SUMMARY PROCEEDINGS
OF A TECHNICAL WORKSHOP

Ecoregional Approaches for Natural Resource Management in the Red River Basin, Vietnam

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PREFACE

This report summarizes the proceedings of a two-day Technical Workshop on Ecoregional Approaches for Natural Resources Management in the Red River Basin (RRB), Vietnam, on 9 &10 November 1998. The Workshop was co-organized by the Vietnam Ministry of Agriculture and Rural Development (MARD) and the International Rice Research Institute (IRRI), and was hosted by the Vietnam Institute for Water Resources Research (VIWRR) in Ha Noi, Vietnam.

The Workshop was sponsored by and organized under the aegis of the Ecoregional Initiative for the Humid/Sub-humid Tropics and Sub-Tropics of Asia -Ecor(I) - as a follow-up of the Ecoregional Planning Workshop for the Red River Basin held in Ha Noi, Vietnam, 6-8 October 1997. The main purpose of the Workshop was to review the past year's progress and to formulate an ecoregional collaborative work plan for NRM in the Red River Basin. The workshop program is given in Appendix I.

The workshop was attended by a total of 42 participants from Vietnamese government agencies and universities, international and foreign research institutions and non-governmental organizations that are involved in research and development (R&D) activities in NRM in the RRB. The full list of the participants is given in Appendix II.

This report comprises of two separate volumes. This first volume contains the summary proceedings of the workshop, highlighting the main R&D issues raised, conclusions arrived at, and recommendations for further action. The second volume is a compilation of the technical papers presented at the Workshop.

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BACKGROUND

The Ecoregional Initiative for the Humid and Sub-humid Tropics and Sub-tropics of Asia, Ecor(I), was conceived by the Consultative Group of International Agricultural Research Centers (CGIAR). IRRI has been assigned to be the convening center for the Initiative. The Ecor(I) is aimed at promoting collaborative regional-level NRM in the context of sustainable development, through partnerships of concerned organizations. The Initiative started in 1995 with the formation and first meeting of the Ecoregional Working Group (EWG), comprising NARS representatives from Vietnam, Thailand, Philippines, Indonesia, Malaysia, India and Bangladesh, and representatives of the International Agricultural Research Centers (IARCs) and advanced research institutions (ARIs).

The scope of work for the Ecor(I), as identified by the EWG, includes developing operational models for R&D in NRM at selected pilot sites. At each pilot site, a Regional Working Group (RWG) would be formed comprising representatives from key institutions involved in R&D activities. The following activities were proposed for each RWG:

1. Determine a common vision and strategy for NRM
2. Make an inventory of the ongoing work on NRM by various partners
3. Organize planning meetings to identify research needs and bottlenecks in implementing a regional level program of NRM (regional action plan)
4. Identify technologies required for improved NRM and encourage the development of such technologies
5. Rationalize any overlapping research between organizations working in the region, and assist in forming natural or new partnerships
6. Assist in re-directing ongoing research to meet a common strategy in the regional action plan; and
7. Develop proposals for new research contributing to improved NRM in the region.

The Red River Basin is the first of the pilot sites established under the Ecor(I) for developing an operational R&D model. A Regional Working Group, the RRB-EWG, was formed to oversee the "*Ecoregional Approach to Natural Resource Management in the Red River Basin, Vietnam*" Project under the Ecor(I). The members of the RRB-RWG include nine institutions (DOSTPQ, DARDP, VASI, NISF, NIAPP, NIWRR, HAU, IWRP, TNU).

The Planning Workshop on Eco-regional Approaches for Natural Resource Management in the Red River Basin (RRB) held in Ha Noi in October 1997, identified eight sets of major research issues relating to natural resources management in the RRB. The research objectives, expected outputs and research partners relating to these sets of issues were determined. The Workshop also identified a number of follow-up activities:

- The sets of issues and their corresponding objectives would be used to formulate thematic studies. Thematic working groups (institutions, convener, person involved) would be formed under the guidance of the RRB-EWG.

- Planning meetings, proposal development and technical workshops would be organized to initiate collaborative research between Vietnamese institutions and international organizations to address some or all of the eight sets of research issues.

The RRB-EWG subsequently decided to focus on four of the eight sets of issues prioritized by the Vietnamese authorities. The four sets of issues are as follows:

1. Soil and nutrient movement
2. Water management
3. Land use management
4. Diversification and economic development

WORKSHOP PROCEEDINGS

Workshop Objectives

This technical workshop was convened by the RRB-EWG to review the progress made following from the 1997 Planning Workshop. The specific objectives are as follows:

1. To review the research methodologies and results related to four sets of issues, i.e. soil and nutrient movement, water management, land use management, and diversification and economic development.
2. To set up a collaborative work plan among the current research projects for application of these research methodologies in common pilot site(s) in the Red River Basin.

The Workshop consisted of two main parts. The first part involved technical presentations reviewing past and on-going R&D activities in the RRB, with emphasis on identifying research gaps and opportunities for better collaboration amongst key agencies concerned. In the second part of the workshop, working groups were formed to determine common programs for integrated studies on the four sets of R&D issues and to formulate collaboration work plans for these integrated studies.

The results of the deliberations, and the recommendations for follow-up action, are presented in these summary proceedings.

Summary of Presentations

Opening Session

Dr. N.N. Kinh, Director of the Department of Science, Technology and Product Quality and Chairman of the RRB-EWG, delivered the welcoming speech and opening remarks for the Workshop.

This was followed by a combined presentation by Dr. P. Teng, Dr. S.P. Kam and Dr. J.C. Castella, providing the background to the Workshop and explaining the basis and the suggested process in order to achieve the workshop objectives.

The underlying basis for initiating this effort at developing an operational R&D model for NRM in the Red River Basin is to improve the mechanisms and linkages for researching and implementing NRM in a more effective manner to meet the goal of sustainable agricultural production and use of the resource base. The premise is that there is a common agreement to move from the existing situation to a preferred and improved situation for achieving this goal.

The present situation is characterized as follows:

- There are already many NRM-related projects and activities within RRB, involving many players, each with their own institutional interests and mandates, and many target groups.
- While there may be informal links made among some of these activities and projects, there is a general lack of coordination to achieve a common set of objectives for integrated NRM.
- The R&D efforts are not necessarily comprehensive in addressing the range of NRM issues.
- The thematic groups that were set up in the RRB-EWG Planning Workshop a year ago have not functioned effectively.

It was suggested that the preferred scenario would be one whereby:

- There is better synergy from fostering complementary R&D efforts for NRM;
- The informal links are formalized, and more linkages established among existing projects and activities; thereby resulting in
- Strengthening of partnerships in R&D efforts

The two-day workshop would focus on the following:

- Arrive at a common perspective of NRM issues for the RRB
- Exchange information about past, present and future R&D activities
- Identify opportunities for facilitating partnerships in promoting integrated NRM studies

The workshop is divided into four sessions, with paper presentations in Sessions 1 to 4 which are meant to:

- Identify the key research issues within each of the four major themes relating to NRM in the RRB
- Examine the overlaps and gaps in addressing these issues
- Determine where and how better collaboration might reduce the overlaps and fill the gaps
- Explore means to achieve better coordination/collaboration

The final Session 5 would be conducted in discussion mode to:

- Identify linkages;
- Seek partnerships;
- Explore mechanisms/resources;
- Draw up collaborative work plans; and
- Develop concept notes for gap-filling research where necessary.

Sessions 1-4. Technical presentations

The technical presentations were organized into four major themes corresponding with the four sets of NRM issues prioritized by the RRB-EWG.

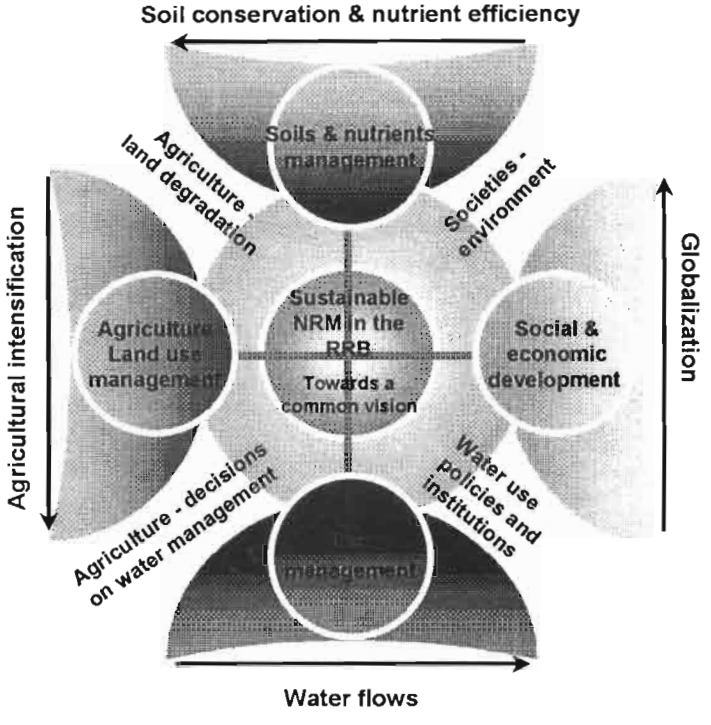

Figure 1. The four sets of NRM issues and their thematic inter-relationships

In Figure 1, the four major NRM themes are represented as geometrical shapes in the four cardinal directions. For each NRM theme, the research concerns span a range of topics from the most basic to the most applied; however some broad trends may be identified specifically for the Red River Basin. For example, soil conservation and nutrient use efficiency constitute the key underlying concern in soil and nutrient management research; intensification is the major issue in agriculture and land use management; the dynamics of water flows and distribution in water management; and the impact of globalization and market integration in social and economic development in agriculture.

In addition, there are also cross-cutting issues that relate these four major NRM themes. For example, agricultural land use changes have implications on water demand, use and management; while changes in social and institutional arrangements impact the way water is managed, which in turn has implications on the agricultural use of the land. Across the soils-water axis, problems of soil erosion in the uplands result in sedimentation and deterioration of water quality at the lower parts of the toposequence. An integrated, ecoregional approach to NRM would place as much attention on these cross-cutting issues as on sectoral ones. Existing institutional arrangements are more oriented towards a sectoral approach in dealing with NRM. One emphasis of the Workshop is to bring together people and agencies to identify cross-cutting NRM issues

that are more effectively addressed multi-sectoral and inter-disciplinary manner and to explore opportunities for achieving it.

A total of 13 topics were presented in Sessions 1-4, which deal with the four major NRM themes. The main points raised in the presentations and in the ensuing discussions are summarized in Tables 1-4 and in the accompanying bulleted lists.

The papers presented at the workshop are available in a separate volume entitled "A Technical Workshop on Ecoregional Approaches for Natural Resources Management in the Red River Basin, Vietnam, 9-10 November 1998. Hanoi, Vietnam – Compilation of Papers presented," and will be distributed upon request. Requests may be submitted to:

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Session 1. Soil and Nutrient Movement

Four papers were presented in this Session. Table 1 below summarizes the salient points raised by the paper presenters.

Table 1. Summary of paper presentations in Session 1

Paper	Main R&D issue(s)	Target/study area	Project/study description	R&D finding/output	Institution(s)	Remarks
1: The movement of soil, water and nutrient on slopping land of the Red River Basin (T.D. Toan)	Cropping systems and crop management for soil conservation and sustaining soil fertility in sloping lands	Phu Tho, Hoa Binh, Ha Tay, Vinh Phuc	Farm-level experiments under different slope and soil conditions, different cropping systems (with emphasis on diversification) and soil conservation measures	▪ Soil loss reduced by 50-100% ▪ Green manure from cover crops helps check soil fertility decline ▪ Crop diversification increases farmer income	NISF	How to encourage farmer adoption of these technological interventions
2: Reversing trends of declining productivity in intensive irrigated rice systems - site-specific nutrient management (SSNM) in the Red River Delta (T.T. Son, A. Dobermann, N.V. Chien and V.T.K. Thoa)	Develop site-specific nutrient management (SSNM) technology for intensive rice systems in the RRD	Phu Tho, Dan Phuong, Tam Dao	Field-level experiments on alluvial and degraded soils comparing SSNM with farmers' practices	Study is on-going; preliminary results indicate a potential for improving nutrient management by using both soil and site-specific approaches	NISF	
3: A comprehensive quantitative study of the soil fertility differentiation at plot scales in the hill region of the Red River Basin (P.Q. Ha)	Quantification of soil fertility parameters across the toposequence within watersheds.	Phu Tho (Thanh Hoa district)	Soil sampling, analysis and comparison of soil physical and chemical properties carried out between the upland and lowland soils within a small, narrow watershed and a large watershed	▪ The upland soils are in a more advanced stage of ferralization , while the lowland soils have higher contents of alterable material ▪ The soils in the large watershed have been affected more by a longer history of cultivation and farmers' practices	NISF, Catholic Univ of Louvain	
4. Research outline on soil and nutrient movement in the Red River Basin (N.V. Bo)	▪ Integrated, quantitative appraisal of soil erosion, movement and deposition in the RRB ▪ Agricultural management strategies for sustaining the soil resource base	Across the toposequence of the RRB	A research proposal for a comprehensive coverage of the research issues identified		Proposed by NISF	

Main discussion points:

1. While some soil conservation practices have been proven to be effective in field experiments, farmers are reluctant to adopt such practices for various reasons. For example hedgerow planting is not popular because it takes up 8-10% of the cultivable land.
2. The substantial data sets and experimental results on soil and nutrient management of NISF could be supported with socio-economic analysis.
3. There is also a need for understanding farmers' perceptions on the one hand, and for increasing farmers' awareness of soil degradation on the other.
4. Adoption of sound soil and nutrient management practices can gradually achieved with farmer acceptance, and also with accompanying measures such as using appropriate varieties and facilitating access to grants and credit.
5. Soil erosion studies should logically be linked with downstream effects of sediment delivery. For a more comprehensive treatment of the environmental impacts of agricultural land use, such studies are necessarily multi-disciplinary. Research issues, key partners and collaborators should be clearly identified.
6. It was also pointed out that there needs to be more coordination and sharing of results among the various research and development groups working in the same thematic and geographical area.
7. One of the contributions of the ECOR(I) is to develop a database on research information, including geographical data, that can be used for many purposes, in particular a metadatabase for integration and querying of information on the current studies. This database needs information on the projects and partnerships, and can help to improve partnership, for example, between the SAM and ECOPOL projects.
8. As agriculture in the RRB becomes increasingly intensified, issues of NRM become more complex and closer collaboration is required between researchers and extension officers.
9. Research and development efforts should not be only top-down, but also bottom up. For example, identification of issues require participation of the stakeholders in a bottom-up approach. On the other hand, project implementation and management would still require some extent a top-down approach.
10. NISF has articulated a comprehensive soil and nutrient research program that would take 5-10 years for implementation, and recognizes the need to collaborate with other national institutions, such as NIAPP, and also with international research institutes such as IRRI.
11. Practically all the presentations in this session dealt with research on soils at field level. There is a need to increase the impact over broader domains. It takes time for the impacts of ecoregional approach on nutrient management to be demonstrated and felt.

Session 2. Water Management

Five papers were presented in this Session. Table 2 below summarizes the salient points raised by the paper presenters.

Table 2. Summary of paper presentations in Session 2

Paper	Main R&D issue(s)	Target/study area	Project/study description	R&D finding/output	Institution(s)
5: Structure of alluvial irrigation water diversion (N.T. Nga)	Improving soil fertility by river water	Red River Delta	• Soil fertility in the RRD can be improved by installing and operating proper water diversion measures • Different structures for water diversion have been studied	• The effect of alluvial irrigation water in improving soil fertility have been justified, but it is limited by flood control measures • Advantages and disadvantages of different structures for alluvial water diversion were compared	VIWRR
6: Participatory irrigation management (PIM) and first step in irrigation management transfer (IMT) at the La Khe irrigation system (T.P. Diem)	Improving water resource use by participatory irrigation management	La Khe irrigation system in Ha Tay province	▪ Different irrigation management models based on top-down or bottom-up approaches or combination of both are compared ▪ The Ha Khe irrigation system is used as a successful example of participatory irrigation management model	▪ The successful management model is a committee for intercanal management, the irrigation company, cooperatives and farmers, with clearly identified responsibility for each member	VIWRR

Table 2 (continued)

Paper	Main R&D issue(s)	Target/study area	Project/study description	R&D finding/output	Institution(s)
7: Improvement of irrigation water use efficiency by application of Irrigation Main System Operation (IMSOP) model for rotational operation of La Khe main irrigation channel (N.V.Chien, T.V.Dat and D.N. Hanh)	Improving irrigation water use efficiency	La Khe irrigation system in Thanh Oai district, Ha Tay province	Trial application of the Irrigation Main System Operation (IMSOP) Model to assist in managing irrigation water distribution by rotational operation	▪ Savings in water use per ha amounted to 15-33% during the trial period ▪ Operationalizing the system requires careful preparation, training of field staff, involvement and understanding of farmers and appropriate legal and policy instruments	VIWRR, Univ of Melbourne (ACIAR funded)
8: Water balance and water resources management for the Red River Basin (N.T.P. Lam)	Water resources management in the RRB for multiple uses	Entire RRB	Balancing between water resources and water demand for hydropower, agriculture, water supply for domestic and industrial use, and environmental protection	▪ Water demand was 16% of resource (frequency 75%) in 1990 and 29% in 2010 ▪ Water resource is seasonally distributed, therefore flow regulation reservoirs are needed for irrigation, flood control, salinity control and navigation ▪ Water management needs to be strengthened by regulations and suitable institutional structure. Management of water as a natural resource and as an economic product should be clearly distinguished	IWRP
9: Water flow control measurement structure (N.T. Quang and V.V. Hai)	Flow control for proper water allocation and better water saving	Red River Delta	Introduction to flow control measurement structures: the baffle distributor and the dethridge - long water wheel	• Flow control measurement structures play an important role in irrigation management • Different types of structures suitable to local conditions are needed	VIWRR

Main discussion points:

1. One problem in water management for agriculture is competition in water use between farms near and far from the main irrigation canals. This problem becomes more serious in the dry season. Water allocation should be based on cropping patterns. A challenge is how to promote the concept of resource sharing to water users.
2. On-farm irrigation management will be the focus in the next five years. There is a trend to shift irrigation management from district to village level. Additional funds are required for water management.
3. In order to promote water use efficiency, the current water fee (based on area) should be changed, for example to be based on total production.
4. Water management requires a simple but efficient rather than a heavy institutional structure. An example of simple water management by H'mong people at five different locations in an NGO irrigation system: since water fee cannot be collected, water users contribute labor force for management and maintenance of the system.
5. There are interactions between irrigation and land use, for example the promotion of short duration varieties (e.g. OMCS) will reduce water demand.
6. Research in water management should be considered from a multi-disciplinary viewpoint, for example, study on flood control should take into consideration the effects of alluvial water on soil fertility.
7. The purpose of water use (for agriculture, industry, etc) should be taken into consideration in analyzing water use efficiency.
8. Pollution of groundwater resource is another NRM issue in the RRD.

Session 3. Land Use Management

Two papers were presented in this Session. Table 3 below summarizes the salient points raised by the paper presenters.

Table 3. Summary of paper presentations in Session 3

Paper	Main R&D issue(s)	Target/study area	Project/study description	R&D finding/output	Institution(s)
10: Soil resources of the Red River Basin (N. Khang, N.C. Pho, B.T.N. Dung and K. Trien)	Soil resources and main land units	Entire RRB	Based on FAO/UNESCO soil types, main land units are identified Slope and attitude are other factors to be considered in analysing land use	▪ 10 main land units in the plans and coastal areas (1.4 million ha) are suitable for agricultural land use ▪ 7 main land units in the hilly mountain (6.3 million ha) are suitable for perennial crops and forestry	NIAPP
11: Land use management in the Red River Basin (V.N. Dung, N.V. Tan and N.T. Anh)	Land use, its variations and proposed land use management	Entire RRB	• Present land use management in the RRB • Effects on land use by policy, population growth, plant protection by chemical application, reforestation, technical and socio-economic constraints • Proposed solutions in land use management for sustainable and ecological development	• Present land use area is 3.6 million ha (44% of basin total) of which 1.5 million ha for agriculture, 1.6 million for forestry • At present, there are 3 agricultural land use systems: (i) traditional shifting cultivation, (ii) traditional upland crops, and (iii) modern agriculture with wetland rice, perennial crops and agro-forestry combination ▪ Each household has 8-10 fragmented fields of 100-360 m^2 located at different places ▪ Land use is affected by policy on land ownership, marketing, agricultural tax and credit ▪ Due to population growth during the last 30 years, agricultural area has expanded while forest area has declined dramatically (e.g. from 80% to 8% in the Northwest) ▪ Chemical fertilizer and pesticide use has exceeded FAO or WHO standards ▪ Reforestation is needed to increase forest area from 19% (1995) to 40-50%. ▪ Proposal for land use management: reforestation, new crop varieties, intensive farming with investment for maintaining soil resource, selected agro-forestry systems, improvement of infrastructure for the highlands	NIAPP

Main discussion points:

1. A question was raised if the physical extent of Red River Basin should be extended to include the Da, Lo, Gam (which form the Red River system), with the Thai Binh river because of the hydrological linkage.
2. Pressure on use of land is very high in the Red River Delta. Besides the high demand for land for cropping, it is estimated that 1 ha of infrastructure is required for every 2.7 ha for agricultural land. In the delta, farms are highly fragmented and plot sizes are very small. It would be desirable to consolidate small farms into larger units for more efficient land resource management, but the maximum farm size is restricted by law.
3. Land fragmentation and small farm size also give rise to problems of proper water management and collection of water fee.
4. There is also increasing pressure on the land resources in the highlands, resulting from increase in population and market integration. One inevitable consequence is deforestation.
5. Land re-allocation carried out in the RRB after 1986 caused conflicts among minority groups in the highlands. For example, the Dao people were displaced when the land they managed under the collective system was returned or claimed back by the Tay people, causing the Dao to resort to unsustainable farming on sloping land. Therefore one important R&D issue is proper NRM on sloping lands.
6. Water resources development in the highlands, such as dam construction and impoundment, has also caused displacement of highland people. For example, about 90,000 people need to be resettled due to reservoir construction.
7. In using a watershed approach in land use planning and management, it should be recognized that there is a close relationship between water and land resources utilization. Therefore better coordination between land use and water resource management agencies is needed. An example of collaboration between water and land management is the implementation of drainage system and land use allocation in Bac Hung Hai project.

Session 4. Diversification and Economic Development

Four presentations were given in this Session, plus an overall introduction. Table 4 below summarizes the salient points raised by the paper presenters.

Table 4. Summary of paper presentations in Session 4

Paper	Main R&D issue(s)	Target/study area	Project/study description	Institution(s)
12: Introduction to the four studies in the RRB by VASI (D.T. Tuan)	Strategies for employment creation and improving income under conditions of agricultural changes characterized by shift from subsistence to commercial farming; diversification vs. specialization, addressing issues of commodity chains, market development, food security and sustainability	Entire RRB	A variety of projects have been initiated by various organizations, with VASI being the main local research partner. The working group for "Diversification and Economic Development of the RRB" functions to coordinate the various research efforts.	VASI, GRET, CIRAD, ORSTOM-IRRI, Kyoto University
13: SAM (Systèmes Agraires de Montagne) project	▪ Understanding the diversity, dynamics and functioning of upland agricultural systems at regional level ▪ Accelerating the transfer of research findings to development and practical implementation	Bac Kan, Son La	• Characterize the biophysical and socio-economic diversity of agricultural production systems and create a NRM knowledge base at different scales ▪ Identify, test and validate indicators to monitor changes and to upscale knowledge from farm to watershed to province levels • Simulate the consequence of land use scenarios in support of decision making by various stakeholders and policy makers	VASI, CIRAD-CA, ORSTOM-IRRI

Table 4. (continued)

Paper	Main R&D issue(s)	Target/study area	Project/study description	Institution(s)
14: Deltas Project	▪ Institutional framework, policies and irrigation management ▪ The water chain ▪ Diversification in poldered raised bed systems	Bac Ninh, Ha Noi, Hai Duong, Hung Yen [Bac Hung Hai Hydraulic Unit of the RRD (200,000 ha), in comparison with MRD and Chao Phraya Delta]	▪ Document and understand the institutional framework and jurisdiction in water allocation, water pricing and social organization patterns around pumping units ▪ Model hydraulics; monitor cropping patterns, irrigation practices and identify management issues ▪ Investigate strategies for agricultural diversification; commodity chains and marketing channels; impact of raised beds practices on polder drainage	VASI, GRET, Univ. de Louvain, Hohenheim Univ (EC funded)
15: ECOPOL Project	Impact of agricultural, economic and institutional policies on agricultural change and development	Ha Tay, Hai Duong, Nam Dinh, Nam Ha	▪ Document, characterize and develop a functional representation of the production-marketing system ▪ Simulate future scenarios ▪ Formulate possible strategies for the future, emphasizing improving the link between farmers and the market	VASI, CIRAD
16: Kyoto collaboration project	▪ Socio-economic issues related to changes from subsistence to commercial farming ▪ Institutional issues – role of cooperatives, local government and the state	Nam Dinh (Nam Ha Irrigation Scheme No.1)	Evaluate rice productivity, cropping systems and nutrient balance, and document water management through field experiments, interviews with agencies, questionnaire survey, monitoring of water pumping operation record and water quality	VASI, Kyoto University

Main discussion points:

1. There is a need to include research components that are directly relevant and effectively support development projects. There are already many partners in ecoregional research in the RRB. The challenge is to achieve good collaboration and integrate the separate studies.
2. Difficulties are often faced in doing research in the highlands, for a number of reasons: (i) farmers in the highlands are very conservative; (ii) budgets for research are limited in comparison to those for development projects. Many development projects provide grants to farmers, but the benefits do not extend beyond the duration of the project.
3. More studies are needed to achieve a better understanding of the agricultural diversification in the RRB. Such studies require collaboration between Vietnamese and international organizations.

In Table 5, the issues raised by the session papers at this Technical Workshop are cross-tabulated against the list of issues earlier identified in the Planning Workshop in 1997[1]. This exercise is meant to determine:

a. Which of the earlier issues received more attention (as indicated by the row totals; highest counts are shown in bold); and
b. Which of the earlier issues were addressed by each paper (as indicated by the column totals; highest counts are shown in bold).

Note:

[1]Refer to Summary Proceedings of the Planning Workshop on Ecoregional Approach to Natural Resources Management in the Red River Basin, Vietnam held in Ha Noi, Vietnam on 06-08 October 1997, prepared MARD and IRRI.

Table 5. Cross tabulations between issues raised in the 1997 Planning Workshop and those addressed in the present session papers. *Papers 4 and 12 do not apply in this cross-checking.

Set 1: Soil and nutrient movement

Issues	Session 1				Session 2					S. 3		Session 4					Total
Paper	1	2	3	4*	5	6	7	8	9	10	11	12*	13	14	15	16	
1. Land degradation in uplands and lowlands	X	X	X	NOT APPLICABLE				X		X	X	NOT APPLICABLE	X				7
2. Effects of soil and nutrient movement within and among uplands to lowlands on long term production of both ecosystems	X		X		X					X			X			X	6
3. Effects of sedimentation on soil fertility in lowlands			X		X												2
4. Improvement of land and soil use	X	X	X		X		X	X		X	X		X				**9**
5. Intensification and soil degradation in uplands and lowlands	X	X	X										X				**4**
6. Rehabilitation of degraded soils in the hills of mid-region	X	X	X							X	X						5
7. Hill erosion	X		X							X	X						4
8. Salinization of soils					X					X							2
Total	6	4	**7**		4	0	1	2	0	6	4		4	0	0	1	39

Set 2: Water management

Issues	Session 1				Session 2					S. 3		Session 4					Total
Paper	1	2	3	4*	5	6	7	8	9	10	11	12*	13	14	15	16	
1. Effects of sedimentation on water management in the lowlands				NOT APPLICABLE	X		X	X				NOT APPLICABLE					3
2. Intensification and degradation of water resource (with large reservoirs) in uplands and lowlands	X		X		X		X		X	X				X			**7**
3. Flood control						X	X	X			X						4
4. Efficient and equitable water management							X	X	X	X				X		X	6
5. Interactions between diversification and water management			X			X		X	X	X				X		X	**7**
6. Water resource inventory and valuation					X		X										2
7. Economic aspects of water management					X			X	X					X		X	5
8. Upgrade of drainage and irrigation systems									X					X			2
9. Management of computing systems for water use					X				X								2
10. Changes implied by new water management systems/organization					X		X							X			3
11. Problems of water quality and environment in rural areas					X	X	X			X						X	5
12. Identification/solving of socio-economic constraints in irrigated areas					X			X						X	X	X	5
13. Institutional aspects in water conservation	X				X		X		X							X	5
Total	2	0	2		**9**	3	8	6	7	4	1		0	7	1	6	56

Set 3: Land use management

Issues / Paper	Session 1				Session 2					S. 3		Session 4					Total
	1	2	3	4*	5	6	7	8	9	10	11	12*	13	14	15	16	
1. Appropriate land use management at watershed level and community level	X		X	NOT APPLICABLE						X	X	NOT APPLICABLE	X			X	6
2. Sustainability of cropping systems, in particular intensive systems	X	X	X					X		X	X		X			X	8
3. Impact of population dynamics on land use								X		X	X		X				4
4. Environmental impact of migration on uplands (mountains)	X										X						2
5. Impact of farmer's practices on resources dynamics								X			X					X	3
6. Reforestation	X							X		X	X						4
7. Nutrient and pesticides management in rice-based cropping system		X	X				X				X						4
8. Effects of pesticide use on health and environment							X			X	X						3
9. Loss of biodiversity due to intensification and natural resource degradation																	
10. Implication of intensive farming system on pest situation											X						1
11. IPM for food crops											X						1
12. Technical and socio-economic constraints to production in mountainous areas										X	X		X				3
Total	4	2	3		0	0	2	4	0	6	11		4	0	0	3	39

Set 4: Diversification and economic development

Issues / Paper	Session 1				Session 2					S. 3		Session 4					Total
	1	2	3	4*	5	6	7	8	9	10	11	12*	13	14	15	16	
1. Diversification, specification of economic activities and agricultural production for increasing farmers income in a sustainable manner				NOT APPLICABLE						X	X	NOT APPLICABLE	X	X	X	X	6
2. Crop - livestock systems in uplands													X				1
3. Maximization of yield return and maximization of economic yield																	
4. Non-agriculture activities											X		X	X	X	X	5
5. Market drive changes and marketing of agricultural products										X	X		X	X	X	X	6
6. Population pressure, employment and diversification											X			X	X		3
7. Linkage between agricultural and non-agricultural enterprises (shock, competition and complementary in resource usage)														X	X	X	3
8. Linkage between town and countryside, between RRB and other regions											X			X	X		3
9. Agro-industrialization as support to diversification														X	X	X	3
10. Evaluation of diversification dynamics													X	X		X	3
11. Commodity and consumption systems													X	X	X	X	4
Total	0	0	0		0	0	0	0	0	2	5		6	9	8	7	37

Typology of NRM projects and activities presented at the Workshop

An exercise was carried out to analyze the nature of NRM projects and activities presented in the first four sessions of the Workshop, and to summarize these in thematic, geographical and institutional terms.

Summary by Themes

Figure 2 summarizes the typology of topics by thematic area. All topics addressed by the speakers during the first four sessions were represented in a square (Figure 2), with each side corresponding to the general theme of a session. Each topic presentation (identified by the paper number indicated in the session summary tables above) was written on a label with a pattern corresponding with that of its session. The labels for the topic presentations were arranged within the space of the square such that topics centered on the session themes were placed closer to the corresponding side of the square, while more interdisciplinary topics were placed closer to the square center.

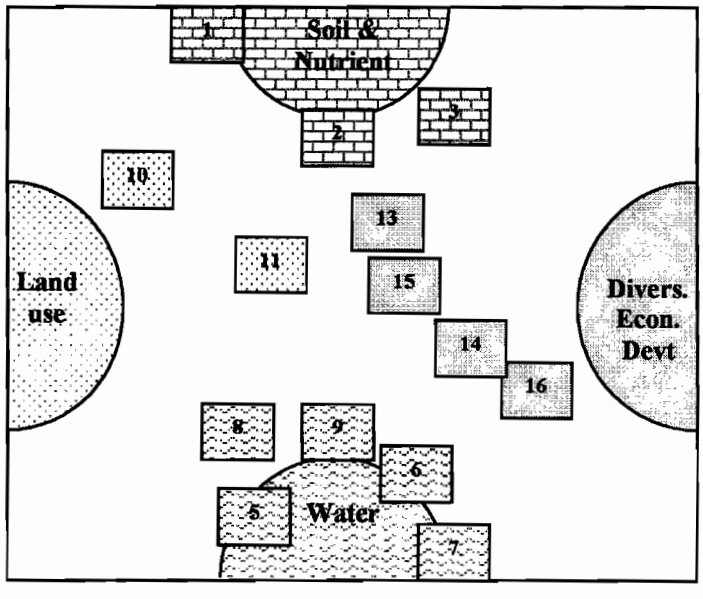

Figure 2. A thematic typology of topics presented at the Workshop

The diagram, as well as the cross-tabulations in Table 5 above, show that most of the topics presented during the first and second session, i.e. "Soil and nutrient management" and "Water management", tend to be discipline-centered. No paper explicitly addressed topics along the vertical "soil – water" axis despite the important role of water in soil and nutrient movements. This was considered as a gap that could be addressed as an ecoregional project for the RRB.

On the other hand, the third and fourth sessions, "Land use management" and "Diversification and economic development", covered a broad range of topics along the horizontal axis. The topics addressed under these two sessions were more interdisciplinary than those of the two previous sessions. A number of presentations addressed all the four themes at the national scale. Some overlaps were identified between the third and fourth sessions (e.g. projects on land use changes and agricultural diversification). These overlaps may be rationalized through collective planning of research activities under the EcoR-I.

Summary by geographical focus

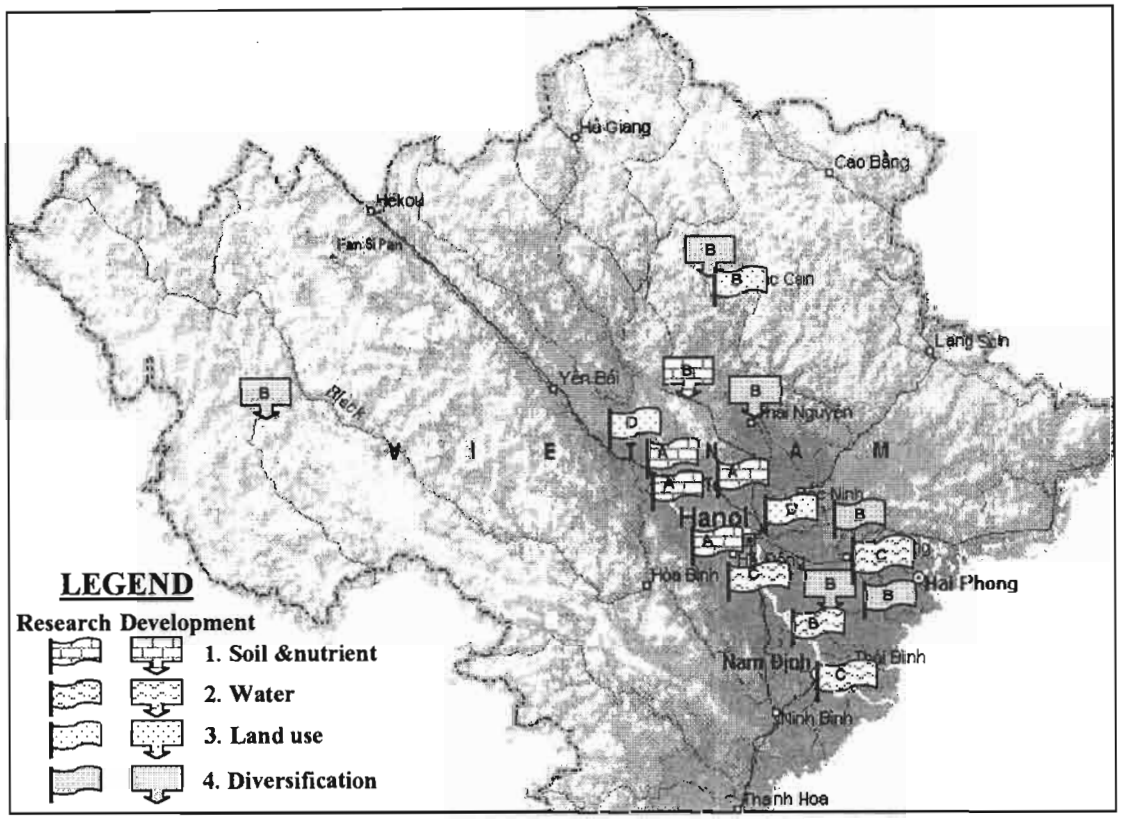

Figure 3. A geographical typology of topics presented at the Workshop

The projects presented during the four sessions were also classified according to the main themes addressed and the implementing institution, and geographically located on a map. Figure 3 illustrates the mapping exercise that was carried out; however because of scale constraint, the actual mapped data are not shown. The results presented are only indicative of the main trends as the presentations did not cover all NRM R&D activities in the Red River Basin.

The first noticeable trend is that most research activities tend to be concentrated around Hanoi, while development-oriented projects are geographically more spread out within the Red River Basin.

It is also found that projects that address complementary research issues in the same geographic area (e.g. in Phu Tho province) do not seem to have any linkage, even though some of these projects are developed by the same institution.

Summary by Institutional Focus

In the general presentation of R&D activities in the RRB, each institution presented a large range of disciplines and research themes. However, further project presentations appeared much more centered on soil and water sciences for NISF and VIWRR respectively. NIAPP and VASI presented a larger range of themes, covering larger geographic areas. The four institutes appear to have developed complementary research activities, but so far independently from each other. In the ensuing discussion,

it was recognized that there are potentially several fields of common interest among institutions, e.g.: water policy and pricing (VIWRR and VASI), land use changes and agricultural diversification (NIAPP and VASI), soil and water movement at the watershed level (NISF, VASI, VIWRR), etc.

This exercise conducted during the few hours devoted to the first four sessions showed its relevance in revealing thematic and geographic gaps, overlaps and opportunities for partnerships between R&D projects in the RRB. However, a more systematic and exhaustive inventory would be needed to draw conclusions at the basin level and to jointly design proposals to fill the gaps, rationalize the overlaps, and harness partnerships.

The need for a Project Information Database

The purpose of the project information database is to gather more comprehensively the type of information that was collected from the participants to the workshop about "who is doing what, where" in the field of NRM. This information would be made available to the different projects and institutions and would facilitate partnerships among them under the EcoR(I). The rationale and proposed activities for implementing a project information database for the RRB are outlined in Concept Note No 5 in Appendix V.

Summary of Discussion Sessions

Session 5: Determination of Common Program(s) for Integrated Studies

Figures 2 and 3 summarize the thematic and geographical distribution of the current projects reported in the Technical Workshop. This information was also captured in the project DBMS (Data Base Management System) comprising a database and mapping tool, which was demonstrated at the workshop. The participants proposed that a beta version be distributed to concerned institutes for testing.

Main discussion points:

1. While farming systems research concentrates on the farm level, the ecoregional approach of NRM addresses upscaling beyond the field and farm level, which requires different methodologies.

2. Food security problem in the highlands, resulting from increasing pressure of local populations, is further exacerbated by the migration of people from the over-populated lowlands. In addition, the migrant lowland farmers who are unfamiliar with cultivation practices on sloping land tend to cause environmental damage.

3. Because of the hydrological linkage between the uplands and lowlands within a river basin, degradation of the uplands would have adverse effects on the lowlands. In order to minimize uplands degradation, it would be necessary for the lowlands economy to support the basic needs of the upland populations.

A list of research issues were identified as requiring further discussion on developing collaborative studies, of which the following four were prioritized:

a. Food security for rural households in the uplands

b. Land use alternatives for water deficit areas

c. Sedimentation and sustainable development

d. Social management of water resources

The remaining issues include the following:

a. Water flow pattern and its relation to land use (deforestation)

b. Changes in cropping patterns in relation to socio-economic development and marketing

c. Application of SysNet methodology in the RRB

d. Movement of population and products between uplands and lowlands

e. Operation of reservoirs for proper land and water resource use

f. Soil fertility and its relationship to sedimentation

Session 6: Setting up Collaboration Work Plans

Four working groups were formed, each comprising participants from Vietnamese and international organizations, to brainstorm on groups of issues and collaborative approaches. The results of group discussions are presented in the tables below.

Group I
Discussion topic 1: Rural development and food security in the uplands

Table 6. Summary of discussions on Topic 1

Problems to be studied	Research objectives	Methodology/Activities	Expected outputs	Partners
1. Degradation and depletion of natural resources, resulting in problems of deforestation, erosion, modification of water flow. 2. High population pressure on arable land 3. Low incomes and limited alternative work opportunities and sources of income. 4. Poverty and food security of the upland communities 5. Understanding of the existing constraints and opportunities and needs of the stakeholders from farmers to policy makers 6. Exploring alternatives and their likely impacts. 7. Sustainability of current agricultural practices 8. Changing cropping systems to diversify and introduce commercially-oriented agriculture 9. Evaluation of agricultural development alternatives 10. Upland population move to lowland areas.	1. Understand the current dynamics of rural development in the uplands. 2. Identify major problems such dynamics will lead to. 3. Propose consequent actions and development orientations to solve these problems.	1. Define a comprehensive agro-ecological zonation of the uplands of the RRB. 2. Collect general statistical data and define a sample of areas 3. Survey on recent evolutions in using soil, water, forest and labor and in animal husbandry. 4. Discussion with stakeholders on the results and on the possible reactions. 5. Analysis of the results to assess the major problems due to the current dynamics. 6. Propose actions and development orientations to solve these problems and discuss with stakeholders and decision makers. 7. Synthesis on the findings and on the effectiveness of the applied methodology.	1. Understanding achieved of the current dynamics of rural development: • Effect of soil use on soil fertility and yields • Effect of forest use on forest quality and forest exploitation • Effect of water use on water availability • Impact of upland population practices on the above aspects • Major problems due to dynamics of rural development. 2. Recommendation of actions and development orientations. 3. Interdisciplinary methodology developed for analyzing the dynamics of uplands' rural development.	NIAPP NISF VASI VIWRR CIRAD ORSTOM IBSRAM CIAT IRRI

Group II
Discussion topic 2: Land use alternatives in the RRB.

Table 7. Summary of discussions on Topic 2

Problems to be studied	Research objectives	Methodology/Activities	Expected outputs	Partners
1. Rapid land use changes due to agricultural policies, population pressure, and integration to market require better adaption of stakeholders. 2. Lack of experience and historical background necessary for making decision on land use. 3. Research results are released too late and have only little impact on development. 4. Diversity of land use due to local situations.	1. To facilitate interactions between research programs. 2. To combine different methodologies in a same geographic area 3. To design methodological innovations for better matching research activities to rapid land use changes. 4. To provide stakeholders with options for sustainable NRM through explorative land use studies. 5. To provide techniques for assessing R&D projects.	1. Technical workshop among NRM projects. 2. Development and testing of methodologies for explorative land use studies. 3. Assessment of NRM projects impact through stakeholder surveys. 4. Evaluation of gaps and overlaps in the NRM studies to rationalize the overlaps and propose gap filling studies. 5. Documentation and information dissemination.	1. Methodology developed for better capturing rapid land use changes 2. A knowledge base on NRM integrating results of R&D projects across levels and toposequence. 3. A decision making support system developed for sustainable management of natural resources. 4. Land use options defined for distinct agroecosystems and socio-economic environments. 5. Improved communication among NRM projects and partnership mechanisms developed	VASI NIAPP NISF IRRI CIRAD ORSTOM KU

Group III
Discussion topic 3: Interactions between soil and water in the RRB.

Table 8. Summary of discussions on Topic 3

Problems to be studied	Research objectives	Methodology/Activities	Expected outputs	Partners
1. An annual average of 140 billion cubic meters of soil and nutrients losses into the sea. 2. Extensive erosion and leaching in many parts of the basin 3. Large increase in the area of bare and denuded hills 4. Land productivity degradation in the uplands and lowlands. 5. Dykes for flood control prevent natural replenishment of lowland deltaic soils 6. Soil erosion and land degradation in the Red River Basin.	1. Standardize methods for quantifying water flow/ sediment/ nutrients 2. Quantify factors causing soil erosion and the process of sedimentation in lowland 3. Identify the features of soil fertility changes 4. Establish suitable cropping patterns that reduce soil loss in the uplands and maximize use of sediment in the lowlands	1. Develop/test standard methods in the river systems 2. Select/establish transect sites for controlling soil erosion in uplands and monitoring soil fertility changes in lowlands 3. Quantify the rate of siltation in water reservoirs 4. Economic evaluation of sediment in lowlands 5. Test cropping pattern that reduce soil loss in the upland and maximize use of sediment in lowlands	1. Sets of standard methods for quantifying water flow/sediment/-nutrient/pollutants identified 2. Quantitative estimates of sediment volume and its economic value 3. Quantified factors of land degradation and soil erosion 4. Sustainable cropping patterns identified 5. Technical publications on methods, sediment estimates and mitigation measures	NISF VIWRR VASI IRRI IBSRAM ICRAF GRET

Group IV
Discussion topic 4: Social management of water resources.

Table 9. Summary of discussions on Topic 4

Problems to be studied	Research objectives	Methodology/Activities	Expected outputs	Partners
1. Social factors and cost effectiveness of water control has not been adequately addressed. 2. Changes in land use result in change in demand for water supply and drainage but existing irrigation and drainage systems have not been adequately adjusted to these changes. 3. Drainage is important for cultivation of upland crops in water-logged areas but not receives attention as irrigation. 4. Farmers' participation in water control has not been encouraged and there are conflicts between farmers and water managers. 5. Irrigation managers are subjected to the requirements of the province where they are located. 6. Lack of coordination and transparency within an irrigation scheme. 7. No strategies/solution for water pricing.	1. To understand the reason of gaps between the design and the real operation of water control system 2. To analyze the management and economic aspects of water control system 3. To prepare a set of recommendations on water management for both irrigation and drainage.	1. Analyze the gaps between design and the reality 2. Land use and flood mapping 3. Economic studies of alternative land use 4. Study water sharing relationship between company, commune, etc. 5. Explore alternatives for water distribution 6. Study sharing of revenues from water surcharge amongst the various groups 7. Establish monitoring (quantitative) and control of flows 8. Costings/financial flow analysis, for drainage as well as irrigation	1. Package of improved water management, both technical and institutional 2. Technical – new tools/technology; improved structures 3. Improved system demonstrated for pilot site 4. Extension program in place to disseminate to other areas 5. Recommendations for water policy, especially water pricing	VIWRR VASI IWRP NIAPP IRRI

Four concept notes were prepared during the group discussions and will be used as starting documents for developing of new research proposals with the collaboration among Vietnamese and international organizations:

1. Research on sustainable rural development in the upland area
2. Matching natural resource management research to rapid and intensive land use changes in the Red River Basin
3. Quantifying sources and movement of sediments and pollutants in the Red River to develop improved mitigation measures for erosion and utilization of alluvium
4. Social management of water resources

A fifth concept note was prepared by IRRI scientists for developing the DBMS for projects in the RRB.

5. An information system on NRM projects in the RRB, Vietnam

These concept notes are included in Appendix IV.

Session 7: Conclusion and Next Steps

In his concluding remarks, Dr. N.N. Kinh expressed appreciation for the outcomes of the workshop and proposed the following actions:

- Report the workshop results to the Vietnam-IRRI meeting, to be held on 12-13 October, 1998.
- Four Vietnamese institutes VASI, NIAPP, NIWRR, NISF will assign coordinators to develop concept notes into research proposals with the assistance from IRRI and other international organizations.
- DOSTPQ will organize a meeting of working groups for each proposal.

On the IRRI side, Dr. P. Teng informed that IRRI can only contribute a limited fund used as seed budget for initiate ecoregional research in the RRB, and Dr. S.P. Kam will be responsible for the ECOR(I) from 1999.

Appendix I: WORKSHOP PROGRAM

Workshop Schedule

Monday, 09 November

	Opening Session *Chair: Prof. Dr. Vu Tuyen Hoang*	
0830 – 0900	Opening Remarks	Dr. Nguyen Ngoc Kinh
0845 – 0930	Implementing integrated natural resource management R&D in the Red River Basin, Vietnam – Towards a common vision	Dr. Paul Teng Dr. Suan Pheng Kam Dr. Jean-Christophe Castella
0930 – 1000	Coffee Break	
	Session 1: Soil and Nutrient Movement *Chair: Dr. Mai Van Quyen*	
1000 – 1020	The movement of soil, water and nutrient on sloping land of the Red River Basin	Mr. Tran Duc Toan
1020 – 1040	Reversing trends of declining productivity in intensive irrigated rice systems – SSNM in Red River Delta	Dr. Tran Thuc Son
1040 – 1100	A comprehensive quantitative study of the soil fertility differentiation at plot scales in the hill region of the Red River Basin	Dr. Pham Quang Ha
1100 – 1120	Research proposal on the set 1 of issues "Soil and nutrient movement" in the RRB	Prof. Dr. Nguyen Van Bo
1120 – 1150	Discussion on soil and nutrient movement	
1150 – 1330	Lunch	

Session 2:
Water Management
Chair: Dr. Tran Dinh Hoi

1330 – 1350	Improvement of irrigation water use efficiency by application of I.M.S.O.P. model for rotational operation of La Khe main irrigation channel	Ms. Tran Phuong Diem Mr. Nguyen Viet Chien
1350 – 1410	Water balance and management of water resources in the RRB	Ms. Nguyen Thi Phuong Lam
1410 – 1430	Structure of alluvial irrigation water diversion	Prof. Nguyen Thanh Nga
1430 – 1450	Water flow control measurement structure	Dr. Nguyen The Quang
1450 – 1520	Coffee break	
1520 – 1550	Discussion on water management	

Session 3:
Land Use Management
Chair: Prof. Dr. Nguyen Van Bo

1550 – 1610	Soil resources of the Red River Basin	Prof. Dr. Nguyen Khang
1610 – 1630	Land use and management in the RRB	Prof. Dr. Vu Nang Dzung
1630 – 1700	Discussion on land use management	
Evening		
1900	Reception hosted by MARD and IRRI	

Tuesday, 10 November

Session 4:
Diversification and Economic Development
Chair: Dr. Dang Kim Son

0830 – 0840	On the diversification and economic development of the Red River Delta	Prof. Dr. Dao The Tuan
0840 – 0855	Project SAM	Dr. Jean-Christophe Castella
0855 – 0910	Project Deltas	Dr. Pascal Bergeret
0910 – 0925	Project ECOPOL	Dr. Franck Jesus
0925 – 0940	Project Kyoto	Mr. Masayuki Yanagisawa
0940 – 0950	Discussion on diversification and economic development	
0950 – 1020	Coffee Break	

Session 5:
Determination of Common Program(s) for Integrated Studies
Chair: Dr. To Phuc Tuong/Dr. Jean-Christophe Castella

1020 – 1100	Study domain(s)/program(s) proposed by lead agencies for each set of issues
1100 – 1200	Discussion and selection of study domain(s)/program(s)
1200 – 1330	Lunch

Session 6:
Setting Up Collaboration Workplans for Integrated Studies
Chair: Dr. Paul Teng

1330 – 1500	Group discussions on research activities and collaboration workplan for each set of issues in selected domain(s)/program(s)
1500 – 1530	Coffee Break
1530 – 1630	Presentation of group discussions
	Plenary discussion on collaboration workplan and funding supports

Session 7:
Conclusion and Next Steps
Chair: Dr. Nguyen Ngoc Kinh

1630 – 1700 Sum up the workshop proceedings and identify follow-up action:

- Action plan summary
- Closing

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Appendix III: ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
CIAT	Centro Internacional de Agricultura Topical
CGIAR	Consultative Group of International Agricultural Research Centers
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France
CIRAD-CA	Annual Crops Department of the Centre for International Cooperation in Agricultural Research for Development
CGPRT	The Regional Coordination Centre for Research and Development of Coarse Grains. Pulses, Roots and Tuber
CLRRI	Cuu Long Rice Research Institute
DARDP	Department of Agricultural and Rural Development Policy, MARD, Vietnam
DBMS	Data Base Management System
DOSTPQ	Department of Science, Technology and Product Quality, MARD, Vietnam
ECOR(I)	Ecoregional Initiative for the Humid/Sub-Humid Tropics/Subtropics of Asia
EWG	Ecoregional Working Group
FAO	Food and Agriculture Organization of the United Nations
FCRI	Food Crops Research Institute
HAU	Ha Noi Agricultural University, Vietnam
GRET	Groupe de Recherche et d' Echanges Technologiques, France
IAS	Institute of Agriculture Science of South Vietnam
IBSRAM	International Board for Soil Research and Management, Thailand
ICRAF	International Centre for Research in Agroforestry
IMT	Irrigation Management Transfer
IWRPM	Institute of Water Resource & Planning Management
IMSOP	Irrigation Main System Operation
IPM	Integrated Pest Management
IRRI	International Rice Research Institute
KU	Kyoto University, Japan
MARD	Ministry of Agriculture and Rural Development
NGO	Non-government organization
NIAPP	National Institute for Agricultural Planning and Projection, MARD, Vietnam
NISF	National Institute for Soils and Fertilizers
NIWRR	National Institute for Water Resources Research
NRM	Natural Resources Management
ORSTOM	Institute Francais de Recherche Scientifique pour le Developpement en Cooperation, France (French Research Institute for Development in Cooperation)
PIM	Participatory irrigation management
R&D	Research and Development
RRD	Red River Delta
RRB	Red River Basin
SAM	Systemes Agraires de Montagne
Sub-NIAPP	Sub-National Institute for Agricultural Planning and Project
TNU	Thai Nguyen University, Vietnam
UNESCO	United Nations Educational, Scientific, and Cultural Organization
VASI	Vietnam Agricultural Science Institute, MARD, Vietnam
VIWRR	Vietnam Institute for Water Resources Research
VTGEO	Trung Tam Vien Tham Va Geomatic
WAU	Wageningen Agricultural University
WHO	World Health Organization

Appendix IV: CONCEPT NOTES

Concept Note 1
Red River Basin Ecoregional Program

Project Title

Research on sustainable rural development in the upland area

Rationale

Current changes in land use and rural development have led to degradation and depletion of natural resources, resulting in problems of deforestation, erosion, modification of water flow. The pressures on the use of the land and water resources stem from high population pressure on arable land and low incomes and limited alternative work opportunities and sources of income.

There is a felt need to address the problems of poverty and food security of the upland communities, at the same time ensuring sustainability of the natural resource base. Seeking the solutions to these problems require a clear and common understanding of the existing constraints and opportunities and needs of the stakeholders from farmers to policy makers, as well as a sound scientific basis for exploring alternatives and their likely impacts. Serious questions on the sustainability of current agricultural practices need to be quantitatively answered. Changing cropping systems to diversify and introduce commercially-oriented agriculture have wider reaching implications on policy and infrastructure development to facilitate better market integration of the isolated areas in the uplands. Agricultural development alternatives need to be evaluated against other options such as tourism development and encouraging the upland population to move to lowland areas.

In the light of current rapid degradation of the natural resource base, there is an urgency to address these problems in an inter-disciplinary and participatory manner involving the various stakeholders. Novel approaches and methodologies in research and bringing research results into implementation and for decision support need to be developed.

Objectives

1. Understand the current dynamics of rural development in the uplands.
2. Assess what major problems such dynamics will lead to.
3. Propose consequent actions and development orientations to solve these problems.

Expected Outputs

1. Understanding of
   a) the current dynamics of rural development in the uplands in relation with soil, water and labor use
   b) effect of soil use on soil fertility and consequent possible yields
   c) effect of forest use on forest quality and consequent possible forest exploitation
   d) effect of water use on water availability and consequent possible use of water
   e) the impact of upland population practices on the above aspects
2. Assessment of the major problems that such dynamics will lead to.
3. Proposition of consequent actions and development orientations to solve these problems leading to better policies for a better development of rural uplands.
4. An interdisciplinary methodology development for better understanding of the dynamics of uplands' rural development.

Activities

1. Define a comprehensive agro-ecological zonation of the uplands of the RRB.
2. Collect general statistical data on each zone.
3. For each zone, define a sample of area where more detailed work will be undertaken.
4. To understand the current dynamics of rural development in the uplands:
   a) survey on recent evolutions of soil use by upland population
   b) soil sample analysis linked with former practices of farmers on the sample site to draw out an image of the current dynamics of soil use and their effect
   c) survey on recent evolutions of water use by upland population
   d) survey on recent evolutions of labor use by upland population
   e) survey on recent evolutions of animal husbandry development by upland population
   f) survey on recent evolutions of forest use by upland population
   g) soil sample analysis linked with former practices of population on the sample site to draw out an image of the effect of current dynamics of soil use
   h) analysis of the quality of a sample of forest areas linked with former practices of population on the sample site to draw out an image of the effect of current dynamics of forest use
   i) survey on changes in water circulation linked with former practices of population on the sample site to draw out an image of the effect of current dynamics of water use
   j) analysis of the effects of the current changes in animal husbandry practices and labor use in uplands
   k) discussion with stakeholders on the results and on the possible reactions of upland population to such evolution.
5. Analysis of the results to assess the major problems the current dynamics will lead to.
6. Writing of proposals of consequent actions and development orientations to solve these problems discussion on these proposals with stakeholders and decision makers.
7. Synthesis on the findings and on the effectiveness of the applied methodology.

Expected Impacts

1. Better understanding of what is at stake in the future evolution of upland areas.
2. Help for decision makers to choose adapted policies for these regions.
3. Help for local stakeholders to manage their own resources.
4. Consequent improved living standards of upland population.
5. Consequent better natural resource management.
6. Applying the methodology to other upland areas.

Partners

NIAPP, NISF, VASI, VIWRR, CIRAD/ORSTOM, IBSRAM, CIAT, IRRI

Duration

3 years (1999-2002).

Funding required

US$ 500,000.00

Concept Note 2
Red River Basin Ecoregional Program

Project Title

Matching natural resource management research to rapid and intensive land use changes in the Red River Basin

Rationale

During the last decade Vietnam went through rapid and profound political, economic, and social changes that give rise to a number of problems for land use planning :

- Land use changes are so rapid that farmers, local leaders, and decision makers have to constantly adapt to new conditions and new rules. But they often lack the experience and the historical background necessary to explore possible options for the future before making decision.
- On the other hand, the rapidity of changes makes it difficult for researchers to capture through traditional approaches. Very often, when research results are released they are not relevant anymore to the current development issues, and therefore have only little impact on development. New methods should thus be developed to insure that research programs match to constantly evolving development issues.
- Agricultural policies, population pressure, and integration to market are main driving forces of current land use changes. However, their impact varies greatly with the diversity of local situations. It is thus important to take into account the interactions between local and regional (sub-national) changes when designing decision making support for sustainable management of natural resources.

As it is very difficult for any individual project to tackle the three above points, we believe it is possible to build on existing knowledge, acquired through past and on-going research projects in the field of natural resource management. Such an approach, requires to develop original methods for multidisciplinary and multiscale integration of NRM knowledge, and to develop partnership mechanisms between NRM projects.

Objectives

- to facilitate interactions between several research programs developing ecoregional approaches in the Red River Basin (Vietnam).
- to combine different methodologies in a same geographic area as a way to develop synergies, identify complementarities between NRM projects, and design methodological innovations to better match research activities to rapid land use changes.
- to provide end-users (policy decision makers, planning agencies, regional stakeholders, etc.) with options for sustainable management of natural resources through explorative land use studies.
- to provide decision makers with keys to assess the relevance of R&D projects in meeting their particular expectations related to sustainable development of a given geographic area.

Expected outputs

- Methodology developed to better capture rapid land use changes
- A knowledge base on natural resource management integrating results of R&D projects from local to regional level (RRB), across the toposequence.
- A decision making support developed for sustainable management of natural resources.
- Land use options defined for contrasted agroecosystems and socio-economic environments.
- Improved communication among NRM projects and partnership mechanisms developed

Sites

All provinces along a transect from Cao Bang (highlands) to Ha Nam (delta).

Activities

- Technical workshop among NRM project working in the study sites.
- Development of methods for explorative land use studies
- Assessment of NRM projects impact through farmers and stakeholders surveys.
- Evaluation of gaps and overlaps (geographic, thematic, etc.) in the past and on-going NRM projects studies. Rationalization of the overlaps and design of gap filling studies.
- Documentation and information dissemination: publication of a land use newsletter, translation of key methodological books into Vietnamese

Partners

All NRM projects in the studied area and related institutions (VASI, NIAPP, NISF, IRRI, CIRAD, ORSTOM, KU)

Duration

5 years

Funding

US$500.000 over the 5-year period

Concept Note 3
Red River Basin Ecoregional Program

Project Title

Quantifying sources and movement of sediments and pollutants in the Red River to develop improved mitigation measures for erosion and utilization of alluvium

Rationale

The Red River in an average year is estimated to discharge approximately 140 billion cubic meters of soil and nutrients into the Gulf of Tonkin. This phenomenon is the result of extensive erosion and leaching in many parts of the basin, and has led to a large increase in the area of bare and denuded hills, and to land productivity loss in the uplands and lowlands. Dykes constructed for flood control have exacerbated the problem by preventing natural replenishment of the lowland deltaic soils, thereby denying the downstream occupants of the Red River what is naturally a benefit from the upstream removal of soil and nutrients. To develop long term strategies for sustainable development in the Red River Basin requires that this annual movement of sediments, and the accompanying pollutants, be quantified so that mitigation measures may be developed that take into account bio-physical as well as socio-economic considerations.

Soil erosion is one of several themes selected by the Red River Basin Ecoregional Program -- an inter-institutional, inter-disciplinary program – which aims at implementing a common vision for sustainable natural resource management in the basin through collaborative projects to address selected issues. In this proposed project, the key issue in natural resource management addressed is:
Land degradation in the uplands resulting in increased sediment in water used for agriculture in the lowlands and accumulation of pollutants in the soils, water and agricultural products.

Objectives

1. Standardize methods for quantifying water flow/ sediment/ nutrients within the uplands, and from the uplands to lowland;
2. Quantify factors causing soil erosion and the process of sedimentation in lowland (including in reservoir);
3. Identify the features of soil fertility changes (degradation/declining productivity/improvement)
4. Establish suitable cropping patterns that reduce soil loss in the uplands and maximize use of sediment in the lowlands

Expected outputs

1. Sets of standard methods for quantifying water flow/sediment/nutrient/pollutant identified
2. Quantitative estimates of sediment and economic value of its contribution to soil fertility in the lowland
3. Quantified factors of the main causes of soil degradation and sources of erosion
4. Sustainable cropping pattern with appropriate technologies identified
5. Technical and popular publications on methods, sediment estimates and mitigation measures

Partners

National Institute for Soil Fertility (NISF), Vietnam
Vietnamese Institute for Water Resources Research (VIWRR)
Vietnamese Agricultural Sciences Institute (VASI)
International Rice Research Institute (IRRI)
International Board for Soil Research and Management (IBSRAM)
International Center for Research on Agroforestry (ICRAF)
GRET

Activities

1. Develop/test standard methods: 3 rivers (Da, Hong and Thaibinh), 3 location/river:upstream, middle and downstream (NISF, VIWRR)
2. Select/Establish transect sites for controlling soil erosion in upland and monitoring soil fertility changes in lowland
3. Quantify the rate of siltation in water reservoirs (VIWRR)
4. Economic evaluation of contribution of sediment to soil fertility in the lowland
5. Test cropping pattern that reduce soil loss in the upland and maximize use of sediment in lowland (NISF, VASI)
6. Training (1)/Workshops (3: planning, impact and final)

Impact and beneficiaries

Outputs anticipated from the proposed collaborative project are improved measures of natural resource management in the Red River Basin by farmers and policy makers. The project will contribute significantly to the reduction of upland land degradation in the main watersheds of the Red River Basin, and to the improved utilization of soil alluvium in the lowland regions of the basin. This will directly reduce poverty by increasing the income of rice farmers in the lowlands.

Funding required

Vietnamese partners will contribute 15 scientist-years of effort towards this collaborative project. A budget of USD 350,000.00 for three years is estimated to support the costs of experimentation, training and planning workshops, and publications.

Concept Note 4
Red River Basin Ecoregional Program

Project Title

Social management of water resources

Rationale and objectives

A number of problems are encountered in water management in the Red River Delta:

- In the past, agricultural water management systems in RRD focused only on the engineering aspects. The social factors and the cost effectiveness of water control has not been adequately addressed.
- Changes in land use, particularly crop diversification, result in change in demand for water supply and drainage. The existing irrigation and drainage systems have not been adequately adjusted to these changes.
- Particularly for the cultivation of upland crops in water-logged areas, drainage is increasingly becoming important and has not been given as much attention and emphasis as irrigation. In particular the drainage systems and practices required very high energy consumption for pumping.
- Water control has been handled completely by the "irrigation" companies, farmers participation has not been adequately encourage, creating conflicts between farmers and system managers.
- Irrigation service providers are subjected to the requirements of the province where they are located, which may compromise the needs of broader service area that covers more than one province.
- Division of control and lack of coordination and transparency within an irrigation scheme, e.g. between irrigation company, commune, cooperative.
- No strategies/solution for water pricing.

There are technical, institutional and policy (especially pricing) aspects/issues that need to be dealt with.

Expected outputs

- Package of improved water management, both technical and institutional
- Technical – new tools/technology; improved structures
- Improved system demonstrated for pilot site
- Extension program in place to disseminate to other areas
- Recommendations for water policy, especially water pricing

Activities

In general:

- Understanding the gaps between design and the reality
- Select methodologies and techniques
- Test methodology in pilot site

Technical aspect:

- Land use mapping
- Flood mapping
- Economic studies of alternative land use

Institutional aspect:

- Study water sharing relationship between company, commune, etc.
- Explore ways of simplifying management of water distribution from primary to secondary to tertiary canals
- Study sharing of revenue from water surcharge amongst the various groups

Policy aspect:

- Establish monitoring (quantitative) and control of flows to better understand the system of flows and distribution
- Costings/financial flow analysis, for drainage as well as irrigation

Expected Impacts

- Reduced costs
- More equitable sharing of costs for irrigation and drainage
- Improved benefit:cost for agricultural production system

Partners:

VIWRR, VASI, IWRP, NIAPP
Farmers, irrigation companies, provincial government
IRRI

Duration:

3 years

Funding required:

1 million