Druk Seed Corporation, Agricultural Machinery Corporation, Commission Agents, private nursery growers, and facilitate the provision of credit through BDFC.

To date, the IHDP has supported direct provision (purchasing) of seeds, seedling, plastic sheets for vegetable gardening, and other inputs for *Dzongkhag* demonstrations. According to programme reports, vegetable production and promotion has been initiated in Chukha, Tala and other mega project areas, as well as in urban areas of Thimphu and schools. Twenty plastic greenhouses have been supplied to selected farmers, as well as 840 tools.

The Extension Sub-programme reported that kitchen garden activities have been started in 15 schools and 7 *Dzongkhags*. It is not clear to what extent the kitchen gardening has been supported by IHDP, as compared with the previous FAO Kitchen Gardening for Better Nutrition Project.

The MOA's Department of Research and Development Services has decided to establish a programme in School Agriculture, working in collaboration with the Ministry of Health and Education. This programme is to include activities on horticulture (focusing primarily on

vegetable gardening, but also possibly fruit and nut trees), as well as livestock management (raising pigs and poultry) and mushroom production. The plan is to develop intensive programmes (both horticulture and livestock) in five schools during the coming year, with at least ten other schools participating less intensively (i.e., receiving seeds and seedlings. The Ministry plans to support this programme through funds from RGOB, as well as SEZAP, GTZ, and IHDP. Besides providing inputs, the programme will also provide training for one teacher in each school.

In terms of promoting pre-harvest management techniques for fruit orchards, an apple scab (disease) control campaign was conducted in 1998-99 in Chummey, Bumthang, reportedly resulting in a significant improvement in fruit quality.

IHDP has not supported any demonstration efforts regarding beekeeping in orchards. Efforts to try beehives in the research station in Yushipang were unsuccessful, as a disease spread by mites killed the bees. Beekeeping has been successful in Bumthang, however, where Helvetas has been providing some support to a Beekeepers' Association, which was created in 1998 and currently has 32 members. This effort started initially to improve pollination in orchards, but has since expanded due to the members' interests in honey sales. Now other *Dzongkhags* are requesting training in beekeeping, which the Beekeepers' Association is able to provide. The major problem emerging, however, is marketing of the honey, as they currently have 7 tons unsold from last year. As they have a high quality product, they therefore want a high price for their honey, which is much more expensive than other honey sold in the region, i.e., India. This Beekeepers' Association has been receiving support from Helvetas. Due to their difficulties in marketing honey, they have been advocating that other *Dzongkhags* focus on promoting beekeeping in terms of its pollination benefits, rather than anticipating honey sales.

Extension services were envisaged to play a facilitating role, by assisting farmers to liaise with input suppliers, such as Druk Seed Corporation (DSC) and Agricultural Machinery Corporation (AMC), as well as to obtain credit, through the Bhutan Development Finance Corporation (BDFC). To date, not much has been done in this regard, although the IHDP horticultural economist (short-term TA) did initiate a meeting with BDFC.

The Extension Sub-programme has provided a substantial amount of funding to the *Dzongkhags*, to support horticulture-related training, and provision of inputs for promotional programmes (winter seeds and summer inputs). In 1999, such support totaled 4.3 million Nu (roughly US$ 100,000).

In terms of the overall output, as well as the general objective for the extension sub-programme, the aim was for demonstration activities to encourage other farmers to adopt successful new technologies. The former Chief Extension Officer noted that it is not clear to what extent the demonstration efforts to date have resulted in replication/adoption by other farmers.

Efficiency

Initial 5-year sub-programme budget:
US$ 1,384,100 in UNDP support and 70 million in RGOB support

Amount spent through 1999:
US$ 313,965

Effectiveness

The Ministry of Agriculture has noted that, although they have tried their best, horticulture extension results to date have been weak. More efforts are needed for outreach and extension in the next few years. PPD believes that as IHDP activities have been spread all over the country, the impact has been limited. Therefore, they wish to focus on development of particular geographical pockets, with some extension agents being assigned to work specifically on

horticultural crops. They also hope to promote the creation of growers' groups, so that extension can be channeled through groups, rather than working with individual progressive (pilot) farmers.

The overall effectiveness of the extension efforts for horticultural promotion has been very limited, as the technical capacity of extension agents and farmers is generally weak. The training has lacked clear-cut strategies, well-defined training / extension programmes and training / extension materials. The Mid-Term Evaluation Mission believes that this area is crucial for success of the horticulture programme, yet has received limited attention.

Areas for corrective action

It is urgent that more clearly defined horticulture extension strategies be developed. These strategies should emphasize:

- training of extension agents as trainers, who would then train farmers;
- focus on training farmers through farmers' groups, associations, and cooperatives, to maximize the outreach of extension efforts (and the support necessary to establish such groups);
- clear guidelines for choice of pilot farmers for demonstration plots and on-farm trials, and the guidelines for how these on-farm horticulture sites would be managed; and
- careful reconsideration of promotional planting programmes, which provide planting materials for free, in light of government's efforts to privatize nurseries, which would then need to sell planting materials.

These issues are explained in more detail in the following paragraphs.

Need to build up extension staff expertise in horticulture. Agricultural extension agents have a wide range of responsibilities, such that they not only support growing of a range of horticultural crops, but also cereal crops, mushrooms, medicinal and aromatic plants, post-harvest processing and marketing, creation of growers' associations, facilitation of input supply, and administrative responsibilities. Given the difficulty in providing adequate technical expertise on such a wide range of crops, the Extension Division has been considering the designation of **subject-matter specialists**, i.e., perhaps designating a District horticultural officer in each *Dzongkhag*.

Discussion is also ongoing regarding the possibility of specializing in a **few key horticultural crops** per *Dzongkhag* or per *Geog*, such that more effective training (to both extension staff and farmers) and support could be provided. If a Dzongkhag decided to focus on three key crops, then extension staff could develop **specialized knowledge in priority crops**. Thus, in some areas apples might be promoted, whereas in others citrus or mango could be the focus. For more remote locations, the emphasis would be on high-value, low-volume crops, especially those that could be dried, such as some medicinal plants (i.e., chirata, pipla) or mushrooms.

Training for extension staff on horticultural topics has been relatively limited, both in terms of pre-service training (at NRTI) and in-service refresher courses. At NRTI, the amount of **training on horticultural topics** needs to be increased, in light of the importance of the horticultural sector.

Due to weaknesses in the overall IHDP programme design and implementation, training and extension are scattered throughout the sub-programmes (i.e., extension, technology generation, MAP-research, marketing, post-harvest processing, and MAP-marketing), with RNRRC research staff, IHDP sub-programme staff and technical advisors, NRTI staff, and other resource persons providing training to extension staff and farmers on a wide range of topics in a relatively *ad hoc* manner. Researchers and other resource persons have been providing this training directly to farmers, since the extension staff lacks the necessary expertise. This situation needs to be changed, so that extension agents assume primary responsibility for training of farmers, and related extension efforts.

Greater coordination and collaboration among the various horticulture sub-programmes is needed. Rather than having sub-programme staff conducting training courses for researchers, extension staff, and farmers together, these resource persons should train the extension staff, who in turn would then train farmers. This approach is essential for building extension capacities and increasing the outreach.

A **training-of-trainers (TOT) approach** should be adopted, wherein extension staff are trained to provide training to farmers on horticultural topics. Such an approach will require that the extension agents master not only the technical horticultural skills, but also skills in effective extension communication, adult education (teaching methods and techniques, preparation of lectures, and development of training programme and topics), and other participatory extension approaches.

Such a strategy will require a **major, systematic increase in horticultural training for extension staff**. Rather than just sending one group of 15 extension agents to a week-long course at NRTI per year, a much more systematic and comprehensive training programme is needed. It would be useful to think, for example, of providing every agricultural extension agent working in the 212 *geogs* and 20 *Dzongkhags* with at least one week of horticulture training per year. More in-depth training, i.e., in-country short courses of at least one month, should be provided to subject-matter (crop) specialists. To adopt such as strategy, however, it will be necessary to find, or develop, an **adequate number of competent trainers**. This situation will require careful analysis, to assess to what extent this training expertise can be found in country, through the RNRRCs, NRTI, and other collaborating institutions, and to what extent outside technical assistance will be required.

Farmer / Producer Training. To provide **training and extension for farmers and producers**, clear strategies need to be developed, and a major increase in training provided. To date, it seems that farmers have had limited training opportunities, in terms of study tours, or farmer field days. Clear guidelines are needed for on-farm demonstration plots, the choice of pilot farmers, and strategies to maximize the "spread effect" of such demonstrations. Increased efforts are needed to establish and support growers' or producers' associations, which could be a focus for extension efforts. More attention should be given to in-country study tours, or other farmer-to-farmer methods of extension.

Facilitation of Horticultural Input Supply. The horticulture extension sub-programme is based upon the assumption that high-quality planting materials and other inputs will be available. The sub-programme was designed such that it would contribute in this area, through training and support to private nursery operators to produce seeds and seedlings, facilitation of collaboration with Druk Seed on inputs, and also with the Bhutan Development Finance Corporation for credit. Nonetheless, many extension agents seem to believe that they should continue their former role of directly supplying these inputs to the farmers, rather than assisting the farmers to obtain such inputs from the private sector.

During the field trip, the MTE Mission was confronted with numerous complaints about the quality of seeds and planting materials currently available, whether from Druk Seed Corporation or other sources. Druk Seed is now more concerned about producing an economic profit, and less interested in maintaining base seed or producing released varieties that may have limited economic potential. Several private nurseries were visited, many of which are producing fruit tree seedlings of poor quality. Some RNRRC staff argued that the Research Centres now have to produce their own seeds and planting materials for promotional, demonstration, or on-farm trial purposes, to be assured of adequate quality. The MTE Mission recommends that the RNRRCs should only produce limited seeds and planting materials for research purposes, not for broader promotional programmes.

The Mid-Term Evaluation Mission believes that, for horticultural development to really take off in Bhutan, it is imperative that high-quality seeds and planting materials be made widely available.

In much of Bhutan, the choice arable land is reserved for paddy and other cereal crops. Therefore, land available for horticulture may often be less fertile and more marginal, such as steep slopes that may be used for fruit and nut orchards. Consequently, it is vital that farmers be provided with high-quality seeds and seedlings that will have a good chance of surviving and performing well in such harsh conditions. To ensure higher-quality inputs, however, the MOA will need to begin to collaborate more actively with the private and semi-private sector stakeholders who provide such inputs.

More focused attention is needed on the **training of private nursery operators**. In the years to come, the aim should be to provide adequate training so that these nursery operators can produce grafted seedlings that can be certified, in terms of their variety and quality (i.e., disease- and pest-free, years until fruiting, etc.). Nursery operators also need training in financial analysis, bookkeeping, marketing, and related skills, so that they can operate their enterprises in a profitable manner.

Similarly, extension staff need to provide farmers and farmer associations with more training in **improved seed production**. It is estimated that Bhutanese farmers produce 80-90 percent of their own seeds. Problems exist, however, with seed quality deteriorating over time. Therefore, greater attention is needed to this issue.

In terms of getting access to inputs, whether seeds, seedlings, greenhouses, irrigation systems, or tools, it was envisaged that farmers might utilise agricultural loans from the Bhutan Development Finance Corporation. As the interest rate for such loans is 13 percent, however, it seems that relatively little use has been made of this credit facility.

Extension on Vegetable Production. The PSD had clearly recognised that it would take some time for further applied research and development of suitable varieties of fruit, nut, medicinal and aromatic plants to be tested and released for cultivation. Therefore, it had stressed the importance of focusing on release and extension of vegetable varieties suitable for kitchen gardening, which would have more immediate impacts on household nutrition and incomes. The programme staff report that in more remote villages, there is greater emphasis on growing vegetables for home consumption. In areas closer to roads, markets, urban areas, or "mega" construction projects, vegetables (and also mushrooms) are grown primarily for sale.

The MTE Mission, however, got the impression that this proposed focus on vegetable promotion has not been adequately emphasized. For example, the RNRRCs have not released any new vegetable varieties within the initial 2.5 years of the programme period. Therefore, it seems that efforts are needed to speed up the release of vegetable varieties.

Although the former Kitchen Gardening for Better Nutrition project had promoted not only vegetable growing, but also provided training in how to prepare and consume new vegetables, such efforts do not seem to have been adequately followed up by IHDP. It should be noted that vegetable gardening has apparently been more successful in the schools, such that the MOA is now establishing it as part of a School Agriculture Programme.

Orchard Management. As discussed in the previous section (under Technology Generation), greater attention needs to be given to promoting improved methods of orchard management, for fruit and nut tree crops. This area is one where efforts could yield concrete results in a relatively short period of time.

Mushroom Production. Although it is not currently part of the IHDP (supported by UNDP), the National Mushroom Production programme has been proposed to be included in IHDP support. During the field trip, the MTE mission noted that in some regions of Bhutan, farmers have enthusiastically taken up mushroom cultivation. Many women are engaged in mushroom cultivation, as it can easily be done in a shed near their home, and thus can easily be combined with women's other daily responsibilities. It is an activity that yields good cash income, but

currently the production is being heavily subsidized by government, through the provision of mushroom spawn, and loaning of equipment, such as generators, power drills, and chain saws, to prepare the wooden billets. In a few areas, mushroom growers are organized into groups, and have received some donor assistance in procuring their own equipment, e.g., the group in Tashiyangtse received approximately US$ 7,000 in support from UNDP/GEF Small Grants Program. The feasibility of gradually phasing out government subsidies and privatizing the supply of inputs warrants careful analysis.

Attention also needs to be given to the issue of sustainable management of wild mushrooms. As these mushrooms grow in the forests, it would be worth explore possibilities for creating associations of mushroom harvesters, who could be assisted to develop sustainable management plans for specific areas.

Horticultural extension materials need improvement. To date, there has been limited technical horticultural oversight and input into the preparation of extension materials. More efforts are needed to prepare clearly-developed technical recommendations on specific horticultural crops, such as crop blue prints, from the RNRRCs, which could be translated into extension and training materials.

Thus, efforts are needed to improve the quality of some of the horticulture extension materials produced, to ensure both their technical accuracy and overall usefulness and attractiveness. IHDP Programme Management is proposing recruitment of a two-year horticulture extension volunteer or regional specialist to work on production of extension materials. This person needs to closely with the Horticulture Coordination Office and MOA's Information and Publicity Section. Furthermore, discussions are needed on how to improve collaboration and the respective roles of various partners – such as IPS (FECSU), NRTI, NPPC, and others – in producing horticulture extension materials.

Government policies relating to extension efforts need careful re-examination. First, the Royal Government has policies related to periodic **transfers of staff**, such that staff who receive training and build up expertise in sub-tropical horticultural crops may then be transferred to higher altitude zones where temperate crops can be grown, and *vice versa*. It would be worthwhile to consider whether it would be possible to keep transfers within a specific agro-ecological zone, so that staff could build up expertise in certain crops. Second, persistent discrepancies exist among government policies, such as the **provision of free or subsidized inputs** through promotional programmes, versus **privatisation**, i.e., the promotion of private nurseries, which are intended to earn a profit through commercial sales of inputs.

Overall management, monitoring and evaluation of the effectiveness of extension efforts needs improvement. This area is one that is being addressed by the Extension Support Project (ESP). To date, however, there has been limited effective collaboration between IHDP and ESP. This situation should be improved.

The monitoring and evaluation systems need to be developed, to assess the effectiveness of extension efforts and their impact, such as in terms of numbers of farmers reached. Participation data, such as training days, should be disaggregated by gender, so that the efforts of extension to reach both women and men farmers can be adequately assessed.

Collaboration and exchange of information with relevant partners needs to be promoted and clearly defined, such as through joint work programmes, Memorandum of Understanding, or other mechanisms. For example, the National Plant Protection Centre has developed some high-quality extension materials on protection of various crops, including horticultural crops, which deserve wider circulation and use.

The Programme Support Document had proposed a long-term technical assistant to work on many of these extension issues. Such a position has never been filled, as it has been argued

that the Extension Support Project would provide the necessary support. This assumption needs to be carefully re-examined. The role of the Extension Programme Officers posted at the RNRRCs also needs to be better defined.

Areas of potential success

Working through the decentralized MOA extension system has the potential to ensure broad coverage and outreach, as do promotional programmes, demonstrations, and on-farm research trials. It is evident that horticultural involvement is expanding, with increasing training for extension staff and farmers, including private nursery operators.

If efforts for particular horticultural crops are focused in specific geographic pockets, then greater impacts may be seen in terms of increased production, home consumption, and rural incomes. The technical knowledge of extension staff and producers in these regions should be fostered, and viable associations of producers for the particular crops created or strengthened.

Some extension materials, leaflets, booklets, calendars, and radio broadcasts have been effective in disseminating useful information on horticultural practices. With increased support, these materials can be strengthened.

Sub-Programme 6(a): Aromatic and Medicinal Plants - Research

Programme Implementation

The general objective of the programme is to broaden the sector of aromatic and medicinal plants in terms of commercial development and identification of additional species with potential for commercial exploitation and income generation for farmers. While the agronomic aspects are entrusted to MOA, quality control, processing and marketing, specifically starting with lemongrass oil, are committed to MTI. Although not part of the Integrated Horticulture Development Programme, the current processing and marketing of medicinal plants (for domestic markets) is undertaken by the Institute for Traditional Medicine Services (ITMS) (formerly known as the National Institute of Traditional Medicine (NITM)), under the Ministry of Health and Education.

This sub-programme was conceived as a continuation of the Project ALA 92/22 - Cultivation of Medicinal Plants for Traditional Medicine, funded by the EU. While the previous project focused more on species used locally, the present sub-programme is emphasizing more species with high export potential. It was designed with 8 outputs and 52 activities, which are sub-divided according to medicinal plants and aromatic plants (MAP).

The two RNR Research Centres implementing the activities are Yusipang, for high-altitude medicinal plants, and Khangma, in the sub-station of Mongar, for the low-altitude plants. National coordination of activities is mandated to Yusipang, but the two Centres are expected to work in coordination.

Programme Performance

Technical capacity (Output 6.a.1) of the officers has been increased through B.Sc. training of one student, study tours and participation to an international congress on Medicinal and Aromatic Plants for human welfare in Argentina. The awareness of farmers has been promoted by training courses on plant identification, collection and extraction of essential oils.

Activities related to the **portable resin distillation unit (Output 6.a.2)** and **identification of alternate markets for resin and turpentine (Output 6.a.3)** have been dropped, since the subject was no more considered a priority. Likewise activities related to **lichens (Output 6.a.4)** have been stopped, since the commercialisation of this item in Europe is banned.

Alternative potential crops for essential oil extraction (Output 6(a).5) are being continuously explored. A live collection of potential essential oil bearing plants has been initiated, and other activities related to this output are proceeding as per work plan. Market surveys and opportunities for essential oils have been explored in SAARC exhibitions and in Europe, where was found an interest for *Artemisia annua*. Training on sustainable harvesting practice and management of naturally growing plants was provided to farmers and extension staff (26 participants). The first draft of a collection and cultivation manual has been circulated, and final guidelines for MAP production and collection will be finalised soon.

Activities related to the **development of naturally occurring medicinal plants (Output 6.a.6)**, is a continuous process, including training of farmers. A survey for export markets has been conducted only for lemon grass. 27 local varieties of lemongrass are maintained in the national lemon grass collection at Lingmethang RNRRC sub-station.

In collaboration with the Institute for Traditional Medicine Services, multiplication and agronomic studies (botanical and quality aspects) on cultivable species has been initiated. 27 low-altitude and 31 high-altitude species were prioritised for cultivation, because of high demand, their rarity, or because their collection was increasingly difficult due to over-harvesting. The list includes 13 trees, 5 shrubs and 40 herbaceous plants (primarily perennial). From autumn 1995, seed and seedlings of these plants were collected from the wild resources with the following objectives:

- to assess the feasibility of domestication;
- to develop a live collection as a source of further multiplication;
- to identify superior provenance lines;
- to study the agronomic characteristics of the species; and
- to explore market opportunities.

Three herb gardens have been established, at altitudes ranging between 2.400 and 4.200 m. a.s.l., with thirty-six high- and low-altitude species.

The development of production technology for six species of medicinal plants[2] was initiated and is continuing. In collaboration with ITMS, 5 species have been released for cultivation, together with a prototype portable drying unit.

Only one species, however, has been found profitable by the horticultural economist, due to low prices established by ITMS, the sole buyer at the moment. The current market for medicinal plants is primarily limited to ITMS, which has at the moment stabilised production quantities. Limited quantities of chirata and pipla, however, are being exported to India

To understand more in-depth the agronomic characteristics, further trials have been established on: sowing date, planting distance, organic manure application and propagation, including *in vitro* multiplication protocols for rare and difficult to obtain medicinal plants. 35 farmers have been selected for cultivating 9 species. No technical recommendations have yet been developed.

Concerning **Output 6(a).7 - Support to improve chirata (*Swertia chirata*) marketing** and **Output 6(a).8 - Support to improve pipla (Piper spp.) marketing**, a mission and a study have been conducted to assess the production and processing of chirata in Louri and pipla (*Piper sp.*) and a programme defined in order to improve collection, processing and packaging methods, including evaluation of possible alternate markets.

Effectiveness of implementation

The sub-programme has well-specified activities, which are clear to follow and implement. The staff is well experienced. They have well-defined ideas on how to proceed, on weak points, difficulties and long-view opportunities for developing the sector. They conduct the activities according to a rational framework and long-view perspective.

A survey on aromatic and medicinal plants is not easy to carry on in an environment such as that of Bhutan. Nonetheless, Yusipang did conduct surveys on high-altitude medicinal plants, to establish survey methodologies, one in 1997 and one in 1998. Protocol designs for the trials on cultivation of aromatic and medicinal plants are not always sufficiently specified, therefore there can be difficulties in interpreting the results. Seed availability may be a major constraint for farmers' cultivation, as well as the low setting of selling prices.

The effectiveness of implementation is therefore, in general, good, although after two-and-a-half years there could be more results on agronomic cultivation and a much wider campaign conducted on sustainable collection of naturally growing plants. Closer coordination is needed between the two RNRRCs.

[2] (*Carum carvi, Dracocephalum tanguiticum, Herpatospermum pedunculosum, Carthamus tinctorius, Phicorhiza kurroa, Abelmuschos muschatos*)

Efficiency of implementation

Initial 5-year sub-programme budget:
US$ 419,800 in UNDP support
[and 11.76 million NU in RGOB support for both MAP sub-programmes combined]

Amount spent through 1999:
US$ 197,202

Areas for corrective action

Better coordination among the two RNRRCS and ITMS on MAP research would improve the results, particularly on marketing aspects (prices, quantity and quality). Verification of parameters for trials on cultivation, e.g. irrigation, spacing, intercropping, rotating and quality analysis for essential oil contents in different cultivation systems, will help to focus on critical aspects for quality production. The proposed national MAP survey is deemed too ambitious: it should be revised to concentrate on specific, well-defined areas of potential interest.

Great potential exists for more cultivation of medicinal and aromatic plants, in terms of kinds and quantity. Nonetheless, it is vital that market opportunities be explored in a more systematic way. In addition to increasing purchase prices, more incentives (fencing, irrigation) will broaden the interest of farmers in cultivating high-altitude medicinal plants, which is a specific income-generating possibility for the mountainous areas.

In specific geographic locations with potential for MAP, extension agents should receive more training on MAP, particularly on issues like sustainable harvesting.

Future research on species that can be used as insecticides and repellents is worth considering, especially since traditional Bhutanese medicinal texts refer to these kinds of plants (e.g. *Adhatoda vasica*). Vetiver (*Vetiveria zizanioides*) should receive more attention as a potentially high-value essential oil, as it is a commercial species with high economic value in the fragrance and cosmetic industries. (Cultivation of vetiver is currently promoted in Bhutan for erosion-control purposes, but not for commercial production.)

The eco-touristic potential of the Lingmethang RNRRC could be developed, where a well-run garden with a wide range of Medicinal Plants is already well established. The research sub-station has a very interesting collection of medicinal plants planted along a nature trail in an area of rehabilitated natural forest, next to a river. This site could become an interesting place for school students, the special nature-oriented tourist visitors, promoting local employment and income-generating activities, provided it is properly advertised through the touristic network.

Areas of potential success

Efforts to date suggest that potential areas of success will include:

- Release of a focused number of species for cultivation together with technical notes, including seed and planting material production;
- Development of commercial, high-value, low-volume medicinal plant crops for remote mountainous villages, to improve local incomes;
- Licensing system for MAP collectors and producers, with licenses to be issued after appropriate training; and
- Good export potentials, if the produce is attractively presented in the market, for example through web pages, advertising for specific niche markets, and appealing packaging.

Sub-Programme 6(b): Aromatics and Medicinal Plants - Marketing

Programme Performance (Activities)
The main objective of the sub-programme is to promote rural agro-based-industries through provision of efficient marketing, processing, and quality control services to the producers and exporters of horticulture produce including essential oils and medicinal plants products, starting with lemon grass oil. This sub-programme is being executed by the Essential Oils Development Programme of the Ministry of Trade and Industry, which was previously supported by the Essential Oil Industry Project (1987-91, 1993-98). To date, activities have only involved the effective export marketing of lemon grass oil (*Cymbopogan flexuosus*). Although oil samples of *Cymbopogan distans* and *Artemisia vulgaris* have been repeatedly marketed, no market demand has yet been established for mass production.

Under **increasing technical capacity (Output 6(b).1),** the main activity pertains to lemon grass oil production. Other essential oils and medicinal plants are yet to be identified in terms of production and market potentials. The B.Sc. candidate for aromatic chemistry and perfume technology is already undergoing training. In terms of short-term training, 5 persons have been sent to India, 3 for a short-term course in aromatic chemistry and 2 on study tours.

Standardized production of quality lemon grass oil (Output 6(b).2) is being achieved as per international standards. The relevant equipment (for gas chromatography) is now being purchased and due to arrive in March 2000. The short-term technical assistant will be fielded in May-June 2000, to synchronize with the harvest and distillation of lemon grass. In addition, plans are already in place for diversifying of products or adding value to the lemon grass oil, initially aiming at the domestic market (products such as room fresheners, insect repellants, and insecticides. etc.). Depending on the initial success in the local markets, other markets and export potentials can be explored.

As a follow-up to the previous project (BHU/92/008), a **repair and maintenance workshop (Output 6(b).3)** is now in place but not yet operational for repairing of distillation units. The stainless steel distillation units produced are more expensive, but yield a higher-quality lemon grass oil and thus fetch higher prices, than the plain steel units introduced by Tashi Corporation.

For **improving the marketing system for export of lemon grass oil (Output 6(b).4)**, all the activities are taking place smoothly, with the exception of the formation of producer groups. This activity is to be initiated on a pilot basis as soon as the guidelines and legislation related to the formation of cooperatives is released by the legal section of PPD (MOA). In addition, a major constraint has been the limited size of the revolving fund, used to provide advance payments to the distillers.

Effectiveness of Implementation
In terms of raising rural incomes, the most successful activity of the horticulture programme has been the production and export marketing of the lemon grass (*Cymbopogan flexuous*) oil to Europe. This activity has been increasing rural incomes and benefiting over 2000 persons (harvesters and distillers) in some of the most remote areas in the eastern Dzongkhags. Total production increased over 300% after the issue of 120 new stainless steel distillation units in 1998 (with 17.5 MT of oil with total market value of about Nu. 7 million) and further 19 units in 1999 (17.63 MT of oil). More of these units being demanded due to the economic success of the programme.

Efficiency of Implementation
Technical inputs and RGOB inputs, such as personnel and management, are well used to cater to the lemon grass oil producers spread over 4 *Dzongkhags* in eastern Bhutan. An issue that needs to be addressed in the near future is the sustainable use of the wild growing lemon grass, which has in some areas been over-harvested (due to increased number of oil distillers).

Initial 5-year sub-programme budget:
US$ 239,250 in UNDP support
[and 11.76 million NU in RGOB support for both MAP sub-programmes combined]

Amount spent through 1999:
US$ 23,958

Areas of Corrective Action
To ease the burdens of production due to the increased number of unit distillers, there is an urgent need to increase the funds for the revolving fund. The proposed amount required for the first two collections of the lemon grass oil is Nu. 1.5 million. This amount would be used to advance partial payment to distillers, so that they can have operating capital to pay the harvesters and cover other costs. Otherwise, distillers cannot be paid for production costs until late in the season. Funds should be now made available to fill the gap to continue past production quotas of 18 MT (1998-99) of lemon grass oil, after submission of a preliminary proposal incorporating group formations or associations.

The assigned study tours and training need to be managed more efficiently. Some study tours to India were not very useful, given that the main markets were in Europe. The quality of oil still needs to be strictly maintained on a continuous basis in order to protect market reputation.

At some point in the future programme management will need to consider handing over the activities of oil collections and marketing to the producers themselves. This can be done either by formation of associations or groups, or with some form of privatization after RGOB/MTI support ends. For this it is suggested that management initiate one or two distiller groups or associations on a trial basis within one Dzongkhag. This will also have to be collaborated with the progress made at the PPD (MOA) on the proposals being drafted for associations or co-operative acts.

The management and sustainable use of the natural resource base needs to be studied, in view of the fact that there are more demands for the distillation units. If further expansion is possible the management needs to estimate how many more units are optimum given the resources base and its sustainability. Furthermore, a quantitative resource base survey is required for potential products prior to exploring export niche markets.

Areas of Potential Success
Product value additions and diversification of products will increase Bhutan's market share, and also insure against unstable markets. The world market prices for lemon grass oil, known internationally as East Indian Oil, are currently dominated by production in India and China. More effort needs to be made to find stable markets for export of oil from *Cymbopogan distans* and *Artemisia vulgaris* to diversify essential oil production.

5 Programme Results

5.1 Progress towards Achievement of Outputs

Sub-Programme 1: Coordination

The coordination sub-programme has played a vital role in supporting all the other horticulture sub-programmes, in terms of coordination functions for planning, reporting, and budgeting; organization of long-term training, short-term training courses, workshops, study tours, and technical assistance; procurement; and development of computer information technology.

Overall strategic planning and coordination of the horticulture sub-sector, however, still needs further attention, including improved coordination among the horticulture sub-programmes. Efforts to promote public participation have been limited to date, but should be enhanced once the Horticulture Development Committee is established in the near future. Increased baseline data is now available, but needs to be organized so that it can be used to monitor progress. Some progress has been made on policy and legal issues, in terms of food safety and standards: more progress is anticipated later this year, once the Seed Act is adopted, when work can be undertaken on certification of seeds and planting materials. Other policy and legal research could be supported through a proposed UNV position.

Sub-Programme 2: Marketing

In summary, the marketing sub-programme is well on its way to achieving much of its targeted outputs although it has been slow to start, as it took time for the main implementers, that is the building of technical capacity mainly the HRD, to be put in place. Its main visible contributions to date are the physical marketing sheds in the rural areas where both men and women farmers can use to sell their produce protected from the vagaries of the weather and assured of a market.

A good start has been made towards exploring alternative markets especially for apples – this effort now needs to be replicated to other markets for other major crops, like citrus, ginger and cardamom and potatoes. The placement of the attaches at the different cities abroad and in the region is a major step towards establishing and exploring alternative markets.

Sub-Programme 3: Post-Harvest

In summary the post-harvest sub-programme has made good progress towards achieving much of its targeted outputs. As with the other sub-programmes, however, it has also been slow to start, as it took time for the two consultants to be fielded; and also the late identification of trainees for long-term B.Sc. studies.

Its main visible contributions to date are the ambient stores for fruits and vegetables and the simple dryers for the rural areas that can be used for both home-level and market-oriented processing. It is too early to judge the impacts and contributions from the knowledge and experience gained from the activities in improved grading, packaging, and trial marketing efforts in the regional markets.

Sub-Programme 4: Technology Generation

For the technology generation sub-programme, most activities have been initiated and most of the equipment procured. The technical assistance provided through a consulting firm and private contracts is almost concluded, while less than 12 months out of the planned 48 months of UNV services were completed. Most of fellowship training and studies abroad have been filled. The

responsible staff is very much committed and works hard, being personally involved in implementing the sub-programme.

Nevertheless, there are several areas for improvement. The overall coordination and framework of adaptive horticulture research, and adaptive fruit and vegetable crops management techniques, need to be strengthened. Research support is needed for production of large-scale nursery outputs. The range of available germplasm needs to be increased, including potential interesting new crops. Closer integration should be developed with the Extension Division, the National Plant Protection Centre, the Soil Service, and the RNR Engineering (formerly Irrigation) Division.

The impact at producers' level is not reported to be significant up to now, nor have any comparative advantages through the intensification and diversification of horticultural production been noted. The training component remains weak. More coordinated efforts are required to meet the increasing demand of farmers for sound technical assistance and for a significant change of the overall approach to horticulture production. Farmer associations for specific crops production and marketing need to be encouraged, as well as strengthening of linkages and collaboration with the private sector. Attractive and sound teaching material is very much wanted by extension technicians and producers.

Sub-Programme 5: Extension

The extension programme has provided some training for extension staff and farmers, resulting in some increases in technical horticultural capabilities. There has been some work initiated on production of extension materials, to improve communication and dissemination of technical recommendations. To date, monitoring and evaluation of extension efforts have been very limited. Extension agents have been provided with some equipment and vehicles, but these facilities are still inadequate to meet the requirements.

A major intended output of the horticulture extension sub-programme is wide availability of quality horticultural planting materials. A large number of planting materials have been purchased and distributed through promotional programmes. Efforts to promote private nurseries, provide training on production of seeds and planting materials, and certification have begun, but need greater attention and support, especially to improve the quality of planting materials.

The horticulture extension sub-programme has promoted a number of demonstration activities and demonstration sites. It is not known, however, to what extent these demonstrations have encouraged other farmers to replicate these efforts. Similarly, as relatively few farmer study tours have been explicitly supported by IHDP, the impact of such study tours on increased farmer awareness of horticultural practices has been relatively minimal.

Sub-Programme 6 (a): Aromatic and Medicinal Plants – Research

The aromatic and medicinal plant research sub-programme is making good progress, aware of its potentialities as well as its difficulties. More rationalised cooperation between the two research stations, and with the National Institute of Traditional Medicine, would improve the effectiveness of implementation, regarding training of extension officers, promoting sustainable collection of wild plants and promoting cultivation of domesticated species. Given current staffing levels, the proposed national survey on MAP is a too huge task to be carried out by this sub-programme, so more geographically-focused surveys should be undertaken. Linkages with the tourism sector could have positive impact on creation of local jobs.

Sub-Programme 6 (b): Aromatic and Medicinal Plants – Marketing

In summary, the lemon grass oil marketing efforts are the most successful within the horticulture programme, in terms of increasing rural incomes. This success is, in part, due to the high value of the lemon grass oil that is now successfully sold in Europe. It has greatly enhanced farmer incomes, especially for the distillers in the most remote areas of the east, where there is now an increased demand for the stainless steel distillation units. To date, the aromatic and medicinal plants marketing sub-programme has not yet worked on export marketing of any other essential oils or of medicinal plants.

5.2 Broader Programme Impacts and Contributions

It should be noted that in the Ministry of Agriculture's recent review of progress with the Eighth Five-year Development Plan, it has concluded that the horticultural development activities have been spread too thin, with the result that overall impacts have not been very visible. As the ultimate aim of the programme is to improve the nutrition, income and living standards for the rural population, MOA believes that it is urgent to focus more attention on outreach and extension to farmers. The MTE Mission concurs with this analysis.

The MTE Mission believes that overall impacts to date are as follows:

- Increase in horticultural planting materials throughout the country, both in the research stations (RNRRCs) and on farms, but such materials vary in quality
- Increase in horticultural knowledge and skills, among horticultural researchers, government staff and farmers
- Increase in range and quantity of horticultural produce
- Some increase in quality of horticultural produce
- Some increases in incomes and/or nutrition due to increased horticultural produce, improved post-harvest processing and marketing

Due to the lack of monitoring of specific indicators, however, it is not possible for the MTE Mission to quantify such probable impacts.

Relevance

The national horticulture programme remains highly relevant to Bhutan's development needs. Horticulture could play an enormous role in increasing rural incomes, and increasing the productivity of rural agriculture. It continues to have a major potential for improving household nutrition, as well as providing products for domestic, regional, and more distant international markets. The future importance of horticulture is well understood by the programme management team, as documented in their brainstorming session on a future vision, "Horticulture 2020" (see Annex 8). To realize this vision, more focused strategies can assist horticulture programme staff, farmers, and collaborators to more effectively engage their efforts and to reach more visible impacts.

Capacity Building

To date, the programme management has placed a major effort in human resource development of its own staff, especially through long-term M.Sc. and B.Sc. training outside of the country. This achievement will bring tangible benefits to Bhutan in the years ahead. Nonetheless, it is vital that these programme staff members receive further guidance and on-the-job training, through in-country training, workshops, study tours, and working in close collaboration with more experienced horticulturalists, researchers, and other specialists.

Capacity-building activities for field extension staff, research staff, and farmers have also been important, but limited in scale. Greater efforts are needed to develop more systematic training and extension programmes, with a focus on training-of-trainers for extension staff, who could then in turn train farmers' groups, producers' associations, and others. These training programmes should aim to provide annual horticultural training for all relevant agriculture extension staff working in the country's 212 *geogs* and 20 *Dzongkhags*.

5.3 Commitment, Ownership and Sustainability

The horticulture programme is highly relevant in the Bhutanese context, and will remain a priority for national development for years to come. It has been accorded high priority in the current Eighth Five Year Plan (1997-2002), which is expected to continue in the forthcoming Ninth Five Year Plan (2002-07). The Ministry of Agriculture demonstrates a clear sense of "ownership" of this nationally executed programme.

Horticultural and agricultural officers working on the programme are highly committed and working hard on their respective activities. The MTE Mission was favourably impressed by the personal commitment of the government staff.

Nonetheless, some participants do not yet fully understand that IHDP is a long-term national programme, and tend to view it as a short-term donor-assisted project. Given recent efforts to involve programme staff and collaborators in strategic planning for future activities, and anticipated forthcoming planning for the 9FYP, it is expected that perception of horticulture as a national programme is growing.

Many people whom the MTE Mission met were actually unaware of the existence of IHDP. They just know that the Royal Government is supporting horticultural activities through its research, extension services, and related efforts in post-harvest processing, marketing, and medicinal and aromatic plants. This situation is perhaps as it should be, such that horticulture promotion and development are seen as integral parts of the Ministry of Agriculture's work and Bhutan's growing economy.

The sustainability of activities is growing, as more farmers and others in the private sector become engaged in horticultural activities and enterprises. The human resource development efforts to build up staff capacities also are contributing to the long-term sustainability of efforts to develop the horticultural sector. To adequately develop horticulture over the next 10-20 years in Bhutan, considerable additional support will be needed, from the Royal Government, donors, and private investors.

6 Recommendations

6.1 Short-Term Recommendations

1. **Strategic Planning:** The Integrated Horticulture Development Programme, as currently designed, is broad and fairly ambitious. Nonetheless, development of horticulture in Bhutan is a long-term endeavour that will require at least 15-20 years of support. Therefore, more attention is needed to strategic planning, in terms of deciding on priorities for the remainder of the current programme, and activities for the coming phases.

    - Therefore, the MTE recommended that the IHDP Programme Management conduct a five-day **strategic planning workshop**, to refocus the programme design, agree upon priority activities and outputs, and to develop a work plan and budget for the remaining two years of the programme (1 July 2000 – 30 June 2002). The strategic planning workshop would work on the further development of indicators to monitor the programme's performance (achievement of outputs) and impacts (achievement of objectives). This proposed workshop was held 20-24 April 2000.

    - The MTE Mission also recommended that revised programme design, indicators, work plan and budget be put into the **UNDP Programme Support Document software**. In early May 2000, UNDP and IHDP programme management have been working to put the workshop results into the PSD software. This PSD software can then be used to monitor progress and updated, if necessary, in the annual programme performance reviews conducted by the Programme Steering Committee.

    - **Clearly differentiated objectives and strategies** should be developed to promote horticulture. Issues needing clarification include reconciling the objectives of promoting horticulture crops for **home consumption**, i.e., kitchen gardening, versus the promotion of horticultural cash crops to enhance **rural household incomes**. Another issue is that of focusing on **capacity building**, through long-term Human Resources Development, versus a short-term focus on **implementation** and achieving visible impacts, which can be hampered when many staff members are absent because of training. Furthermore, the **relative emphasis on crops** - perennial tree crops (fruits and nuts), vegetables, medicinal plants, lemongrass and other essential oils, and mushrooms - needs to be clearly decided, so that resources (personnel time, research, extension and so forth) can be rationally allocated.

    - Before 30 September 2000, the IHDP needs to set clear strategies for integrated development of **key priority horticulture crops** in specific geographical zones of Bhutan. These strategies should include training, research, extension, post-harvest processing and marketing processes, looking at not only the technical but also the economic aspects of the crops. For each priority crop, sound crop blueprints (manuals), suitable for use by extension agents, should be prepared before the end of the current phase (30 June 2002). As soon as possible, extension materials for farmers should be developed on the basis of these crop blueprints.

2. **Improving Overall Coordination**: Overall coordination of the horticulture programme, its research and extension activities, needs to be improved. This issue should be addressed by 30 June 2000.

    - Given the other recommendations of the MTE Mission, many responsibilities for the Coordination Unit have been identified. The Ministry needs to re-consider how overall **coordination and planning of horticultural development** will be promoted within the

Ministry's organizational structure, rather than seeing the Coordination Unit as a temporary structure. The MOA needs to decide how to best address these issues, whether through increasing administrative staff in the Coordination Unit, providing management training for existing staff, and/or obtaining technical assistance. Various programme stakeholders need also comply with management's procedural guidelines, i.e., regarding planning, budgeting, reporting, monitoring, etc.

- Horticulture is a technically challenging and complex field. Given the limited trained Bhutanese personnel, efforts must be made to provide additional assistance. Trained Bhutanese horticulturalists should focus their work on substantive technical, policy and strategic planning issues, rather than **administrative and managerial tasks**. For the latter, the Royal Government can consider hiring Bhutanese personnel outside of the civil service. This issue is a key one for improving co-ordination and national execution of the overall programme.

- The **functions of research and extension should be clarified** to reduce the current overlap in activities. Research should focus on adaptive research and technical training of extension staff, whereas the extension service should provide the primary training for farmers. Other sub-programmes, such as post-harvest processing and marketing, should work closely with research and extension. Clear definitions, policies and strategies must be agreed to, implemented and monitored for on-farm research trials, extension-led demonstration plots and promotional planting programmes.

- To improve overall coordination of horticulture activities, the MTE Mission recommends that future efforts be made to **reduce /consolidate, rather than increase, the number of sub-programmes**. Thus, support to mushroom production could be handled through the technology generation and extension sub-programmes, and support to school agriculture through the extension sub-programme. Consideration could also be given to possible future combining of the two existing sub-programmes dealing with medicinal and aromatic plants.

3. **Information Management, Monitoring and Evaluation Systems:** The horticulture programme needs to better organize and manage the information being generated from its research and technical assistance inputs, as well as to put into place a monitoring and evaluation system to adequately track indicators of the programme's performance and impacts. This effort should be facilitated by the ongoing information technology development.

    - With respect to the **programme reports**, there needs to be a numbered series of technical reports, as well as a numbered series of administrative reports, and a complete set of all reports established in a central location.

    - The **information technology** specialist plans to work on development of inter/intranet databases. Urgent attention needs to be given to creation of a baseline database, using information generated from the socio-economic survey and horticultural crop surveys and other applicable data. This activity can be taken up by the Coordination Unit, although it will require the collaboration of all sub-programme and collaborating partners. These systems need to be created no later than 30 September 2000 and then kept up to date.

    - Work done to date on development of indicators needs to be followed up, to establish an effective **monitoring and evaluation system**.

4. **Focusing Research Strategies:** The research activities conducted in the RNRRCs on all horticultural crops, including medicinal and aromatic plants, need to be more focused on strategic priorities, with more comprehensive planning and execution, sound research protocols, and clear division of responsibilities among research staff and research stations.

Overall, the RNRRC horticultural, medicinal and aromatic research staff need to develop and begin to implement a more focused research strategy, with competent technical advice, no later than 30 September 2000.

a. First, a major focus must be placed on **adaptive agronomic and socio-economic research** that will produce short-term technical recommendations for growers, producers, and private sector collaborators.

b. Second, researchers need to provide **training to extension staff**, but limit their training for farmers to those engaged in on-farm trials.

c. Third, efforts must be made to **speed up release** of vegetable varieties and medicinal plant domestication, preparation of sound crop blueprints, and technical recommendations on crop management, nursery management, nursery facilities, sustainable management of medicinal and aromatic plants, post harvest and marketing practices.

5. **Defining Extension Approaches:** The extension strategies for promotion of horticulture need careful review and reformulation, to increase the horticulture technical competence of staff and farmers, and improve overall effectiveness of extension. All of these efforts will require close collaboration with the Extension Support Project, and should be ongoing by 30 September 2000.

- First, a major focus should be on providing **training-of-trainers courses for extension** staff, who would be trained by RNRRC research staff, horticulture sub-programme staff, NRTI staff, or other resource persons, such as those working on plant protection or soils. The extension staff then should be responsible for providing the majority of the training to farmers. The amount of training needs to be substantially increased, such that all extension agents having responsibility for horticultural crops should receive training each year. If some extension officers are designated as horticulture subject matter specialists, then they will require additional training. These extension agents should, in turn, provide a major increase in training for farmers. Areas needing particular attention include formation and support to growers' and producers' associations, crop management practices, the proper management of demonstration sites, post-harvest and marketing practices.

- Second, careful review is needed of the **overall policies regarding the free provision of inputs for promotional and demonstration campaigns**, in light of the government's interest to privatize the supply of inputs and promote private nurseries.

- Third, more technical oversight is needed on the production of **horticulture extension materials**, to ensure that these materials are technically accurate, and improved in overall attractiveness and usefulness for the farmers.

- Fourth, urgent attention is needed on developing better systems for **monitoring and evaluating the effectiveness of extension efforts**.

6. **Post Harvest:** Post-harvest activities, which are being initiated for the first time in Bhutan, will need overall direction in designing and planning both for the medium and long term. Collaboration with the private sector can help raise awareness of post-harvest techniques for better marketing.

- Management needs overall assistance in both technical and administrative levels to help out with office management as well as to effectively carry out its various activities in the field.

- More small-scale food processing ventures need to be initiated as such activities reveal practical information on the food chain process leading up to sales and marketing of the product.

7. **Marketing:** Improvement of local and export marketing of horticultural produce, medicinal and aromatic plants, and value-added products will require not only improvement of domestic markets, but also greater attention to domestic and export market information, development of marketing strategies, particularly for niche export products and development of agro-eco-tourism potentials within Bhutan, and improving linkages with all ongoing marketing efforts and collaborators. Marketing studies are needed to find viable markets for alternative essential oils and medicinal plants.

   - The Agricultural Marketing Section needs to explore **more extensive uses of the popular marketing facilities**, to incorporate storage and toilet facilities, and use these sites for effective information collection and dissemination. These marketing facilities should also incorporate traditional Bhutanese architecture as much as possible.

   - **Marketing concepts should be widened**, from facilities and information collection and dissemination to a more holistic concept, where internal markets can be exploited in view of improving the unique regional agro-eco-tourism potentials. Each region's potentials in organic farming, medicinal and high value crops or plants, handicrafts and local traditions can be showcased to attract both local and foreign tourists to fuel the local economy.

   - The marketing unit further needs to create its own niche within RGOB by **spearheading coordination among all marketing efforts** by the various agencies with the private sector.

8. **Strengthening Collaboration with a Broad Range of Stakeholders:** Development of horticulture in Bhutan involves a broad range of stakeholders, in addition to farmers and government staff. The MTE Mission endorses the plan to **create a Horticulture Development Committee**, to involve representatives of private sector stakeholder groups.

   - This committee should meet at least annually, to review progress in the horticulture sub-sector, and revise short-, medium-, and long-term planning targets. The Ministry of Agriculture needs to formulate this committee as soon as possible, if possible no later than 30 June 2000.

9. **Addressing Problems of Horticulture Inputs:** A major focus must be placed on improving the private sector production and supply of horticultural inputs, especially high-quality seeds and grafted seedlings. The Horticulture Development Committee should carefully examine these issues, and develop strategies to build capacity among the providers of these inputs. A strategy needs to be developed soon, ideally by 31 December 2000.

   - To achieve this, technical assistance and training and other support is required for private **nursery operators**, both small-scale individual operations as well as larger-scale semi-commercial operations. Training is also needed for farmers and producer associations, to improve the quality of **seed production**.

   - Attention is also required to improve the quality and availability of **other horticultural inputs**, such as fertilizers, pesticides, greenhouses, irrigation systems, other agricultural machinery, and credit. Many of these inputs are increasingly being supplied by the private sector and by semi-private government corporations. This area needs greater attention by the Ministry of Agriculture and its collaborators.

- Policy and regulatory frameworks and national programmes should be improved to ensure that **enabling conditions and adequate incentives** are provided to encourage the production of certified planting materials.

10. **Providing Adequate Technical Guidance:** Recent graduates need technical guidance and supervision by more experienced professionals to provide further on-the-job training and to improve overall implementation of the programme. If such expertise is not currently available in country, then international and regional technical assistance should be procured.

    - For adequate planning and technically sound execution of the horticulture programme, competent technical expertise is required in a number of areas. The Mid-Term Evaluation Mission recommends further technical guidance in the following areas, listed in order of priority: (1) research management and planning; (2) nursery management; (3) programme management and coordination; (4) information technology; (5) walnut propagation; (6) fruit tree propagation; (7) social science, including support to creation of farmers' associations, producer groups, and community-based organizations for sustainable management of natural resources; and (8) monitoring and evaluation.

    - Other areas where more technical expertise is needed include: (9) policy and legal analysis; (10) seed/planting certification; (11) solvent extraction; (12) horticulture extension communication; (13) post harvest planning and research; (14) post harvest technician; (15) mango propagation and production; and (16) medicinal and aromatic plant agronomist.

    - While some of these areas have been already planned or ongoing, others were newly identified during the MTE Mission. (Draft Terms of Reference for new TA, or suggested revisions on existing TOR, are provided in Annex 9.) At the Strategic Planning Workshop, IHDP programme participants proposed very few technical assistance inputs for the next two years. The MTE Mission still believes, however, that the proposed inputs may be needed.

    - The MTE Mission recommends that MOA consider where it can best find such technical guidance. If such technical guidance cannot be found in country, then technical assistance should be recruited, whether through FAO, private consulting firms, or UN volunteers. In terms of providing technical backstopping to individual consultants, FAO may be best suited to provide these services. UNDP and RGOB should discuss whether such TA could be supported within the existing IHDP budget, or whether additional STS funds to procure assistance from FAO could be available.

    - It may be possible also for MOA to find some expertise through other projects and programmes. For example, the Extension Support Project may be able to provide some short-term technical assistance on the creation of producer associations.

In addition to these major overall recommendations, the Mid-Term Evaluation Mission has provided more detailed technical recommendations (areas of corrective action) for each of the IHDP sub-programmes.

6.2 Longer-Term Recommendations

11. **Possible Future UNDP Assistance:** Considering the potential of horticulture in the development of Bhutan, UNDP should consider providing further support during the second Country Cooperation Framework / Ninth Five Year Plan.

12. **Strengthening National Execution of the National Horticulture Programme:** Further efforts are needed to build support for the national horticulture programme. Efforts should be made to further strengthen the programme approach to horticulture development, working closely with other UN projects and with other donors currently engaged in related areas. UNDP's efforts in donor co-ordination need to continue not only at the headquarters/policy level, but also at the field implementation level.

    - The Integrated Horticulture Development Programme needs to be seen as a **long-term national programme**, rather than perceived as a short-term project. The Royal Government of Bhutan needs to consider how the development horticulture will be supported over the next 10-20 years, what core support will be forthcoming from RGOB, and what roles can be played by assistance from donors and other collaborators, including the private sector and non-governmental organizations.

    - To **simplify national execution**, efforts are required to further develop planning, monitoring, reporting, evaluation, and budgeting procedures that can meet the needs of both RGOB and its development partners, to avoid duplication of efforts. This issue is one that the Ministry of Agriculture and other relevant RGOB ministries need to address, in negotiation with donors and other collaborators. To pilot such an approach, a two-year work plan and budget will be prepared to meet the needs of both RGOB and UNDP for the remainder of the initial IHDP support. This issue should also be discussed by RGOB and UNDP in the context of its periodic review of national execution (NEX) of UNDP-assisted programmes.

13. **Focus on Areas of Comparative Advantage:** Bhutan should build upon its efforts to date to exploit areas where it has comparative advantage and immense potential exists for high-value, low-volume export crops, i.e., essential oils, medicinal plants, mushrooms, processed agro-products, and organic horticultural produce.

    - Specific **niche markets** for horticultural products should be identified and research and extension strategies developed to improve the entire chain, from production through post-harvest processing and marketing.

    - In the future, greater involvement of **private sector and joint venture investments** should be encouraged, both in the supply of horticultural inputs and in the production, processing and marketing;

14. **Upstream work on policy issues and a regulatory framework** to create a supportive enabling environment for the future development of horticulture will remain a priority area for RGOB action, with assistance from UNDP and other development partners.

    - Work is ongoing with respect to legislation and regulations on seeds, co-operatives, non-governmental organizations, seed and seedling certification, and food safety standards. These areas are crucial for creating an **enabling environment** for horticultural development.

    - **Government staffing and transfer policies** should be considered, in terms of allocating scarce horticultural expertise where it can best be used on substantive, technical issues, rather than administrative issues. Efforts need to be made to keep personnel working with specific agro-ecological zones and to build up expertise in particular crops, and to develop career tracks in research and extension.

    - Other areas warranting attention include reviews of current **common property systems and land use policies**, which lead to vacant land with absentee owners, and current

patterns of rural-urban migration, resulting in decreasing labour and increasing areas of fallow land in rural areas.

- Policies need to be developed to protect Bhutanese **intellectual property rights and patent rights with respect to agro-biodiversity and indigenous germplasm**, especially in the area of medicinal plants.

7 Lessons Learned

1. In designing a new major sub-sectoral programme under national execution, it is vital to assure that adequate technical expertise is available to launch the activities. If many of the government staff are young and recently trained, and/or being sent outside of the country for training during the initial stage of the programme, then long-term and short-term technical assistance may be required for the initial few years of the programme, before being gradually cut back.

2. Cumulative progress reports and internal evaluation reports need to be prepared by the programme management prior to any external evaluations. To facilitate the preparation of such reports, the programme needs to develop an adequate monitoring and evaluation (M&E) system. Such monitoring and reporting will not only serve evaluation purposes, but also more importantly serve as an ongoing management tool.

ANNEXES

1. Terms of Reference
2. Comments from UNDP Regional Office on Terms of Reference
3. New Organisational Charts for the Ministry of Agriculture.
4. Itinerary
5. Persons Met
6. Documentation Reviewed
7. Mid-Term Review Workshop Agenda
8. "Horticulture 2020"
9. Draft Terms of Reference for Recommended Technical Assistance
10. Holistic Marketing (Agro-based Eco-Tourism)
11. Project Evaluation Information Sheet (PEIS)

Annex 1. Mid-Term Evaluation (MTE) of Integrated Horticulture Development Programme. BHU/97/003

Terms of Reference

1. Background

The Integrated Horticulture Development Programme was started in July 1997 and is expected to end by June 2002. The programme document was prepared jointly by a multidisciplinary team consisting of members from the RGOB and UNDP. The programme document was formulated based on Horticulture Masterplan and the National Horticulture Action Plan documents, which identified 8 key sub-programmes encompassing all aspects of horticulture sector activity for the Eight-Plan period and beyond. For each sub-programme, basic strategic issues were identified for priority attention during the Eight-Plan period.

From the eight sub-programmes identified, six key sub-programmes (Coordination, Marketing, Extension, Technology Generation, Post-harvest, Medicinal and Aromatics plants development) were chosen to be supported by UNDP to assist in strengthening the Horticulture Section of the Research Extension and Irrigation Division under the Integrated Horticulture Development Programme (IHDP) BHU/97/003.

The objectives of the programme are:

National Development Objectives:

- To increase income, living and nutritional standards of the rural population.
- To promote sustainable land use system and environment; promote employment thereby mitigating rural-urban migration

Keeping in line with the national development objectives, the programme's long term objectives are:

- To increase the range and quality of horticultural produce in the country;
- To promote export marketing of surplus produce to generate on farm income and assist in relieving of the balance of payment difficulties.

In short term, the programme will support the Government in building its capacities in horticulture sub-sector through the following immediate objectives:

- To improve the coordination of horticultural development in Bhutan;
- To improve the marketing system for domestic /export horticultural produce;
- To reduce post-harvest losses of horticulture produce;
- To provide appropriate and locally adapted management recommendations for horticulture crops and enable growers optimise their returns from horticulture produce;
- To develop an effective horticultural extension programme with on the ground demonstrations – growing potential crops in farmers fields and demonstrating improved crop management practices;
- Develop existing commercial aromatics and medicinal plants and identify additional species with potential for commercial exploitation generating alternate sources of sustainable income to the farmers;
- Promote rural agro-based industries through provisions of efficient marketing, processing and quality control services to the producers and exporters of horticulture produce including essential oils and medicinal plant products, starting with lemon grass oil;

2. Scope and Purpose of the Evaluation

The purpose of the evaluation is to:

1. Assess the relevance of the programme's concept and the programme's effectiveness in realizing its immediate objectives and the extent to which they contribute towards building/strengthening the capacities of the horticulture sub-sector in achieving its long-term objectives.

   In particular, the team should assess whether:
   - The programme approach was sound, the beneficiaries and users of the programme results were identified;
   - The underlying assumptions were accurate and the objectives were the correct ones for solving the perceived problem;
   - The objectives and outputs were stated precisely and in verifiable terms; the objectives were achievable;
   - The relationship between the different programme elements (outputs, activities etc.) were logical and commensurate with the time and resources available;
   - A work plan was prepared and followed.

2. Review the efficiency and adequacy in implementation and management of the programme.
   In particular, the team should review the quality and timeliness of inputs, activities, responsiveness of programme management of changes in the programme environment; monitoring to changes in the programme environment; monitoring/backstopping of the programme by all concerned parties. Evaluate whether programme design allowed for flexibility in responding to changes in the programme environment.

3. To review the results of the programme
   In particular, the team should;
   - review the achievements of the programme and assess their effectiveness in solving the perceived problems;
   - assess whether the programme is producing its outputs effectively and efficiently;
   - assess the quality of the outputs and how they are utilized;
   - assess whether the programme is in the right direction to achieve its objectives;
   - identify the major issues and problems which are facilitating or impeding the progress of the programme in achieving its desired results;
   - determine the effect of the programme on target groups or institutions;
   - assess any unforeseen effects on non-target groups and any unintended effects caused by the programme;
   - assess the adequacy of the programme self-monitoring;
   - assess the significance of the results so far achieved for the country or region;
   - determine the degree of linkages between different sub-programmes and support given by the Government and other related agencies and vice versa and how well the programme fit into national development policy.

Findings and Recommendations of Review Members

Based on all the above points, the MTE should make specific recommendations on the future course of action of the programme and make any recommendations on how to modify or reorient the programme, if necessary, to ensure successful implementation of the programme. The mission should further make recommendations to ensure that no

duplication of activities with other government departments and donors does not take place, and that proper coordination and consultation in the horticulture sector is ensured.

The mission should particularly record any significant lessons that can be drawn from the experience of the programme implementation and its results, especially anything that worked well and that can be applied to other projects as well as anything that has worked badly and should be avoided in the future.

Composition of the Mission

The mission will consist of:

- One representative form UNDP preferably with experience in similar mission and with socio-economic background.
- One horticulturist through FAO.
- One Representative from RGOB, preferably from the Private sector.

Duration, Timetable and Itinerary of Evaluation Mission

The evaluation mission should commence from mid February to March 2000 for a duration of four weeks with the following tentative itinerary:

a)	Briefing of mission (UNDP, Programme Director, Programme Coordinator, Sub-Programme Coordinators, IHDP)	3 days
b)	Field evaluation in Bhutan (including reviewing reports)	15 days
c)	Preparation of draft evaluation report	6 days
d)	Debriefing / discussion of draft report	1 day
e)	Finalisation of report	3 days
Total		**28 days**

Methodology and Implementation Arrangements

The evaluation will primarily be based on desk review of relevant documents complemented by selected field visits and interviews of different stakeholders and programme beneficiaries.

The Mission will maintain close liaison with the UNDP Resident representative in Bhutan, the Programme Director in the MoA, the concerned Agencies of the Government, the counterpart staff assigned to the programme and representatives of donor agencies. To the extent possible, the mission should consult any organizations of the civil society and people participating in the project.

Although the mission should feel free to discuss with the concerned authorities anything relevant to its assignment, it is not authorized to make any commitments on behalf of the Government or UNDP.

Report of the Mission

The mission is required to discuss and finalize the evaluation report prior to departure from Bhutan. The format of the evaluation mission's report should follow the guidelines contained in the UNDP Handbook series titled “Results – oriented Monitoring and Evaluation.”

The mission report shall give a detailed account of the itinerary, persons interviewed, summary of field visits, lists of documents reviewed, questionnaire used and summary of results and any other relevant materials. The report shall be submitted in hard copy and electronic form.

Annex 2. Comments from UNDP Regional Office in Bangkok on Terms of Reference for Mid-Term Evaluation – Integrated Horticulture Development in Bhutan

Overall, the TOR are well drafted and comprehensive. As you well know, at UNDP TORs for evaluations tend to give relatively clear instructions in order to allow for a certain degree of harmony between different evaluations so as to permit comparisons across programmes and countries. Nevertheless, below please find a few comments that you may wish to consider. They relate to broader development goals.

1. What is the relationship between the components funded by UNDP and those funded by other donors or RGOB? This would appear to be important not only due to the challenges it places on management, but also as it may provide clues on how UNDP assistance can be made more catalytic in certain sectors in order to maximize the impact of our funds.

2. What kind of benchmarking system was developed to monitor increases in incomes and nutritional standards as well as in land uses? Clearly, the success of the programme (its outputs and outcomes in Strategic Results Framework lingo!) would be determined by tracking progress in the above two dimensions highlighted in the TOR. The mission ought to review this as well as provide guidance if the benchmarking system is not yet in place in a systematic manner. Lessons learned could also be applied to broader efforts at poverty monitoring that you may wish to be considering.

3. What are the links that exist between the horticulture programme and other programmes at UNDP? Mutually supportive linkages should be considered (at least briefly) in order to help assess effectiveness of UNDP assistance as a whole.

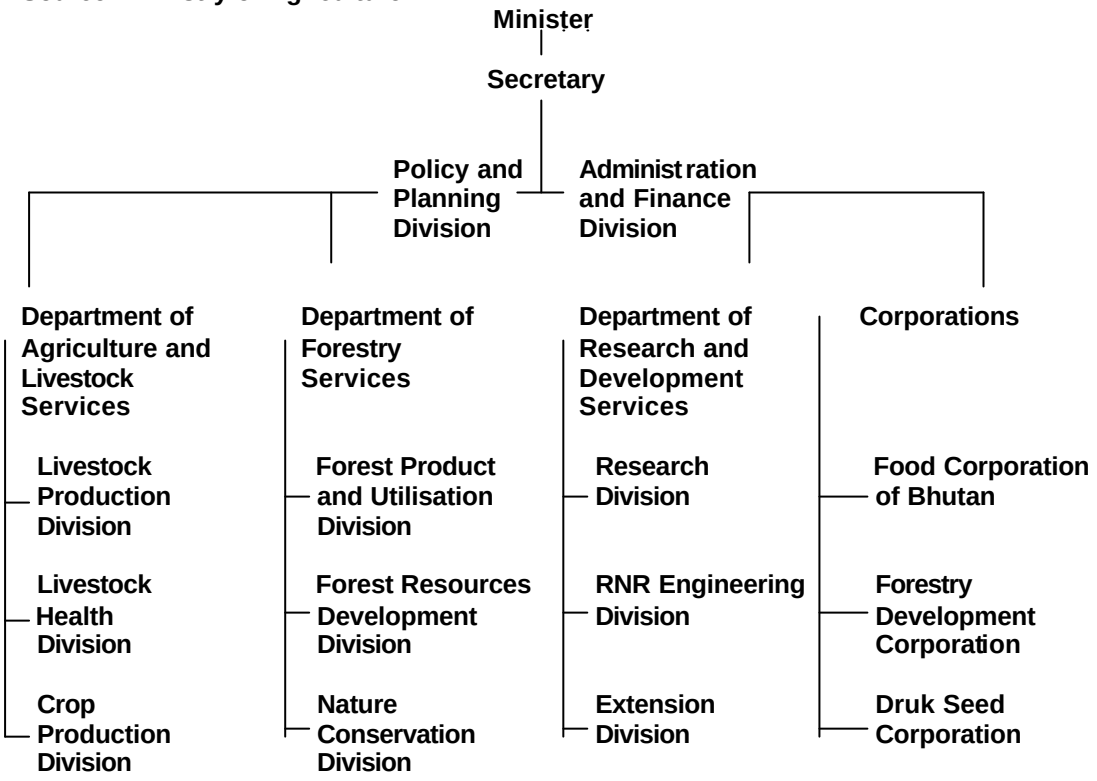
4. What are the links between the horticulture sector and the rest of the Bhutanese economy? In other words, has UNDP supported synergies with the rest of the country when focusing on this more limited activity?

5. To what extent has an effective system of support to farmers (from seeds to eventual post harvest marketing) been set in place and how have lessons learned in this process influenced policies and programmes of the RGOB?

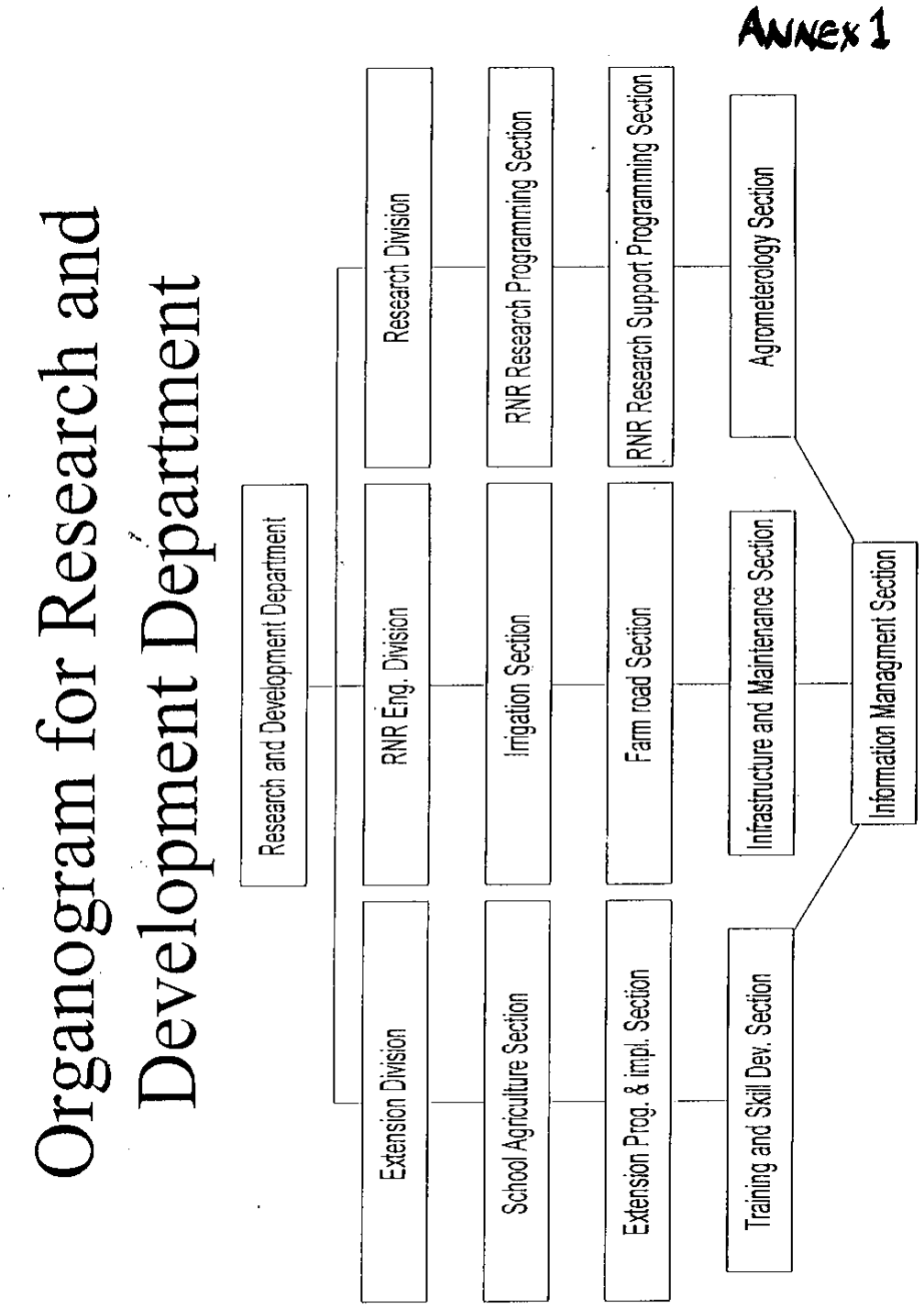
In the final analysis, what we are suggesting is that the questions raised in the TOR would cover well the UNDP inputs and their management. However, of more critical importance is whether the assistance has had a tangible impact on Bhutan's development as a whole.

Annex 3. New Organisational Charts for the Ministry of Agriculture.

Figure 1. New Organogram for the Ministry of Agriculture (as of February 2000).
Source: Ministry of Agriculture.

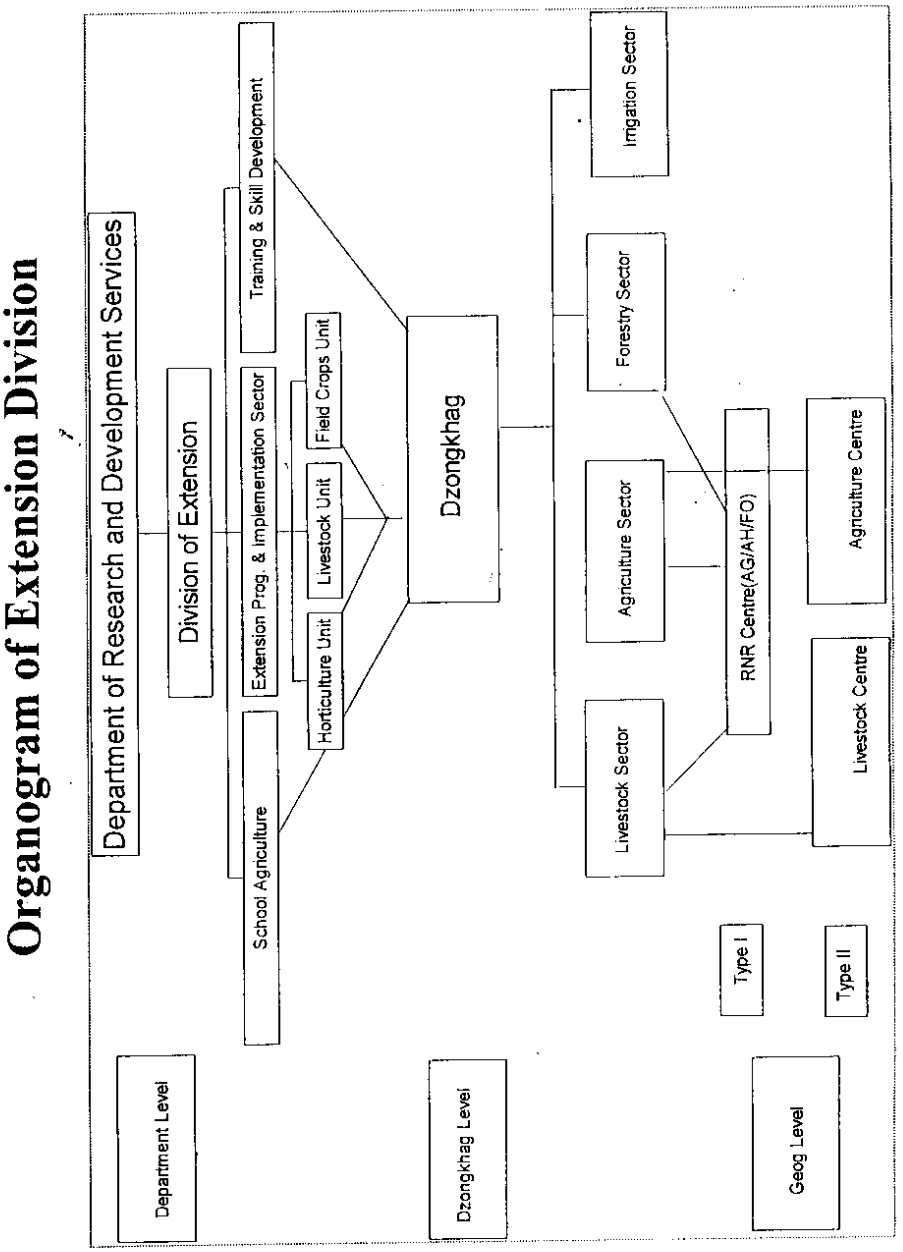


Annex 3. Figure 2. New Organogram for the Department of Research and Development Services, Ministry of Agriculture (as of February 2000).
Source: Ministry of Agriculture.



Annex 3. Figure 3. New Organogram for the Extension Division (as of February 2000). Source: Ministry of Agriculture.

ANNEX 2



Annex 4. Itinerary of Mid-Term Evaluation Mission.

Date	Place From – To
13.2.2000	Arrival of Team leader from Bangkok (Dr. Paula J. Williams)
14.2.2000 - do -	Meeting at UNDP with program Co-ordinator IHDP, Program Officer UNDP with Dr. Paula. Arrival of Dr. Sandini from Delhi
15.2.2000	Call on Director, MOA (at 9.30 am) Call on Minister, Ministry of Agriculture (at 10 am) Call on UNDP RR, DRR (at 11 am – 12 am) Discussion with the Sub-Program Coordinators in the afternoon
16.2.2000 Morning Afternoon	Continue discussion with Sub-Program Co-ordinators Finalization of tour Program
17.2.2000 Morning Afternoon	Travel to Bajo. Visit RNRRC, Yusipang enroute Visit RNRRC, Bajo
18.2.2000	Travel to Trongsa, visiting mushroom growers en route
19.2.2000	Field visits, meeting with Dzongdag
20.2.2000	Zhemgang-Bumthang Visit on farm apple trial, visit RNRRC, meeting with farmers
21.2.2000	Bumthang – visit Lingmethang Research Station enroute -Mongar
22.2.2000	Mongar-visit mango and other horticulture crop plantations at Autsho-travel back to Mongar
23.2.2000	Mongar – visit private nursery grower at Dremtshi – Trashigang
24.2.2000	Trashigang-visit Tashiyantse area, travel to Khangma
25.2.2000	Visit RNRRC, meeting with Programme Director and other officials at Khangma
26.2.2000	More meetings with RNRRC staff (Paula Williams & Maria Gabriella Sandini); Trashigang – Samdrup Jongkhar (Dawa Penjore)
27.2.2000 Morning Afternoon	Samdrup Jongkhar – meet Dasho Dzongdag and Agriculture staff, then Visit auction Yard (Dawa Penjore) Travel to Bumthang (Paula Williams & Maria Gabriella Sandini)
28.2.2000	Samdrup Jongkhar – Trashigang (Dawa Penjore) Visits to Beekeepers' Association & apple-juice factory, then travel to Bajo (Paula Williams & Maria Gabriella Sandini)
29.2.2000 1.3.2000	Trashigang-Bumthang (Dawa Penjore) Meetings with NRTI, RNRRC Bajo, Druk Seed, then travel to Thimphu (Paula Williams & Maria Gabriella Sandini) Bumthang-Thimphu (Dawa Penjore) Work in Thimphu (Paula Williams & Maria Gabriella Sandini)
2.3.2000	Thimphu-travel to Paro, visit Druk Seed, Post Harvest Unit, AMC, travel to Thimphu (Dawa Penjore & Maria Gabriella Sandini) Meetings in Thimphu (Paula Williams)
3.3.2000 - 9.3.2000	Report preparation and consultation with Program Management
10.3.2000	Debriefing/wrap up meeting
11.3.2000 - 17.3.2000	Work on draft report
17.4.2000 – 19.4.2000	Preparation for Strategic Planning Workshop and travel to Bumthang (Paula Williams & Dawa Penjore)
20.4.2000 – 24.5.2000	Strategic Planning Workshop in Bumthang (Paula Williams & Dawa Penjore)
25.4.2000 – 5.5.2000	Travel to Thimphu, Follow-up to Strategic Planning Workshop, Additional Debriefing, and Finalisation of Draft Report

Annex 5. Persons Met

THIMPHU
1. Honorable Minister Lyonpo Dr. Kinzang Dorji
2. Mr. Shun-ichi Murata, Resident Representative UNDP
3. Ms. Nevine Guirgis, Deputy Resident Representative UNDP
4. Mr. Tenzin Dorji, Sustainable Development Advisor UNDP
5. Ms. Sonam Choetsho, SDA Programme Assistant, UNDP
6. Ms. Janette Moritz, UNV Coordinator
7. Dr. Anton Burgi, WSL FNP, Joint Bhutanese-Swiss Team Evaluating RNRRC System
8. Dr. Hanspeter Maag, CIS, Joint Bhutanese-Swiss Team Evaluating RNRRC System
9. Dr. Urs Scheidegger, Professor, Joint Bhutanese-Swiss Team Evaluating RNRRC System
10. Dr. Wolf Preuss, Team Leader, UNDP Country Review Mission
11. Mr. Sherub Gyaltshen, Director, Department of Research and Development Services (MOA)
12. Dr. Pema Gyamtsho, Head PPD (MOA)
13. Mr. Chadho Tenzin, Policy and Legal Section, PPD (MOA)
14. Ms. Chimi P. Wangdi, Programme Co-ordinator (IHDP)
15. Mr. Choni Dhendup, Sub-programme Co-ordinator (AMU)
16. Mr. Chimmi Tshering, Planning Officer, AMU
17. Mr. Eduardo A. O. Santos, UNV Information Technology (IHDP)
18. Phurb Lham, Information Technology, Research, DRDS (MOA)
19. Dr. Pema Chophel, Chief Extension Officer (former Chief Research Officer)
20. Mr. Dorji, Acting Programme Co-ordinatior
21. Mr. B.B.Rai, Asst. Extension Officer
22. Mr. Samdrup Rigyel, Head In-charge (FESCU)
23. Mr. Thuji Tshering, Programme Officer, School Agriculture Programme, MOA
24. Mr. Chencho Norbu, National Project Manager (NSSC, Simtokha)
25. Mr. D.B. Tamang, Research Officer (SPAL, Simtokha)
26. Mr. N.K. Pradhan, National Director (NPPC, Simtokha)
27. Mr. Dorji Wangchuk, Director (National Mushroom Center)
28. Mr. Dawa Penjor, Mushroom Development Officer (National Mushroom Center)
29. Mr. Gyem Dorji, General Manager, Bhutan Agro Industries Ltd.
30. Dr. Dorji Thinley, Head, Pharmaceutical and Research Unit (ITMS)
31. Mr. Uygen, Marketing Officer (ITMS)
32. Mr. Namgay, Namgay Exports
33. Mr. Lam Dorji, Executive Director, Royal Society for the Protection of Nature (RSPN)
34. Mr. Tshewang Wangchuk, Park Manager, Jigme Dorji National Park
35. Mr. David J. Mills, Co-director, Extension Support Project (ESP)
36. Mr. Richard Pickering, Extension Advisor, Extension Support Project (ESP)
37. Dr. Irmela Krug, Medicinal and Aromatic Plant Agronomist
38. Mr. David W. Doolan, Walnut Propagation Consultant to IHDP, High Value Horticulture Ltd.

PARO
39. Mr. Ugyen Penjore, Sub-Programme Co-ordinator (Post-Harvest)
40. Mr. Pema Dakpa, Agri-engineer (Post-Harvest)
41. Mr. Jambay, Director, Druk Seed Corporation
42. Mr. Wangdi, Seed Programme Officer, Druk Seed Corporation
43. Mr. Gem Tshering, Tissue Culture Lab, Druk Seed Corporation
44. M. Chetem Wangchen, AMC

YUSIPANG
45. Mr. Phuntsho Namgyal, Programme Co-ordinator (RNRRC)
46. Mr. Tshitila, Sub-programme Co-ordinator (MAP)

BAJO

47. Mr. Ganesh B. Chettri, Chief Research Offficer (DRDS, Thimphu; formerly Programme Coordinator, RNRRC-Bajo)
48. Mr. Sangay Duba, Programme Co-ordinator (RNRRC)
49. Mr. Pema Dorji, Research Officer
50. Mr. Mahesh Gimiray, Research Officer
51. Ms. Yuden Dorji, Horticulturist
52. Mr. Jigme Norbu
53. Mr. D. Chettri, Research Assistant
54. Mr. Uygen Tshering, Research Assistant
55. Mr. Sangay Dorji, Senior Research Assistant
56. Mr. Phub Tesho Farmer
57. Regional manager, Druk Seed Corporation

LOBATSE

58. Mr. Dorji Wnagchuk Director, Natural Resources Training Institute
59. Dr. Phangchung, Principal, Natural Resources Training Institute
60. Mr. Samuel B. Moser, Co-Director, Natural Resources Training Institute

TRONGSA

61. Dasho Dophu Tshering, Dzongdha
62. Mr. Dhendup Dukpa, DAO
63. Mr. Leki Tshering, Extension Officer
64. Mr. Leki Tenzing, Extension Officer
65. Mr. Dorji, Extension Agent
66. Mr. Tshewang, farmer (agro-forestry nursery)
67. Mr. Karma Tshering - farmer
68. Mr. Tshering, farmer
69. Ms. Sedon (nursery)
70. Mr. Pusapa, Extension Agent (Dragting Gewog)
71. Mr. Tshering Dendup, farmer
72. Mr. Tenzing, farmer (Nubi Gewog)
73. Mr. Dorji, farmer (Kungarapten)

BUMTHANG

74. Mr. Kunzang Wangdi, Officer in Charge (RNRRC)
75. Mr. Sonam Tashi, Horticulture Co-ordinator
76. Mr. P.B. Ghaley, DAO
77. Mr. Wangda, Extension Agent
78. Mr. Khota, orchard farmer (Tamshing)
79. Mr. Jurmi, orchard farmer (Choekor)
80. Mr. Namgay, Horticulture Technician
81. President, Beekeepers' Association
82. Owner, apple juice factory

MONGAR (INCLUDING LIMITHANG)

83. Dr. Timsinha, Officer in Charge, Research Sub-Station
84. Mr. Dhanapati Dhungyel, Research Officer (MAP)
85. Tshewang Lhendup Mongar, DAO
86. Mr. Neten Drukpa, Research Assistant
87. Mr. Dechen Wangda, farmer, Chali
88. Mr. Tshewang Thinley, farmer

89. Mr. Namgay, farmer, Chali
90. Ex Chaskar Gup, Yadi (Market shed contractor)
91. Mr. Tshewang Tashi (commission agent for Mongar and Drepung Gewogs)
92. Ms. Wangmo, Farmer and Chime (elected member of National Assembly) and Mr. Tenzin, farmer

DRAMITSE
93. Mr. Chador Wangdi, Extension Agent
94. Mr. Pema Dorji, entrepreneur / farmer

TRASHIGANG
95. DAO of Trashigang
96. Mr. P.M. Pradhan, Director RNRRC
97. Mr. Tyan Raj Gurung, Research Officer (Farming Systems)
98. Mr. Kinley Tshering, Research Officer (Horticulture)
99. Mr. Karma Tashi, Extension Programme Officer (formerly Chief Extension Officer, REID)
100. Mr. Vijay Moktan, Research Officer
101. Mr. Phurba Dorji, (Livestock Extension)
102. Mr. Dohpu Tshering, (Economist)
103. Mr. Tshering Penjore, (Plant Protection)
104. Mr. Kadola, Administration Office
105. Mr. Nima Woesar, Extension Supervisor (Khaling)
106. Mr. Karma Drupa, Project Facilitation Officer, Second Eastern Agricultural Zone Project (SEZAP) and Third Forestry Project

TRASHIYANGTSE (farmer group involved in mushroom)
107. Ms. Jimi Zangmo
108. Mr. Dechen
109. Ms. Rinchen
110. Ms. Karma
111. Ms. Tashi Wangmo

SAMDRUP JONGKHAR
111. Dasho Penden Wangchuk, Dzongdag
112. Mr. Gangchu, FCB Regional Director
113. Mr. Karma, FCB Complex Manager
114. District Civil Engineer
115. Mr. Dechen Wangchuk, farmer
116. Mr. Sonam Dorji (Choepon Singkhar Lauri)

Annex 6. Documentation Reviewed

Programme Documents

Integrated Horticulture Development Programme BHU/97/003.

1997 *Integrated Horticulture Development Programme, Programme Support Document of the Government of Bhutan.* United Nations Development Programme.

1996 *Programme Support Implementation Arrangement for Strategic Action Plan for Horticulture Development.* Draft document.

Royal Government of Bhutan (RGOB), Ministry of Agriculture (MOA), Integrated Horticulture Development Project, BHU/87/016.

1994 *Master Plan for Horticulture Development.*
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Vol. 1, Annex 1. Programme Element Profiles.
Vol. 1, Annex 2. Dzongkhag Development Prospects.
Vol. 2, Project Profiles.

RGOB, MOA, the Renewable Natural Resource (RNR) Sector.

1995 *Horticulture Development Policy and Strategy for the Eighth Five Year Plan.* 27 December.

RGOB. MOA.

1999 *Horticulture Development: The Glimpses of 8th FYP.* Paper presented in the Workshop on Enhancing Efficiency and Effectiveness of RNR Services Delivery, 22-24 April. Thimphu.

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Ministry of Agriculture (MOA), Research, Extension and Irrigation Division (REID), Horticulture Section, Integrated Horticulture Development Programme BHU/97/003.

1998 *1° Semi-annual report*, Jul. – Dec. 1997.
1998 *2° Semi-annual report*, Jan. - Jun. 1998.
1988 *3° Semi-annual report*, Jul. - Dec. 1998.
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1999 *5° Semi-annual report*, Jul. - Dec. 1999.

1998 *Minutes of First Steering Committee Meeting of IHDP*, 20 November.
1999 *Minutes of Second Steering Committee Meeting of IHDP*, 13 December.

1998 *Annual Programme/Project Report. Period covered: July '97 to Oct. '98.* October.
1999 *Annual Programme/Project Report. Period covered: Oct. 98 to July '99.* July.

1998 *Minutes of the Programme Management Committee (PMC) Meeting*, 24-25 September.
1999 *Minutes of the 5th Programme Management Committee (PMC) Meeting*, 5 February.
1999 *Minutes of the 6th Programme Management Committee (PMC) Meeting*, 8 July.
1999 *Minutes of the 7th Programme Management Committee (PMC) Meeting*, 30 November.

Ministry of Agriculture (MOA), Department of Research and Development Services (DRDS), Horticulture Section, Integrated Horticulture Development Programme BHU/97/003.

2000 *Annual Work Plan and Budget, 1 July 2000 – 30 June 2001*. Draft, 9 March.

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2000 *Budget Revision "G," updated to show most expenses through 31 December 1999.* Prepared by UNDP staff, 16 February.

Coordination
1999 *Connecting the Ministry of Agriculture and the RNR Research Institutes to the Internet*. Rogier Gruys, Computer Consultant, UNDP, Bhutan

Potato Development Project for Bhutan, Nepal and Pakistan, Project CIP (International Potato Center)/SDC
1999 *Legal and Technical Requirements for the implementation of Potato Seed Certification in Bhutan*. Oscar A. Hidalgo

IHDP BHU/97/003
1999 International Technical Assistance. *Food Safety and Standards*. Consultant, High Value Horticulture Ltd. REID, MOA, UNDP

RGOB, MOA, IHDP BHU/87/016
1998 *Horticulture Baseline Survey*. Final Report. NRTI, Lobesa.

Marketing
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1999 *Brief Progress Report of the Agricultural Marketing Section* (June 1997 to end 1999)

IHDP BHU/97/003
1997 International Technical Assistance. Cultivation of Medicinal Plants For Traditional Medicine Project Bhutan, ALA/)2/22 Report on the Mission of the Marketing Expert, High Value Horticulture Ltd., REID, MOA, UNDP

Post-Harvest
1999 *Work-plan by output for the Post-harvest Unit (1997 - 2002)*

1998 *Leaflets on post-harvest tips for fruit and vegetables*. Post-Harvest Unit, IHDP, REID, Farmer- Extension Communication Support Unit

1998 *Post-Harvest Unit Feasibility Study for Cold Stores in Bhutan*. REID, MOAS, RGOB. Paro

Extension
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Annex 7. Mid-Term Review Workshop Agenda.

INTEGRATED HORTICULTURE DEVELOPMENT PROGRAMME
MID-TERM REVIEW WORKSHOP

7 MARCH 2000

9:30	Workshop Objectives Self-Introductions
9:45	Horticulture 2020: Building a Vision
10:30	Assessing Progress: Indicators of Performance and Impact
11:00	Discussion Groups: Defining Indicators to Assess Progress towards Objectives and Desired Outputs (Results)
12:30	Group Reports and General Discussion
13:00	Lunch
14:00	Discussion Groups: Progress to Date
15:30	Group Findings on Progress to Date General Discussion on Overall Priorities
17:00	Close of Workshop

Annex 8. "Horticulture 2020": Ideas on Future Vision Generated During a Brainstorming Session At Mid-Term Review Workshop (7 March 2000)

1. Quality products
2. 10-fold increase in GDP contribution
3. Department of Horticulture to be created.
4. Access to horticulture products by all segments of the population.
5. Year round production
6. Production for consumption & also for industrial processing
7. At least 3 fruit plants in every back yard
8. Important supplier of organic/health food
9. Aqua culture strengthened
10. Improved orchard for every individual
11. Main source of income for farmers
12. Farmers being able to manage on their own
13. High-value horticulture products having niche in the international markets
14. Increased export
15. Horticulture to reduce rural-urban migration
16. Contribution to employment in the rural sector
17. Specialised horticultural services privatised
18. Specialisation among growers
19. National food security and access to food assured
20. Good infrastructure to support the above
21. Improved processing at village level
22. Trained horticultural staff and manpower
23. Agro-industry based on horticulture
24. Investment from private sector attractive
25. Successful growers' groups established and linked to a national cooperative body
26. Productivity: land, H20 Resources/unit/time increased by 4 times
27. Farmers enjoying higher standard of living
28. Country on the world map for producing quality herb, aromatic & medicinal plants
29. Active Sunday markets in all the Dzongkhags and a daily market in Thimphu
30. Coordinated approach to horticulture development
31. Regulatory framework and administration of regulations
32. Community-based extension programmes
33. Market information (national & international) available
34. Horticulture data base to be maintained in computer, which should be accessible through intra/internet
35. Information technology (IT) to be used for extension purposes
36. Gene bank established
37. Some private sector supporting own research
38. An efficient market system in place for both domestic and export markets
39. Farmer groups making use of information and IT
40. Integration of good horticultural practices and nutrition in the educational system
41. Quality seeds and seedlings available at the Dzongkhag level
42. Food safety standards in place
43. Protecting and productively using the horticultural plants, products and the knowledge system
44. Respect other forms of land use
45. Strong research base

Annex 9. Draft Terms of Reference for Recommended Technical Assistance.

Support for Technical Service (STS)

The support is for backstopping and monitoring during implementation. STS funds are for ensuring the highest technical quality of UNDP-supported programmes, aimed especially at supporting national execution.

FAO Backstopping

Backstopping from FAO is recommended for crucial points for changing in high-qualified areas, where something has been done, but not enough to improve in a sound way and achieve the objectives at the end of the programme. It is a Special Advisory Function of FAO, with its high-qualified technical guarantee, that provides Support and Services that could not be envisaged within the main Programme Technical Assistance. This special advisory function is different in character from the technical services that could be obtained from the market and provided through contracts with consultancy firms.

Example- Draft

Project number: BHU/97/A/01/99
Programme title: Integrated Horticulture Development Programme

The assistance to be provided under STS modality will involve the participation of experts either from FAO HQ or selected by FAO to reinforce the role of the field experts. The areas in which assistance will be provided include horticulture research management/planning, fruit management and propagation and a yet unspecified consultancy line, which would be determined in the first year of the Technical Service. In addition to missions to visit the programme areas, FAO will provide technical backstopping from Headquarters and the Regional Office for Asia and the Pacific (RAP) to improve the technical supervision of the programme.

Experts		months
Horticultural/Fruit Research Expert	FAO	3
Plant Propagation & Nursery Expert	FAO	2
Horticultural Expert at HQs	FAO	1.1/2
Nut /Walnut Propagation Expert	FAO	2
Temperate Fruit Expert at HQs	FAO	
Seed/planting Certification	FAO	1.1/2
Seed Expert at Hqs	FAO	1/3
Social Science Expert	FAO	1
Social science at Hqs	FAO	1/3
Unspecified Consultant Services		
Unspecified Consultant at HQs		
Mission Costs		

Backstopping Desk work includes 1 day a month for the further 2 years + 1 mission of 15 days/year (Horticultural Crops Group - AGPS)

Terms of Reference
Technical Backstopping Mission in Support of Horticulture Research Management/ Technology Generation Component of Programme BHU/97/003
Horticulture Research Support

The assistance to this component of the programme will include two field missions.

Mission Duration: 12 weeks in the field, split in 2 missions; 3 weeks at HQs

Purpose:
In the **first mission (7 weeks)**, to be scheduled in the second half of the third year of the programme implementation, he/she will:

1. Assess through field visits, documents, reports, research proceedings, work plans review and technical discussions with the concerned programme staff the present situation of the Renewable National Resources Research network
2. Assist REID, MOA in revising the formulation of the national horticulture research plan (and policies), taking into consideration the priorities and approaches of the programme, particularly in critical areas of production
3. Design a comprehensive horticultural research framework, which includes the four Research Centres and their Substations
4. Revise and improve the research protocols
5. Develop the research approach and methodologies, coordination, planning, monitoring, analysis, comparison, interpretation or research results at regional and national level
6. Advise on scientific research reports writing
7. Advise in fruit and vegetable germplasm acquisition, including WEB use
8. Assist in improving capability of dissemination of research output and adoption
9. Assist in improving coordination with other relevant services in the country (soil, plant protection, etc.)
10. Assist and facilitate institutional linkages with relevant international and regional research centres outside the country
11. Provide recommendations to the Renewable Natural Resource Research Centres
12. Discuss findings and recommendations in a seminar with all parties concerned
13. Prepare a draft report for follow-up activities

In the **second mission (5 weeks)**, to be scheduled in the second half of the fourth year of the programme implementation, he/she will:

1. Review progress made in the implementation of the recommendations made in the previous mission
2. Support programme staff in implementing the horticulture research planning and monitoring
3. Provide technical support to the programme on best strategies for overcoming local constraints toward the expected outputs
4. Prepare a draft report for follow-up activities

After each mission a technical report shall be prepared and submitted to UNDP, summarizing findings, achievements and recommendations of the mission

In addition to the fieldwork scheduled there should be 3 weeks of technical backstopping at headquarters budgeted for support to this work. This would cover the following:

- identification of candidates
- recruitment of candidate
- briefing of STS consultant
- debriefing consultant
- technical clearance of reports.

Terms of Reference
Technical Backstopping Mission in Support of Horticulture Research Management/ Technology Generation Component of Programme BHU/97/003

Temperate Fruit Expert

Mission Duration:

Purpose:

1. Assess through field visits, documents, reports, research proceedings, work plans review and technical discussions with the concerned programme staff the present situation of sub-programme on temperate fruit production
2. Assist in further refining the horticulture research plan, by reviewing the list of priority crop needs for adaptive research, within the general strategies and framework of the Technology Generation Sub-Programme
3. Assist in establishing fruit crop germplasm, both in Research Centres at on-farm
4. Assist in maintenance of a database on both introduced and indigenous germplasm
5. Assist in developing proper methods of evaluation/screening of the potential plants, leading to quick release of the recommended varieties for cultivation
6. In collaboration with SPAL, NPPC and Irrigation Section, assist in develop appropriate strategies with respect to fruit plant management, including plant nutrition, irrigation, intercropping, IPM protection, training and pruning, with the view to develop appropriate integrated crop management practices for adoption by the growers.
7. Act as resource person in workshops and seminars as required
8. Assist in the designing the format and review the technical contents for the compilation of temperate fruit plant blue print
9. Prepare a technical report at the end of the mission, giving findings, conclusions and recommendations

Terms of Reference
Technical Backstopping Mission in Support of Horticulture Research Management/ Technology Generation Component of Programme BHU/97/003

Plant Propagation and Nursery Management

Mission Duration:

Purpose: to speed up the fruit nursery privatisation process and the availability of quality fruit planting material

1. Assist in developing technical strategies and plans at national level for mass production of fruit planting material, taking into consideration the needs of farmers
2. Advise and assist to establish and manage superior mother plant collections both for scions and rootstocks, in RNRRCs and at private nurseries orchards
3. Assist in improving basic technical nursery management under covering and in open space, grafting and budding techniques, packaging and transportation
4. Advise and assist in nursery work organisation for fruit plant s mass production
5. Assist in developing marketing strategies for nursery produces
6. Assist in financial planning of private nursery enterprises
7. Advice in nursery certification procedures, including registration of the private nurseries with the Seed and Plant Certification Programme within the framework of the Seed Act
8. Advise on specific programme toward nursery privatisation to be set by the Government in collaboration with the Bhutan Development Finance Corporation, in order to facilitate access to credit
9. Advise Agricultural Machinery Centre on procurement of suitable nursery facilities and equipment, including modular, low cost greenhouses, considering resistant, biodegradable covering material, drip irrigation and recommendations for proper location and installation
10. Support on designing and implementing a general programme and curricula for nursery training, both for trainers and private producers
11. Support on organising workshops
12. Assist in supporting private associations for quality controlled planting material production, in the procurement of improved horticultural seed and planting material
13. Follow up of regional field training activities
14. Act as resource person in workshops and seminars as required
15. Assist in the designing the format and review the technical contents for the compilation of fruit plant propagation and nursery management blue print
16. Prepare a technical report at the end of the mission, giving findings, conclusions and recommendations

Terms of Reference
Technical Backstopping Mission in Support of Horticulture Research Management/ Technology Generation Component of Programme BHU/97/003

Mango Propagation and Production Expert

Mission Duration:

Purpose:

1. Advise and assist in procurement of germplasm
2. Assist in orchard establishment, including intercropping
3. Advise and assist in mango propagation and nursery management techniques for mass production (cleft grafting)
4. Advise and assist on orchard management
5. Training for trainers
6. On-farm demonstrations

Possible Source of Expertise: a regional expert or UN volunteer, possibly from the Philippines or Bangladesh, might be best suited for this assignment. The Mango Information Network in the Philippines might be a good source of potential candidates.

Terms of Reference
Technical Backstopping Mission in Support of Horticulture Research Management/ Technology Generation Component of Programme BHU/97/003

Walnut Propagation Expert

Mission Duration:

Purpose: *technical assistance and short-term training, both within and outside of Bhutan, have already been provided on walnut propagation. IHDP Programme Management, nonetheless, feels the need for additional technical assistance. They should define exactly what further assistance is needed, and prepare the Terms of Reference for this consultant.*

Terms of Reference

Post Harvest Planning Specialist

Purpose: *IHDP Programme Management had already drafted Terms of Reference for a Post Harvest consultant. The TOR, however, had combined both strategic planning responsibilities with technical field-level work. The MTE Mission recommends that this proposed input be split into two different ones, one to focus on the planning issues, the other on the technical ones.*

Terms of Reference
Technical Backstopping Mission in Support of
Integrated Horticulture Development Programme BHU/97/003

Social Scientist
Creation of Associations of Growers and Producers

Length of Assignment: 12 months, with possibility of extension; possibility of several shorter missions

Purpose: to assist the programme management with the creation of associations and community-based organisations to facilitate horticulture development and sustainable community-based management activities, and to provide guidance on social research, including socio-economic surveys

Tasks:

- Examine successful growers' associations, producers' associations, and other similar community-based organisations to identify factors contributing to the success of such organisations

- Review the new legislation authorising the creation of cooperatives and non-governmental organisations, as well as other pertinent legislation, to determine the legal requirements for establishment of an association or community-based organisation

- Review the efforts to date the by RNRRC/East, the Third Forestry Project, other forestry and agricultural extension efforts, and MTI's Essential Oils Development Programme

- Develop a model approach for creating an association of lemon grass harvesters and distillers, to include:
  - Objectives for creating the organisations
  - By-laws and regulations for the organisations
  - Areas to be managed
  - Negotiation on rules for management, and sanctions to be applied if rules are not followed
  - Financial management of a revolving fund, to cover advances to distillers on purchase of lemon grass oil
  - Assist in the creation of one or more such associations

Possible Source of Expertise: a regional expert or UN volunteer, possibly from the Regional Community Forestry Training Center in Bangkok, might be best suited for this assignment.

Annex 10. Holistic Marketing (Agro-based Eco-Tourism)

A more holistic approach is recommended to build internal and external markets, especially from the point of view of developing agro-based eco-tourism. Thus, efforts could be supported to develop the potentials in exploiting the regional, location-specific specialties in the diverse regions and localities spread across the country.

This marketing strategy can be an attempt to bring the buyer to the product- to not only look for markets outside of Bhutan- but to create markets within the country. Thus, the remote (but accessible), disparate, and undeveloped regions can be taken into account as attractive, new, unexplored, and exciting destinations within Bhutan for both the local and foreign tourist. Such marketing can be approached in two ways.

First, an emphasis can be placed on developing the product, i.e., to consider local/regional specialties in indigenous products, cottage industries and handicrafts, natural or scenic attractions (wildlife, natural sanctuaries), fairs and festivals. These resources can be showcased in a package deal or strategy that complements each other. The unique trademark of a particular area can be used to advertise it as a new and popular destination for both local and international tourists.

The list of attractions or potentials to consider include: the indigenous flora' artisans and handicrafts, including weaving peculiar to the area; a tools and implements museum; organic/traditional farming, including mushrooms and lemongrass unique to the area; and river rafting and kayaking potentials, as already being researched by the Department of Tourism (formerly known as the Tourism Authority of Bhutan (TAB)).

Second, the next step would be to train local people to manage their own potentials and resources. Having the product is good but not sufficient to increase rural incomes; therefore local entrepreneurs need training both to develop and to take advantage of their local resources and specialties. Here farmer groups, or cooperatives, within the *Geog* planning sphere would play major roles to decide on how or what to develop.

An example of a rural agro-based eco-tourism potential could be considered for Trashiyangtsi.It could be developed like Bumthang, in terms of driving the local economy with tourism. The area/region can be portrayed as a destination that houses unique products in a package deal for the local or foreign visitor. The attractions include: a natural setting (flora and fauna within certain altitudes), the famous festival at Chorten Kora, local handicrafts of wooden bowls, cups and containers as a traditional supplier within Bhutan, a wildlife sanctuary at Bomdeling with the arrival and departure of the Black-necked cranes, trekking, farm visits and organic farm tours.

Within the current tourism context, many rural areas of Bhutan that have unique visitor attractions are by-passed when the tourists travel straight through the lateral route from Trongsa to Bumthang. The west and central (mainly Bumthang) areas have historically been attractive tourist destinations that have helped develop the local economies. After visiting Bumthang, if the visitors continue further east, there are few sightseeing or tourist attractions for the visitors to stop and spend their time. Exceptions include the occasional stop at the Khaling weaving center and the rare visit to the Gomkora festival – when it takes place once a year, and to view, or visit, the dzong at Tashigang. Many visitors wish to visit these areas that have unique qualities different from the much-visited western and central parts of Bhutan.

In the early 1990s, the Primevera Company organized a tour of 30 Germans, who visited the lemon grass country in Mongar and Trashigang to see for themselves the organic environment in which the lemon grass was grown, harvested and the lemon grass oil distilled. If their product brochure stated that economic benefits went to over 3000 farmers in the remote areas, this marketing could help develop a popular and a regular tour to the lemon grass areas, which could increase sales as well as markets for other local-based industries.

Annex 11. PROGRAMME EVALUATION INFORMATION SHEET

Part I: Basic Programme Information

1.	Programme Number:	BHU/97/003*1		Use the format GUY/81/003*1 *1 signifying the number of times the programme has been evaluated.
2.	Programme Title	INTEGRATED HORTICULTURE DEVELOPMENT PROGRAMME (IHDP)		
3.	Executing Agency:	NEX	(National Execution by Royal Government of Bhutan)	
4.	Budget at the time of Evaluation:	6 500 000		
5.	UNDP Contribution:	6 500 000		
6.	Cost Sharing:	RGOB (in kind)		
7.	ACC Sub-sector:	0600	Agriculture, forestry & fisheries	
8.	Current Phase of the programme:	First phase of programme (but previous project)		
9.	Scheduled comp letion date of the programme: Programme approval date:	30-06-2002 30-06-1997		
10.	Regional Bureau	RBAP (Regional Bureau for Asia & Pacific)		
11.	Year of Evaluation:	2000	(Two digits)	
12.	Type of Evaluation:	IE	1E = Mid-term 2E = Terminal 3E = Ex-post	
13.	Functional Descriptors:	PRIMARY: SECONDARY:	FS15 (Institution-building) FS01 (Direct support)	

14. Thematic Descriptors: UNDP projects focus on building and strengthening national capacity in one or more of the following thematic areas. Use 7A for "Yes", 1B for "Partially", 6B for "No".

.	Poverty Eradication and grass-roots participation	1B
.	Environment and natural resources management	1B
.	Management development	1B
.	Technical cooperation among developing countries	6B
.	Transfer and adaptation of technology for development	7A
.	Women in Development	1B

NOTE: This programme fits within the thematic area of:SUSTAINABLE LIVELIHOODS.
It also contributes to GOVERNANCE and ENVIRONMENT.

15.	Programme Descriptors	PDH002	Horticulture

16.	Report Descriptors	??	
17.	Cluster Evaluation:	6B	7A = Yes; 6B = No.
18.	This project is the lead applicable project in the cluster?	1D	7A = Yes; 6B = No; 1D = Not
19.	For Cluster Evaluations list projects, starting with the lead project.	1D	1D if not applicable.

Representation on the evaluation mission

20.	UNDP	1S	1S = Consultant 2S = Staff 3S = Both consultant and staff 6B = No
21.	Executing Agency (= Government)		
22.	Government	1S	
23.	Others	6B	

PART II. Terms of reference (TOR) of the evaluation mission.

1.	Were the TOR project-specific?	7A	7A = Yes 6B = No

Did the TOR require assessment of:

2.	Project design?	7A
3.	Personnel?	7A
4.	Equipment?	7A
5.	Training?	7A
6.	Management?	7A
7.	Results?	7A
8.	Effectiveness?	7A
9.	Capacity building?	7A
10.	Environmental impact?	7A
11.	Women in development?	7A
12.	Impact on the beneficiaries?	7A
13.	Sustainability?	7A
14.	Coordination with other development efforts in the country?	7A

Part III. Programmme design.

All questions in this section refer to the current design of the programme. In other words, if the original objectives, outputs, inputs and activities of the programme have been modified, the questions refer to the modified versions.

1.	How well was the programme designed?	6A	1A = Very good

			2A = Good 6A = Satisfactory 4B = Poor.

Please respond to this question only after answering the following questions:

2.	Has the design of the current phase built on the results of previous phase(s)?	7A	7A = Yes 1B = Partially 6B = No 4N = Current Phase is Phase 1.

NOTE: The current phase of the programme is the first phase, but the programme built upon an earlier UNDP project.

3.	Was the programme linked to important national/sectoral objectives?	7A	7A = Yes 1B = Partially 6B = No
4.	Was the programme designed within the framework of a programme approach?	7A	
5.	Did the programme have linkages with other projects funded or not by UNDP?	1B	
6.	Did the programme design take account of socio-economic factors?	7A	
7.	Were the beneficiaries/target groups identified?	7A	
8.	Were the beneficiaries/target groups consulted in the formulation stage?	7A	
9.	Were the immediate objectives clear?	7A	
10.	Were the immediate objectives internally consistent?	7A	
11.	Do the outputs and activities logically lead to the achievement of the immediate objectives?	1B	
12.	Did the results include success criteria?	1B	
13.	Are the immediate objectives still relevant?	7A	
14.	Were the immediate objectives overly ambitious?	1B	
15.	Were the external assumptions optimistic?	7A	
16.	Did the programme have a realistic time frame?	1B	
17.	Was the institutional arrangement appropriate?	1B	
18.	Was the design of the programme (objectives, outputs, inputs and activities) modified during programme implementation?	7A	

19.	Did the mission draw any major findings or lessons?	7A	7A = Yes **(see part X)** 6B = No
Part IV:	**Programme personnel**		
1.	Main composition of international personnel	2P	1P = Long-term experts 2P = Short term experts 3P = Consultants 4P = Associate experts 5P = UNVs
2.	Appropriateness of international personnel	2A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor
3.	Performance of international personnel	2A	
4.	Was there a shortage of international personnel?	6B	7A = Yes 6B = No
5.	Were there delays in the arrival of international personnel?	7A	
6.	Was the international personnel fully utilized?	6B	
7.	Was the international personnel involved in training staff counterpart?	7A	
8.	Did the programme make use of national experts?	7A	
9.	Appropriateness of national experts	2A	1A = Very good 2A = Good
10.	To what extent were national fully utilized?	6A	6A = Satisfactory 4B = Poor 1D = Not applicable
11.	Performance of national experts	2A	
12.	Appropriateness of counterpart staff	2A	
13.	Performance of counterpart staff	2A	
14.	Was there a shortage of counterpart staff?	7A	7A = Yes 6B = No
15.	Were there delays in the appointment of counterpart staff?	6B	
16.	Did the international personnel include women?	6B	7A = Yes 6B = No
17.	Did the national personnel include women?	6B	
18.	Did the counterpart staff include women?	7A	

19.	Did the programme suffer from high national staff turnover	7A	
20.	Did the mission arrive at any major findings/lessons?	7A	7A = Yes **(see part X)** 6B = No

Part V: Training.

1.	Fellowship training	1A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor 1D = Not applicable

NOTE: To date, only one M.Sc. trainee has returned from studies (in late February 2000).

2.	Did the fellowship trainees include women?	7A	7A = Yes 6B = No
3.	Was there a shortage of fellowship training candidates?	7A	
4.	Were there delays in fellowship training?	7A	
5.	Were the fellowship trainees fully utilized?	1D	

NOTE: too early to know, as only one trainee has returned from studies, within the past month

6.	Did the fellowship candidates have language problems?	6B	
7.	In-service training	6A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor 1D = Not applicable
8.	Was there a shortage of in-service trainees?	1B	7A = Yes 1B = Partially 6B = No 1D = Not applicable
9.	Were there delays in-service training?	7A	
10.	Were the on-the-job trainees significantly utilized?	1B	
11.	Was the training methodology appropriate?	7A	
12.	Did the mission make any major findings	7A	7A = Yes **(see part X)** 6B = No

Part VI. Equipment and infrastructure.

1.	Overall assessment of the contribution of the equipment to programme results	2A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor 1D = Not applicable
2.	Were there delays in the procurement of the equipment?	1B	7A = Yes 1B = Partially

			6B = No 1D = Not applicable
3.	Was the equipment of suitable quality?	1B	
4.	Was the equipment appropriate?	7A	
5.	Was the equipment significantly utilized?	7A	
6.	Was there a shortage of spare parts?	6B	
7.	Was the equipment properly maintained?	7A	
8.	Can the use of the equipment be sustained after programme completion?	7A	
9.	Were there problems with the provision of physical facilities?	6B	
10.	Were there problems with transport facilities?	6B	
11.	Did the mission make any major findings or draw any major lessons related to equipment?	6B	7A = Yes **(see part X)** 6B = No

Part VII. Management

1.	How well was the programme managed on the whole?	6A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor
2.	Was the programme managed by only a National Programme Director?	7A	7A = Yes 6B = No
3.	How well was the programme monitored?	6A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor
4.	Assessment of UNDP field support	1A	
5.	Agency backstopping	1D	(1D = not applicable)
6.	Coordination among Government, Agency and UNDP?	2A	
7.	Coordination with other development efforts in the country.	2A	
8.	Was the work plan realistic?	7A	7A = Yes 6B = No 6D = No work plan exists.
9.	Did the programme experience overall delays?	7A	7A = Yes 6B = No
10.	What was the overall impact of the the delays?	8B	3C = Potential setbacks were overcome 4C = Permanent setbacks

			8B = None significant 1D = Not applicable
11.	Did the mission make any major findings?	7A	7A = Yes **(see part X)** 6B = No

Part VIII. Government support

1.	Overall government support for the the programme	1A	1A = Very good 2A = Good 6A = Satisfactory 4B = Poor 1D = Not applicable

Please characterize, when applicable, the effect of the following government policies on the programme:

2.	Personnel	2C	1C = Positive 2C = Negative 1D = Not applicable
3.	Training	1C	
4.	Research	1C	
5.	Procurement	1C	
6.	Pricing and Tax	1C	
7.	Foreign trade	1C	
8.	Sector	1C	
9.	Region	1C	
10.	Participatory development	1C	
11.	Gender consideration	1C	
12.	Environment	1C	
13.	Others (specify) Cultural heritage Land use policy, legislation on cooperatives Intellectual property rights & patent rights	7A	7A = Yes **(see part X)** 6B = No
14.	Did the experience of this particular programme highlight a need for a change in government policy?	6B	7A = Yes **(see part X)** 6B = No
15.	Did the mission make any major findings or draw any major lessons?	7A	7A = Yes **(see part X)** 6B = No

Part IX. Results

<u>Nota bene:</u> **Complete either part A or part B depending on the type of evaluation.**

A. Mid-term Evaluation.

1.	What is the overall achievement of the programme at the time of the evaluation?	8A	4A = Exceeds target 8A = On target 3B = Below target

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Please before responding to this question, keep in mind the guidance provided in pages 22 to 25 of this chapter and try to respond first to the following questions:

2.	Was the programme purpose relevant?	7A	7A = Yes 1B = Partially 6B = No
3.	Was the programme approach appropriate?	7A	
4.	Was the modality of execution adequate?	1B	
5.	Have the beneficiaries of the programme been reached or are they likely to be reached?	7A	
6.	Have the target groups (end-users) of the programme been reached or are they likely to be reached?	7A	
7.	Is a mid-course change in the programme design necessary?	1B	
8.	Are the overall achievements likely to be sustained after programme completion?	7A	

NOTE: This question is interpreted to mean "sustained after UNDP support to the programme ends." Since it is a national programme, it is assumed that the programme will continue.

9.	To what extent the institution building component will be achieved?	5A	5A = Significant 6A = Satisfactory 4B = Poor
10.	Is the programme performing well?	1B	7A = Yes 1B = Partially 6B = No
11.	Is the programme likely to be successful?	7A	
12.	Recommendation of the mission for future assistance	2M	1M = Extension 1Mn= Extension for n months, e.g, = 1M9 = extension for 9 months 2M = New programme phase 4M = Programme Termination 5M = No recommendation

NOTE: 13-month extension will be required to complete long-term training. If first phase of programme is successful, then consider support for a second phase.

B. Terminal and ex-post evaluations

1.	Describe the overall achievements of the programme at the time of the evaluation?	___	3A = Successful 2B = Partly successful 7B = Unsuccessful

Please before responding to this first question, keep in mind the guidance provided in pages 22 to 25 of this chapter and try to respond first to the following questions:

2.	Was the programme relevant?	___	7A = Yes 1B = Partially 6B = No
3.	Was the programme efficient?	___	

4.	To what extent were the outputs achieved?	___	5A = Significant 6A = Satisfactory 4B = Poor
5.	To what extent were the immediate objectives achieved?	___	
6.	To what extent were the development objectives achieved?	___	
7.	Did the programme perform well?	___	7A = Yes 1B = Partially 6B = No
8.	Was the programme cost effective?	___	
9.	To what extent has capacity-building been achieved?	___	5A = Significant 6A = Satisfactory 4B = Poor
10.	Have the beneficiaries of the programme been reached?	___	7A = Yes 1B = Partially 6B = No
11.	Have the target groups (end-users) of the programme been reached?	___	
12.	Did the programme make a positive or negative impact on the target groups?	___	1C = Positive 2C = Negative 6C = No impact
13.	Did the programme make a positive or negative impact on gender issues?	___	
14.	Did the programme make a positive or negative impact on environment?	___	
15.	Did the programme make a positive or negative impact on the institution?	___	
16.	Are the overall achievements likely to be sustained after programme completion?	___	
17.	What are the views of the following parties on the programme?		
	- Government	___	1C = Positive 2C = Negative 5C = No views
	- Recipient institution	___	
	- Beneficiaries	___	
	- Executing agency	___	
	- Implementing agency	___	
18.	Recommendations of the mission for future UNDP assistance	___	1M = Extension 1Mn= Extension for n months, e.g, = 1M9 = extension for 9 months 2M = New programme phase 4M = Programme Termination 5M = No recommendation

Part X Textual information

Nota bene: **This section of the programme evaluation information sheet must be filled in by the evaluation team and given to the Resident Representative prior to leaving the country where the evaluation takes place.**

1. Summary of immediate objectives and outputs (summarize what is stated in the programme document)

2. Findings on programme identification and design (provide a summary of the evaluation findings on programme identification and design)

3. Findings on general results of the programme (include findings on relevance, performance and success)

4. Main problems faced by the programme (summarize the main problems previously and currently faced)

5. Summary of recommendations (provide a summary of the main report recommendations and indicate to whom they were addressed)

6. Lessons learned (List all lessons learned from the evaluation that may be applied to other projects and programme s)

For Textual information, see the executive Summary of the Mid-Term Evaluation Report.