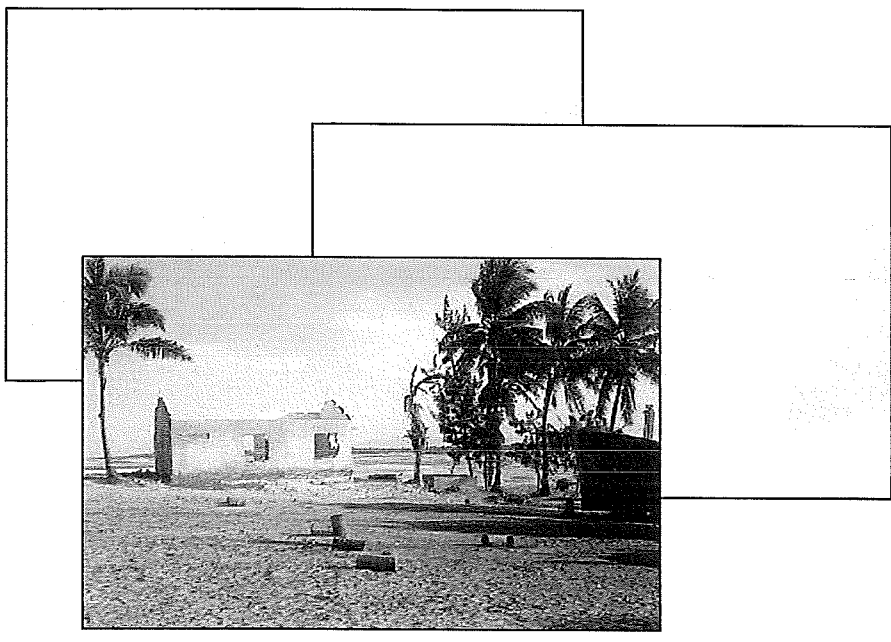


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MULTI-DONOR MISSION REPORT

Central Provinces Initiative Partnership to Mitigate Natural Disasters in Central Vietnam



Volume 1 Summary Report

Findings of the Multi-donor Mission in May 2000

Ministry of Agriculture and Rural Development
International Financing Agencies
Multilateral and Bilateral Donors
Non-governmental Organizations

*Final Draft Report
22 September 2000*

CPI Central Provinces Initiative
Partnership to Mitigate Natural Disasters in Central Vietnam

Volume 1

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SUMMARY REPORT
FINDINGS OF THE MULTI-DONOR MISSION
Central Provinces Initiative Partnership to Mitigate Natural Disasters
in Central Vietnam

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FINDINGS OF THE MULTI-DONOR MISSION
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SUMMARY REPORT

FINDINGS OF THE MULTI-DONOR MISSION

Central Provinces Initiative Partnership to Mitigate Natural Disasters in Central Vietnam

Acknowledgments

The Central Provinces Initiative Partnership is an important opportunity for Government and Donors to work together to solve the most pressing development problem in Central Vietnam: *How to mitigate the natural disasters that prevent sustainable development in one of the poorest regions of the country.*

The need for this Central Provinces Initiative Partnership became apparent to the Vietnam Consultative Group of Donor Countries, the CG, after the catastrophic flooding that occurred in Central Vietnam in November and December 1999. Any long-term assessment of development programs in Vietnam indicates that such natural disasters are annual occurrences in the Central Provinces and have a major impact. These recurrent disasters have resulted in unsustainable development that has kept Central Vietnam mired in poverty. It is to this challenge that the CG has recently put its effort in this initiative now called the CPI-Partnership.

The founding coordinators of the CPI-Partnership named below wish to thank the following Government offices, multilateral donors, bilateral donors, and non-governmental organizations that have made the CPI-Partnership possible. They are the Ministries of Agriculture and Rural Development, Transportation, Planning and Investment, Labor War Invalids and Social Affairs, Hydro-meteorological Services, and Office of Government; the representatives of the seven Central Provinces most affected by the November and December 1999 flooding; the Asian Development Bank and the World Bank; the Embassies of the Netherlands, France, Japan, the United States, and Finland; the United Nations Development Programme; the International Federation of Red Cross and Red Crescent Societies; and the Vietnam Red Cross.

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SUMMARY REPORT

FINDINGS OF THE MULTI-DONOR MISSION

Central Provinces Initiative Partnership to Mitigate Natural Disasters in Central Vietnam

1.0 Introduction to the Summary Report

After the severe floods that occurred at the end of 1999 in Central Vietnam, and after witnessing the devastating effect they had in terms of loss of life and property, a series of disaster mitigation initiatives were taken by a number of Government authorities and the Vietnam International Donor Community. These initiatives were led by the Ministry of Agriculture and Rural Development (MARD), as well as by the United Nations Development Program (UNDP) and the Royal Netherlands Embassy, who joined efforts to form of a strategic partnership to mitigate natural disasters in Central Vietnam.

This initiative resulted in a Multi-donor Mission to the Central Provinces that visited the 1999 flood-affected area from 4 to 19 May 2000. The field mission was followed by a joint presentation of the Mission's findings to all involved parties, authorities, and donors on 31 May. Some of the recommendations of the Mission, as presented to the donors, are now being translated into specific action within the framework of the Central Provinces Initiative Partnership (CPI-Partnership) for a Multi-donor Integrated Natural Disaster Mitigation Policy for Central Vietnam.

The exact scope of the Terms of Reference for the CPI-Partnership has yet to be completely defined. This scope is subject to further discussion and refinement. It is anticipated that a Memorandum of Agreement will be signed by all main parties involved, including the Government and the International Donor Community.

The contents of this Memorandum of Agreement will depend on the way the Vietnamese authorities will share different CPI-Partnership responsibilities, and the way these CPI-Partnership responsibilities can be accommodated and implemented in collaboration with the International Donor Community.

The possible content of a Memorandum of Agreement will be discussed later in this Summary Report. Prior to that discussion, however, it is necessary to understand the scope of the problem of natural disaster mitigation in Central Vietnam we are dealing with and the range of possible solutions. Following that, an overview of the Multi-donor Mission and a brief summary of its purpose are presented. The projects and programs developed by the Mission experts are then discussed in detail.

As indicated earlier, largely because this region of Vietnam is highly vulnerable to natural hazards, sustainable socio-economic development has been difficult to achieve. A report section on *Community Participation and Empowerment* therefore focuses on social issues and suggests that disaster mitigation, if undertaken properly, can enhance sustainable community development. In the latter part of this summary, financial and institutional matters, mechanisms by which the CPI-Partnership will be able to sustain itself, are touched upon. Finally, summary and recommendations are presented.

2.0 Introduction to the Problem of Natural Disasters in Central Vietnam

The location and topography of Central Vietnam makes this region extremely vulnerable to natural hazards. Located along the coast of the East Sea, this part of Vietnam is subject to typhoons and tropical depressions from June to November every year. In addition, because of the meteorological conditions generated during the monsoon season, Central Vietnam is subject to heavy rains from September to December.

The topography of Central Vietnam makes the provinces there particularly vulnerable to flooding. The mountainous western region serves as the upper catchment area for the rivers that flow east, feeding relatively narrow low-lying coastal plains. In Central Vietnam, the Truong Son Mountain Range runs parallel and close to the coast. Thus, between the mountains and the coast are these low-lying plains that are repeatedly broken by the rivers and streams that flow from the uplands to the sea. When overloaded by rainfall, these waterways discharge their excess runoff into the floodplains as flash floods. In sum, high mountains and large upland areas, relatively narrow lowland plains, many short steep gradient river systems, and long stretches of coastal sand dunes characterize the region.

2.1 Natural Disasters in Central Vietnam

Central Vietnam is vulnerable to almost all classes of natural hazards: typhoons, tropical storms and tropical depressions, monsoon rains, flash floods, landslides, drought, and whirlwinds. These natural and often extreme weather events are not in themselves disastrous. Only when they affect human settlements and infrastructure are they transformed into *natural disasters*.

Unfortunately, the location and topography of Central Vietnam puts the region especially at risk of natural disasters. As indicated above, numerous short and high gradient river systems flow through this coastal region. They deposit alluvial soil and provide life-sustaining water, turning the lowlands into the most fertile agricultural land in the Central Provinces. Thus, the coastal plains are the most heavily populated part of Central Vietnam. So, when extreme weather events such as typhoons and floods occur, the impact on people, their agricultural lands and livestock, and their infrastructure is calamitous. Their development efforts are set back, and thus they remain trapped in a cycle of poverty.

2.2 The Floods of November and December 1999

The floods that inundated Central Vietnam in November and December 1999 were particularly severe. The first severe flooding occurred between 1 and 6 November. Some areas received twice their mean annual rainfall in just a few days. Because of the topographical conditions described above, water levels in many rivers rose very rapidly, in some cases several *meters* per hour. By most estimates, these floods are considered the largest to hit Central Vietnam in the last hundred years. In all, the floods affected seven provinces: Quang Binh, Quang Tri, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai, and Binh Dinh.

The early December floods, occurring only four weeks later, were concentrated further south than the November flooding. Nonetheless, some provinces bore the brunt of disaster twice. Thua Thien-Hue, Da Nang, Quang Nam, and Quang Ngai were heavily affected by both the November and December flooding.

The damage from these floods was considerable. Over 700 people lost their lives; and many more were injured or stricken with disease while coping with the floods. Tens of thousands of people had to be evacuated to higher ground. Many families lost their homes and their livelihoods, and had to be resettled to safer areas. There was immense destruction of and damage to homes, schools, clinics, and other public buildings. Rural and urban infrastructure, including electric power stations and power supplies; roads and bridges; railways; ports; irrigation and aquaculture systems; water supplies; and communication systems were damaged or destroyed. Agricultural land was washed away or covered with sediment. Crops were destroyed; stored food, seed, and fertilizer were swept away or became waterlogged beyond use; and thousands of livestock were destroyed or became diseased. The cost of the physical damage in the Central Provinces was estimated to be more than US\$ 340 million, and those most affected by the flooding lived in the poorest communities.

In December immediately after the second flood, the Government and the International Donor Community recognized the need to respond immediately to the emergency needs of the people most affected by the flooding and the need to respond to their longer-term needs. Working together, a fledgling CPI-Partnership began to develop a strategy to mitigate natural disasters in Central Vietnam.

2.3 Concerns of the Government and the International Donor Community

As indicated above, natural hazards in and of themselves may not become calamities. Only when they affect populated areas or severely impact the environment do they become *natural disasters*. Central Vietnam, because of its location and topography, is especially at risk of natural disasters. To compound the problem, the Central Provinces are the poorest region in Vietnam. The Central Vietnamese people are by all accounts industrious, hard working, and motivated. Their poverty is due in large part to their inability to sustain their socio-economic development because they have been repeatedly beset by natural disasters. These disasters destroy crops, inundate and sweep away houses and public buildings, wash away personal possessions, and destroy rural infrastructure. In short, natural disasters deplete the basic resources needed to reduce poverty and to eradicate hunger.

At its annual meeting in December 1999, the Foreign Donor Consultative Group to Vietnam (the CG) indicated that the development of a Strategic Partnership for an Integrated Natural Disaster Mitigation Policy for Central Vietnam will be its highest priority. A number of donor countries immediately pledged their support for mitigating natural disasters. Since then, members of this strategic partnership have worked together and taken a number of initiatives to develop a strategy for natural disaster mitigation. The first step of this process was the deployment of the Fact-finding Mission to the Central Provinces in January 2000 to prepare Terms of Reference for a more wide ranging Multi-donor Mission that was undertaken in May 2000. This report is a summary of the findings, conclusions, and recommendations of the Multi-donor Mission.

3.0 Definition of the Problem and Methodology for Solution

The numerous natural disasters that affect Central Vietnam, the typhoons, river flooding, flash flooding, inundation, landslides, riverbank erosion, coastal erosion, drought, and all other adverse natural phenomena, are preventing sustainable development of the region and thus keeping its inhabitant mired in poverty. This problem has been recognized by the Consultative Group of donor countries to Vietnam (the CG). In an effort to solve the problem, a coordinated natural disaster mitigation program is being established by the Government and Donors. This program has been given the name CPI-Partnership.

3.1 Need for Natural Disaster Mitigation in Central Vietnam

In providing protection from natural disasters and taking measures to mitigate the effects of natural disasters, due account must be taken of social factors and the need to safeguard the interests of people living in poverty in the most flood-prone areas. These concerns translate into a number of development problems that must be dealt with in formulating an effective sustainable natural disaster mitigation strategy.

- *Development Problems:* Development is extremely difficult to sustain when progress is repeatedly set back by natural disasters. An effective natural disaster mitigation strategy must incorporate opportunities for socio-economic development into its policy framework and its mitigation plans.
- *Poverty Problems:* Those people most affected by natural disasters in Central Vietnam are those least able to cope with the effects of the disaster. While incorporating development opportunities into the disaster mitigation framework, special attention must be given to poverty reduction and hunger eradication. By soliciting the participation of the people most directly affected by natural disasters through a *grassroots participatory approach*, the afflicted communities will become *empowered* and share a sense of *ownership* of the projects they have developed. This *empowerment* and *self-determination* are the foundations of sound and sustainable socio-economic development.
- *Institutional Problems:* The Central Provinces Initiative Partnership provides an opportunity for the development of institutions that will coordinate, manage, and implement disaster mitigation programs and projects. These institutions will operate on every level, from the local level in the hamlet and commune up to the central government level in Hanoi.

3.2 Government and Donor Collaboration

After the December 1999 CG meeting, the CPI-Partnership became a fast-track activity: workshops have been held; missions have been sent to the field to study the problem; and reports have been prepared under the sponsorship of the donors. The purpose of all these actions was to address the impact of natural disasters on sustainable development, hunger, and poverty in Central Vietnam; and to develop a process to implement a strategic partnership that focuses on reducing the impact of natural disasters on the most vulnerable and poorest people living in the region.

To date, the following CPI activities have been completed:

- A Fact-finding Mission was fielded to Central Vietnam in January 2000 to prepare Terms of Reference for a comprehensive multi-donor mission to design the CPI-Partnership
- A *Natural Disaster Lessons Learned Workshop* was held in Da Nang City from 6 to 8 March 2000 to gather grassroots experience and to understand grassroots needs for natural disaster mitigation in Central Vietnam
- A Multi-donor Mission was fielded to the Central Provinces from 4 to 19 May 2000; twenty-five national and international experts participated in the mission. Their goal was to define the program and institutional framework of the Partnership
- A donor meeting and briefing on the Multi-donor Mission was held on 31 May 2000 to introduce the Partnership to donors
- The Multi-donor Mission Report details of the CPI-Partnership. The report was completed in September 2000

3.3 CPI Methodology

The purpose of the Fact-finding and Multi-donor Missions to the Central Provinces was to identify geographic areas and development sectors that are at risk of natural disasters and to propose solutions to the development problem of natural disaster vulnerability. These solutions fall within the realm of natural disaster preparedness and natural disaster mitigation. It is impossible to prevent most natural disasters. On the other hand, natural disaster mitigation, the reduction of the effects of natural disasters on humankind and its environment, is often attainable. Thus, the purpose of the missions was the identification of measures that could mitigate the effects of natural disasters in Central Vietnam.

The manner in which potential natural disaster mitigation measures were identified was:

- Initial study, collaboration, and planning prior to the missions
- Field trips and field study of the disaster-stricken areas
- Briefings by and discussions with Government and with donor representatives
- Ongoing discussion and sharing of knowledge among national and international mission members
- Documentation of this disaster knowledge and proposed disaster mitigation solutions in reports that have been shared with all CPI-Partners

During the missions, mission members incorporated the following principles to guide their research.

1. Natural disaster mitigation measures must be incorporated into the design and implementation of all development projects and programs in Central Vietnam if development is to be sustained.
2. To optimize natural-disaster mitigation, a mix of non-structural and structural strategies must be considered. Typical non-structural natural

disaster measures include: 1) disaster response including rescue and evacuation planning; 2) disaster area mapping and zoning; 3) disaster warning systems; 4) *grassroots* disaster preparedness training and planning; and 5) river basin planning.

Typical structural natural-disaster measures include: 1) reservoir and dam safety; 2) river and estuary dykes; 3) coastal and riverine erosion protection; 4) estuary and port dredging; 5) saltwater intrusion barriers; and 6) new flood control reservoirs.

3. Resources are limited; it impossible to take all actions needed to protect all areas and all people all of the time. Thus, careful selection and ranking of programs and projects is required to develop an optimal natural disaster mitigation strategy.

3.4 Results of the Fact-finding Mission

The first step in the CPI process was to gather information. In January 2000 a Fact-finding Mission went to Central Vietnam to make a preliminary assessment of the natural disaster situation and to prepare Terms of Reference for more in-depth studies. In many respects the Fact-finding Mission was a precursor to the much larger Multi-donor Mission; it collected basic information and provided preliminary guidelines for future study by the Multi-donor Mission members.

The two main objectives of the Fact-finding Mission were:

- To assess ongoing relief and rehabilitation efforts in the Central Provinces and identify what should be done to provide further relief from the effects of the 1999 floods
- To determine how the devastating effects of recurrent natural disasters in the Central Provinces could be mitigated

The following is a summary the mission's findings and the perceived issues of most importance:

3.4.1 Review of Disaster Response

During and immediately after the two floods, emergency relief and assistance were provided from many sources. The arrangements for such responses to future floods should be reviewed to determine their effectiveness. These arrangements should also be reviewed to determine their impact on the long-term security of those people still at risk of future flooding.

3.4.2 Examination of Restoration and Rehabilitation Efforts

Work was continuing on urgent repairs, restoration, and rehabilitation of facilities and infrastructure; and the Provinces had made proposals for further rehabilitation works. It was recommended that current and proposed projects be examined for cost-effectiveness and priority. It was further recommended that in some cases the funds required for major costly repair work might be more effectively spent on non-structural flood mitigation solutions.

3.4.3 Disaster Mitigation as an Integrative Process

To be effective, natural disaster mitigation in Central Vietnam must be an integrative process that considers a variety of geographic features and areas: 1) upper mountain watersheds; 2) upland hilly areas; 3) lowland delta areas; 4) sand dune areas; 5) lagoon areas; and 6) coastal zones. Mitigation programs that operate in isolation may have unintended consequences for neighboring areas. Thus, coordinated programs are fundamental to effective disaster mitigation.

3.4.4 The Need for Varying Times for Program and Project Implementation

For mitigation to be effective, a clear distinction must be made between different time horizons needed for different natural disaster mitigation measures. These time horizons may be defined as follows:

Distinction	Time Horizon
Immediate and urgent interventions	Preparedness prior to the next natural disaster period (less than one year)
Short-term interventions	1 to 2 years for planning and implementation
Intermediate-term interventions	2 to 5 years for planning and implementation
Long-term interventions	Greater than 5 years for planning and implementation

3.4.5 Recommendations for Non-structural and Structural Projects

Having surveyed the damage and discussed the needs of different areas with government officials, the Fact-finding Mission made informed decisions about which types of programs and projects should be given immediate and urgent priority, and whether low cost non-structural or structural measures would best meet these urgent and immediate needs. Among the high priority non-structural programs and projects recommended were:

1. Commune and village public disaster preparedness training
2. Simple flood-alert warning systems that include a limited number of automated floodwater level and rainfall reporting stations
3. Floodplain mapping and zoning
4. Review and improvement of current disaster plans
5. Better and faster disaster reporting
6. Better disaster-proof standard designs for structures to be built in flood-prone areas
7. Increased use of Red Cross disaster-resistant houseframe kits
8. Disaster proof emergency communication systems and power supplies
9. International quality weather and disaster reporting on Voice of Vietnam Television and Radio
10. Collection and summary of Hydro-meteorological information for flood project design
11. Protection of the population against flood-exposed unexploded ordinance (UXO).

12. Improved emergency communication capability for disaster officials during natural disasters
13. Signaling and beaconing for boat safe haven and anchorage locations, for estuary ports, and for approach channels

High-priority structural programs and projects include:

1. Construction of new riverbank revetments to protect infrastructure crossings of flood-prone rivers
2. Repair of dams and reservoirs damaged by high-velocity flood discharge and overtopping during the 1999 floods
3. Repair of other unsafe medium-scale and small-scale reservoirs

To date (September 2000), more than US\$ 40 million has been expended on or pledged to some of the projects identified above (Attachment 1).

3.4.6 Natural Disaster Mitigation Policy and Planning

The Fact-finding Mission also recommended that an *Integrated Natural Disaster Mitigation Policy* be formulated for Central Vietnam. This policy should take all issues that relate to natural-disaster mitigation in Central Vietnam into account and should consider both non-structural and structural measures. The policy should result in an *Action Plan*, which will include short, medium and long-term components. The Central Vietnam Policy and the Action Plan should be consistent with the Government's *National Strategy and Action Plan for Mitigating Water Disasters* in Vietnam.

3.4.7 Continuation of the Process: Next Steps

As indicated above, the Fact-finding Mission identified a range of actions that are needed for the development of an integrated natural disaster mitigation strategy in Central Vietnam. Some of these actions will lead to immediate benefit, while other actions will be longer term in nature. To further continue the process, members of the Fact-finding Mission recommended the following steps:

- Action by the donors for the further development of a strategic partnership dedicated to natural disaster mitigation in the Central Provinces.
- The authorization of and funding for a second mission to Central Vietnam. This Multi-donor Mission would carry out necessary in-depth studies, and further identify what measures are needed to mitigate natural disasters in the region. It was proposed that the Multi-donor Mission begin in late April or early May 2000 so that its findings could be reported at the next mid-term Consultative Group Meeting in June 2000.

During the Fact-finding Mission, members surveyed the 1999 flood damage and determined the type of expertise needed to make an in-depth assessment of the disaster-mitigation measures required. This knowledge became the basis for drafting the Terms of Reference for the Multi-donor Mission.

4.0 Objective, Purpose, and Overview of the Multi-donor Mission

4.1 Objective and Purpose of the Multi-donor Mission

The objective of the Multi-donor Mission to the Central Provinces was to assess the damage done during the late 1999 flooding and to assess future vulnerability in order to determine natural disaster mitigation needs in the region. The overall purpose of the mission was to assist the Government of Vietnam and the International Donor Community in identifying natural disaster mitigation programs and projects that could be supported in order to provide much needed natural disaster protection for the region. The Terms of Reference for the mission are given in Attachment 2.

4.2 Participant and Their Contributions to the Process

All major CPI activities relating to natural disaster mitigation in Central Vietnam are shown in Table 1. Prior to the Multi-donor Mission, invitations were sent to all parties, including Government, Embassies, non-governmental organizations, and funding agencies that were considered to have an interest in joining this initiative. The parties that have provided the most active support to the partnership to date are listed in the Acknowledgments of this Summary Report.

The Mission's international participants represented the Asian Development Bank (ADB) and the World Bank; the Embassies of the Netherlands, France, Japan, the United States and Finland; the UNDP; and the International Federation of the Red Cross and Red Crescent Societies (IFRC). The Mission's national participants represented the Ministries of Agriculture and Rural Development (MARD), Transportation (MOT), Planning and Investment (MPI), Labour War Invalids and Social Affairs (MOLISA), Hydro-meteorological Services (HMS), and Office of Government (OOG), as well as representatives of the seven Central Provinces most affected by the 1999 flooding. Prior to the Multi-donor Mission, the Terms of Reference for the mission to Central Vietnam was prepared jointly by the Ministry of Agriculture and Rural Development (MARD), the United Nations Development Program (UNDP), and the Royal Netherlands Embassy.

4.3 Planning and Organization Workshop

On May 4, the joint National and International Multi-donor Mission began when participants met for the first time in Da Nang City. During this first meeting, mission participants were grouped by their respective Terms of Reference into five Working Groups:

- Group 1: Coordination Expert Team
- Group 2: Preparedness and Relief Expert Team
- Group 3: Infrastructure and Rehabilitation Expert Team
- Group 4: Water and Marine Resources Management Expert Team
- Group 5: Resettlement, Social Issues, and the Environment Expert Team

In plenary sessions, all outstanding mission issues were resolved and itineraries were consolidated or otherwise coordinated which led to the arrangement that:

1. Working Groups 2 and 3 became a single group of experts for most of the mission.
2. Working Groups 4 and 5 became a single group of experts for all of the mission.
3. Working Group 1 joined Groups 4 and 5 for the first part of the mission; and then worked independently in order to coordinate and follow its Terms of Reference.

4.4 Field Visits

During the fields trips to the Provinces, the teams were usually received first by the Chairman or Vice-chairman of the Provincial People's Committee. After receiving a thorough briefing about the subject of natural disasters in the province, additional information was received through extensive and consolidated discussions and field trips covering a variety of issues related to natural disaster mitigation. The effects of flooding and other priority disaster mitigation subjects were the focus of all discussions and field visits.

Field trips by mission participants and local officials were an important element in the mission process and were extremely valuable. Due to the travel distances involved, it was not possible to visit all the projects that could have been reviewed by mission experts. However, a large number of individual projects were visited, and many of these projects were representative of other projects not visited. Thus, a good impression was obtained of what is being done now and what further assistance may be required in the future.

The provincial information about individual disaster mitigation projects was usually provided in table format, in either the Vietnamese or English language. For high priority projects, additional information was obtained through direct discussion with local officials. All provincial officials had the opportunity to thoroughly brief the mission participants about their province's list of disaster mitigation projects and the priority of these projects. The list of presented projects is included in this report as Attachment 3.

Many of the projects were presented with documents pertaining to feasibility. This documentation was collected and has been incorporated in a CPI-Partnership database prepared by the mission.

An important issue raised during all the discussions and presentations related to the integration of the proposed projects. For the CPI-Partnership to be effective, these projects must fit within the context of a comprehensive program master plan or framework. This approach has worked extremely well. During the mission, an integrative program approach helped all parties to interrelate the various projects proposed. Thus, it became possible to assess how a particular project would contribute to the overall program goal of natural disaster mitigation.

Following the mission, experts undertook the task of structuring the abundance of information received so that it would be in a format appropriate for analysis and for presentation to the Donor Community. Following mission specific guidelines and policies, the mission expert teams prepared a uniform method for clustering and drafting projects in an integrative and comprehensive program approach to natural disaster mitigation.

Mid-way through the mission, on May 14, the expert teams met in Hue City, Thua Thien-Hue Province, to have a coordination meeting and to exchange information about projects. From there the teams continued their field visits, finished their respective field work, and on 19 May met again in Da Nang City for a wrap-up meeting where they shared their findings. The international experts and many of their national counterparts then moved to Hanoi to start work on the Final Report and to prepare for a meeting with the international donors on 31 May.

4.5 Donor Meeting in Hanoi

During the concluding mission briefing on 31 May, the findings of the Multi-donor Mission were presented to international donors and government officials. The Ministry of Agriculture and Rural Development and other Ministries also presented their assessment of the mission. In addition, various international donors committed themselves to future participation in the CPI-Partnership. Commitments from more donors are expected after the final Mission Report is completed and distributed.

5.0 Projects and Programs Developed by the Multi-donor Mission

5.1.1 Projects Proposed by the Seven Provinces

As discussed earlier, a significant amount of proposed natural disaster mitigation project information was provided to the Multi-donor Mission. In order to be able to structure this information, a database was created.

Each of the projects was given a unique reference code, a two-letter prefix denoting the province from which the project originated. For example, QT indicates that the project originated in Quang Tri Province. The number one (1) indicates that the project is of a non-structural nature; the number two (2) specifies that the project is of a structural nature. Each project was also given a reference number. Thus, QB 1-03 indicates that the project is the third of a series of non-structural projects located in Quang Binh Province.

All these numbers were correlated with provincial priority lists of natural disaster mitigation needs, as well as with other documents showing natural disaster mitigation projects and their respective importance. More than 230 projects were presented to the mission during the fieldwork. The database was, therefore, a valuable tool for structuring disaster mitigation needs information; it enabled mission experts to group related projects into programs.

As used in this report, a program is defined as a group of projects that are similar in nature or contribute more or less equally to a particular natural disaster mitigation measure such as disaster preparedness, reforestation, and other needs. In this respect, not all projects that were presented contributed to the aims and goals of natural disaster mitigation. These projects were not given priority in the process of expert assessment.

5.1.2 Projects Proposed by Mission Experts During the Mission

During the Mission and at the numerous meetings and discussions that were held between local officials and mission experts, ideas were developed by the national and international experts for non-structural projects that could contribute to solving natural disaster problems. In general, these expert introduced non-structural projects are based on an integrated natural disaster mitigation approach such as design guidelines, master plans, and similar planning-based tools or attitudes.

These non-structural disaster mitigation tools, including master planning and floodplain modeling, were considered important CPI-Partnership outputs that could be used immediately. As with many other countries in transition from a centrally-planned economy towards a more delegated local planning approach, Vietnam deserves the utmost support in developing adequate natural disaster mitigation non-structural tools for use at the local level.

Due to the bottom-up nature of these non-structural disaster mitigation tools, this approach can easily be supported and implemented on all levels, ranging from Central and Local Government to Universities, NGO's, and others. Therefore, the Mission recommends that all requests for bottom-up, locally-centered master planning and for technical assistance be carefully considered.

Structural projects for disaster mitigation were also identified by the experts. Due to the large scale of some of these projects, however, implementation may not be immediately possible, because funding may not be immediately available. In some cases, project approval by responsible authorities can take considerable time. In these cases, it is suggested that some projects be executed as *Pilot Projects* that can mitigate natural disasters and also serve educational, training, and scientific purposes. This pilot project approach is also recommended when new, proven technology from overseas is to be introduced to Vietnam. Such an approach can be used even if not all variables in Vietnam are known. Projects of this type that were identified by the Mission have been included in the overall project list.

5.1.3 Social Development Input to the Mission

A Social Development Specialist was assigned by the UNDP to participate in the mission and to conduct a study of the issue of community participation and empowerment in flood prevention and mitigation. This issue is important because the negative impacts of the 1999 floods were limited due to the self-help provided from individuals and village communities living in the flooded areas. The UNDP wanted to identify how the capacity of farmers and their communities to cope with and respond to large-scale flooding could be further strengthened. The inclusion of an expert to evaluate the recent experience of disaster-affected communities and to suggest ways that these communities can participate more actively in disaster mitigation was a valuable addition to the mission.

5.2 Project Clustering

As stated previously, over 230 projects were discussed, recommended, or otherwise identified during the Mission (Attachment 3). These projects covered many diverse fields of natural disaster management. Some projects are site specific; other projects are not restricted to a particular locale and may indeed cut across provincial administrative boundaries.

In order to condense this large and diverse list of projects, an effort was made to integrate like projects in a systematic manner. This systems approach is consistent with the intent of donor and lender organizations to develop an integrated approach and policy for natural disaster mitigation in Central Vietnam. Furthermore, an integrated approach offers opportunities for the sharing of knowledge and experience among similar projects throughout all the Central Provinces.

The manner in which individual projects were clustered by the mission experts into comprehensive programs is shown in Table 2. There are numerous ways to group individual projects into programs. As presented here, projects are grouped as being either non-structural (1) or structural (2). As will be seen later, the experts further grouped projects based on when a project will begin and how long it will last. For example, planning and study projects are medium and long duration, while emergency rehabilitation projects may be ready for immediate implementation and only last for a short time.

For structural programs, the classification adopted is compatible with a watershed basin hierarchy, generally flowing from uplands, through the floodplains, and down to the coast as show in Figure 1.

A brief explanation of each of the program clusters is given in Table 3 for non-structural programs and in Table 4 for structural programs. The difference between non-structural and structural programs is evident from the respective descriptions given in the Tables.

5.3 Integration of Projects into Programs

The project-clustering scheme, outlined in Table 2 and further delineated in Tables 3 and 4, provides a practical framework to group projects into programs. It is intended that the clustering scheme serve both now and in the future, when new projects may be added to the proposed programs. It is by no means the intention of the Mission to offer a fixed program framework into which everything shall be defined and structured in a final way.

No fit of diverse projects into any classification scheme is perfect. The mission's proposed clustering scheme did, however, allow mission experts to integrate many separate projects within the same province, and to integrate projects that extended beyond provincial boundaries.

This program approach is also designed to be compatible with potential analyses by different donor organizations, each of which may have different investment strategies. This program approach will indicate potential Donor interest in a particular sector, and this information may be of interest to the Government. In addition, as seen from the perspective of the Donors and their technical assistance or lending practice, it seems that programs offer better opportunities to work together through Donor co-financing than do projects that work alone through individual Donor financing.

Therefore, the clustering of projects by this Multi-donor Mission worked well. Clustering combined project information into an initial definition of programs for natural disaster mitigation in Central Vietnam.

The outcome of the project clustering exercise for each of the natural disaster mitigation programs is given in Attachment 4. It includes all of the program information in detail, including all proposed projects and their reference numbers, in the following Logical Framework format:

- 1. Problems and Opportunities:**

This frame provides background information for a particular disaster-related problem, describes the problem, and indicates how solving the problem can provide opportunities for socio-economic development.

- 2. Objectives:**

This frame specifies the result that is expected from the implementation of the program. For any given objective, it is understood that saving of lives, minimizing damage to property, and safeguarding economic development are top priorities.

- 3. Strategy:**

Within this frame, collaboration with national counterparts, the identification of the lead national agency, and relevant administrative issues are included where possible.

4. Schedule:

This frame indicates how long it will take to plan, study, and implement a program or projects within a cluster. Timeframes have been reduced to two values: immediate (a year or less) and short-term (1 to 2 years); and medium term (2 to 5 years) and long-term (more than 5 years).

5. Outputs and Benefits:

This frame specifies what should be produced as a result of program implementation and how these outputs will be beneficial. In regard to the objective given out in frame 2, this frame shows why this natural disaster mitigation objective is worth achieving.

6. Inputs:

This frame indicates what activities, training, and expertise are needed to implement a particular program. It also states the manner in which these inputs will be employed to achieve the objective.

7. Risks:

This frame identifies potential technical, financial, and organizational impediments to success of the program. It also shows the implications of each of the impediments.

8. Alternatives:

This frame describes what happens if the current situation continues or if alternatives to the proposed program are implemented.

9. Project Costs:

This frame gives planning, implementation, and life cycle cost estimates to the maximum extent possible.

10. Expert Opinion and Comments:

This frame summarizes the important opinions and conclusions of the mission experts. Within this frame may also be specific projects with code numbers and titles that fall within the program given in order of priority or sequencing. In cases where a comprehensive listing by priority or sequencing is inappropriate, this section provides a brief qualitative discussion of how prioritization and sequencing under the program should be approached by Donors. This expert comment is an important basis for clarification of the program or individual projects.

11. Projects:

This frame presents the list of specific projects with the code numbers and the titles being clustered and listed as a program. For example: #TH2-20, New Construction of Ta Trach Reservoir; #QT2-14, Ben Hai Watershed Reforestation.

In order to show the geographic extent of the program being proposed, at the beginning of each Program Summary and Logical Framework (Attachment 4) a map of the Central Provinces is provided. These maps show where the proposed programs are located. An example of this GIS information is presented in Figure 2.

5.4 Project Prioritization

There are numerous opportunities for donor participation in activities that can significantly mitigate the effects of natural disasters in the Central Provinces. These opportunities include both non-structural and structural programs and projects.

The mission expert teams clustered the identified projects into 25 programs, following the procedure described earlier. Some of these programs overlap with others; this is inevitable. In addition, some programs are not as important as other programs in terms of providing a direct solution to the problem of mitigating natural disasters in Central Vietnam. Nonetheless, all programs taken together contribute significantly to natural disaster prevention or mitigation.

As stated previously, a large number of possible projects were listed by responsible Government authorities at the Central, Provincial, District, and Commune level. Some of projects can be classified as extremely urgent, and many of these urgent projects are relatively easy to implement. In this respect, it is important to restate one of the conclusions that was reached at the Mission closure meeting on May 31: *that which can and should be implemented must be implemented.*

Consequently, each program has projects that fall into two categories: 1) projects that are ready to be implemented immediately; and 2) projects that require more preparation time. Projects that may need more preparation time generally require feasibility studies for planning and design, large financial inputs, and other time-consuming actions. They may also need more time so that they can be integrated properly with other related projects or ongoing programs presently supported by Donors. This type of project is thus more appropriate for longer-term implementation.

In terms of time scale, the following distinctions are used for natural disaster mitigation projects and programs:

Immediate-term and Short-term	Projects with the highest priority, to be completed before the next flood season or within one year Projects with a high priority, to be completed within two years
Medium -term and Long-term	Projects that need a long preparation period, to be completed within five years Projects that need a great deal of preparation time, to be completed in more than five years

Using this time scale approach for implementation, the provincial project priority list given in Attachment 3, and the experts' professional judgement specified in the Program Summaries and Logical Frameworks in Attachment 4, projects and programs can be ranked by priority.

5.5 Prioritized Projects

Following the approach described above, programs and projects qualifying for immediate implementation are:

Issue and Program	Program No.
<i>Disaster Preparedness and Management</i>	1.1.1a & 1.1.1b
Flood and typhoon warning systems	1.1.1a
Emergency communication systems	1.1.2
Lifesaving and rescue equipment	1.1.2
Safe areas in 2-storey buildings and other high places	1.1.2
Relocation planning and management	1.2
Safe shelter for fisherfolk	2.3.1
Natural disaster and agricultural insurance	1.4
<i>Flood Plain Management</i>	1.3.2
Flood and inundation mapping	1.1.3
Integrated disaster response planning and training	1.3.2
Planning and management tools for sustainable development	1.3.2
<i>River Basin Management</i>	
River basin management planning	1.3.5
<i>Rural Infrastructure</i>	
Adequate roads for evacuation and rescue; and disaster resistant schools, health clinics, and disaster relief facilities	2.2.1
<i>River Control</i>	
River bank protection for threatened infrastructure and river crossings	2.2.3b
<i>Coastal Facilities</i>	
Safe havens for fishing boats	2.3.1
Emergency dredging	2.3.1
<i>Coastal Structures</i>	
Emergency repair of disaster damaged structures	2.3.2
<i>Reservoirs and Dams</i>	
Monitoring and emergency warning systems	2.1.2a
Rehabilitation of unsafe dams and reservoirs	2.1.2a

The International Experts prioritized the program list above using the following criteria:

1. Projects that are deemed extremely urgent and valuable in the immediate and short term for emergency response to natural disasters and for sustainable development
2. Positive project evaluation based on mission expert social, environment, and technical assessment
3. Interventions within an environment where government authorities and donors are ready communicating
4. Programs and projects that do not need long planning or study time

In order to proceed with the implementation process for the programs and projects considered suitable for immediate implementation, the responsible authorities, who are the owners of the project, should, if necessary, approach the International Donor Community with a specific request for assistance and funding.

Projects that are already included into one or more ongoing bilateral donor support programs are expected to continue as planned. Nonetheless, it is stressed that when such projects qualify as part of an integrated program approach, this program approach should be brought forward as early as possible. In this way, implementation will be easier to deal with, both for Government and for Donors.

In order to improve efficiency by eliminating a fragmented approach, responsibility for coordination of the programs should be delegated to a *Secretariat* with a program office that is accountable to the CPI-Partnership between Government and Donors. This coordination should also be employed for new projects that have yet to be proposed or listed, but may exist and be ready for implementation. Through a coordinated approach within the CPI-Partnership, it will be much easier to comply with Donor implementation processes and procedures.

6.0 Community Participation and Empowerment

6.1 Inputs of the Social Development Specialist

The objective of this input to the mission was to assess the role of the self-help farmers groups in planning and implementing flood fighting action plans and to formulate recommendations for Government and Donor support for community empowerment in flood prevention and mitigation. Thus, the issues of social development addressed were:

- *Self Help*: How did farmers and communities help each other to overcome the recent floods? How were they equipped and organized to do so? What constraints did they face?
- *Institutional Structure*: What is the institutional environment to support the local community in protecting itself from natural disasters? What are the current Government policies in this regard? Should they be changed to mobilize the efforts of farmers and communities in preventing and mitigating flood impacts?
- *Empowerment*: How can the capacity at the grassroots level be strengthened to better provide community participation and empowerment.

In a 1999 joint Government-Donor poverty report, *Attacking Poverty*¹, it was reported that in Central Vietnam, a region with than 8 million people, 10.6% of the population is poor. Most of the rest of the population lives just above the poverty level. Consequently, any setback, and especially a natural disaster, can easily push many people into poverty. Thus, the mission of the Social Development Expert was to focus on two issues: the impact of natural disaster on villagers and how, by participating in the formulation of disaster mitigation plans, these villagers could empower themselves and their communities. His findings (Attachment 5) are as follows.

6.2 Findings of the Social Development Specialist

People have coped with natural disasters such as flooding for centuries, using traditional mitigation and emergency responses based on traditional ties.

During the annual flood season in the Central Provinces, farmers do not plant or harvest crops. They use the period from October through December to work on their livestock and to prepare for protecting themselves from natural disasters. This disaster preparation includes storage of paddy and disaster relief supplies in the rafters of the home, building up riverbanks and other waterways with soil, and preparing rescue equipment for possible use.

People have made use of available skills and materials, but with mixed results.

According to some reports, many deaths occurred in the 1999 flooding when people were trapped in the attic areas of their homes by rising floodwaters. This indicates a lack of awareness of the dangers of flooding. Another problem is that very few villagers are skilled swimmers. While most can stay afloat and dog-paddle, few possess the skill to rescue others; and this problem is not being addressed. Nowhere in the Central Provinces are there organized water-safety courses for any population. Thus, there is

¹ *Attacking Poverty*, Poverty Working Group, Hanoi, 1999

little awareness of proper forms of water safety and rescue. To compound the problem, most of the rescue equipment is home-made from materials intended for other uses. This equipment tends to have a high rate of failure.

Warning systems are inadequate; most populations rely on their own information sources.

Warnings from Vietnam television and radio are usually of a general nature and do not provide clear guidance for preparation or evacuation. In addition, many villagers do not know how to interpret the information they are receiving. Disseminating the message is also difficult. Few households in rural areas have televisions or telephones.

With some exceptions, evacuation, rescue, and relief responses have been inefficient.

Since 1995, plans have been made and formalized that provide for Local Committees for Flood and Storm Control (LCFSC). Unfortunately, this formalization has not been translated into effective action. In three villages visited on the mission, the local LCFSC groups were very loosely formed. And nowhere, except in Hoi An Town, had these local committees been supplied with rescue materials or received training, nor had evacuation plans been formalized.

Roles of mass organizations are not formalized.

The Vietnam Red Cross is the only mass organization that officially provides natural disaster rescue and relief. There are, however, a number of other mass organizations in Central Vietnam whose primary function is not related to disasters, but who become active in disaster relief when there is an emergency. These organizations, the *Veteran's Association*, *Youth Union*, and *Women's Union*, become heavily involved in relief activities on a more informal basis; responsibility is delegated based primarily on the capacities of members of the organizations. These organizations, along with others and Government agencies, successfully conducted campaigns to collect monetary and in-kind donations after the 1999 floods.

Local management of resources and infrastructure is weak and lacks transparency.

Since the beginning of the Doi Moi reform program in the mid 1980's, the Government has tried to allow for greater local control of local resources. Now communes have public welfare funds and disaster preparedness funds from which to contribute to the maintenance and construction of local projects and small scale infrastructure works. In most commune projects able-bodied people are obliged to provide local labor.

Furthermore, in May 1998, a decree popularly known as the *Grass-roots Democracy Decree* was promulgated. This Decree legalizes people's direct participation in local decision making, as well as established transparency and accountability as mechanisms at the commune level. It thus aims to improve governance at the local levels.

During the mission field visits, however, it seemed that neither local management of infrastructure construction nor grassroots democracy has taken a strong hold in the villages in Central Vietnam.

Relocation schemes remain too top-down and under-funded.

The mission made a distinction between *resettlement* to a distant locale and *relocation* to a nearby area. Those people who were being relocated near their original homes seemed pleased with their imminent move; they will be allowed to maintain use rights on their original lands. None of the schemes, however, compared the costs of rehabilitating current disaster-prone areas to make them less vulnerable to natural disasters versus the costs of relocation to new areas. In addition, it seems that no person or family unit is given the option of where to relocate. At present, most relocation areas have only rudimentary infrastructure and seem to have agricultural land of poor quality.

Disaster-related work of international donors and NGO's is not well co-ordinated and focuses mainly on relief.

At present, only the Federation of Red Cross and Red Crescent Societies is explicitly involved in a wide range of disaster management activities. In the aftermath of the 1999 floods, however, nearly all international donors and NGO's in the region participated in relief operations. In general, NGO's procured relief funds from their home governments and then worked with local officials to distribute aid and relief. Had their activities been better coordinated, the aid that was delivered may have reached more people and been more effective.

6.3 Conclusions of the Social Development Specialist

These findings have relevance for many of the projects and programs studied by other mission experts. Those people most vulnerable to natural disaster in the Central Provinces are villagers who can least afford to have their lives disrupted and their homes and livelihoods destroyed. Enabling them to cope with the inevitability of natural disasters in a positive manner, and enabling them to respond rather than react, can empower them in ways that go beyond disaster management. The Social Development Specialist's input provides an important bottom-up perspective that informs virtually all projects studied; the findings also provide important recommendations for all programs and projects that can facilitate the empowerment of communities more directly.

7.0 Environmental Sustainability

7.1 Need for Environmental Sustainability

The objective of this input to the mission was to assess the need and opportunity for environmental sustainability in natural disaster mitigation program and project planning, design, and implementation. Especially important was the mission goal of making environmental concepts integral to all programs and projects.

Environmental experts participated in the process of development of programs and projects prepared by the mission. The result was a specific program on Environmental Sustainability (program 1.3.1) and a more comprehensive environmentally sustainable planning model for the entire CPI-Partnership (Attachment 6).

7.2 Strategic Environmental Assessment

The most far reaching conclusion of the environmental expert input to the mission was the recommendation for a comprehensive Strategic Environmental Assessment (SEA) to guide the design and implementation of programs and projects under the CPI-Partnership.

A Strategic Environmental Assessment is an overall measurement of the effects of competing programs and projects upon each other with the view of directing environmentally sound programs and projects to where they are most needed. Using SEA as an overall management tool also facilitates the maintenance of a chosen environmental quality rather than simply monitoring problem related indicators or minimizing impacts of environmental interventions. SEA is particularly pertinent in Central Vietnam where there is significant environmental deterioration and where the related impacts of structural natural disaster mitigation projects may have numerous negative effects. The SEA used as a framework for project planning will offer a tool to direct environmentally risky projects away from sensitive areas; and direct environmentally beneficial projects to areas already facing serious problems. It will also provide project planners with screening methods needed to select projects based on pre-selected environmental criteria.

The commitment of government authorities and local communities to the SEA process is crucial. When project preparation is made with sensitivity and sound justification, and with extended discussions at every stage of the preparation process, then forces can be joined behind the SEA approach. Further, it is important to involve official authorities, the private sector, the non-governmental sector, and impacted communities.

7.3 Problem-Specific Approach

The SEA approach is relatively new and unknown in Vietnam. Therefore, it is suggested for the purpose of this methodology that a *problem-specific* assessment of sustainable development be initially adopted, but enhanced by concepts inherent within a SEA. This will allow for the proper environmental focus when screening, selecting, and targeting natural disaster mitigation activities where environmental criteria result in a self-selecting procedure which guides project siting and technical content.

8.0 Institutional Setting and Coordination

8.1 Background to Institutional Arrangements

As implied in its title, the CPI-Partnership means that a number of otherwise separate, government agencies, non-governmental organizations, and international donors will work together to attain a common objective: *the mitigation of natural disasters and the subsequent enhancement of sustainable development in Central Vietnam*. For this objective to come about, it will be necessary to establish lines of communication so that the activities of the CPI-Partners are clearly understood and their activities are coordinated to avoid duplication of effort and overlap of programs and projects. Within this CPI-Partnership, the Vietnamese Government and the International Donor Community will be able to formulate an effective strategy to mitigate natural disasters in Central Vietnam. This will be accomplished through programs that will reduce the effects of natural disasters on sustainable development.

Thus, the scope and aim of the CPI-Partnership can be summarized as follows:

Based on a well-coordinated allocation of resources and an active bottom-up approach, the CPI-Partnership has the task and joint responsibility to coordinate and streamline all efforts that are made to prevent and reduce loss of life, damage to property, and loss of livelihood due to natural disasters in the Central Provinces of Vietnam.

8.2 Memorandum of Agreement

A written agreement of purpose and method of implementation between the Government and Donors is a necessary first step for implementing the programs and priorities qualified and quantified by the national and international experts during the Multi-donor Mission to the Central Provinces. This agreement should be in the form of a Memorandum of Agreement (MOA) between the Ministry of Agriculture and Rural Development as the executing and leading Government Agency and other CPI Partners. These other partners may be other Vietnamese ministries and authorities, international financing agencies, international and bilateral donors, and non-governmental organizations.

8.3 Organization

On the basis of the MOA, all interested organizations will be represented in the CPI-Partnership at an appropriate level. In practice, this means that, given the large number of parties involved, a distinction may be made between members and observers.

In order to keep the overall organization effective, it is proposed that a Steering Committee be constituted within MARD. Also, a combined Secretariat and Project Implementation Office should be formed and be located in Central Vietnam. The Steering Committee is likely to be linked to the Central and Provincial Committees for Flood and Storm Control. These institutional arrangements will be in accord with scope of the CPI-Partnership as presented above, but the details of the institutional arrangements must be developed further by the Partnership members. An organization chart for the CPI-Partnership is given in Figure 3.

8.4 Secretariat

It is the intention to make the Secretariat the focal point of the CPI-Partnership. As the focal point of the CPI-Partnership, the Secretariat will have the overall responsibility and task of coordinating and supporting all activities that are within the scope of the CPI-Partnership. The Secretariat will be accountable to the Steering Committee and will report to that group on a regular basis. The Secretariat should be located in the Central Provinces.

The initial tasks for the Secretariat should be as follows:

1. To implement and execute directives issued by the CPI-Partnership Steering Committee.
2. To assist the Provincial Authorities in their preparation of projects for potential funding.
3. To serve as a clearinghouse for information relating to disaster mitigation in the Central Provinces.
4. To coordinate activities and to share information with Donors and with Government agencies, particularly the Provincial Committees for Flood and Storm Control and the MARD Disaster Management Center.
5. To implement adequate and fully operational disaster monitoring, data collection, and disaster warning systems.
6. To develop the objectives of the CPI-Partnership through disaster training, awareness building, planning and design tools, and other relevant measures.
7. To be a partner with scientific and academic disciplines in providing data, field logistics, and other support for natural disaster mitigation in Central Vietnam.
8. To prepare all information related to work plans, budgets, logistical activities, and financial reports; and to provide this information to the CPI-Partnership Steering Committee as required.
9. To operate as a logistical center for international experts assigned to the CPI-Partnership.
10. To perform other work tasks as required to support the CPI-Partnership Steering Committee.

The involvement of the CPI-Secretariat should not go beyond its tasks as described above, unless otherwise mandated to do so. It is the responsibility of the Steering Committee to annually review the Terms of Reference of the Secretariat.

Once an agreement is reached on the scope for the CPI-Partnership and the tasks of the CPI-Partnership organization are clear, permanent full-time staff should be assigned to the Secretariat. Members of the Secretariat staff will need to have an adequate level of expertise. Given the complexity and the number of natural disaster mitigation issues involved in Central Vietnam, it is proposed that the staff will include, at a minimum, a resource economist and a water management specialist.

8.5 Review Missions

To support the CPI-Partnership on an international level, it is recommended that joint national and international review missions take place in the same setting as the Multi-donor Mission. The number and type of experts that will participate in these review missions will vary with the main issues to be dealt with. As progress is made in solving the natural disaster problems in Central Vietnam, the disaster mitigation issues will also change.

9.0 Donor and Government Development Priorities

9.1 Donor Priority Programs in Vietnam

Donors in Vietnam have varying aid priorities. For example, the United Nations puts a great deal of emphasis on *governance, hunger eradication and poverty reduction, and environmental and natural resource management*. Other donors may stress these and other priorities such as *infrastructure improvement, social development programs, disaster preparedness and response, administrative reform, and institutional capacity building*.

In order for the CPI-Partnership to be most effective, the programs being proposed by the Multi-donor Mission experts must relate to the priorities of the donors who will be ultimately funding these programs and projects. Therefore, the twenty-four Multi-donor Mission program recommendations have been grouped into five donor-funding priority categories.

9.2 Integration of the CPI-Partnership into Donor Aid Programs

The following table shows how the CPI Programs are compatible with current donor development programs in Vietnam.

Donor Priority Development Aid Areas	Corresponding CPI-Partnership Programs
Social Development and Poverty Reduction	Relocation Planning and Development - 1.2 Agricultural Extension - 1.5 Irrigation and Drainage Systems - 2.2.2 Sandy Area Planning and Development - 2.2.4 Water Supply and Sanitation - 2.2.5 Aquaculture, Fisheries, and Agricultural Resources - 2.2.7
Disaster Preparedness and Response	Disaster Preparedness - 1.1.2 Flood and Inundation Mapping and Modeling - 1.1.3 Natural Disaster Agriculture and Property Insurance - 1.4 Coastal Facilities - 2.3.1
Environmental and Natural Resources Management	Environmental Sustainability - 1.3.1 Floodplain Management - 1.3.2 Reforestation - 2.1.1
Administration Reform, Coordination, Capacity Building, and Governance	Provincial Disaster Management Planning - 1.1.1a National Disaster Management Planning - 1.1.1b River Basin Organizations - 1.3.3 Port Authorities - 1.3.4 River Basin Master Planning - 1.3.5
Rural and Urban Infrastructure	Rehabilitation of Existing Reservoirs - 2.1.2a Construction of New Reservoirs - 2.1.2b Rural Infrastructure - 2.2.1 River Flow Capacity Improvement - 2.2.3a River Bank Erosion Protection - 2.2.3b Salinity Dams and Dikes - 2.2.6 Coastal Structures - 2.3.2

10.0 Financial Arrangements

10.1 Financial Support of the CPI-Partnership

Since the inception of the CPI-Partnership, overviews have been presented on various occasions showing grants and loans that have been allocated to CPI-Partnership issues. The most recent of these overviews was in a CPI-Partnership Progress Report for the Consultative Group Meeting in Da Lat Town in June 2000 (Annex 1). It should be stressed that these figures represent a mix of finances in terms of money spent, re-allocated funds, proposed budgets, and funding levels available.

To secure financing for priority disaster mitigation projects in Central Vietnam, it is recommended that the owner of each project promote that project to donors who have ongoing aid programs available to accommodate the project. Similarly, donors can request project proposals from government owners. Donors will also determine how programs or projects that coincide with their development aid priorities can be accommodated. Only through such an interactive process can adequate solutions be found for funding the natural disaster mitigation programs and projects needed in Central Vietnam that have been identified by CPI-Partnership.

10.2 Financial Support of the CPI-Partnership Secretariat

It is obvious that the joint CPI Secretariat and Project Implementation Office will play an essential role in this funding process. However, until this Secretariat is established, the identification of funding is the joint responsibility of owners and Donors. It is recommended that a block grant of funds be provided to the CPI Secretariat to give it the financial authority to implement the CPI-Partnership and to be able to work to attract financial sponsors for the Partnership programs and projects.

10.3 Donor Funding of Rehabilitation for the 1999 Floods

As of September 2000, US\$ 40 million has been given by donors in the form of grants and loans for natural disaster rehabilitation and mitigation in Central Vietnam (Attachment 1). It is hoped that the CPI-Partnership, through its coordination and through its program approach, will attract significant levels of new funding for all natural disaster mitigation efforts in Central Vietnam.

11.0 Summary and Recommendations

Need for natural disaster mitigation in Central Vietnam:

1. Any form of development in Central Vietnam is not sustainable without proper regard for the natural disasters that annually strike this most vulnerable part of the country.
2. Natural disaster mitigation should be included in the design and implementation of all ongoing and new development projects in Central Vietnam.
3. All multilateral, bilateral, and NGO donors giving development aid in Central Vietnam should coordinate their efforts in order to most effectively mitigate the negative impact of natural disasters on sustainable development.

Important issues of natural disaster mitigation in Central Vietnam:

4. Social issues need to be addressed in any effective natural disaster mitigation program for sustainable development in Central Vietnam. For example, relocation that moves disaster-prone populations to nearby safer areas is always preferred to resettlement that moves disaster-prone populations to new areas far from their existing communities.
5. Empowerment of people should be a fundamental component of any effective natural disaster mitigation program for sustainable development in Central Vietnam. When selecting projects and setting priorities, a bottom-up, grassroots Participatory Learning Activity (PLA) and Logical Framework process is preferred over a central planning process.
6. Environmental assessment, management, and impact mitigation need to be considered globally in the design and implementation of all natural disaster mitigation programs for sustainable development in Central Vietnam. Such global environmental assessment, management, and impact mitigation must recognize the inter-relationship between natural disaster mitigation programs, projects, and actions. This environmental assessment must be from upstream to downstream, and from the uplands to the coastal zones of the highly disaster-prone river basins of Central Vietnam.

Natural disaster mitigation programs and donor priorities in Central Vietnam:

7. Donor aid priorities in Central Vietnam can be grouped into broad areas of support:
 - 1) Social development and poverty reduction
 - 2) Disaster preparedness and response
 - 3) Environment and natural resources management
 - 4) Administrative reform, coordination, capacity building and governance
 - 5) Rural and urban infrastructure

In order for Donors to see clearly how the Central Provinces Initiative Partnership is compatible with their interests, all natural disaster mitigation programs and projects need to be shown to be within one of the existing or pipeline areas of donor support.

8. Twenty-three program areas were identified by the mission as effective and necessary for a comprehensive disaster mitigation program in Central Vietnam. Donor aid priority areas can be combined with these natural disaster program areas in the following way:

Donor Priority Development Aid Areas	Corresponding CPI-Partnership Programs
Social Development and Poverty Reduction	Relocation Planning and Development Agricultural Extension Irrigation and Drainage Systems Sandy Area Planning and Development Water Supply and Sanitation Aquaculture, Fisheries, and Agricultural Resources
Disaster Preparedness and Response	Disaster Preparedness Flood and Inundation Mapping and Modeling Natural Disaster Agriculture and Property Insurance Coastal Facilities
Environment and Natural Resources Management	Environmental Sustainability Floodplain Management Reforestation
Administrative Reform, Coordination, Capacity Building, and Governance	Provincial Disaster Management Planning National Disaster Management Planning River Basin Organizations Port Authorities River Basin Master Planning
Rural and Urban Infrastructure	Rehabilitation of Existing Reservoirs Construction of New Reservoirs Rural Infrastructure River Flow Capacity Improvement River Bank Erosion Protection Salinity Dams and Dikes Coastal Structures

9. Each of the recommended program areas for natural disaster mitigation in Central Vietnam has been presented in a logical framework with the following components:
- 1) Problems and opportunities
 - 2) Objectives
 - 3) Strategy
 - 4) Schedule
 - 5) Outputs and benefits
 - 6) Inputs
 - 7) Risks
 - 8) Alternatives
 - 9) Costs
 - 10) Expert opinion and comments
 - 11) Typical projects

10. Both program implementation and project implementation can be considered to have two time scales depending on the amount of planning work that needs to be performed before program or project approval, financing, and initiation:

Immediate-term and Short-term	Projects with the highest priority, to be completed before the next flood season or within one year Projects with a high priority, to be completed within two years
Medium-term and Long-term	Projects that need a long preparation period, to be completed within five years Projects that need a great deal of preparation time, to be completed in more than five years

11. A number of natural disaster mitigation programs and projects qualify for immediate funding and implementation in Central Vietnam based on the following criteria:

- 1) Projects that are extremely urgent in the immediate and short term for emergency response to natural disasters and for sustainable development
- 2) Project screening based on mission expert social, environmental and technical assessment
- 3) Programs and projects that can immediately take place within an existing and ongoing conversation between the Government and donors
- 4) Programs and projects that do not require a significant planning or study time period

Issue and Program
<p><i>Disaster Preparedness and Management</i></p> <p>Flood and typhoon warning systems Emergency communication systems Lifesaving and rescue equipment Safe areas in 2-storey buildings and other high places Relocation planning and management Safe shelter for fisherfolk Natural disaster and agricultural insurance</p>
<p><i>Flood Plain Management</i></p> <p>Flood and inundation mapping Integrated disaster response planning and training Planning and management tools for sustainable development</p>
<p><i>River Basin Management</i></p> <p>River basin management planning</p>

<i>Rural Infrastructure</i> Adequate roads for evacuation and rescue; and disaster resistant schools, health clinics, and disaster relief facilities
<i>River Control</i> River bank protection for threatened infrastructure and river crossings
<i>Coastal Facilities</i> Safe havens for fishing boats Emergency dredging
<i>Coastal Structures</i> Emergency repair of disaster damaged structures
<i>Reservoirs and Dams</i> Monitoring and emergency warning systems Rehabilitation of unsafe dams and reservoirs

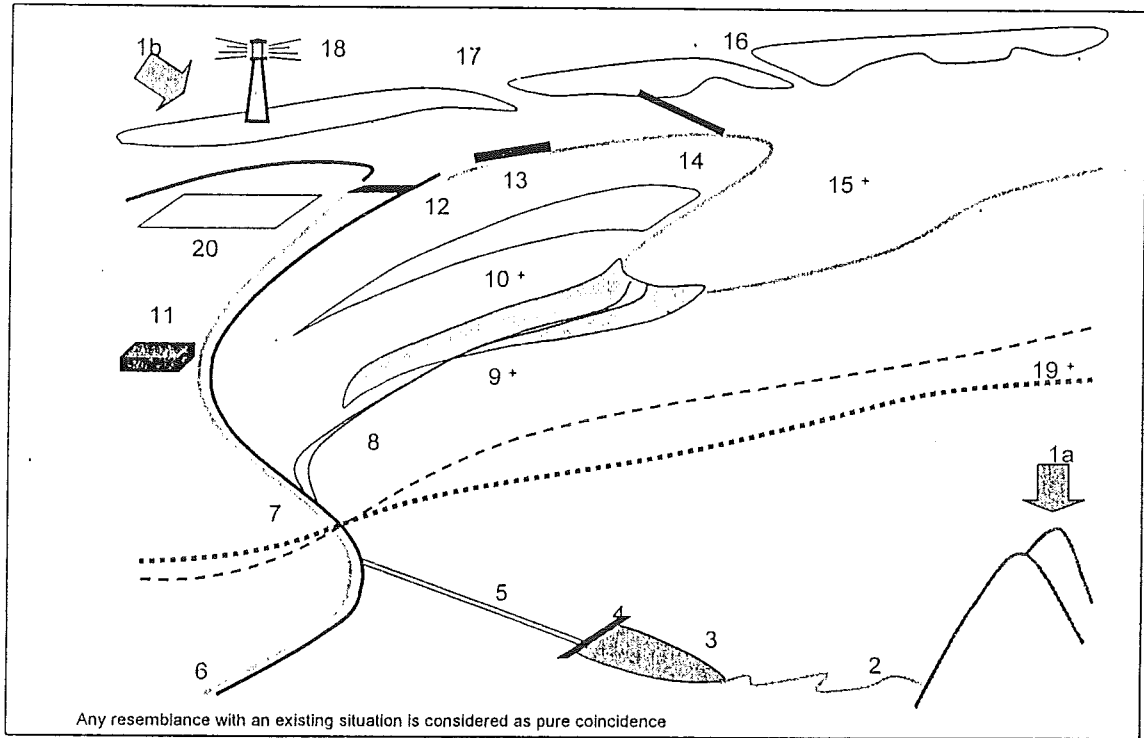
Community participation, community empowerment and environmental sustainability:

12. People in Central Vietnam have coped with natural disasters for centuries using traditional mitigation and emergency responses based on traditional family and community. But using available skills and materials for disaster mitigation is no longer effective in the context of sustainable development. Bottom-up natural disaster program and project selection and prioritization from the commune and village level is appropriate and needed to strengthen the self help nature of traditional disaster coping mechanisms of the poor and hungry.
13. A sectoral approach to environmental planning for sustainable development is recommended for the natural disaster mitigation programs and projects proposed for the CPI-Partnership. A Strategic Environmental Assessment is an overall measurement of the effects of competing programs and projects upon each other with the aim of directing environmentally social programs and projects to where they are most needed. SEA as a program and project planning, design and management method is considered to be well suited for central region natural disaster mitigation.

Institutional setting, coordination, and financing:

14. The aim and scope of the CPI-Partnership should be as follows:
Based on a well-coordinated allocation of resources and an active bottom-up approach, the CPI-Partnership has the task and joint responsibility to coordinate and streamline all efforts that are made to prevent and reduce loss of life, damage to property, and loss of livelihood due to natural disasters in the Central Provinces of Vietnam.
15. The CPI-Partnership should be institutionalized through a Memorandum of Agreement to be signed by motivated Donors and by the Government.
16. The CPI-Partnership should be directed and executed by Donor representatives and a Steering Committee having inter-ministerial responsibilities.

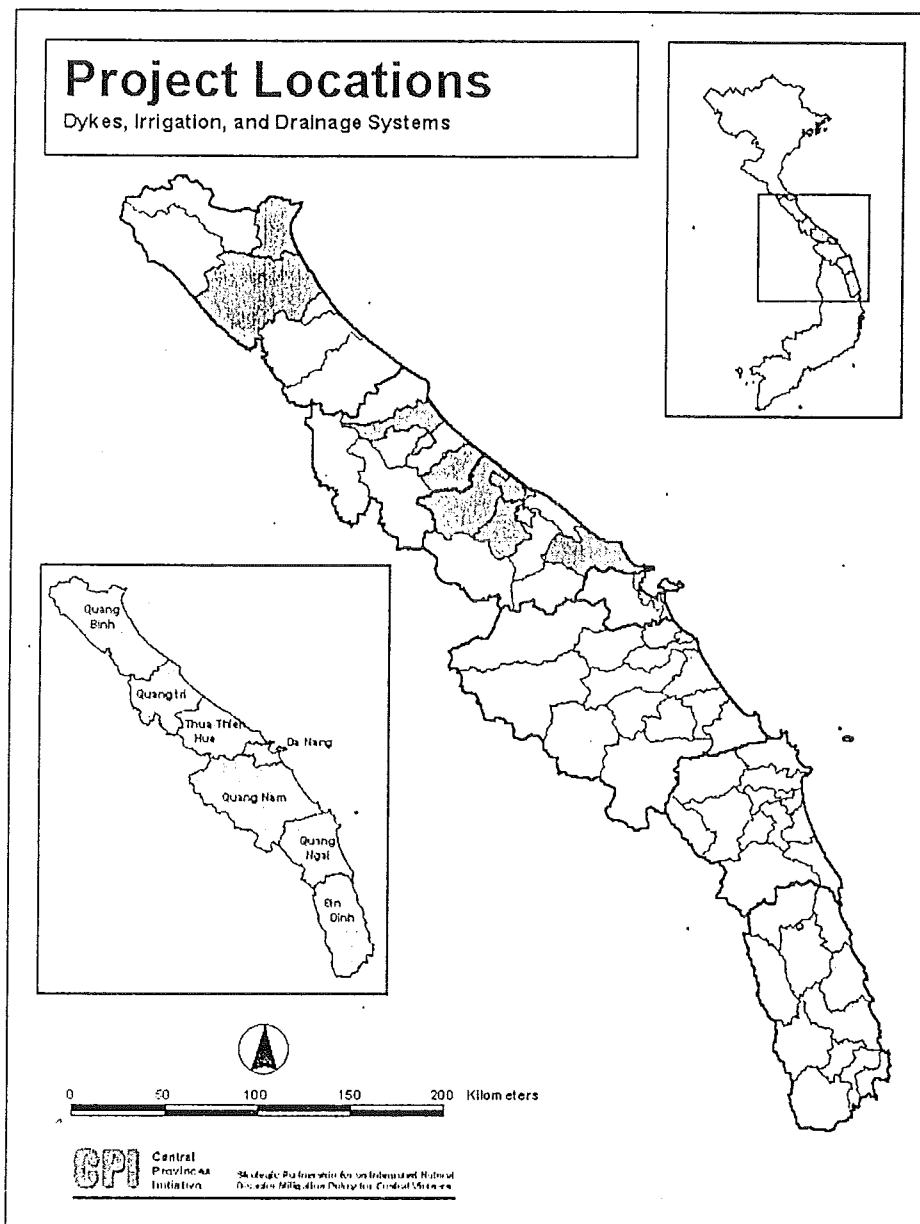
Figures and Tables



No.	Natural disaster and disaster mitigation features
1a	Rainstorm
1b	Hurricane
2	Stream
3	Reservoir
4	Dam
5	Channel
6	River
7	River diversion
8	River narrows
9	Low land area
10	High area

No.	Natural disaster and disaster mitigation features
11	City
12	Salinity dam
13	Port (quay)
14	Bridge
15	Estuary/lagoon
16	Inlet/gap
17	Bar/siltation
18	Lighthouse, safe haven
19	Infrastructure (road, rail)
20	Sandy lands
21	Other features

Figure 1: Schematic Representation of Process of Merging Individual Disaster Mitigation Projects into Integrated Disaster Mitigation Programs



Program Title: Dykes, Irrigation, and Drainage Systems

Primary Objective: To provide adequate conditions for runoff, including protection of low-lying areas: to minimize damage in the floodplain during flooding.

Implementation Strategy: Main issue for improvement of the overall flood disaster situation. Crucial in terms of planning and operational conditions, and for restoring agricultural systems after a natural disaster.

Dykes, Irrigation, and Drainage Systems

Figure 2. Typical Location Map of a CPI Program – River Basin Organization

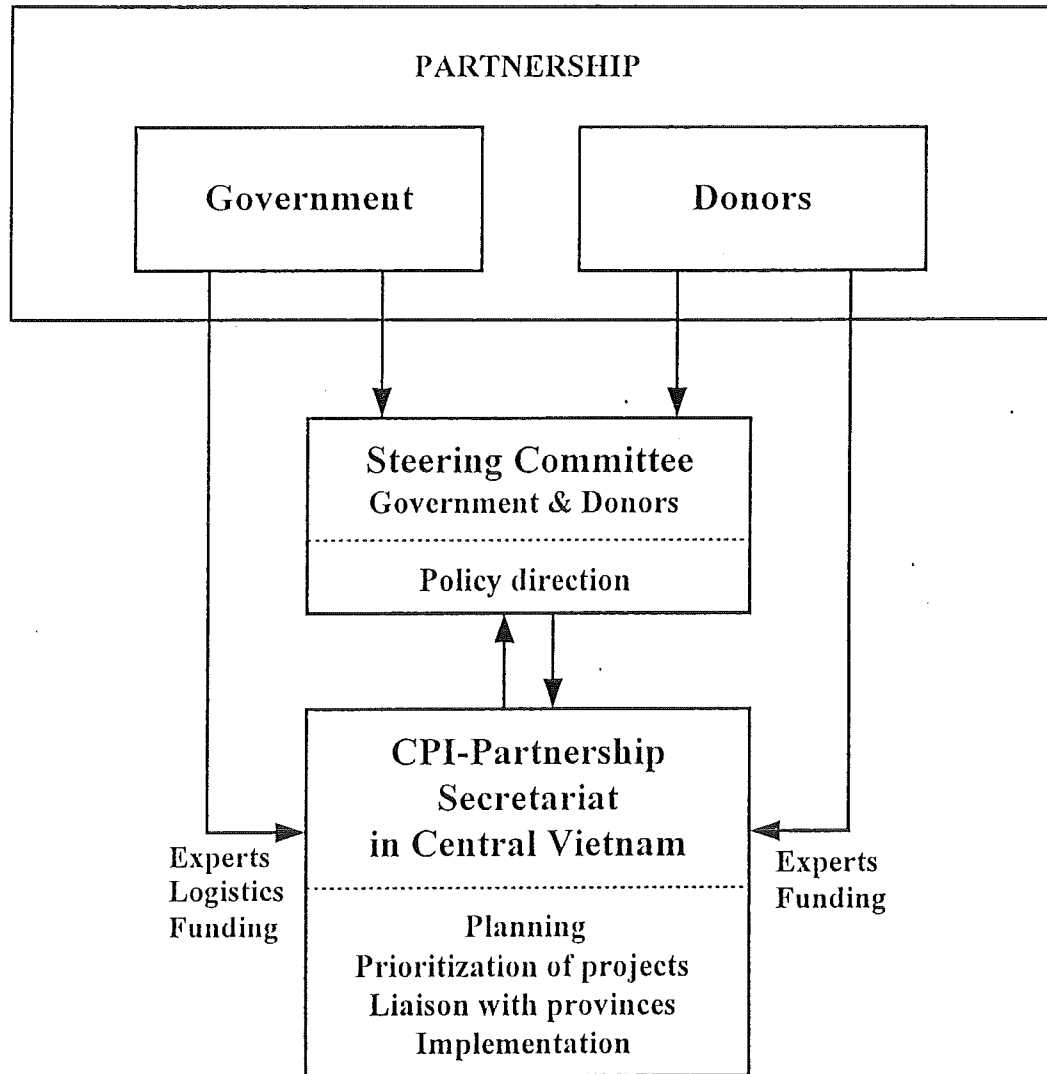


Figure 3. Proposed Organization of the CPI-Partnership

Table 1
Time Line of Activities of the CPI-Partnership to Mitigate Natural Disasters
in Central Vietnam

Time	Participant	Activity and location
November and December 1999	Provinces of Quang Binh, Quang Tri, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai, and Binh Dinh	Two separate largest recent history storms flood central Vietnam in a two month period; in seven central Vietnam provinces
December 1999	The Vietnam Consultative Group (CG) of Donor Countries	The annual CG meeting recognizes the need for a multi-donor approach to natural disaster mitigation in Central Vietnam for sustainable development, hunger eradication, and poverty reduction; in Hanoi
January 2000	The Royal Netherlands Embassy and the United Nations Development Program (UNDP)	The Netherlands Embassy and the UNDP assume responsibility for coordination of a Central Provinces Initiative (CPI) to mitigate natural disasters in Central Vietnam; in Hanoi
January 12 to 28, 2000	Ministry of Agriculture and Rural Development (MARD), Royal Netherlands Embassy, and the UNDP	A fact-finding mission is sent to Central Vietnam and issues a three volume report including Terms of Reference for a Multi-donor Expert Mission; in the seven central flooded provinces and in Hanoi
March 6 to 8, 2000	Central Government, seven central provinces, and donor representatives	National Workshop on Lessons Learned and Program Support for Relief and Mitigation of Natural Disasters in Vietnam; in Da Nang City
April 2000	MARD and other Government Ministries	A Government Inter-ministerial Coordination Committee is instituted within the International Cooperation Department of MARD; in Hanoi
May 3 to 31, 2000	MARD, Netherlands Embassy, UNDP, French Embassy, Japanese Embassy, U.S. Embassy, Finnish Embassy, Asian Development Bank, World Bank, and the International Federation of Red Cross and Red Crescent Societies	A Multi-donor Mission is organized and undertakes a mission to Central Vietnam to develop a process for a program of natural disaster reduction in Central Vietnam; in the seven central flooded provinces
May 31, 2000	CPI Multi-donor Mission experts, donors, and government representatives	Briefing meeting to donors on results of the CPI Multi-donor Mission; in Hanoi
June 22, 2000	The Vietnam Consultative Group (CG) of donor countries and the Government	A progress report of the CPI process is presented at the mid-term CG meeting; in Da Lat

Table 1 (Continued)
**Time Line of Activities of the CPI-Partnership to Mitigate Natural Disasters
in Central Vietnam**

Time	Participant	Activity and location
July, 2000	Royal Netherlands Embassy and UNDP	Preparation and distribution of First Draft Summary Report of Findings of the Multi-donor Mission
10 August 2000	Ministries of Agriculture and Rural Development, Planning and Investment, Transport, Environment, Hydrology, and Hydro-meteorological Services	Internal review of Multi-donor Mission Report and preparation of recommendations for improvement of the report.
22 September 2000	Royal Netherlands Embassy, Finnish Embassy, and UNDP	Preparation and distribution of Final Draft Summary Report of Findings of the Multi-donor Mission

Table 2
Program Classification for Nonstructural and Structural
Natural Disaster Mitigation Programs

Program Classification			
1.0 Non Structural			
1.1 Disaster Preparedness and Management			
	1.1.1 Disaster Management Planning	1.1.1a	Provincial Level
		1.1.1b	National Level
1.1.2 Disaster Preparedness			
1.1.3 Flood and Inundation Mapping			
1.2 Relocation Planning and Development			
1.3 Integrated Catchment Planning and Management			
1.3.1 Environmental Sustainability			
1.3.2 Floodplain Management and Modelling			
1.3.3 River Basin Organizations (RBOs)			
1.3.4 Port Authorities			
1.3.5 River Basin Master Planning			
1.4 Natural Disaster Agriculture and Property Insurance			
1.5 Agricultural Extension			
2.0 Structural			
2.1 Watersheds			
2.1.1 Watershed Management and Reforestation			
	2.1.2 Reservoirs and dams	2.1.2a	Rehabilitation
		2.1.2b	New Construction
2.2 Floodplains and Estuaries			
2.2.1 Rural Infrastructure			
2.2.2 Dykes, Irrigation and Drainage Systems			
	2.2.3 River Control	2.2.3a	River Flow Capacity Improvement
		2.2.3b	Riverbank Erosion Protection
2.2.4 Sandy Area Development			
2.2.5 Water Supply and Sanitation			
2.2.6 Salinity Dams and Dykes			
2.2.7 Aquaculture, Fisheries and Agriculture Resources			
2.3 Coastal			
2.3.1 Coastal Facilities			
2.3.2 Coastal Structures			

Table 3
Non-structural Natural Disaster Mitigation Programs

1.0	Non-Structural Programs for Natural Disaster Mitigation
1.1.1	<i>Disaster Management Planning</i> - Providing Hydro-meteorological monitoring, forecasting, and early warning of natural disaster events
1.1.2	<i>Disaster Preparedness</i> - Providing community-level self-protection measures
1.1.3	<i>Flood and Inundation Mapping</i> - Preparing maps of historical flooding for a foundation for future mapping of floods of great magnitude for more effective future floodplain management and emergency relief
1.2	<i>Relocation Planning</i> - Providing land, some infrastructure, and governmental assistance to households whose homes have been destroyed, or for populations who are vulnerable to future natural disasters
1.3.1	<i>Environmental Sustainability</i> - Integrating environmental considerations into disaster mitigation
1.3.2	<i>Floodplain Management</i> - Providing tools for assessing risks on floodplains, and the creation of scenarios for alternative development or protective works; cluster suitable for training with actual projects concerned with structural natural disaster mitigation
1.3.3	<i>River Basin Management Organisation</i> - Promoting an integrated approach to river basin development and use; cluster very suitable for training and implementation of <i>Pilot Projects</i>
1.3.4	<i>Port Authorities</i> - Evaluating the many functions involved in a port and estuary outlet zone that may require the formation of a dedicated port authority; dealing with safe access, shelter, beaconing, and dredging
1.3.5	<i>River Basin Master Planning</i> - Realizing optimal use and development for various water sectors on the basis of sustainable development; facilitating the availability of sufficient water in the dry season and flood mitigation during the wet season; covering all sectors, including cross provincial border issues
1.4	<i>Natural Disaster Agriculture and Property Insurance</i> - A national insurance program that covers crop and farmland loss due to flooding and other natural disasters will provide greater financial security for farmers
1.5	<i>Agricultural Extension</i> - Extension services and other technical assistance will be provided in a manner that enables farmers to have the means of mitigating the effects of flooding and other natural disasters

Table 4
Structural Natural Disaster Mitigation Programs

2.0	Structural Programs for Natural Disaster Mitigation
2.1.1	<i>Watershed Management and Reforestation</i> - Decreasing the amount of runoff from rainfall that intensifies flood magnitudes and contributes to soil erosion in watersheds; minimizing sedimentation in lowland channels
2.1.2	<i>Reservoirs</i> - Modifying dams or repairing dams and reservoirs damaged by flooding; constructing new dams and reservoirs to provide a safe and secure source of water during drought and controlling/mitigating future flooding; all activities in this program are subject to an Environmental Sustainability Review (1.3.1) and Relocation Assessment (1.2)
2.2.1	<i>Rural Infrastructure</i> - Repairing flood-damaged houses, schools, health clinics, roads, railroads, and other infrastructure that are critical to natural disaster emergency response and to flood recovery
2.2.2	<i>Irrigation and Drainage Systems</i> - Repairing and upgrading flood-damaged irrigation systems that are essential for improved agricultural production; providing adequate floodwater runoff capacities
2.2.3	<i>River Control</i> - Controlling the flow of water via dykes and adequate water channels to protect communities and important infrastructure against flooding; cluster very suitable for <i>Pilot Projects</i> due to dynamic behavior of rivers in the Central Provinces
2.2.4	<i>Sandy Area Developments</i> - Mitigating the effect of sandy areas that are encroaching upon valuable agricultural areas; developing sandy areas to become agriculturally productive and to possibly be suitable for relocation of disaster vulnerable populations
2.2.5	<i>Water Supply</i> - Repairing infrastructure damaged by flooding, and implementing new water supply systems where required
2.2.6	<i>Salinity Dams and Dykes</i> - Strengthening and repairing dams and associated systems to prevent saltwater intrusion during low river flow conditions; and preventing obstruction of floodwater runoff
2.2.7	<i>Aquaculture, Fisheries and Agriculture Resource</i> - Planning and constructing of aquaculture dykes and related infrastructure in a way that will be sustainable during flooding, and not result in increased flooding of other nearby waterways or floodplains
2.3.1	<i>Coastal Facilities</i> - Providing safe anchorage/havens; dredging of river outlets to provide adequate runoff capacity for rivers and channels; improving access by fishing boats through the creation of new river outlets; suitable cluster for the execution of <i>Pilot Projects</i> , given the limited local experience with outlets in sandy coastal areas
2.3.2	<i>Coastal Structures</i> - Protecting of existing infrastructure or re-establishing existing river entrances which have been made unstable; institutional strengthening of coastal management capabilities and coastal engineering expertise for the Central Provinces; cluster very suitable for the execution of <i>Pilot Projects</i> , given the limited local experience with structures in sandy coastal areas

Attachment 1

Donor Response to Natural Disaster Rehabilitation in Central Vietnam

Floods in November and December 1999

CPI-Central Province Initiative for an Integrated Natural Disaster Mitigation Policy for Central Vietnam

MULTI-LATERAL AND BILATERAL DONOR RESPONSE FOR NATURAL DISASTER REHABILITATION IN CENTRAL VIETNAM

(As of 24 August, 2000)

[Emergency relief aid given as a result of the November and December 1999 flooding is not listed]

Date of Pledge	Country	Programme or Project Being Supported	Central Vietnam Provinces Targeted	Amount Proposed (US\$)	Grant or Loan	Donor Implementation
January 2000 to present	Netherlands	1. Management Support for the Strategic Partnership	1. All provinces	1. \$ 200,000	1. Grant	1. Netherlands Embassy & MARD
		2. Funding of Lessons Learned Workshop in Da Nang on 6 – 8 March, 2000	2. All provinces	2. \$ 10,000	2. Grant	2. MARD
		3. Disaster resistant housing	3. All provinces	3. \$ 150,000	3. Grant	3. Red Cross
January 2000 to present	United Nations Development Programme (UNDP)	1. Management Support for Strategic Partnership	1. All provinces	1. \$ 60,000	1. Grant	1. UNDP (Environment and Natural Disaster Mitigation Programme)
March 2000	France	1. Funding of Lessons Learned Workshop in Da Nang on 6 – 8 March, 2000	1. All provinces	1. \$ 12,000	1. Grant	1. Ambassade de France
March 2000 to present	Asian Development Bank	Emergency repairs to infrastructure under Loan 1259 – VIE (FS)				
		1. Rao Nam Irrigation System	1. Quang Binh	1. \$1,800,000	1. Loan	1. MARD
		2. Nam Thach Han Irrigation System	2. Quang Tri	2. \$3,200,000	2. Loan	2. MARD
		3. Khe May Irrigation System	3. Quang Tri	3. \$ 600,000	3. Loan	3. MARD
		4. Bau Nhum Irrigation System	4. Quang Tri	4. \$ 400,000	4. Loan	4. MARD
		Emergency repair to infrastructure under loan reallocations				
5. Rural roads	5. To be determined	5. To be determined	5. Loan	5. Ministry of Transport		
6. Schools	6. To be determined	6. To be determined	6. Loan	6. Ministry of Education		
January 2000 to present	World Bank	Emergency repair to infrastructure under loan reallocations				
		1. Thach Nham 2 irrigation system	1. Quang Ngai	1. \$3,200,000	1. Loan	1. MARD
		2. Phu Ninh Irrigation System	2. Quang Nam	2. \$2,600,000	2. Loan	2. MARD
		3. Duy Thanh Dam	3. Quang Nam	3. \$3,700,000	3. Loan	3. MARD
		4. Thu Bon River revetment	4. Quang Nam	4. \$1,900,000	4. Loan	4. MARD
		5. Rural Roads	5. To be determined	5. To be determined	5. Loan	5. Ministry of Transport
6. Schools	6. To be determined	6. To be determined	6. Loan	6. Ministry of Education		

CPI-Central Province Initiative for an Integrated Natural Disaster Mitigation Policy for Central Vietnam

MULTI-LATERAL AND BILATERAL DONOR RESPONSE FOR NATURAL DISASTER REHABILITATION IN CENTRAL VIETNAM

(As of 24 August, 2000)

[Emergency relief aid given as a result of the November and December 1999 flooding is not listed]

Date of Pledge	Country	Programme or Project Being Supported	Central Vietnam Provinces Targeted	Amount Proposed (US\$)	Grant or Loan	Donor Implementation
April 2000	United States (USAID Office of Foreign Disaster Assistance)	1. Computer graphics based disaster warning and severe storm information system for the Vietnam National Television Network	1. Entire country	1. \$ 350,000	1. Grant	1. UNDP Disaster Management Unit
		2. Installation and operation of river flood warning "Alert" systems on the most flash flood-prone rivers in Central Vietnam	2. Thua Thien-Hue, other provinces	2. \$ 600,000	2. Grant	2. UNDP Disaster Management Unit
		3. Natural disaster zoning maps of the most disaster-prone provinces of Central Vietnam	3. All provinces	3. \$ 150,000	3. Grant	3. UNDP Disaster Management Unit
		4. Reconstruction of flood damaged houses	4. All provinces	4. \$ 590,000	4. Grant	4. Red Cross
		5. Construction of flood proof schools and health clinics	5. Thua Thien-Hue	5. \$2,700,000	5. Grant	5. Ministry of Construction
		6. Mobile emergency hospital for disaster relief	6. All provinces	6. \$1,200,000	6. Grant	6. Red Cross
April 2000	Luxembourg	1. Grassroots community natural disaster preparedness training	1. Quang Binh, Quang Tri, and Quang Nam	1. \$ 250,000	1. Grant	1. UNDP (Hunger Eradication and Poverty Reduction Programme)
April 2000	International Federation of Red Cross and Red Crescent Societies	1. Emergency rescue equipment, motor vehicles for Provincial Red Cross offices, emergency response training	1. All provinces	1. \$1,200,000	1. Grant	1. Vietnam Red Cross
		2. Disaster resistant house kits	2. All provinces	2. \$ 590,000	2. Grant	2. American Red Cross
January 2000	Italy	1. Technical Assistance to the hydro-meteorological services	1. To be determined	1. \$2,600,000	1. Loan	1. Hydro-meteorological Services

CPI-Central Province Initiative for an Integrated Natural Disaster Mitigation Policy for Central Vietnam

MULTI-LATERAL AND BILATERAL DONOR RESPONSE FOR NATURAL DISASTER REHABILITATION IN CENTRAL VIETNAM

(As of 24 August, 2000)

[Emergency relief aid given as a result of the November and December 1999 flooding is not listed]

Date of Pledge	Country	Programme or Project Being Supported	Central Vietnam Provinces Targeted	Amount Proposed (US\$)	Grant or Loan	Donor Implementation
01 February, 2000	Canada	1. Resettlement of population and construction of disaster proof houses for 370 families	1. Thua Thien-Hue	1. \$ 330,000	1. Grant	1. CIDA and Canadian Centre for International Studies and Cooperation
1999 – 2000	Australia	1. Typhoon hydromet warning station on offshore island and hydromet institutional strengthening 2. Disaster resistant housing	1. To be determined 2. All provinces	1. \$ 120,000 2. \$ 68,000	1. Grant 2. Grant	1. AusAid to Hydromet Services 2. Red Cross
June 2000	Norway	1. Construction of new flood resistant schools	1. Quang Tri, Thua Thien-Hue and Quang Nam	1. \$1,400,000	1. Grant	1. NORAID
June 2000	Belgium	1. Disaster resistant housing	1. All provinces	1. \$ 448,000	1. Grant	1. Red Cross
June 2000	Czech Republic	1. Disaster resistant housing	1. All provinces	1. \$ 15,000	1. Grant	1. Red Cross
June 2000	Denmark	1. Disaster resistant housing	1. All provinces	1. \$ 35,000	1. Grant	1. Red Cross
June 2000	New Zealand	1. Disaster resistant housing	1. All provinces	1. \$ 80,000	1. Grant	1. Red Cross
June 2000	European Union	1. Disaster preparedness, flood, and forest fire prevention 2. Reduction of natural catastrophies in river basin 3. Human resource development, institutional development, and risk reduction	1. Quang Binh 2. Thua Thien-Hue 3. All provinces	1. \$ 200,000 2. \$ 220,000 3. \$ 360,000	1. Grant 2. Grant 3. Grant	1. NGO APS 2. NGO CODEV 3. Red Cross

CPI-Central Province Initiative for an Integrated Natural Disaster Mitigation Policy for Central Vietnam

MULTI-LATERAL AND BILATERAL DONOR RESPONSE FOR NATURAL DISASTER REHABILITATION IN CENTRAL VIETNAM

(As of 24 August, 2000)

[Emergency relief aid given as a result of the November and December 1999 flooding is not listed]

Date of Pledge	Country	Programme or Project Being Supported	Central Vietnam Provinces Targeted	Amount Proposed (US\$)	Grant or Loan	Donor Implementation
2000-2001	Japan	Support under JBIC Sector Loan III:				
		1. Rural Road	1. Quang Tri, Quang Nam	1. \$1,214,000	1. Loan	1. JBIC
		2. Rural Electrification	2. Quang Binh, Quang Tri, Quang Nam, Da Nang, Binh Dinh, Phu Yen	2. \$2,143,000	2. Loan	2. JBIC
		3. Rural Water Supply	3. Quang Binh, Quang Tri, Thua Thien Hue, Quang Ngai, Phu Yen	3. \$3,643,000	3. Loan	3. JBIC
		4. Small Scale Irrigation	4. Quang Binh, Thua Thien Hue, Quang Ngai, Binh Dinh	4. \$2,429,000	4. Loan	4. JBIC
		5. Afforestation	5. Quang Tri, Thua Thien Hue, Quang Nam, Quang Ngai, Phu Yen	5. TBD	5. Loan	5. JBIC
24 August, 2000		Total rehabilitation funds committed to date		\$40,767,000	Grant & loan	

Attachment 2

Terms of Reference for Multi-donor Mission Experts

Development of an Integrated Natural Disaster Mitigation Policy for Central Vietnam

TERMS OF REFERENCE FOR IN-DEPTH STUDIES OF MATTERS IDENTIFIED BY THE FACT-FINDING MISSION

INTRODUCTION

Terms of Reference for the second Multi-donor Mission to develop an Integrated Natural Disaster Mitigation Policy for Central Vietnam are given in the following pages. The scope of work is indicated under 13 items or issues. It is envisaged that a team of 8 to 10 mission members will be required to cover the issues in the time available. It is likely that some mission members will have appropriate qualifications and experience to undertake studies of more than one issue, and in this case some of the input times may need to be varied. All team members are expected to have appropriate qualifications and extensive experience directly relevant to their tasks. Experience in Vietnam is preferred and possibly a requirement for all mission members.

All the issues are inter-related, and close coordination will be needed among the team members. The final draft Integrated Natural Disaster Mitigation Policy for Central Vietnam produced by the team should be truly integrated. It should also be consistent with the existing *National Strategy and Action Plan for Mitigating Water Disasters in Vietnam*, while drawing attention to any recommendations for further updating the national plan in the light of lessons learned in or since the catastrophic 1999 flooding in Central Vietnam.

In carrying out the studies, a participatory approach should be adopted through consulting and cooperating with the various agencies and organizations involved in flood mitigation and disaster management. Consultation with communities at district and commune levels using the participatory approach should also be undertaken where and whenever appropriate. Matters common to most if not all the issues should be considered in each case. These include training requirements, social and environmental impacts, the objective of poverty reduction and hunger eradication, and the empowerment of women.

The policy must take into account the provisions of the Law on Water Resources, implemented in January 1999, and of all relevant government decrees and legal requirements. However where improvements could be made to legal regulations which would enhance the protection of life and property against the effects of natural disasters and floods, appropriate recommendations for new or improved legal formulations should be made by the mission.

The mission should take account of the work of other relevant projects, including water resources and flood mitigation activities in the Red River Basin and in the Mekong River Basin. It is not desired to duplicate any other work or studies being carried out. Any reasonable steps to shorten the time to complete the mission's work should be considered. Details of damage and loss caused by the 1999 floods are contained elsewhere in the Fact-finding Mission's Report Volume 1; as are details of donor initiatives in the Central Provinces in Volume 2; and rehabilitation work proposed by the Provincial People's Committees in Volume 3.

1. MANAGEMENT AND COORDINATION OF INTEGRATED NATURAL DISASTER MITIGATION POLICY FOR CENTRAL VIETNAM

Objectives

- (a) To ensure that the Integrated Natural Disaster Mitigation Policy for Central Vietnam developed by the initiative is truly integrated and the basis for an effective Action Plan.
- (b) To ensure that the second mission is managed effectively, including the coordination of all the activities and the carrying out of its work on time and within budget.
- (c) To compile the Integrated Natural Disaster Mitigation Policy for Central Vietnam.

Background

The Integrated Natural Disaster Mitigation Policy for Central Vietnam will study a wide range of issues, all of which are in some way inter-related. It will be necessary for the studies to be managed effectively so that, where required, findings on some aspects are available at times required for use in consideration of other issues. Overlap of the studies is to be avoided, while ensuring that no important matters are overlooked.

The outcome of the policy will be a coherent strategy and action plan, which includes actions which can be implemented without delay; and others which will require further consideration. It is important to maintain momentum to solve problems created by the 1999 floods and to put in place policies which will minimize future natural disaster damage. Emphasis will be placed on early implementation of applicable strategies wherever practicable.

The policy will use the outcomes of all the tasks to compile the strategy and action plan. To ensure that cross-cutting issues are taken into account, the next multi-donor mission team will include members experienced in poverty alleviation, gender and other social issues, and environmental management. In these roles they will consult with other team members and review their recommendations in the light of these issues.

Scope of Work

- Ensure that the various studies and actions are coordinated.
- Ensure that the outcomes are integrated into a cohesive policy and action plan by taking account of the linkages and inter-relationships among the issues.
- Ensure that training needs are identified and acted upon wherever appropriate.
- Develop an English language and Vietnamese language Internet website to keep all actors informed on all aspects of the initiative.

Resources

- (a) The team leader will be qualified in an appropriate discipline and experienced in flood and other natural disaster mitigation policies and practices. Team leadership experience is essential, as well as experience in Vietnam. Experience in institutional issues will be helpful. Input approximately 10 weeks.
- (b) Community specialist or sociologist, with experience in poverty alleviation, gender and community issues. Input approximately 6 weeks.
- (c) Environmental planning and management specialist with experience in assessing the impact of development in natural disaster and flood-prone areas. Input approximately 4 weeks.
- (d) National organization with experience in designing and maintaining an Internet website in the two languages of English and Vietnamese. The input to the site will initially be from the fact-finding mission report; subsequent input will be by the multi-donor mission team members, by donors, and by Government.

2. INSTITUTIONAL ARRANGEMENTS AND CAPABILITIES

Objectives

- (a) To achieve the most efficient and effective institutional arrangements for the implementation and management of the Integrated Natural Disaster Mitigation Policy for Central Vietnam.

Background

The Law on Water Resources of 1999 sets out powers and responsibilities for flood protection (Chapter IV of the law). It states that State agencies, economic organizations, political organizations, socio-political organizations, social organizations, armed forces units, and all individuals have a duty to take part in the prevention, fighting against and overcoming of the consequences of floods. The Government directs ministries, branches and people's committees at the various levels to carry out these duties, and these groups are responsible for organizing the implementation of flood protection activities.

The Ministry of Agriculture and Rural Development has been allocated the responsibility for flood protection at Central Government level. Within the Ministry there is a Department responsible for flood protection and dyke management. The Disaster Management Unit within the Ministry is responsible for strengthening the national capacity for disaster management through facilitating information collection and exchange, intra-governmental and inter-governmental coordination, and public access to information. There is also a Central Committee for Flood and Storm Control, with counterpart Provincial Committees for Flood and Storm Control in each of the Central Provinces. These committees are made up of representatives of the relevant ministries and departments at each level.

The Law on Water Resource allocates responsibility for organizing the observation and forecasting and issuing of timely information on rain, floods, and rising sea levels "on the national scale" to the State managing agency in meteorology, the Hydro-meteorological Service (HMS). The service has counterparts at provincial level and at regional centers.

During and after the 1999 flood events, there was a great deal of good cooperation among government agencies and other groups. Much effective relief work was carried out and is still being carried out. The Central and Provincial Flood and Storm Control Committees appeared to work well, and during the fact-finding mission's visits to five of the provinces it was evident that the committees in those provinces were very much committed to carrying out their functions effectively.

There is always the possibility of improving organizations and administrative arrangements. With this in mind, a review of the present institutional arrangements should be made to see whether any changes would be beneficial and whether any institutional strengthening is desirable. Possible benefits to be considered include better preparedness for floods and storms, and more accurate and timely information on flood levels being made available to the public and to agencies. Also to be considered are how agencies extra curricular to the government, like the Vietnam Red Cross, are integrated into current institutional arrangements.

Scope of Work

- Review the current institutional arrangements, capabilities, responsibilities and authorities at all levels for managing natural disaster and flood disaster preparedness and response in the Central Provinces.
- Assess the effectiveness, efficiency in the use of resources, and capabilities of the organizations involved.
- Consider whether the composition of the Provincial Flood and Storm Control Committees is adequate in the light of the many organizations involved in planning and response activities.

In particular assess whether organizations such as the Vietnam Red Cross are appropriately represented.

- Recommend any appropriate changes in organizations or responsibilities, and identify institutional strengthening needs.
- Consider how to better integrate the broadcast services of the Voice of Vietnam Radio and Television Services into the process of pre-natural disaster awareness training, natural disaster warning, and natural disaster information services.

Resources

It is expected that this issue will be examined by the team leader.

3. EMERGENCY RESPONSE AND CONTINUING RELIEF AND REHABILITATION SUPPORT

Objectives

- (a) To determine the continuing needs for relief and rehabilitation support to the people affected by the 1999 floods.
- (b) To determine the extent to which these needs can be met under current arrangements, and to identify further actions needed to meet any shortfalls.
- (c) To determine whether current arrangements are adequate to deal with future severe flood events, and to identify actions needed to overcome any shortcomings.

Background

As a result of the 1999 floods many people required evacuation, rescue, treatment for injury and disease; and provision of emergency food, shelter, clothing, cash, and other necessities. Many households lost homes, land, crops, seeds, fertilizer, produce, livestock, cash, and personal belongings. In many areas the planting for winter/spring crops was delayed or destroyed, meaning that there will be continuing food shortages in many areas. Loss of crops, livestock, land, small irrigation infrastructure, and other means that people have lost their future livelihood.

Scope of Work

- Review the adequacy of current actions being taken by government agencies at all levels, by NGOs, and by donors and others to alleviate the losses, suffering and dislocation caused by the 1999 floods and their aftermath.
- Make recommendations for any additional actions needed or modifications to current arrangements and activities to cope with the continuing relief and rehabilitation issues.
- Review the arrangements in place to cope with future severe natural disaster and flood events, and make recommendations on any desirable modifications or additions to the arrangements. The issues to be reviewed include, but are not limited to, the following:
 - Natural disaster preparedness plans, including but not limited to, the items following.
 - Representation of all relevant and appropriate agencies and organizations on planning and executing committees and working groups.
 - Stockpiling of, and arrangements to acquire as needed, goods and commodities likely to be needed in future natural disaster and flood emergencies, including food, medicines (for people and livestock), clothing, building materials, fuel (for cooking and transport), rescue equipment (including boats), communications equipment, seeds, fertilizer, etc.
 - Assessment of the security from flood damage of stockpile or storage locations.
 - Arrangements for transporting and delivering of urgently needed supplies of relief goods and commodities.
 - Standing arrangements and authorizations for the mobilization as necessary of relevant agencies and organizations, including government agencies at all levels, defense and police forces, donors, and NGO's.
- Include assessment of the needs of the more vulnerable and at-risk members of the community. In this regard the work of the World Food Programme in identifying vulnerable and at-risk communes and districts is to be taken into account and cooperation with these efforts is encouraged where appropriate.

Resources

Senior consultant experienced in disaster relief management, familiar with policies and activities needed to prepare for and to respond to disaster situations. Input approximately 6 weeks.

4. FLOOD INUNDATION MAPPING

Objectives

- (a) To provide information on the areas likely to be inundated by natural disasters including major floods.
- (b) To provide a planning tool for use in conjunction with a flood-prone area zoning policy.
- (c) To assist in identifying areas of hazard so that planning can be properly carried out for preparedness for floods and for emergency response in the event of floods.
- (d) To assess the safety and adequacy of emergency refuge areas and long term resettlement areas.

Background

Knowledge of areas likely to be flooded by natural disasters is essential if rational decisions are to be made on a range of matters: including land use, siting and appropriate design of structures, location of refuge areas for use in flood times, etc. Knowledge of the depth and duration of flood inundation is also useful in making such decisions and in planning the most appropriate siting and types of crops, and the location of emergency access routes. It is understood that Radarsat images of the areas inundated in the 1999 floods are available. These show areas covered by water as black. It is proposed that the feasibility of using these images and of superimposing them on suitable existing maps be examined, and if possible of deriving the depths and durations of flooding. If feasible, work should proceed on the production and issue of inundation maps.

Scope of Work

- Review and assess existing local activities and institutions related to the establishment of inundation maps.
- Confirm the availability of Radarsat images showing the November and December 1999 floods; and of earlier floods of extreme disaster events.
- Confirm the availability of suitable existing base mapping, such as 1:50,000 scale topographic mapping, for the flood-affected areas.
- Prepare guidelines for the preparation of inundation maps by superimposing Radarsat images on existing mapping. The method should include the checking of ground truth by observation of known flood levels and by interviews with residents of the flooded areas.
- Identify an appropriate Vietnamese government agency or agencies to create the inundation maps and arrange for the maps to be produced. Alternatively, a donor may propose to arrange for the production of inundation maps by a private commercial contract.
- Provide appropriate training for the selected mapping agency or agencies, if required.
- Supervise the initial production of the first inundation maps.
- If feasible the maps should also indicate depths and duration of flooding, based on the use of contour maps or other suitable means; and on the use of Radarsat images taken at successive time intervals.
- The primary objective should be to produce maps indicating the areal extent of the 1999 flooding and possibly other historical flooding as soon as possible; so that the information is available to agencies and communities before the next flood season. If necessary the addition of depth and duration data can be made over a longer period of time.
- The final mapping must be to a scale and in a format that presents the information in a way that is suitable for the purposes outlined, and can be understood by all levels of disaster officials and decision makers at the Central Government, Province, District, and even Commune level.

Resources

Senior cartographer or GIS specialist with experience in the preparation of maps from satellite data.
Input approximately 8 weeks.

5. FLOOD FORECASTING AND WARNING SYSTEMS

Objectives

- (a) To provide flood forecasting systems in each of the Central Provinces which will allow timely and suitably accurate estimates of flood levels to be made.
- (b) To provide warning systems for each province which will allow the timely dissemination of flood information to communities likely to be affected and to relevant government agencies and non-government organizations.

Background

At present the amount of hydro-meteorological information collected in the provinces is extremely limited and probably of questionable accuracy. Historically, there appears to be a very low level of investment in hydromet measurement in the Central Provinces. Existing measuring devices consist mainly of simple rain gauges and staff gauges for measuring water levels, both of which are manually read. The number of such stations in each important catchment area is also extremely limited. Data is passed on by the observers by means of telephone or radio. These communication methods are susceptible to breakdown during heavy rainfall and winds. In some cases cellular telephones were used during the 1999 floods and these were found to be reliable in the natural disaster conditions prevailing.

Velocity and flow rates of rivers are measured at very few of the hydromet stations, so there are no rating curves available for most stations. There do not appear to be any mathematical models of catchment rainfall-runoff relationships or of flood routing along the rivers, which would allow the information to be analyzed and transformed into useful and reasonably accurate predictions of flood levels.

The general result is that only very limited flood forecasting information is available, and its dissemination is likely to be too late to be able to take timely flood mitigation actions.

An improved network of rainfall and river stage measuring stations with appropriate equipment is required, together with improved decision support and information dissemination systems. Weather forecasting, including predictions and tracking typhoons, and heavy rainfall, is clearly a national weather service responsibility. It is believed however, that for maximum effectiveness, flood forecasting, monitoring and warning should be a provincial responsibility, with regional and national backup and support as necessary. The Central and Provincial Committees for Flood and Storm Control should probably have more direct control over and access to data from provincial river gauging and rainfall measurement stations. Further any measurement equipment installed must be suitable to measure high rainfall quantities using doppler technology and all measurements must be automated and transmitted electronically in real time.

Scope of Work

- In each of the affected provinces, review the location and condition of existing rainfall and water level measuring stations, the method and type of equipment used for collecting data, the availability of historical data, the method of analyzing data, the method of disseminating information to the community and agencies, and the scope and content of such information. It is understood that historical hydro-meteorological data is held in French archives, and the feasibility of obtaining this data should be examined as a priority.
- All available hydromet data, both in Vietnam archives and in French archives should be collected, evaluated for quality and consistency, and made available in a standard format for use by planners, designers and decision makers in both the Government and in the donor community. The data should be archived in CD Rom format and made available in electronic format assessable using internet web browser technology.

- Design an appropriate network of rainfall and water level measuring stations for each of the significant river systems. This will incorporate appropriate automatic measuring, recording and transmitting instrumentation that is hardened to withstand tropical rain storms and the loss of mains power and conventional telephone service.
- Provide specifications for all proposed equipment and appropriate designs for site installations.
- Prepare cost estimates for procurement and installation of the proposed networks.
- Provide guidelines on the interpretation and use of the data to be obtained from the networks. As little historical data on stream flow rates is available at present, it is envisaged that initially empirical rules would be developed to provide relevant forecasts of river levels and areas of flood inundation. The guidelines should however also include procedures for storing the data collected and using it over time to develop more sophisticated forecasting models. It is envisaged that flood routing models would be developed first; followed by rainfall-runoff models. Where appropriate, synthetic models could be recommended.
- The work should take into account the data collection and analysis systems used or proposed nationally for forecasting typhoon and monsoon rains.
- In designing the networks, account should be taken of the various catchment characteristics. In the mountainous areas and upland areas, flash floods are common, with peak water levels occurring less than 6 hours after the commencement of rainfall. In the lowland delta and coastal areas, longer times for river level rise are more common, reported to be in the order of 6 to 12 hours. The overriding aims for the river measurement network are to improve the accuracy of flood forecasting and to increase the time between the giving of warnings of high water levels, and the occurrence of such water levels.
- The design is to incorporate suitable data transmission systems, including the use of cellular telephones or satellite transmission where appropriate.
- Provide guidelines on the type of information to be derived and disseminated to the community and government agencies, and guidelines on standardized message formats to be provided.
- It is intended to have the systems operational as soon as practicable, and as far as possible before the next flood season. It may be appropriate to install the systems in stages, with say the main river in each province being provided with a measuring network initially, followed by the other significant river tributaries.

Resources

Senior hydrologist or water resources engineer with experience in the design and operation of hydro-meteorological measuring networks and the estimation of flood flows and levels from rainfall-runoff models and flood routing techniques. Input approximately 8 weeks.

6. PUBLIC EDUCATION AND INFORMATION SYSTEM

Objectives

- (a) To ensure that sufficiently accurate and timely information on potential and actual natural disaster and flood events is available at all times.
- (b) To ensure that information on natural disaster mitigation actions and precautions to be taken is given to the community regularly; and that education is provided to assist people to be prepared for natural disasters and floods, and to take appropriate action when they occur.
- (c) To ensure that the means of delivering such education and information are available and operational at all times.
- (d) To ensure that responsibilities and authority for producing and disseminating flood warnings are clear and known to those concerned.
- (e) To ensure that rural poor people and the lowest level of commune and village government, who are the most vulnerable population group and government level affected by natural disasters, are included in the disaster mitigation decision making process through the participatory approach.

Background

The timely dissemination of realistic information and advice on impending natural disasters from severe weather and potential flood events is essential if loss of life and property is to be minimized. The community needs to be prepared for such events by knowing what to do when natural disaster events are imminent or occurring, and by receiving authoritative information at appropriate times. It is evident that the accuracy, timeliness and relevance of information on actual and potential flood water levels during the 1999 floods was inadequate. It is also evident that the methods used for disseminating such information and warnings leave considerable room for improvement. An improved public education and information system is required, which will make use of the information to be obtained from the proposed improved hydromet forecasting and warning systems.

Improved public information and education systems work best when they are helped to be designed by the people they are designed to serve. For this reason, a participatory approach at the district, commune and village level is needed for the most effective design and implementation of these information and education system.

Scope of Work

- Develop guidelines for actions to be taken before, during, and after natural disaster and flood events. Whenever possible, uses the participatory approach and include the needs of the most vulnerable population groups in developing the guidelines.
- Identify clear disaster preparation and warning messages to be passed to the community. Different messages will be needed for different levels of government and for different population groups.
- Develop systems and procedures for obtaining and disseminating the necessary information and warnings, taking into account the data which will be provided from the improved flood forecasting and warning system.
- Include the means necessary to ensure that the communication systems used to disseminate information and warnings are disaster-proof.
- Prepare specifications for the necessary equipment and materials.
- Prepare cost estimates for implementation of the improved systems.

Resources

Natural disaster communications specialist or public health expert with experience in systems and equipment used in providing information to the public and in the preparation of public information campaigns. Input approximately 4 weeks.

The guidelines and system will be developed in consultation with the hydrologist or engineer involved in developing the Flood Forecasting and Warning Systems (Issue No. 5).

7. ENVIRONMENTAL ASSESSMENT AND SUSTAINABLE DEVELOPMENT

Objectives

- (a) To incorporate environmental issues into development planning for the Integrated Natural Disaster Mitigation Policy for Central Vietnam.
- (b) To assess that all natural disaster mitigation schemes selected for the Natural Disaster Mitigation Strategy and Action Plan for Central Vietnam are environmentally positive and sustainable over the intermediate and long term.
- (c) To assess which projects are most likely to help reverse the environmental degradation of the Central Provinces that has contributed to the increase in occurrence and magnitude of natural disasters.

Background

Years of war, under-investment, geo-political division, and over exploitation of natural resources has been extremely devastating to the environmental conditions in Central Vietnam. Chemical defoliation, over logging of watershed forests, improper agricultural practices, destruction of coastal mangrove forests, and mining of offshore coral deposits have all contributed to the decline in the ability of the environment to mitigate the effects of natural disasters. Lack of forest cover contributes to mountain landslides; in-appropriate agricultural practices contributes to sedimentation that fills up river channels and makes flooding and river bank erosion prevalent and more severe; destruction of coastal mangroves and offshore coral reefs increases the damage to coastal zones and accelerates salt water intrusion up estuaries and into ground water aquifers.

All of these years of environmental neglect must be considered and every effort should be made to incorporate environmental considerations into this disaster mitigation initiative in Central Vietnam.

Scope of Work

- Ensure that environmental considerations and impacts are properly considered and evaluated in each component of the disaster mitigation initiative.
- Help to develop disaster mitigation projects that stop and even possibly reverse negative environmental impacts that are contributing to more frequent and more severe natural disasters in Central Vietnam.
- Help to prepare an appropriate level of environmental assessment of all components of the natural disaster mitigation initiative.
- Help to rank those disaster mitigation projects most likely to be environmentally acceptable and developmentally sustainable.

Resources

Senior environmental planner and project assessment specialist with experience in disaster mitigation projects, and with experience in Vietnam. Input approximately 6 weeks.

8. FLOOD-PRONE AND COASTAL AREAS ZONING SYSTEM

Objectives

- (a) To develop a method for identifying areas which are prone to natural disaster flooding and coastal damage.
- (b) To develop a policy for land use in such areas which will make optimal use of the land while minimizing future injury, loss, and damage from natural disasters including floods and storms.

Background

Floods and storms are natural events and it is not economically viable to provide full physical protection against all the effects of the maximum possible flood for any given river basin or of the most severe storms and energy of sea waves. Part of the method of dealing realistically with these effects is to accept that dangerous situations and damage to the landscape cannot be realistically prevented in some areas, and to prevent or discourage unsuitable or inappropriate land use in such areas.

Ideally the identification of areas at hazard from flood or storm damage should include division into areas of varying levels of risk. This would include categories of land use based on the probability of being subjected to natural disasters including flooding in any given year of 1%, 5%, 10%, 50%, 100%, etc. Categories could also include criteria related to the likely depth and duration of flooding. Areas such as floodways where high water velocities are likely to occur should also be identified. Such information will allow the selection of appropriate activities or land use, which could be accepted in flood-prone areas, provided the level of risk was acceptable to each particular activity or land use. For example some crops can withstand flooding of certain depths and durations, while other crops cannot. Some buildings and activities could be permitted in areas where the probability of flooding is low, but should generally not be permitted where there is a high probability of annual flooding. Alternatively, buildings in flood prone areas could be required to have sufficient height and floor levels to allow the upper part of the structure to remain above the level of an appropriate probability of flooding.

The availability of historical hydro-meteorological and hydrographic data for the Central Provinces is believed to be too limited to allow realistic estimates of flood flow rates, flood levels, and the areal extent of floods of various probabilities to be made. Therefore, as a first step, it is proposed that information on the extent and effects of the 1999 floods should be used to provide a bench mark which can form the basis of a flood-prone land zoning system.

Scope of Work

- Develop a method of identifying areas which are prone to inland flooding and to coastal erosion.
- Develop a policy for future land use in flood-prone inland and coastal areas.
- Recommend methods of implementation.

Resources

Engineer or planning specialist with experience in flood-prone and coastal area zoning systems. Input approximately 4 weeks.

Engineer or hydrologist with experience in flood estimation techniques. Input approximately 3 weeks.

9. SCREENING OF PROPOSALS FOR REPAIR OF RECENT FLOOD AND STORM DAMAGE, AND FOR PROTECTION AGAINST FUTURE DAMAGE FROM NATURAL DISASTERS

Objectives

- (a) To ensure that projects approved for repair of flood and storm damage from the 1999 flooding have been properly based on the policy and strategy approved by the Government and accepted by donors; and properly assessed for cost-effectiveness, while taking into account social and environmental factors, so that projects are funded on the basis of achieving an appropriate level of natural disaster damage protection at an economically acceptable cost.
- (b) To provide government and donors with a full schedule of recommended projects, which can be considered for funding. These should each be designated as immediate, short, intermediate, or long term in the development time frame.

Background

Much infrastructure, facilities, land, housing and other property was damaged or destroyed as a result of the 1999 floods in Central Vietnam. The various Provincial People's Committees have put forward many proposals for rehabilitating, repairing, or replacing damaged works and property. Some projects are probably not economically justifiable; some projects are complex and require much more preparation and evaluation before implementation; and some projects are so important, obvious, and have such high cost-benefit advantage that they should be implemented immediately.

An example of economically questionable provincial priority projects are some river bank protection schemes. Some of these proposals involve major works with high costs. It is likely that some proposals will not be economically justifiable when the value of property or facilities to be protected is not high, or where the likelihood of repeated damage in future natural disaster, flood, or storm events is high. Examples of these could be the construction of long lengths of major dykes or river bank revetments to protect low-grade cultivated land, or large structural works to protect land behind ocean-front sand dunes which are in a dynamic state of erosion and encroachment by the sea.

An example of a project which will require further technical evaluation is the proposal for remedial work for restoration of the coastal lagoon in Thua Thien-Hue Province. The inter-relationship in the lagoon of land, sea, lagoon, and river is very complex and action to close one of the new openings to the sea will require detailed investigation if it is to be successful. The socio-economic and environmental implications of this intervention also need careful consideration.

On the other hand it is imperative that some significant structural repair works be carried out without delay to prevent further damage to major items of infrastructure along rivers such as road and rail bridges, electricity transmission lines, and large irrigation pumping stations. Major existing infrastructure investments must be protected with appropriate river bank protection, both upstream and downstream, before the next flood season.

While some proposed projects may be difficult to justify on economic grounds, most will have a social implication which must also be taken into account. If rehabilitation of agricultural land is not carried out, or if a destroyed village is not rebuilt, the people who formerly worked or lived in those areas will need alternative livelihoods and or living accommodation. Resettlement to other areas away from their former living areas may result in family and other social dislocations. In considering whether to endorse projects with such implications, the availability of acceptable alternative livelihoods, land, and living areas must be carefully taken into account.

14. STRATEGY AND ACTION PLAN FOR MITIGATING WATER DISASTERS IN VIETNAM

Objectives

- (a) To ensure that the integrated natural disaster mitigation policy being developed for the Central Provinces is compatible with the existing *National Strategy and Action Plan for Mitigating Water Disasters in Vietnam*.
- (b) To see whether the experience arising from the 1999 flooding give any need to modify the existing *National Strategy and Action Plan*.

Background

A *Strategy and Action Plan for Mitigating Water Disasters in Vietnam* was published by the UN Department of Humanitarian Affairs in 1994, with the involvement of UNDP and the Ministry of Water Resources. This strategy and action plan was updated in 1996, with the publication of a report outlining progress to date on implementation of the Action Plan and modifications to the Strategy. Clearly the proposed integrated natural disaster protection policy being prepared for the Central Provinces of Vietnam should take account of the existing overall national strategy and be consistent with it. At the same time the Central Province natural disaster mitigation initiative is timely to take advantage of the experiences of and lessons learnt from the 1999 floods; and to see whether these show the need for any changes to the national strategy.

Scope of Work

- Review the existing *National Strategy and Action Plan for Mitigating Water Disasters in Vietnam* in the light of lessons learned from the 1999 flooding. The outcomes of the "Lessons learned Workshop" to be held in March in Da Nang should be taken into account.
- Assess the extent to which the updated National Strategy and Action Plan have been implemented in the Central Provinces.
- Recommend any appropriate changes in the National Strategy and Action Plan.

Resources

Senior disaster management specialist, emergency services practitioner, water resources engineer or other specialist with experience in the planning and implementation of natural disaster and flood mitigation policies. Input approximately 2 weeks.

Attachment 3

Prioritized List of Natural Disaster Mitigation Projects for Central Vietnam

PRIORITIZED NATURAL DISASTER MITIGATION PROJECTS

Central Provinces of Vietnam

(Information provided by Ministry of Agriculture and Rural Development as of August 2000)

No.	DU AN (VIETNAMESE)	PROJECTS (ENGLISH)	GIẢI PHÁP KỸ THUẬT	TECHNICAL SOLUTION	HANG MUC	CATEGORY	KINH PHÍ - AMOUNT	
							VNĐ (màu)	US\$
1	TỈNH QUẢNG BÌNH	QUANG BINH PROVINCE		Provincial Sub-total Cost			120,691	\$8,626,500
1	Trang bị phương tiện cứu hộ, cứu trợ trong mùa lũ lụt	Provide rescue and relief equipment for the flood season	Trang thiết bị bao gồm: áo phao, thuyền gắn máy, thiết bị an toàn.	Boats with engines, canoe, life buoy, safety equipment	Cứu hộ	Disaster preparedness	2,121	\$151,500
2	Xây dựng hệ thống cảnh báo, dự báo lũ tại những vùng chịu ảnh hưởng củ lũ (Districts: Bố Trạch, Quảng Ninh, Tuyên Hoá, Lệ Thủy, Quảng Trạch, Minh Hoá)	Establish flood forecasting and warning systems in flood prone areas (Districts of Bố Trạch, Quảng Ninh, Tuyên Hoá, Lệ Thủy, Quảng Trạch, Minh Hoá)	Xây dựng 6 trạm quan trắc thủy văn, XD mốc cảnh báo lũ, báo cho 81 mốc	Build 6 hydrological measurement stations; build 81 flood and typhoon warning stations	Khí tượng thủy văn	Hydromet	627	\$45,000
3	Khôi phục kè biển Nhật Lệ - Bầu Tró	Repair of the Nhật Lệ - Bầu Tró Sea Revetment, in Đồng Hới	Kè lát mái mới + mở hàn	Slope protection revetment and dike	Thủy lợi	Water Resource	12,000	\$860,000
4	Bảo vệ bờ cửa sông Lý Hòa, xã Hải Trạch, huyện Bố Trạch.	River bank protection of the Lý Hoà River Revetment, Hải Trạch Commune, Bố Trạch District	Tường kè (200 m đối với bờ sông); kè lát mái + mở hàn (1200 m với bờ biển)	Revetment wall 200 m long and a dam 1,200 m long	Thủy lợi	Water resource	8,800	\$630,000
5	Khôi phục các cống - hệ thống dè diều.	Repair sluices and dykes system						
5a	Cống Hối Tre (tả sông of Gianh River, Quảng Phúc, Quảng Trạch District)	Hối Tre Sluice (Right side of Gianh River, Quảng Phúc, Quảng Trạch District)	Khôi phục lại	Repair of sluices	Thủy lợi	Water resource	1,288	\$92,000
5b	Cống Hoàn Trạch (tả sông of Lý Hoà River, xã Hoàn Trạch, Bố Trạch District)	Hoàn Trạch Sluice (Right side of Lý Hoà River, Hoàn Trạch Commune, Bố Trạch District)	Khôi phục lại	Repair of sluices	Thủy lợi	Water resource	1,512	\$108,000
6	Sửa chữa gia cố đập đất và tràn xả lũ thuộc hệ thống thủy lợi Vực Sanh, huyện Bố Trạch	Repair and strengthen earthfill dam and spillway for the irrigation system of the Vực Sanh hydraulic system, Bố Trạch District	Nâng cấp tràn xả lũ, lát mái đập th/lưu, tường chắn sóng, tường nghiêng chống thấm bằng đất sét.	Upgrade spillway, revetment construction for outer slope protection, freeboard for wave overtopping prevention, watertight clay covering slope	Thủy lợi	Water resource	6,100	\$436,000

PRIORITIZED NATURAL DISASTER MITIGATION PROJECTS

Central Provinces of Vietnam

(Information provided by Ministry of Agriculture and Rural Development as of August 2000)

No.	DỰ ÁN (VIETNAMESE)	PROJECTS (ENGLISH)	GIẢI PHÁP KỸ THUẬT	TECHNICAL SOLUTION	HẠNG MỤC	CATEGORY	KINH PHÍ - AMOUNT	
							VND (triệu)	US\$
7	Đê kè chống xói lở bảo vệ khu dân cư và phục vụ SX nông nghiệp thôn Đông Thành, xã Quảng Minh, Quảng Trạch District (1100m)	Dike and revetment for protection of inhabited areas, Đông Thành, Quảng Minh Commune, Quảng Trạch District	Đê+kè và xây cống tại K0+633	Dikes, revetments, sluices at K0+633; 1,100 m long	Thủy lợi	Water resource	389	\$28,000
8	Dự án xin tài trợ các hạng mục phòng tránh bão, lũ thuộc ngành Thủy sản Quảng Bình (Cửa sông Roòn, Lý Hoà, Nhật Lệ)	Flood mitigation and prevention proposed by Department of Fisheries (Estuaries Roòn, Lý Hoà, and Nhật Lệ).	Khu neo đậu thuyền an toàn) khi bão, lũ (S. Ròn, Nhật Lệ) H/thống đèn tín hiệu báo bão, dẫn đường (Cửa S. Ròn, Lý Hoà, xã Hải Thủy) Hệ thống máy thông tin chỉ đạo khi có bão.	Safe haven for fishing boats, warning light poles system (Cửa S. Ròn, Lý Hoà, xã Hải Thủy), and emergency communication system	Cứu hộ	Disaster preparedness	8,300	\$593,000
9	Di dân ở khu vực sạt lở nghiêm trọng Lý Hoà River, xã Hải Trạch, huyện Bố Trạch	Evacuation of people in dangerous landslide area near Lý Hoà Riverbank, Hải Trạch Commune, Bố Trạch District	220 hộ; 1100 nhân khẩu	220 households; 1100 people	Tái định cư	Relocation	5,000	\$357,000
10	Xây dựng 02 phòng khám da khoa khu vực ngập lụt - Phục vụ khám chữa bệnh cho cộng đồng (huyện Quảng Ninh, Bố Trạch)	Build 2 health clinics in Quang Ninh District, and in Bo Trach District	K/cấu nhà 2 tầng (tổng DT: 1550 m2) HT cấp nước, điện, xử lý chất thải.	2 storey structure (total area: 1,550 m2); including water, electricity, and waste disposal system	Khác	Other	3,670	\$262,000
11	Xây dựng 16 trạm y tế (tại huyện Quảng Trạch: 4 xã Bố Trạch: 1 xã, Lệ Thủy: 8 xã, Tuyên Hoá: 1 xã, T/xã Đồng Hới: 1 phường)	Build 16 health clinics at Quang Trạch District (4 Communes) Bố Trạch: 1 Commune, Lệ Thủy: 8 Communes, Tuyên Hoá: 1 Commune, T/xã Đồng Hới: 1 phường)	Diện tích sử dụng: 250*16 = 4000 m2)	Area: 4,000 m2	Khác	Other	6,500	\$465,000

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							VND (triệu)	US\$
12	Sửa chữa đầu mối và nâng cấp kiên cố hệ thống kênh chính Bắc Vực Tròn, huyện Quảng Trạch	Repair and upgrade the main canal system at Bắc Vực Tròn, Quảng Trạch District	Lát mái th/ lưu đập, gia cố chống xói hạ lưu chân đập, khoan phụt vữa BT chống thấm cho tràn xả lũ, XD mới 2 cầu và 1km đường quản lý, nâng cấp kiên cố kênh chính Bắc Vực Tròn	Upstream outer slope protection, injection of cement grout for water tightness, build 2 new bridges, upgrade main canals in Bac Vuc Tron	Thủy lợi	Water resource	26,334	\$1,881,000
13	Sửa chữa công trình đầu mối và kênh chính, hệ thống thủy lợi Cẩm Ly	Repair the head works and the main canal of the Cẩm Ly irrigation system	Sửa chân đập tràn, gia cố mái Th/lưu đập đường quản lý (3,5km), kiên cố hoá hệ thống kênh mương chính (12km), sửa chữa các công trình trên kênh (10 cống tiêu, 8 tràn...)	Repair spillway, main irrigation canals and ditches	Thủy lợi	Water resource	38,050	\$2,718,000

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							VND (triệu)	US\$
II	TỈNH QUẢNG TRỊ	QUANG TRI PROVINCE		Provincial Sub-total Cost			200,679	\$14,366,071
1	Trang bị phương tiện cứu hộ, cứu trợ trong mùa lũ lụt	Provide rescue equipment and for the flood season	Trang thiết bị bao gồm: áo phao, thuyền gắn máy, thiết bị an toàn.	Engine boat, canoe, life buoy, safety equipment	Cứu hộ	Disaster preparedness	2,121	\$151,500
2	Xây dựng hệ thống dự báo, cảnh báo lũ (Tại huyện: Hải Lăng, (Tại huyện: Hải Lăng, Triệu Phong, Gio Linh, Vĩnh Linh, Cam Lộ; TX Quảng Trị, Đông Hà)	Establish a disaster forecasting and warning system (Districts: Hải Lăng, Triệu Phong, Gio Linh, Vĩnh Linh, Cam Lộ; TX Quảng Trị, Đông Hà)	Xây dựng 6 trạm quan trắc thủy văn, XD mốc cảnh báo lũ, bão cho 81 mốc	Build 6 hydrological stations; Build 81 flood and typhoon warning towers	Khí tượng thủy văn	Hydromet	627	\$45,000
3	Nâng cao năng lực thiết bị thông tin cho Ban chỉ huy Phòng chống lụt bão các cấp	Enhance communication capacity for the Flood and Storm Control Committee at all levels			Cứu hộ	Disaster preparedness	681	\$49,000
4	Lên đê chống úng vùng đồng bằng huyện Hải Lăng (45km)	Build a dike to resist waterlogging for delta of Hai Lang District	Đắp đê gia cố 3 mặt bằng BT	Embankment dike and strengthening on three sides with concrete	Thủy lợi	Water resource	45,000	\$3,214,286
5	Kè Hậu Kiên, hữu sông Thạch Hãn, Xã Tiên Phong	Repair Hau Kien Revetment, left side of Thạch Han river, Tien Phong			Thủy lợi	Water resource	10,000	\$714,000
6	Khu trú tàu thuyền đánh cá ngư dân Cửa Tùng, huyện Vĩnh Linh	Safe haven for fisherman at Cửa Tùng, Vĩnh Linh district			Khác	Other	12,000	\$857,000
7	Dự án chống xói lở bờ sông	River bank erosion prevention projects						
7a	Kè Cửa Việt, tả sông Thạch Hãn, huyện Gio Linh (3000m)	Cửa Việt Revetment, right side of Thạch Hãn river, Gio Linh District	Tu bổ bằng BT+ đá hộc	Use of concrete and stone; 3,000 m long	Thủy lợi	Water resource	10,000	\$715,000
7b	Kè Trà Liên Đông, hữu sông Thạch Hãn, huyện Triệu Phong	Trà Liên Đông Revetment, left side of Thạch Hãn River, Triệu Phong District	Tu bổ bằng BT+ đá hộc	Use of concrete and stone; 1,700 m long	Thủy lợi	Water resource	12,000	\$857,000
7c	Kè Cửa Độ, hữu sông Thạch Hãn, huyện Triệu Phong (1500m)	Cửa Độ Revetment, left side of Thạch Hãn river, Triệu Phong district	Tu bổ bằng BT+ đá hộc	Use of concrete and stone; 1,500 m long	Thủy lợi	Water resource	3,000	\$215,000

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							VND (triệu)	US\$
7d	Kê Gia Phúc, tả sông Bến Hải, huyện Vĩnh Linh (1000m)	Gia Phúc Revetment, right side of Bến Hải river, Vĩnh Linh District	Tu bổ bằng BT+ đá hộc	Use of concrete and stone; 1,000 m long	Thuỷ lợi	Water resource	2,000	\$143,000
8	Nâng cấp hệ thống thuỷ lợi Nghĩa Hy, huyện Cam Lộ	Upgrading of Nghĩa Hy irrigation system, Cam Lộ District	Nâng cao đập chính, gia cố tràn xả lũ sửa chữa cống lấy nước, nâng cấp kênh mương, XD mới 2 cống tiêu	Improve main dam, strengthen spillway, repair sluice, upgrade canals and chanel; build 2 new drainage canals	Thuỷ lợi	Water resource	19,800	\$1,414,286
9	Khắc phục lụt bão và nâng cấp đê - kè - cống	Upgrading of dykes, revetments, and sluices						
9a	Đê tả sông Bến Hải, huyện Vĩnh Linh (3600m)	Dyke on the right side of Bến Hải River, Vĩnh Linh District	Embank dykes and make concrete Rivetment	Embankment dykes and concrete rivetment; 3,600 m long	Thuỷ lợi	Water resource	4,500	\$322,000
9b	Đê hữu sông Thạch Hãn, huyện Triệu Phong (12500m)	Dyke on the left side of the Thạch Hãn River, Triệu Phong District	Embank dykes and make concrete Rivetment	Embankment dykes and concrete rivetment: 12,500 m long	Thuỷ lợi	Water resource	11,500	\$822,000
10	Sửa chữa, nâng cấp hồ Hà Thượng đảm bảo năng lực tưới TK	Repair and upgrade Hà Thượng Reservoir	Nâng cấp đập đất, tràn, cống	Upgrade earthfill dam, spillway, and sluice	Thuỷ lợi	Water resource	8,300	\$593,000
11	Sửa chữa, nâng cấp hồ Hiếu Nam, huyện Cam Lộ	Repair and upgrade Hiếu Nam Reservoir, Cam Lộ District	Sửa chữa tràn xả lũ.	Repair spillway	Thuỷ lợi	Water resource	5,500	\$393,000
12	Quy hoạch di dời dân vùng ngập lụt.	Evacuate people out of flood prone areas	Di dời dân vùng ngập lụt, XD công trình hạ tầng thiết yếu	Relocate people and build necessary infrastructure	Tái định cư	Relocation	29,000	\$2,100,000
12a	Huyện Hải Lăng:	Hải Lăng District	500 hộ thuộc 5 xã	500 households in 5 communes				
12b	Huyện Triệu Phong:	Triệu Phong District	480 hộ thuộc 7 xã	480 households in 7 communes				
13	Các công trình cấp nước sạch nông thôn vùng lũ lụt tỉnh Quảng Trị	Clean water supply to flood prone areas	Gồm 29 công trình cho 28 xã và 3 thôn Thị trấn Cam Lộ (124.359 người)	Including 29 projects for 28 communes and 3 hamlets population: 124,359	Khác	Other	24,650	\$1,761,000

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							VND (triệu)	US\$
III	TỈNH THỪA THIÊN - HUẾ	THUA THIEN HUE		Provincial Sub-total Cost			252,100	\$18,011,000
1	Hỗ trợ khắc phục lũ lụt, giảm nhẹ thiên tai tỉnh Thừa Thiên - Huế	Disaster/flood mitigation:						
1a	Hỗ trợ phương tiện cứu hộ ưu tiên khu vực ngập lũ nặng (huyện: Huế, Phong Điền, Quảng Điền, Hương Trà, Phú Vang, Hương Thủy, Phú Lộc)	Rescue equipment for Districts: Huế, Phong Điền, Quảng Điền, Hương Trà, Phú Vang, Hương Thủy, and Phú Lộc	Gồm: 840 thuyền máy 8400 phao cứu sinh	Canoes: 840 Life buoy: 8,400		Cứu hộ	Disaster preparedness	30,000 \$2,140,000
1b	Dự án hệ thống báo bão sớm cho ngư dân ven biển (Tại Thuận an, Tư Hiền)	Flood alert system for fisherman along coastal areas: Thuan An and Tu Hien	Gồm : Hệ thống báo bão và hệ thống đo sóng, đo thủy triều.	Life buoys: 280 telephones: 140 Radio: 425	Mobile	Khí tượng thủy văn	Hydromet	1,050 \$75,000
1c	Dự án hỗ trợ thông tin liên lạc, cứu sinh cho ngư dân đánh cá xa bờ (huyện : Phú Vang, Phú Lộc, Phong Điền, Quảng Điền, Hương Trà, Hương thủy)	Communication equipment for fisherman offshore in Districts: Phu Vang, Phu Loc, Phong Dien, Quang Dien, Huong Tra, and Huong Thuy	Phao cứu sinh: 2860 bộ. Máy bộ đàm: 140 chiếc. Radio: 425 chiếc.	Life Buoys: 280 telephones: 140 Radio: 425	Mobile	Cứu hộ	Disaster preparedness	819 \$58,500
1d	Dự án xây dựng khu trú bão cho tàu thuyền, bảng hướng dẫn luồng lạch, vùng dầm phá (gồm 9 vị trí)	Safe haven for ships, and waterway markers in the lagoon at 9 locations	Số tàu trú ẩn: 432.	Number of ships: 432		Khác	Other	2,260 \$162,000
2	Hỗ trợ phao cứu sinh cho ngư dân nghèo khu vực dầm phá, ven biển	Life buoys for fisherman	Cần cấp: 6907 phao cứu sinh.	Life buoys: 6,907		Cứu hộ	Disaster preparedness	415 \$32,000
3	Khôi phục và nâng cấp đê Nho Lâm - Nghĩa Lộ, huyện Quảng Điền	Repair and upgrade Nho Lam-Nghia Lo Dikes, Quang Dien District	Kết cấu tràn rọ đá+tiêu năng	Structural construction		Thủy lợi	Water resource	4,131 \$295,000
4	Kho dự trữ giống cây trồng, xã Hương Long và Quảng Vinh.	Seed storage in Huong Lan and Quang Vinh	Bảo quản 3000 tấn giống Điện tích kho xây dựng 2500 m2	Capacity 3,000 ton Area: 2,500 m2		Nông nghiệp	Agriculture	4,000 \$286,000

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							VND (triệu)	US\$
5	Củng cố và phát triển các khu định cư thuộc vùng thấp lụt ven phá Tam Giang, huyện Quảng Điền.	Resettlement locations in the lowland of Tam Giang lagoon	ổn định cho 242 hộ	Number of households: 242	Tái định cư	Relocation	2,100	\$150,000
6	Tuyến đê Đông sông Ô Lâu (xã Điền Hưng, Điền Môn, Điền Lộc, Điền Hoà)	O Lau dike construction	Đắp đê bao, kè lát mái, xây 26 cống	Slope open Revetment, 26 sluices	Thuỷ lợi	Water resource	14,065	\$1,005,000
7	Công trình đê biển Vinh Giang - Vinh Hưng - Vinh Mỹ, huyện Phú	Sea dikes at Vinh Giang - Vinh Hưng - Vinh Mỹ in Phú Lộc	Nâng cao đê, lát mái bằng đá hộc	Heighten dike and provide slope protection with stone	Thuỷ lợi	Water resource	9,121	\$651,500
8	Công trình tu bổ đê điều khắc phục lũ lụt năm 1999.	Repair of dikes in province						
8a	Đoạn đê Hương phong (K33 - K40)	Hương phong Dikes (K33 - K40)	Kè lát mái đá hộc dày 30 cm	Revetment of stone, 30 cm thick	Thuỷ lợi	Water resource	10,373	\$741,000
8b	Đoạn đê Phú Mỹ (K7+600 - K9+600)	Phú Mỹ Dikes (K7+600 - K9+600)	Kè lát mái đá hộc dày 30 cm	Revetment of stone, 30 cm thick	Thuỷ lợi	Water resource	5,480	\$392,000
8c	Đoạn đê Vinh Hà (K0 - K2)	Vinh Hà Dikes (K0 - K2)	Kè lát mái đá hộc dày 30 cm	Revetment of stone, 30 cm thick	Thuỷ lợi	Water resource	3,735	\$267,000
9	Khôi phục và nâng cấp đê Diên Hồng, huyện Quảng Điền (4000m)	Repair and upgrade Dien Hong dike, Quang Dien District	<i>Đê hữu:</i>	Left side:	Thuỷ lợi	Water resource	5,450	\$390,000
9a			K0 - K0+610: nâng cao đê+trồng cỏ	K0 - K0+610: high dike and plant grass				
9b			K0+610 - K0+848: kè đá lát, hộ chân.	K0+610 - K0+848: stone dam with bank protection				
9c			K0+848 - K1+528: nâng cao đê, kè lát mái, hộ chân.	K0+848 - K1+528: high dike, revetment on slope, and bank protection				

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							VNĐ (triệu)	US\$
			<i>Đề bờ tả:</i>	Right side:				
9d			K0-K0+900: lát mái, hộ chân, xây mới cống tiêu Bưởi.	K0-K0+900: slope and bank protection, build new drainage				
9e			K0+900 đến hết: áp trúc, lát mái và xây mới 3 cống tiêu.	K0+900 to the end: drainage and filter construction on the landslide slope				
10	Đầu tư xây dựng 30 trạm y tế vùng thấp trung thường xuyên bị ngập	Build 30 health clinics in the lowland area	Tổng DT: 30*263 = 7890 m2)	Area: 7890 m2	Khác	Other	15,000	\$1,072,000
11	Xây dựng trường học khác phục lũ lụt và giảm nhẹ thiên tai	Build new schools	Xây 30 trường thuộc 9 huyện tổng DT sử dụng: 9000 m2	School: 30 Area: 9.000 m2	Khác	Other	30,800	\$2,200,000
12	Công trình tiếp nhận nguồn nước hồ Truồi đổ xuống sông Nông vùng đồng bằng Nam sông Hương	Water supply project, from Truoi Lake to Nong river, South Delta of Huong River	Đắp bờ sông lên +0,8, kiên cố hoá 6km kênh, xây mới 10 cống, sửa chữa 13 cống, lắp mới 48 bộ đàn cửa van	Heighten river bank log 0.8 meters, strengthen canal 6 km long, build 10 new sluices, repair 13 sluices, supply 48 new gates	Thủy lợi	Water resource	22,392	\$1,600,000
13	Đầu tư di dời dân từ những vùng bị ngập lụt nặng lên vùng cao thuộc xã Dương Hoà, huyện Hương Thủy	Relocate people from flood affected heavily flood area to highland area in Duong Hoa Commune, Huong Thuy District	Di dời 265 hộ, XD công trình điện, nước, nhà, văn hoá phúc lợi, g/thông	256 households; build electricity, water supply, houses, entertainment, and transportation systems	Tái định cư	Relocation	10,470	\$748,000
14	Quy hoạch khu tái định cư Phong An, xã Phong An, huyện Phong Điền.	Plan relocation area at Phong An, Phong An Commune, Phong Dien District	Quy hoạch xây dựng: 30 hộ	30 households	Tái định cư	Relocation	578	\$42,000
15	Đầu tư di dời dân từ những vùng bị ngập lụt nặng lên vùng cao thuộc xã Thủy Bằng, huyện Hương Thủy.	Invest in relocation project moving population from flood prone area to highland in Thuy Bang Commune, Huong Thuy	Di dời 150 hộ, XD công trình điện, nước, nhà, văn hoá phúc lợi, g/thông	150 households; build electricity, water supply, houses, entertainment, and transportation systems	Tái	Relocation	6,385	\$456,000
16	Xây dựng rừng phòng hộ đầu nguồn sông Hương.	Afforestation upstream in Huong River catchment	Trồng mới và bảo vệ 5000 ha	New forest: 5,000 ha	Rừng	Forestry	58,520	\$4,180,000

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							VNĐ (mẫu)	US\$
17	Xây dựng rừng phòng hộ đầu nguồn sông A Sáp.	Afforestation upstream in Huong River catchment	Trồng mới và bảo vệ 1861 ha	New forest: 1,861 ha	Rừng	Forestry	14,956	\$1,068,000

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							VND (triệu)	US\$
IV	TỈNH ĐÀ NẴNG	DA NANG PROVINCE		Provincial Sub-total Cost			79,564	\$5,686,000
1	Dự án trang thiết bị phao cứu sinh	Provide life buoy	Trang bị cho 30.000 ngư dân cho 70.000 dân sống trong vùng lũ	Fisherman: 30,000 People in flood prone area: 70,000	Cứu hộ	Disaster preparedness	10,000	\$715,000
2	Dự án cung cấp thuyền cứu hộ, cứu nạn cho 100 thôn, phường bị ngập nặng (Huyện Hoà Vang, quận Ngũ Hành Sơn, Hải Châu, quận Ngũ Hành Sơn, Hải Châu, and Liên Chiểu)	Provide rescue boats for flood prone areas in Huyện Hoà Vang, quận Ngũ Hành Sơn, Hải Châu, Liên Chiểu)			Cứu hộ	Disaster preparedness		
3	Kè bảo vệ bờ sông Vĩnh Điện - Kè Bình Kỳ, (K0 - K0+645) phường Hoà Quý, quận Ngũ Hành Sơn	Build Vinh Dien Revetment - Binh Ky Revetment (KO KO+645) Hoà Quý, Ngũ Hành Sơn	Kè mềm : lát đá khan + đá đỏ	Clay Revetment: stone and rock	Cứu hộ	Disaster preparedness	4,254	\$304,000
4	Xây cống ngăn mặn Tùng Lâm, phường Hoà Quý, quận Ngũ Hành Sơn	Build sluice to prevent salt intrusion at Tùng Lâm, Hoà Quý, and Ngũ Hành Sơn	Xây mới	New construction	Thuỷ lợi	Water resource	4,000	\$286,000
5	Kè bảo vệ bờ sông Cẩm Lệ - Nâng cấp và sửa chữa kè Cồn Dấu (Từ K0 - K0+331) Hoà xuân, huyện Hoà Vang	Cam Le revetment - upgrade and repair Con Dau revetment (KO - KO+ 331), Hoa Xuan, Hoa Vang District	Kè mềm : lát đá khan + đá đỏ	Clay revetment: stone and rock	Thuỷ lợi	Water resource	960	\$69,000
6	Khắc phục khẩn cấp hậu quả lũ lụt Hồ chứa Đông Tréo, xã Hoà Phú, huyện Hoà Vang	Hoa Phu Reservoir, Hoa Van District	XD mới tràn xả lũ và sự cố, sửa cống, nâng cấp đập đất	Repair spillway, repair sluices, upgrade dam	Thuỷ lợi	Water resource	1,500	\$108,000
7	Dự án nước sạch xã Hoà Quý, quận Ngũ Hành sơn	Provide clean water for Hoà Quý Commune, quận Ngũ Hành sơn	Cấp nước sạch cho 10.000 dân	People: 10,000			7,000	\$500,000
8(*)	Dự án nước sạch xã Hoà Xuân, quận Ngũ Hành Sơn	Provide clean water for Hoà Xuân Commune, Ngũ Hành Sơn District	Cấp nước sạch cho 10.000 dân	People: 10,000	Khác	Other	7,000	\$500,000

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							VND (tỉêu)	US\$
9	Dự án nước sạch xã Hoà Tiến, huyện Hoà Vang	Provide clean water for Hoà Tiến Commune, Hoà Vang District	Cấp nước sạch cho 7000 dân	People: 10,000	Khác	Other	7,000	\$500,000
10	Tổng hợp vốn đầu tư dự án tái định cư T.phố Đà Nẵng bao gồm các xã: Hoà Phú, Hoà Bắc, Hoà Liên, Hoà Phong, Hoà Xuân, Hoà Tiến, Hoà Thọ, Hoà Quý.	Relocation project: Hoà Phú, Hoà Bắc, Hoà Liên, Hoà Phong, Hoà Xuân, Hoà Tiến, Hoà Thọ, Hoà Quý (Da Nang City)	Số hộ di dời: 1715	Households: 1,715	Tái định cư	Relocation	35,150	\$2,511,000
11	Khắc phục khẩn cấp hậu quả lũ lụt Hồ chứa Hốc Khê, huyện Hoà Vang.	Urgent rehabilitation of Hốc Khê Reservoir, Hoa Vang district	XD mới tràn xả lũ , sửa cống, nâng cấp đập đất	Repair pillway, repair sluices, and upgrade dam	Thủy lợi	Water resource	1,500	\$107,000
12	Khắc phục khẩn cấp hậu quả lũ lụt Hồ chứa Hố Cái, xã Hoà sơn, xã Hoà Phong, huyện Hoà Vang.	Urgent rehabilitation of Ho Cai Reservoir, Hoa Phong Commune, Hoa Vang District	XD mới tràn xả lũ , sửa cống, nâng cấp đập đất	Repair pillway, repair sluices, and upgrade dam	Thủy lợi	Water resource	1,200	\$86,000

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							VND (triệu)	US\$
	TỈNH QUẢNG NAM	QUANG NAM PROVINCE		Provincial Sub-total Cost			170,729	12,253,857
1	Trang bị phương tiện cứu hộ, cứu trợ trong mùa lũ lụt	Provide rescuing equipment used during flood season	Trang thiết bị bao gồm: áo phao, thuyền gắn máy, thiết bị an toàn.	Engine boats, canoe, life buoy, safety equipment	Cứu hộ	Disaster preparedness	2,121	\$151,500
2(*)	Xây dựng hệ thống cảnh báo, dự báo lũ tại những vùng chịu ảnh hưởng của lũ (huyện Đại Lộc, Điện Bàn, Duy Xuyên, Thăng Bình, Tam Kỳ, Quế Sơn)	Establish flood forecasting and warning system in flood prone area (Communes: Đại Lộc, Điện Bàn, Duy Xuyên, Thăng Bình, Tam Kỳ, Quế Sơn)	Xây dựng 6 trạm quan trắc thủy văn, XD mốc cảnh báo lũ, báo cho 81 mốc	Build 6 hydrological measurement station; Build 81 flood and typhoon warning towers	Khí tượng thủy văn	Hydromet	627	\$45,000
3	Sửa chữa và nâng cấp hồ chứa nước Cao Ngạn, huyện Thăng Bình.	Repair and upgrade Cao Ngạn Reservoir, Thăng Bình District	Mở rộng m/c đập chính và phụ, lát mái th/lưu, sửa cống, sửa tràn xả lũ gia cố và hoàn chỉnh m/c kênh chính	Extend main and sub-revetment, provide outer slope protection, repair spillway, strengthen and repair main canal	Thủy lợi	Water resource	5,570	\$398,000
4	Dự án xử lý khẩn cấp một số đoạn bờ bị sạt lở thuộc sông Thu Bồn - Vu Gia tỉnh Quảng Nam (15,000 m)	Repair river side erosion of Thu Bon River, Vu Giang (1,5000 m)	Nâng cấp và sửa chữa	Upgrade and repair river bank			75,000	\$5,400,000
5	Đầu tư xây dựng 06 trạm y tế cho 6 xã, thị trấn huyện Đại Lộc. (Xã Đại Cường, Đại Sơn, Đại Hồng, Đại Đồng, Đại Minh, T.T ái Nghĩa)	Build 6 health clinics for 6 Communes and Towns for Dai Loc District: (Xã Đại Cường, Đại Sơn, Đại Hồng, Đại Đồng, Đại Minh, T.T ái Nghĩa)	Diện tích sử dụng: 1557 m ²	Area: 1,557 m ²	Khác	Other	2,596	\$186,000
6	Đầu tư xây dựng trường tiểu học Đại Quang 1, xã Đại Quang	Construction of primary school Dai Quang No.1, Dai Quang Commune	Diện tích sử dụng: 1500 m ²	Area: 1,500m ²	Khác	Other	2,101	\$150,000
7	Đầu tư xây dựng trường tiểu học Đại Chánh, xã Đại Chánh	Construction of primary school Dai Chanh in Dai Chanh Commune	Diện tích sử dụng: 1600 m ²	Area: 1,600 m ²	Khác	Other	2,109	\$151,000

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							VND (triệu)	US\$
8	Đầu tư xây dựng trường tiểu học số 1 thị trấn Ái Nghĩa, huyện Đại Lộc	Construction of primary school in Ai Nghia Town, Dai Loc Commune	Diện tích sử dụng: 1900 m ²	Area: 1,900 m ²	Khác	Other	2,590	\$185,000
9(*)	Di dời dân vùng sạt lở	Relocation for peoples in erosion prone areas	4322 hộ	Households: 4,322	Tái định cư	Relocation	42,215	\$3,015,357
10	Nâng cấp và mở rộng hồ chứa nước Phú Lộc, huyện Duy Xuyên	Upgrade and increase capacity of Phu Loc Reservoir	Sửa tràn xả lũ, sửa cống,	Repair spillway, sluices, and complete drainage canals	Thủy lợi	Water resource	12,900	\$922,000
11	Sửa chữa và nâng cấp hồ chứa nước Ron, huyện Trà My	Upgrade and increase capacity of Ron Reservoir, Tra My District	Sửa tràn xả lũ, sửa đóng dất tiêu nước hạ lưu, hoàn chỉnh h/t kênh tiêu	Repair spillway, rockfill, construction covering in the inner slope, and complete drainage canals	Thủy lợi	Water resource	4,900	\$350,000
2(*)	Cải tạo và nâng cấp hồ chứa nước Phước Hà & Hồ Giang, huyện Thăng Bình, Quế Sơn	Upgrade Phuoc Ha and Ho Giang Reservoirs, Thang Binh, Que Son district	Cải tạo và nâng cấp đập đất, tràn, cống lấy nước, h/t kênh và công trình trên kênh	Repair and upgrade dam, spillway, sluice, channel system and construction related with this channel system	Thủy lợi	Water resour	18,000	\$1,300,000

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							VND (triệu)	US\$
VI	TỈNH QUẢNG NGÃI	QUANG NGAI PROVINCE		Provincial Sub-total Cost			152,045	\$10,866,500
1	Trang bị phương tiện cứu hộ, cứu trợ trong mùa lũ lụt	Provide rescue equipment for use in the flood season	Trang thiết bị bao gồm: áo phao, thuyền gấn máy, thiết bị an toàn	Engine boats, canoe, life buoy, safety equipment	Cứu hộ	Disaster preparedness	2,121	\$151,500
2	Xây dựng hệ thống cảnh báo, dự báo lũ tại những vùng chịu ảnh hưởng của lũ dọc sông Trà Khúc và sông Vệ	Establish flood forecasting and warning system in flood prone areas affected by the Tra Khuc River and Ve River	Xây dựng 6 trạm quan trắc thủy văn, XD mốc cảnh báo lũ, bão cho 81 mốc	Build 6 hydrological measurement station; Build 81 flood and typhoon warning guide	Khí tượng thủy văn	Hydromet	627	\$45,000
3	Trạm báo bão ven biển: Lý Sơn, Sa Kỳ, Cổ Luỹ, Mỹ Á, Sa Huỳnh	Establish typhoon warning stations located in coastal zone at Lý Sơn, Sa Kỳ, Cổ Luỹ, Mỹ Á, and Sa Huỳnh.			Khí tượng thủy văn	Hydromet	7,000	\$500,000
4	Hệ thống phòng tránh cho thuyền đánh cá	Provide safe haven for fishing boats			Cứu hộ	Disaster preparedness	55,000	\$3,930,000
5	Công trình xử lý sạt lở đoạn Mỹ Phước - Tịnh Hà, sông Trà Khúc	Construction stability against erosion at My Phuoc, and Tinh Ha, along the Tra Khuc River bank						
5a	Cụm Mỹ Phước, xã Nghĩa Thuận, huyện Tư Nghĩa	Cụm Mỹ Phước, Nghĩa Thuận Commune, Tư Nghĩa District.	Xây 05 mỏ hàn và kè lát mái	Build 5 groins and revetments for bank and slope protection	Thủy lợi	Water resource	2,595	\$186,000
5b	Cụm Tịnh Hà, huyện Tịnh Sơn	Cụm Tịnh Hà, Tịnh Sơn District.	Xây 08 mỏ hàn và kè lát mái	Build 8 groins and revetments for bank and slope protection	Thủy lợi	Water resource	3,702	\$266,000
6	Kè và đê Bình Trung, sông Trà Bông, xã Tịnh Thọ, huyện Sơn Tịnh	Repair Binh Trung revetment and dike, Sơn Tịnh District			Thủy lợi	Water resource	7,000	\$500,000
7	Sửa chữa và nâng cấp hồ chứa nước Hồ Quýt, huyện Sơn Tịnh	Repair and upgrade Ho Quyt Reservoir, Sơn Tịnh District	Sửa tràn, cống lấy nước, Sửa và sử lý thấm đập	Repair spillway and sluices, and reinforce dam water tightness	Thủy lợi	Water resource	3,700	\$265,000

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							VND (triệu)	US\$
8	Di dân và tái định cư khỏi vùng sạt lở bờ sông, bờ biển Sơn Tịnh, Tư Nghĩa, Mộ đức, Đức Phổ, Sơn Hà, Sơn Tây	Resettlement of population affected by erosion on costal line at Sơn Tịnh, Tư Nghĩa, Mộ đức, Đức Phổ, Sơn Hà, and Sơn Tây.	Số hộ di dời:		Tái định cư	Relocation	42,000	\$3,000,000
9	Di dời khẩn cấp dân tại vùng sạt lở huyện Sơn Hà (xã: Sơn hạ, Sơn Kỳ, Sơn Thành, Sơn Giang)	Evacuate people in dangerous landslide area in Sơn Hà District (Commune: Sơn Hạ, Sơn Kỳ, Sơn Thành, and Sơn Giang)	Số hộ di dời: 251 hộ	Households: 251	Tái định cư	Relocation	5,700	\$407,000
10	Sửa chữa và nâng cấp hồ chứa nước Ông Tối, huyện Mộ Đức	Repair and upgrade Ông Tối Reservoir, Mộ Đức District	Sửa tràn, cống lấy nước, Sửa và sử lý thấm đập	Repair spillway and sluices; provide water tightness	Thuỷ lợi	Water resource	4,000	\$286,000
11	Sửa chữa và nâng cấp hồ chứa nước Liên Trì, huyện Bình Sơn	Repair and upgrade Liên Trì Reservoir, Bình Sơn District	Sửa tràn, cống lấy nước, Sửa và sử lý thấm đập	Repair spillway and sluices; provide water tightness	Thuỷ lợi	Water resource	3,200	\$230,000
12	Xây dựng trạm xá cho các vùng bị ảnh hưởng lũ	Build health clinics in flood affected areas			Khác	Other	15,400	\$1,100,000

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							VND (triệu)	US\$
V1	TỈNH BÌNH ĐỊNH	BÌNH ĐỊNH PROVINCE		Provincial Sub-total Cost			117,548	\$8,401,214
1	Trang bị phương tiện cứu hộ, cứu trợ trong mùa lũ lụt	Provide rescue equipment to be used in flood season	Trang thiết bị bao gồm: áo phao, thuyền gắn máy, thiết bị an toàn	Engine boats, canoe, life buoy, safety equipment	Cứu hộ	Disaster preparedness	2,121	\$151,500
2(*)	Xây dựng hệ thống cảnh báo, dự báo lũ tại những vùng chịu ảnh hưởng của lũ dọc sông Trà Khúc và sông Vệ.	Establish flood forecasting and warning system in flood prone areas along the Tra Khuc and Ve Rivers	Xây dựng 6 trạm quan trắc thủy văn, XD mốc cảnh báo lũ, bảo cho 81 mốc	Build 6 hydrological stations; Build 81 flood and typhoon warning towers	Khí tượng thủy văn	Hydromet	627	\$45,000
3	Xây dựng hệ thống thông báo bão cho ngư dân				Cứu hộ	Disaster preparedness	4,100	\$293,000
4	Dự án bảo đảm an toàn cho ngư dân	Safety equipment for fishermen	Gồm: 5,000 máy radio, 16,000 áo phao, 8,000 phao tròn	Radio: 5,000 Life bouys: 16,000 Round life rings: 8,000	Cứu hộ	Disaster preparedness	4,080	\$292,000
5	Khảo sát, lập báo cáo NCKT dự án đầu tư nạo vét khu trú đậu tàu thuyền tại Tam Quan	Investigate and prepare a feasibility study for investment in dredging of Tam Quan Port			Giao thông Thủy lợi	Transport Water resource	197	\$15,000
6	Khôi phục hệ thống đê Đông Gồm: đê Nhơn Phú, Nhơn Bình, Phước Thắng-Cát Chánh, Phước Hoà-Nhơn Hội, tại T.phố Qui Nhơn, huyện Phước Thắng, Phù Cát.(13km)	Repair of the Đông Gồm dike system: Nhơn Phú, Nhơn Bình, Phước Thắng-Cát Chánh, Phước Hoà- Nhơn Hội, Qui Nhơn city, Phước Thắng District, Phù Cát	Nâng cao đê, kê lát mái và sửa chữa cống tiêu	Heighthen dike, dam, and repair drainage	Thủy lợi	Water resource	13,200	\$943,000
7	Tu sửa và nâng cấp công trình hồ chứa nước Hóc Môn, huyện Phù Mỹ.	Repair and upgrade the Hoc Mon Reservoir, Phu My District	Sửa tràn, đập, cống	Repair spillway, dam, and sluices	Thủy lợi	Water resource	9,600	\$686,000
8	Tu sửa hồ chứa nước Lỗ Môn, xã Tây Giang, huyện Tây Sơn	Repair and upgrade the Lo Mon Reservoir, Tay Giang Commune, Tay Son District	Sửa tràn, đập, cống	Repair spillway, dam, and sluices	Thủy lợi	Water resource	2,253	\$161,000

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							VND (triệu)	US\$
9	Công trình: Trung tâm hậu cần dịch vụ làng cá Tam Quan Bắc, xã Tam Quan - Hoài Nhơn (Xây dựng làng cá và nạo vét luồng lạch)	Construct the Tam Quan Bac Fishing Services Center in Hoai Nhon District	Cảng cá, nạo vét luồng lạch,	Build fishing port and dredge channel	Giao thông	Transport	17.972	\$1,283,714
10	Di dân vùng ngập lụt ven sông An Lão (02 huyện An Lão và Hoài Ân)	Resettle population in flood prone areas along the An Lao River in the Districts of An Lao and Hoai An	Di chuyển 202 hộ dân	Household: 202	Tái định cư	Relocation	3.462	\$247,000
11	Cải tạo nâng cấp khu đầu mối hồ chứa nước Suối Rùn, xã Ân Tường, huyện Hoài Ân	Repair and upgrade Suoi Rua Reservoir, An Tuong Commune, Hoai An District	XD tràn xả lũ kiên cố mới	Construct spillway	Thủy lợi	Water resource	3,900	\$279,000
12	Đầu tư xây dựng, cải tạo nâng cấp Bệnh viện Đa khoa huyện Phù Mỹ	Upgrade general hospital in Phu My District	DT sử dụng: 391 m2 và hệ thống điện, nước	Area: 391 m2; + electricity and including water supply	Khác	Other	14,400	\$1,029,000
13	Bờ Ngự thủy Cát trắng - Khắc phục lũ lụt, đoạn đê Bà A (520m)	Rehabilitate Ba A Dike at Ngu Thuy Cat Trang damaged by 1999 Flood	Khắc phục đoạn đê vỡ, xây 2 cống lấy nước	Repair broken dike, and build 2 sluices	Thủy lợi	Water resource	751	\$54,000
14	Chống xói lở bờ đê Thủ Tinh, xã Cát Minh, huyện Phù cát.	Provide erosion prevention for Thu Tinh Dike, Cat Minh Commune, Phu Cat District	Nâng cấp đê cũ, x/d mô hàn	Upgrade old dikes and construct dam	Thủy lợi	Water resource	653	\$47,000
15	Hồ chứa nước Đồng Tranh, xã Hoài Sơn, huyện Hoài Nhơn	Repair and upgrade Dong Tranh Reservoir, Hoai Son Commune, Hoai Nhon District	XD đập phụ, cải tạo đập chính; XD cống lấy nước cho đập phụ và chính, XD tràn xả lũ	Construct sub-dam and repair main dam; build 2 sluices and a spillway	Thủy lợi	Water resource	7,731	\$553,000
16	Nâng cấp và sửa chữa hồ chứa Hòn Gà, xã Bình Thành, huyện Tây Sơn	Repair and upgrade Hon Ga Reservoir, Binh Thanh Commune, Tay Son District	Sửa và nâng cấp đập, tràn xả lũ	Repair and upgrade dams and spillways	Thủy lợi	Water resource	1,900	\$136,000

PRIORITIZED NATURAL DISASTER MITIGATION PROJECTS
Central Provinces of Vietnam

(Information provided by Ministry of Agriculture and Rural Development as of August 2000)

No.	DỰ ÁN (VIETNAMESE)	PROJECTS (ENGLISH)	GIẢI PHÁP KỸ THUẬT	TECHNICAL SOLUTION	HẠNG MỤC	CATEGORY	KINH PHÍ - AMOUNT	
							VND (triệu)	US\$
17	Bến cá Đê Gi. huyện Phú Cát	Construct fishing port at De Gi, Phu Cat District			Giáo thông	Transport	30,601	\$2,186,000

PRIORITIZED NATURAL DISASTER MITIGATION PROJECTS
Central Provinces of Vietnam
(Information provided by Ministry of Agriculture and Rural Development as of August 2000)

No.	DỰ ÁN (VIETNAMESE)	PROJECTS (ENGLISH)	GIẢI PHÁP KỸ THUẬT	TECHNICAL SOLUTION	HẠNG MỤC	CATEGORY	KINH PHÍ - AMOUNT	
							VND (triệu)	US\$
	TỔNG CỘNG	TOTAL AMOUNT					1,093,356	\$78,211,143

Note: (*) indicate the projects which are corrected and supplemented.

PRIORITIZED NATURAL DISASTER MITIGATION PROJECTS

Central Provinces of Vietnam

(Information provided by Ministry of Agriculture and Rural Development as of August 2000)

No.	DỰ ÁN (VIETNAMESE)	PROJECTS (ENGLISH)	GIẢI PHÁP KỸ THUẬT	TECHNICAL SOLUTION	HẠNG MỤC	CATEGORY	KINH PHÍ - AMOUNT	
							VNĐ (nếu)	US\$
	TỔNG CỘNG	TOTAL AMOUNT					1,093,356	\$78,211,143

Note: (*) indicate the projects which are corrected and supplemented.

Attachment 4

Natural Disaster Mitigation Program Summaries and Logical Frameworks

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Program Classification for Nonstructural and Structural
Natural Disaster Mitigation Programs

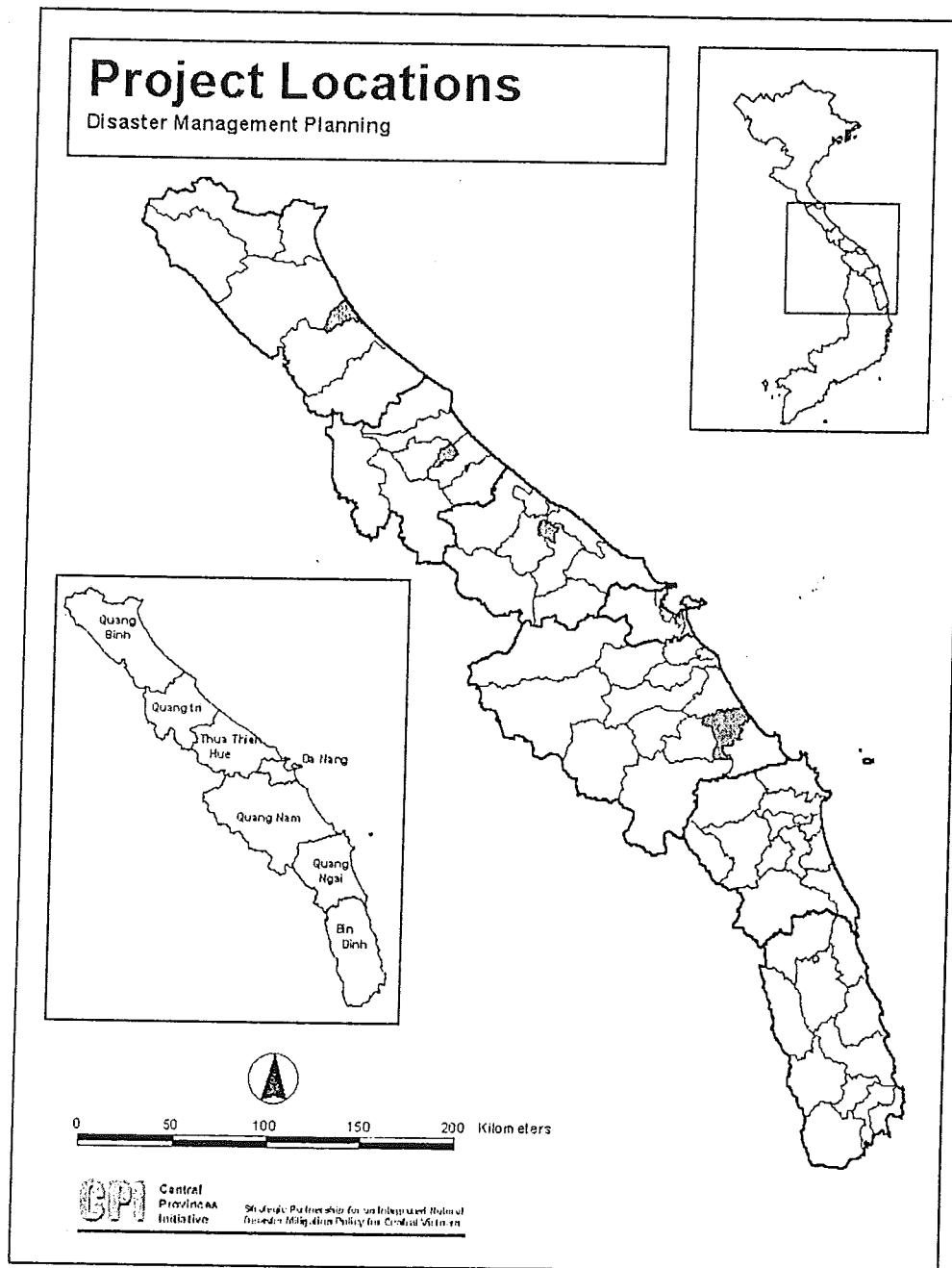
Program Classification			
1.0 Non Structural			
1.1 Disaster Preparedness and Management			
	1.1.1 Disaster Management Planning	1.1.1a	Provincial Level
		1.1.1b	National Level
1.1.2 Disaster Preparedness			
1.1.3 Flood and Inundation Mapping			
1.2 Relocation Planning and Development			
1.3 Integrated Catchment Planning and Management			
1.3.1 Environmental Sustainability			
1.3.2 Floodplain Management and Modelling			
1.3.3 River Basin Organizations (RBOs)			
1.3.4 Port Authorities			
1.3.5 River Basin Master Planning			
1.4 Natural Disaster Agriculture and Property Insurance			
1.5 Agricultural Extension			
2.0 Structural			
2.1 Watersheds			
2.1.1 Watershed Management and Reforestation			
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2.2 Floodplains and Estuaries			
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2.2.2 Dykes, Irrigation and Drainage Systems			
	2.2.3 River Control	2.2.3a	River Flow Capacity Improvement
		2.2.3b	Riverbank Erosion Protection
2.2.4 Sandy Area Development			
2.2.5 Water Supply and Sanitation			
2.2.6 Salinity Dams and Dykes			
2.2.7 Aquaculture, Fisheries and Agriculture Resources			
2.3 Coastal			
2.3.1 Coastal Facilities			
2.3.2 Coastal Structures			

Non-structural Natural Disaster Mitigation Programs

1.0	Non-Structural Programs for Natural Disaster Mitigation
1.1.1	<i>Disaster Management Planning</i> - Providing Hydro-meteorological monitoring, forecasting, and early warning of natural disaster events
1.1.2	<i>Disaster Preparedness</i> - Providing community-level self-protection measures
1.1.3	<i>Flood and Inundation Mapping</i> - Preparing maps of historical flooding for a foundation for future mapping of floods of great magnitude and for more effective future floodplain management and emergency relief
1.2	<i>Relocation Planning and Development</i> - Providing land, some infrastructure, and governmental assistance to households whose homes have been destroyed, or for populations who are vulnerable to natural hazards
1.3.1	<i>Environmental Sustainability</i> - Integrating environmental considerations into disaster mitigation
1.3.2	<i>Floodplain Management and Modelling</i> - Providing tools for assessing risks to floodplains, and for the creation of scenarios for alternative development or protective works; clustering suitable for training for projects concerned with structural natural disaster mitigation
1.3.3	<i>River Basin Management Organisations</i> - Promoting an integrated approach to river basin development and use; clustering very suitable for training and implementation of <i>Pilot Projects</i>
1.3.4	<i>Port Authorities</i> - Evaluating the many functions involved in a port and estuary outlet zone that may require the formation of a dedicated port authority; dealing with safe access, shelter, beaconing, and dredging
1.3.5	<i>River Basin Master Planning</i> - Realizing optimal use and development for various water sectors on the basis of sustainable development; facilitating the availability of sufficient water in the dry season and flood mitigation during the wet season; covering all sectors, including cross-provincial border issues
1.4	<i>Natural Disaster Agriculture and Property Insurance</i> - Development of a natural disaster agriculture and property insurance program in Vietnam that deals with both systematic catastrophic and non-systematic risks; and development of the insurance in a manner that incorporates the input of farmers
1.5	<i>Agricultural Extension</i> - Development of a support program for sustainable farming that emphasizes disaster mitigation practices

Structural Natural Disaster Mitigation Programs

2.0	Structural Programs for Natural Disaster Mitigation
2.1.1	Watershed Management and Reforestation - Decreasing the amount of runoff from rainfall that intensifies flood magnitudes and contributes to soil erosion in watersheds; minimizing sedimentation in lowland channels
2.1.2	Reservoirs and Dams - Modifying dams or repairing dams and reservoirs damaged by flooding; constructing new dams and reservoirs to provide a safe and secure source of water during drought and controlling/mitigating future flooding; all activities in this program are subject to an Environmental Sustainability Review (1.3.1) and Relocation Planning (1.2)
2.2.1	Rural Infrastructure - Repairing flood-damaged houses, schools, health clinics, roads, railroads, and other infrastructure that are critical to natural disaster and flood recovery
2.2.2	Dykes, Irrigation and Drainage Systems - Repairing and upgrading flood-damaged irrigation systems that are essential for improved agricultural production; providing adequate floodwater run-off capacities
2.2.3	River Control - Controlling the flow of water via dykes and adequate water channels to protect communities and important infrastructure against flooding; clustering very suitable for <i>Pilot Projects</i> due to dynamic behavior of rivers in the Central Provinces
2.2.4	Sandy Area Development - Mitigating the effect of sandy areas that are encroaching upon valuable agricultural areas; developing sandy areas to become agriculturally productive and to possibly be suitable for relocation of disaster vulnerable populations
2.2.5	Water Supply - Repairing infrastructure damaged by flooding, and implementing new water supply systems where required
2.2.6	Salinity Dams and Dykes - Strengthening and repairing dams and associated systems to prevent salt-water intrusion during low river flow conditions; and preventing the obstruction of floodwater run-off
2.2.7	Aquaculture, Fisheries and Agriculture Resources - Planning and constructing aquaculture dykes and related infrastructure in a way that will be sustainable during flooding and not result in increased flooding of nearby waterways or floodplains
2.3.1	Coastal Facilities - Providing safe anchorage/havens; dredging of river outlets to provide adequate floodwater run-off capacity for rivers and channels; improving access for fishing boats through the creation of new river outlets; clustering suitable for the execution of <i>Pilot Projects</i> , given the limited local experience with outlets in sandy coastal areas
2.3.2	Coastal Structures - Protecting existing infrastructure or re-establishing existing river entrances which have been made unstable; institutional strengthening of coastal management capabilities and coastal engineering expertise for the Central Provinces; clustering suitable for the execution of <i>Pilot Projects</i> , given the limited local experience with structures in sandy coastal areas



Program Title:

Disaster Management Planning

Primary Objective:

To save human life and to minimize social, economic, and environmental damage that results from natural and human induced disasters.

Implementation Strategy:

The program will be implemented with the Provincial Committees for Flood and Storm Control, the Hydro-meteorological Service of Vietnam, and the Central Committee for Flood and Storm Control.

Disaster Management Planning

1.0 NON-STRUCTURAL NATURAL DISASTER MITIGATION PROGRAMS

1.1.1a DISASTER MANAGEMENT PLANNING - PROVINCIAL LEVEL

This program integrates numerous high-priority provincial-level projects that national and international experts agree are critical for effective natural disaster management in Central Vietnam. It creates Disaster Mitigation Management Centers under the Provincial Committees for Flood and Storm Control (PCFSC), and provides these Centers with robust communications infrastructure to receive information about precipitation in the province, impending floods, and typhoons. The Centers will have analytical tools to forecast and map areas at risk of natural disasters, and will be equipped to issue radio-based warnings to government officials, fisher people, farmers, and the public in general. The program will foster development of low-cost, robust radios that will be used by fisher people and by communes to monitor emergency warning broadcasts prepared by the Centers. A Center will be developed first in Thua Thien-Hue Province and be used as a model for other provinces.

1.	<p>Problems and Opportunities: <i>Problems:</i> During routine floods and especially during the November 1999 flood, each provincial-level PCFSC had difficulty reacting to the floods because of (1) little or no timely information about the extent and severity of precipitation; (2) insufficient knowledge of which areas were being flooded; and (3) lack of a robust communications infrastructure to alert districts and communes at risk of being inundated. <i>Opportunities:</i> In creating disaster management centers, the PCFSC will be able to update its communication technology, thereby enabling it to reach those people most at risk of natural disasters.</p>
2.	<p>Objectives: To save human life and to minimize social, economic, and environmental damage that results from natural and human-induced disasters, in particular those people at the <i>grassroots level</i> who are often most vulnerable to disaster.</p>
3.	<p>Strategy: This would be a cooperative program, with the PCFSC as the principal provincial-level response entity; and the Hydro-meteorological Service of Vietnam (HMS), and the Central Committee for Flood and Storm Control (CCFSC) as principal national response entities.</p>
4.	<p>Schedule: Immediate and short term.</p>
5.	<p>Outputs and Benefits: <i>Outputs:</i> This program will:</p> <ul style="list-style-type: none"> ▪ Integrate several discrete flood-related activities into a single program and prepare a template of a Disaster Mitigation Management Center to be implemented subsequently in all Central Vietnam Provinces ▪ Provide a coordination mechanism and maximize use of limited resources ▪ Develop a consistent approach to gathering, analyzing, and disseminating data and information on natural disasters, including floods and typhoons ▪ Provide a template for similar projects throughout Central Vietnam for provinces at risk of natural disasters, including typhoons and floods, so that several provinces can benefit from the investment in program design ▪ Use robust communication, analysis, and information technology to disseminate information to officials who are responsible for managing natural

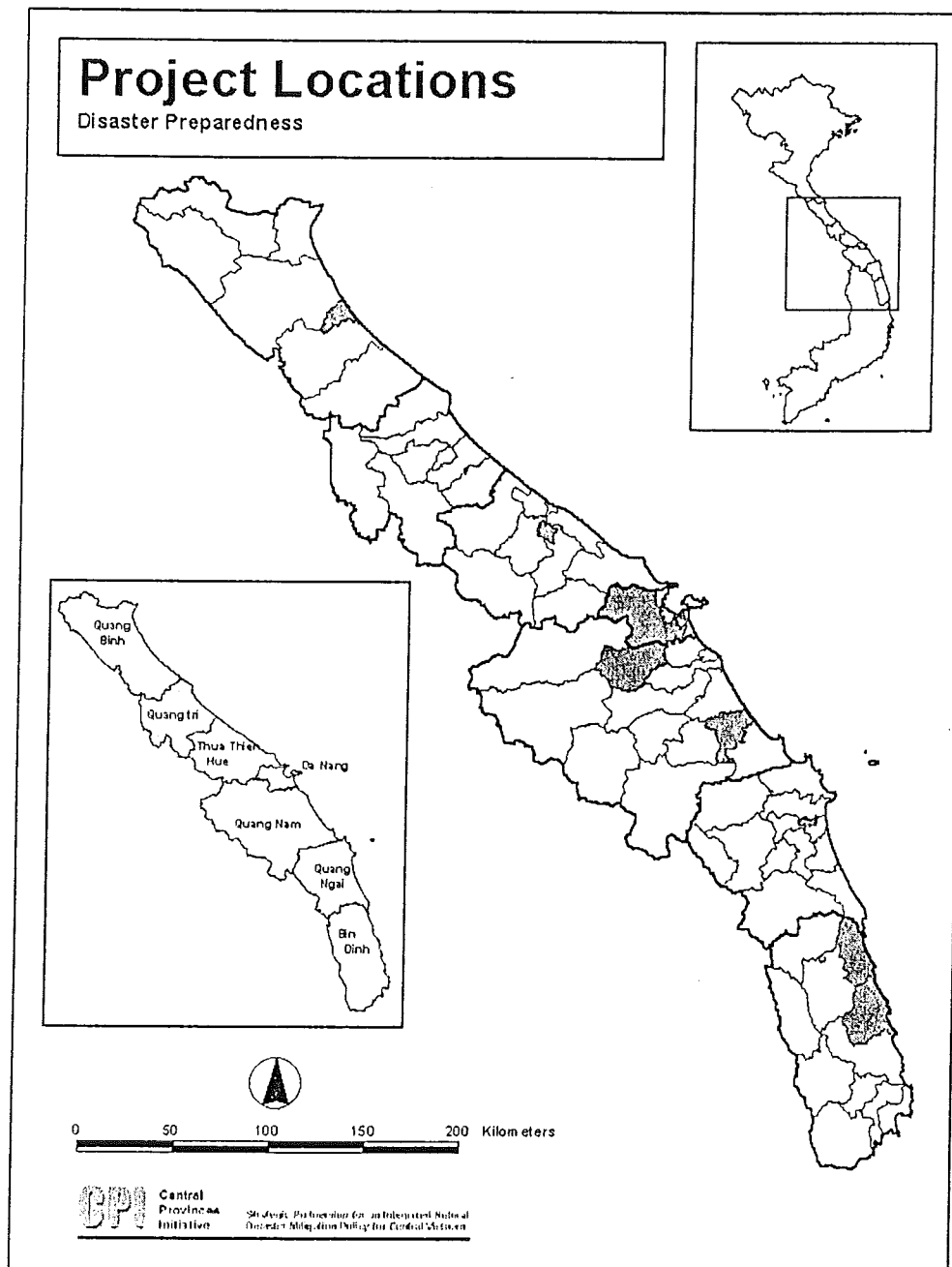
	<p>disasters; and to the impacted population at risk</p> <p>Benefits: Other provinces will be able to benefit from the experience of Thua Thien-Hue and thereby adapt the prototype to their needs; the capacity of all officials involved in the management system will expand; a repository of disaster-related information will be established; the populations at risk will become less vulnerable to natural disasters.</p>
6.	<p>Inputs: Between US\$ 1 and 3 million per province for each Disaster Mitigation Management Center, depending on the sophistication and robustness of the communication infrastructure: forecasting and map-reading technology; low-cost radios for distribution to the vulnerable population.</p>
7.	<p>Risks: Technical risks are minimal because the technologies to be used are well established and robust. There is some risk to implementing a new institutional approach. Thus, a well-planned, step-by-step process is needed.</p>
8.	<p>Alternatives: One alternative is to do nothing and suffer the consequences of natural disaster. A second alternative is to implement the discrete projects, although they might not be compatible. The result would be an improvement over the do-nothing scenario, but less of an improvement than suggested herein.</p>
9.	<p>Project Cost: A four-month system design study would cost approximately US\$ 300,000 and would define (1) the computer and database resources required at the Center; (2) attributes of the real-time hydro-meteorological network and terms of reference to procure and install the network; (3) the maps, reports, and other documentation that will be resident at the Center or distributed from the Center; (4) communications requirements and associated maintenance requirements; (5) institutional capacity development of national staff; (6) a project implementation plan to include schedule, budget, administrative control, and management; and (7) terms of reference for procuring all hardware, software, and other tangible commodities.</p>
10.	<p>Expert Opinion and Comments: This program will be closely integrated with National Level Disaster Management, as cited in Program 1.1.1b. At the provincial level, the program also will be integrated with information components of emergency response and recovery projects, and flood-mapping projects DN1-03 and QN1-02 for flood and inundation mapping; these projects will provide a library of map products to the Centers. The centers will maintain a catalog of all dams and hydraulic structures at risk of failure, and provide emergency response plans and warnings. Finally, the Centers will operate throughout the year if there is a risk in a province of other natural disasters such as drought and forest fires, or human-induced disasters such as chemical spills or railway and highway accidents.</p>
11.	<p>Projects: QB1-01: Disaster prevention planning and inundation mapping QB1-02: Flood forecasting, alarm equipment, and rescue QB1-10, QT2-30, and TH2-32: Improved hydro-meteorological networks QT1-1: Enhanced communications systems in preparation for floods QT1-3 and QN1-01: Flood-warning system QT2-31: Communication of flood related information TH2-19 and DN1-01: Flood warning, including stations and communications</p>

1.1.1b DISASTER MANAGEMENT PLANNING – NATIONAL LEVEL

This program complements the program for disaster management planning at the provincial level through integration of disaster response at the provincial and national levels. Articles 37 and 43 of the National Water Resources Law, enacted January 1, 1999, designates responsibility to the Hydro-meteorological Service of Vietnam (HMS) to organize the observation, forecasting and issuance of timely information on rain, flooding, drought, and sea level rise at the National level. As many of the major hazards associated with natural disasters in Vietnam are hydro-meteorological, effective coordination of effort in terms of obtaining, analyzing and disseminating timely hydro-meteorological information and early warning products is crucial for natural disaster management and mitigation.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Communication between the national HMS, and regional and provincial HMS Centers is weak. Transmission of national-level satellite imagery and other observation and forecast products is too slow and unreliable to support timely natural disaster warnings by Provincial Committees for Flood and Storm Control (PCFSC). Consequently, national ministries and provincial level departments may receive relevant hydro-meteorological information only after a disaster event has occurred. Regional and provincial HMS Centers currently lack the equipment and trained staff needed to process and interpret hydro-meteorological data for early warning purposes. At the national level, exchange of information on impending hydro-meteorological disaster conditions among Ministries that participate in the Central Committee for Flood and Storm Control (CCFSC) and with international organizations must also be strengthened. Finally, additional HMS products such as seasonal forecasts may provide information on the probable overall effect of the rainy season, including the potential for climatic extremes, based on El Niño and other factors influencing regional, national and sub-national climate.</p> <p><i>Opportunities:</i> HMS products can be developed and updated as appropriate; a communication system that transmits disaster-related information to decision makers in a timely manner can be developed.</p>
2.	<p>Objective:</p> <p>To help save lives and reduce the vulnerability of those most at risk of natural disasters; to minimize social, economic, and environmental damage from hydro-meteorological disasters.</p>
3.	<p>Strategy:</p> <p>Other financing options include government funds, multi-lateral bank loans, and bilateral grants. This program is to be implemented in phases as listed in Section Seven.</p>
4.	<p>Schedule:</p> <p>Medium and long term.</p>
5.	<p>Outputs and Benefits:</p> <p><i>Outputs:</i> The output of the U.S. funded HMS modernization plan will be a 5-year, US\$ 30 million modernization program.</p> <p><i>Benefits:</i> This program will:</p> <ul style="list-style-type: none"> ▪ Support the development and dissemination of improved observational and forecast natural disaster hydro-meteorological products at the national level; also to be used at regional and provincial levels

	<ul style="list-style-type: none"> ▪ Support the implementation and application of such products and techniques at regional and provincial levels ▪ Provide a means for building capacity and standardizing natural disaster prediction methodologies nationwide ▪ Establish mechanisms to promote exchange of information related to hydro-meteorological risk factors and disaster management between government ministries and international organizations ▪ Promote applied research and development of new products and techniques for anticipating natural disaster hazard conditions months in advance
6.	<p>Inputs: Hydro-meteorological instrumentation valued at US\$ 2.7 million, which has already been loaned to HMS by the Italian government for purchase of the equipment.</p>
7.	<p>Risks: Hydro-meteorological hazard monitoring, forecasting and early warning information is only effective for disaster management if it reaches decision-makers and the public promptly, and in a useful form. The national program described herein will support a broader range of additional disaster-reduction measures that are described in the provincial level Program 1.1.1a. Conversely, provincial-level hydro-meteorological hazard early warning systems require national level coordination and support. Such coordination will help to avoid uncoordinated development of multiple provincial-level Disaster Centers that are funded by multiple donors using incompatible techniques and equipment. Such coordination also will create sustainable provincial-level technical and capacity-building mechanisms.</p>
8.	<p>Alternatives: Do nothing, which would result in communities continuing to be vulnerable to natural disaster. Implementing provincial level Program 1.1.1a without this national program would not provide the national and international level of information that is required for timely natural disaster warning to be effective in the Central Provinces.</p>
9.	<p>Project Cost: A US\$ 180,000 grant already has been provided by the U.S. government for a HMS modernization plan, which is almost complete. Elements include: 1) upgrading of the national hydromet observing network; 2) improved forecasting; and 3) enhanced dissemination of hydro-meteorological and early warning information to other ministries and mass media.</p>
10.	<p>Expert Opinion and Comments: This program for further development of hydro-meteorological observational, forecasting, and early warning capacity is justified, given:</p> <ul style="list-style-type: none"> ▪ The adverse impacts of frequent disasters on sustainable development in the Central Provinces ▪ That hydro-meteorological hazards are the principal external, non-vulnerability related risk factors ▪ Recent and continuing scientific advances in hydro-meteorological monitoring, forecasting, and climate prediction ▪ The possibility of climatic changes from global warming
11.	<p>Projects: Supports and complements provincial-level disaster management planning, as defined in the provincial level Program 1.1.1a.</p>



Program Title:

Disaster Preparedness

Primary Objective:

To disseminate disaster preparedness information; to provide timely warning of impending disasters; to build and provide safe shelter from flooding; to provide rescue equipment; and other related activities.

Implementation Strategy:

Immediate implementation through new and ongoing Government, Donor, and NGO programs is a fundamental requirement.

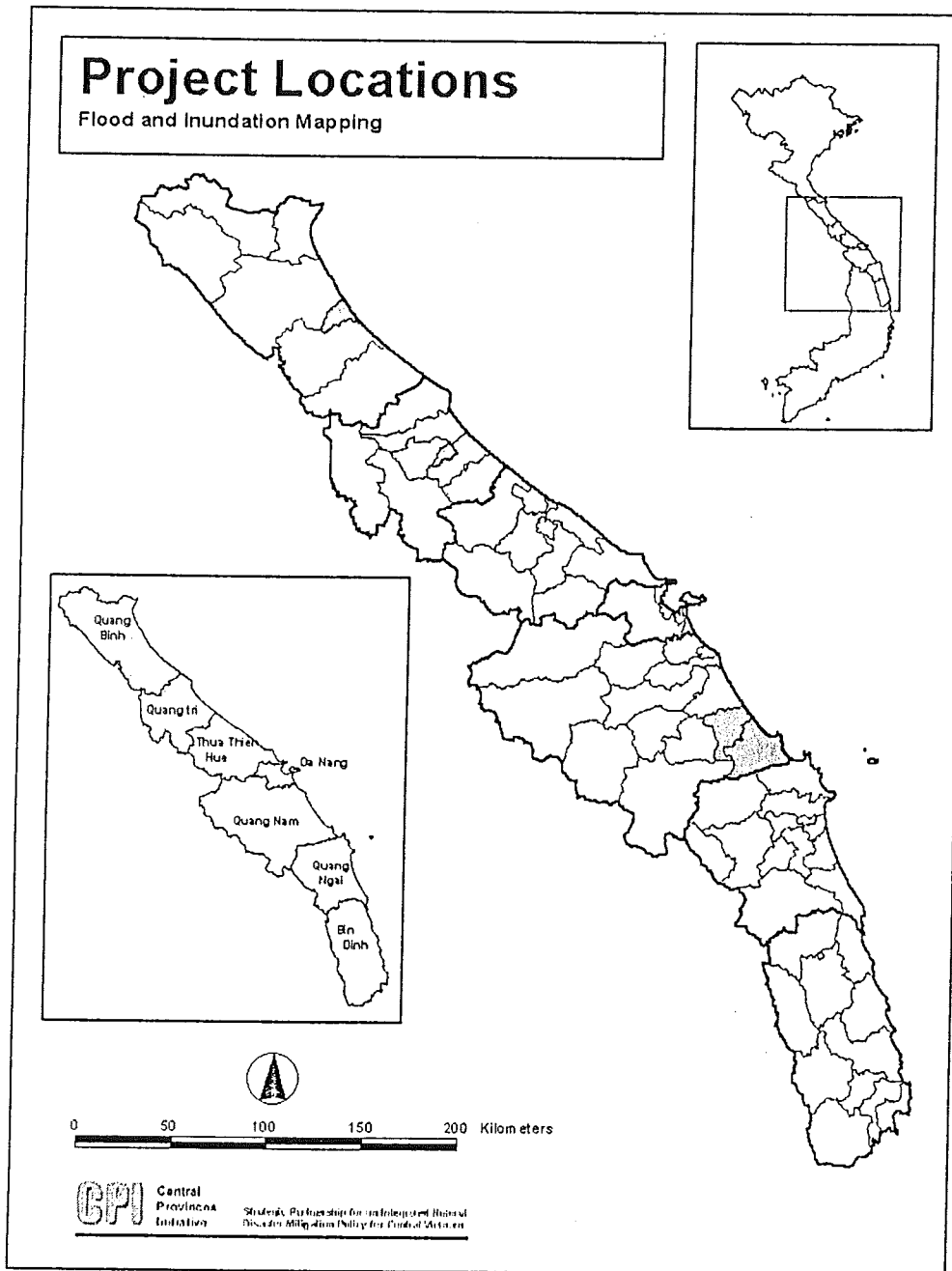
1.1.2 DISASTER PREPAREDNESS

All seven provinces affected by the late 1999 flood have projects whose objectives are to reduce vulnerability to natural disaster at the commune level. The proposed solutions vary, including building shelters with second floors, training, rescue equipment, communication systems, and other activities. Combining these projects into a program will increase their overall effectiveness considerably, especially if the areas at risk are prioritized to receive assistance based on their vulnerability to natural disaster. Involvement of the communes in prioritizing projects through a participatory approach is therefore essential.

1	<p>Problems and Opportunities:</p> <p>Problems: Almost all life saving activities related to natural disasters is done at the commune level. During the critical first hours of a disaster such as a flood, many communes are cut off from the outside world and, unable to communicate their needs, have to depend largely on their own resources. This communication breakdown from the commune causes a lack of information necessary for the provinces to allocate the resources needed for life saving, rescue, and evacuation.</p> <p>Opportunities: Communes, and even hamlets, can become empowered by participating in risk and vulnerability analyses, by identifying safe shelter areas, and by identifying evacuation routes. By installing or refining an existing province-district-commune communication system, the needs of those most vulnerable to natural disaster can be relayed to decision makers, who can then provide appropriate assistance.</p>
2	<p>Objective:</p> <ul style="list-style-type: none">▪ To disseminate information to the population at the grassroots level to reduce their vulnerability to natural disasters▪ To establish a system to provide advance warning to the population at the grassroots level about the timing and nature of the disaster before it occurs▪ To establish safe shelter areas in communes where such areas are not now available▪ To increase the life-saving capacity at the commune level; to save those people unable to save themselves▪ To assist communes in requesting emergency assistance when their local capacity for life saving and rescue is exceeded

3	<p>Strategy:</p> <p>First, proposals have to be screened and prioritized. A number of these projects are not in the most natural disaster vulnerable areas. Flood maps can be used to identify those projects with the most positive impact. A field visit can then ensure the proper location of these projects. Project proposals for the building of schools and medical clinics have to be screened based on both location and technical design. The Red Cross has a program to build two storey kindergartens in hamlets, which has the advantage that they can provide disaster life saving refuges in small isolated communities.</p> <p>The ongoing Red Cross/UNDP grassroots disaster preparedness training program can be linked with communal mapping activities in natural disaster prioritized areas. The synergy between training, information, safe havens, and live saving can then be made. The IFRC will supply the VNRC with communication equipment and emergency relief centers at the commune level. At this moment, 20 local Red Cross centers are planned to be built in the year 2000, but more will be build when funding becomes available.</p> <p>In the longer term, two pilot programs on preparedness could be initiated, one in rural areas at risk, the other in Hoi An. Details of these can be found in the UNDP report: <i>Empowerment of Communities That Live with Floods</i>. Also, a capacity development project with local insurers to help them expand their services is recommended.</p>
4	<p>Outputs and Benefits:</p> <p>Outputs: Projects designed to enable communes to reduce their vulnerability to natural disaster; emergency relief and management centers staffed by officials at the grassroots level; increased capacity to respond to local natural disasters.</p> <p>Benefits:</p> <ul style="list-style-type: none"> ▪ The program will reduce loss of life ▪ The program will reduce economic losses at the commune level; the commune will recover faster with less outside assistance ▪ The program can be duplicated in other provinces, if proven successful
5	<p>Inputs:</p> <p>Flood and inundation maps; project appraisal and selection: field visits to identify best locations for projects; communication and rescue equipment; grassroots emergency relief and management centers; four-wheel drive motor vehicles, some of which will also serve as ambulances.</p>
6	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Much of the benefit will be lost if the commune is not involved in the decision making process ▪ The effect of the program will be reduced if it is not targeted to the most vulnerable areas ▪ Lack of a coordinated approach, taking into account all natural disaster preparedness components, will result in a loss of added value ▪ The program must be linked with all national and provincial natural disaster information and warning systems
7	<p>Alternatives:</p> <p>Resettle people out of disaster prone areas. In this case, the infrastructure and economical situation in safer areas has to be improved. Resettlement is a long-term program when it is done properly. Not all natural disaster-prone areas can be evacuated, because safer land is simply not available for all.</p>

8	<p>Planning costs: Under development.</p>
9	<p>Program Relationships: Mapping, early warning, building standards, rural infrastructure.</p>
10.	<p>Expert Opinion and Comments: Starting this program immediately will increase the emergency natural disaster response capacity during the next flood season and be a useful component of an overall Central Vietnam Disaster Mitigation Strategy. The program potentially links the national and provincial level with the communes. In order to take advantage of this potential, the integrated approach taken by the Central and Provincial Committees for Flood and Storm Control should be encouraged, enforced, and applied to all disaster mitigation and disaster preparedness programs. The Provincial Committees for Flood and Storm Control should also become more permanent establishments and include as permanent members departments and organizations that are key players in disaster preparedness, rescue, and emergency relief. Provision of communication and life-saving equipment should have the highest priority; while the building of safe havens should target the most natural disaster vulnerable areas.</p> <p>Ongoing programs to coordinate with are the Red Cross/UNDP grassroots disaster preparedness training program, which already is targeted to the Central Provinces with extra funding from the International Federation of Red Cross and other training programs currently under development.</p> <p>Smaller donors can be included if the program is well-coordinated.</p>
11.	<p>Project: QB1-01: Disaster prevention planning and inundation mapping QB1-02: Flood forecasting alarm equipment and rescue QB1-03: Training and education for disaster preparedness QB1-09: Warning system for boats and fishing communes QB2-17: Four shelters QB2-18: Two emergency stations QT1-01: Enhanced communication systems in preparation for floods QT1-02: Rescue and supporting equipment TH2-19: Flood warning stations and communications DN1-01: Flood warning stations and communications DN1-02: Flood education DN2-12: Life buoys for fishermen DN2-13: Life buoys for people in flood prone areas DN2-14: Specially build motorboats and canoes for 100 hamlets QN1-01: Flood warning system QN2-08: Building primary schools in flood prone areas QN2-09: Building health clinics in flood prone areas QG2-10: Building two floor schools in flood prone areas QG2-11: Building health clinics in flood prone areas QG2-13: Storm warning stations in Ly Son, Sa Ky, Co Luy, My A, and Sa Huynh BD2-31: Phu My hospital BD2-32: Primary schools for 20 coastal villages</p>



Program Title:

Flood and Inundation Mapping

Primary Objective:

To produce an accurate set of information and maps about flooding and inundation; to provide the Provincial Committees for Flood and Storm Control and all other relevant agencies with this information.

Implementation Strategy:

Implementation has the highest priority and can be begin immediately. Involvement of local grassroots populations is necessary.

Flood and Inundation Mapping

1.1.3 FLOOD AND INUNDATION MAPPING

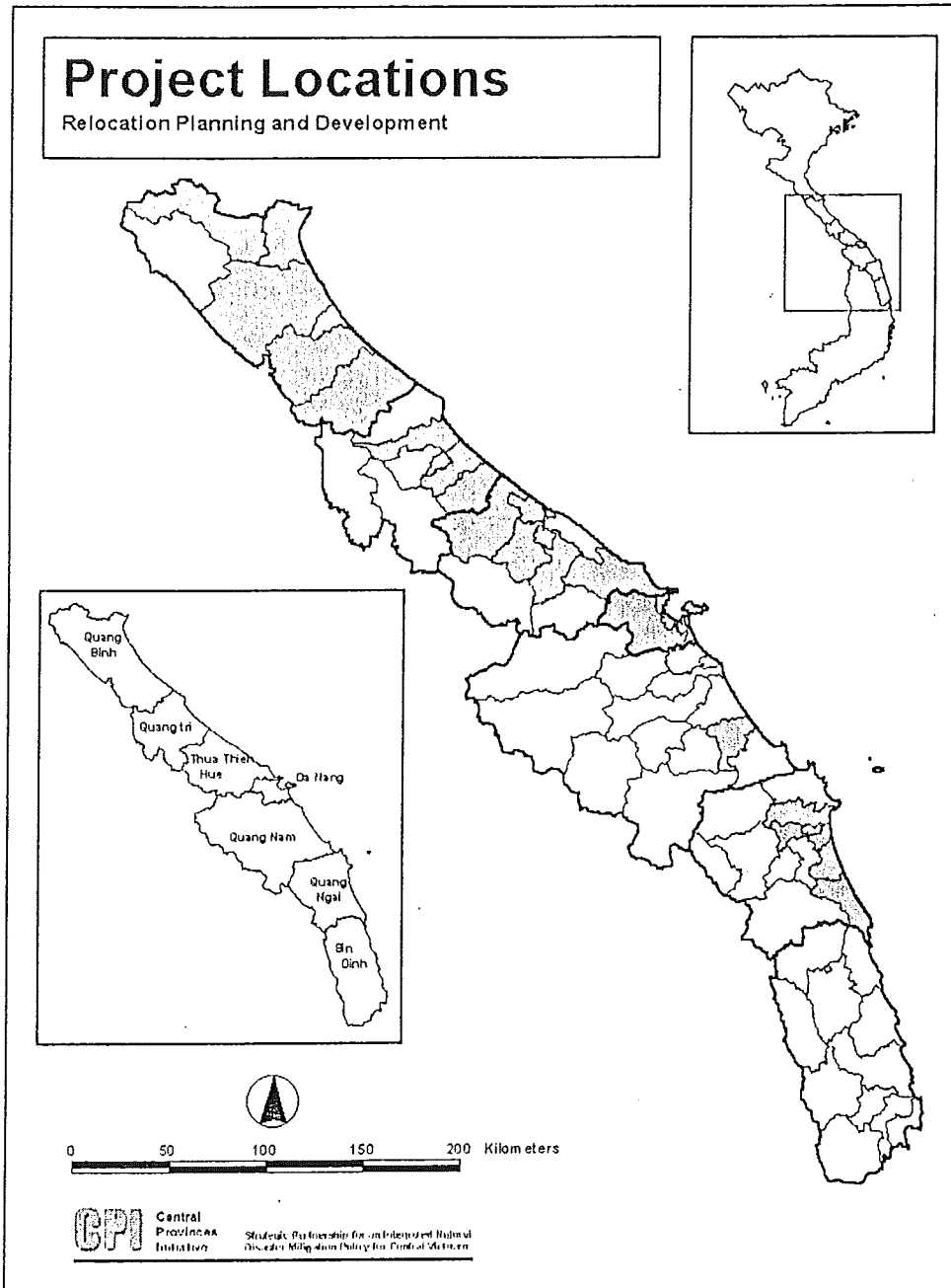
Some of the most urgently needed and essential tools for flood mitigation decision-making and public education are flood and inundation maps. Flood and inundation maps provide a record of past disasters. They show the areas flooded and inundated during past flood events. They also show the locations where people are most at risk of flooding or inundation according to various defined levels of risks. These flood-risk analyses incorporate data related to duration of flooding, depth of inundation, flow velocity, and potential for scour under structures by floodwaters. These maps are also an efficient means to strengthen public awareness, and they provide effective materials for training and education about natural disasters. Officials of all flood prone areas of Central Vietnam recognize that the flood and inundation mapping program has great potential to reduce the impact of natural disaster. Therefore, it is one of their highest priorities.

1.	Problems and Opportunities: <i>Problems:</i> As natural disasters happen yearly, there is great practical knowledge, and short and medium-term memory of these disasters in the Central Provinces. It seems, however, that there is no written scientific record of past disaster events. Indeed, despite all of these individual disaster memories, society has no memory unless an institutional memory is developed. <i>Opportunities:</i> Flood and inundation mapping information can serve as an institutional device that will help the entire population. Flood and inundation maps provide practical and necessary information that can be used in many activities related to disaster preparedness, mitigation, and response. These maps can be used for emergency rescue and evacuation, post-disaster recovery, and sustainable land use planning.
2.	Objectives: <ul style="list-style-type: none">▪ To identify areas at risk of flooding▪ To improve flood disaster prevention and preparedness planning

<p>3.</p>	<p>Strategy:</p> <ul style="list-style-type: none"> ▪ Definition of a plan of action for flood inundation to be made widespread in the Central Provinces using the same institutional framework in each province. This plan should address a methodology, and the way to have it efficiently carried out by each province according, as much as possible, to its own special needs, concerns, and flooding potential ▪ Start as the first mapping the flood of 1999, considered to be the largest flood in living memory; and then possibly use the 1999 flood as a benchmark for other past flooding ▪ Develop a methodology for preparing these inundation maps, keeping in mind at least the following concerns: 1) define the administrative level for map boundaries (Commune, District, and Province); 2) develop requirements for new thematic maps: maps of dams and hydraulic structures at risk; maps of storage of rescue equipment and food supplies; maps of evacuation routes; 3) ensure that the maps reflect and respect institutional policy rules; and 4) produce user friendly and end-user oriented printed products ▪ Develop a methodology for making a corresponding field benchmark network, both for a record of past flooding and for future flood warning; a well co-ordinated, participatory approach must be a strong input, using the informal knowledge of the local population ▪ Begin to record maximum annual flood levels ▪ Prepare both flood and inundation maps and a corresponding field benchmark network for the most disaster prone provinces of Central Vietnam, combining a participatory approach and modern technologies as a back-up ▪ Set up libraries of maps at different government levels (Commune, District, and Province) within the Provincial Committee for Flood and Storm Control (PCFSC) of each province, organised in a database following technical standards which will be defined. The provincial level will manage all the maps, define the outlines, and implement the GIS through one governmental body as the DOSTE in Quang Tri Province (QT1-06) or at any other level at the choice of the province, and at district or commune level with libraries of paper maps ▪ Ensure appropriate training, both for disaster officials and for impacted populations, on how to contribute to the process of making and using both the mapping and the correspondent benchmark network to mitigate loss of life, property damage, and disruption of livelihood in future floods and other natural disasters ▪ Strengthen the participation of local populations in mapping of natural disaster prone areas
<p>4.</p>	<p>Schedule: Immediate and short term.</p>

5.	<p>Outputs and Benefits: Outputs: Flood and inundation maps for all provinces; libraries of flood and inundation maps at all administrative levels of government maps; officials at all levels of government trained in the multiple uses and applications of flood and inundation mapping. Benefits:</p> <ul style="list-style-type: none"> ▪ Maintaining a record of past natural disaster events will strengthen institutional memory ▪ The following disaster-preparedness activities will be facilitated: 1) where high storey flood shelter structures are needed; 2) appropriate land use such as showing high elevation terrain where people will be safe from flooding; and 3) development work such as not rebuilding at the same place with the same type of structure washed away by strong velocity flows in past floods ▪ Helping the various and numerous actors in development and natural disaster protection to share their information; and possibly helping these actors to address controversial disaster mitigation issues and alternatives ▪ Provide high-level and appropriate training materials for basic education in disaster preparedness and mitigation ▪ Establishing disaster management and warning links with the affected people in their immediate and familiar environment
6.	<p>Inputs: Technical expertise in flood and inundation mapping; training courses for local population so they can contribute to the map building process; map interpretation training for disaster officials; further training on the multiple uses of flood and inundation maps.</p>
7.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Not to be able to take into account the different end-user needs; some needs being lost during the mapping process ▪ Impose on the population technologies from <i>outside</i> which are not easy to understand or to use locally
8.	<p>Alternatives:</p> <ul style="list-style-type: none"> ▪ Do nothing and loose records in terms of links between the magnitude of past disasters and flood areas impacted ▪ Keep making the same errors in land use or disaster protection, and thus miss out on new and more efficient ways to organise rescue and recovery
9.	<p>Project Cost: The co-ordination of several agencies is needed.</p>

<p>10.</p>	<p>Expert Opinion and Comments:</p> <ul style="list-style-type: none"> ▪ Disaster zoning maps should show river floodplains, flash flood prone areas, and coastal flood prone areas. ▪ Up-to-date technologies such as Radarsat satellite images and GIS should be used to help to produce and record maps. As these technologies are available in Vietnam, they should be part of this program. But, in the central provinces, the technical knowledge of flood impacted populations of limited education is very basic. They will have to increase their understanding of such technologies before they are able to deal with their property at risk of flooding. ▪ As a second step, and mainly as a decision-making tool for planning, provinces should consider maps showing results of hydraulic modelling of floods. But these models need to be calibrated and developed with data which have to be checked if they exist or are available; or collected during at least a multi-year period of hydrological measurement. This is addressed in the Disaster Management Planning Programs. ▪ It is emphasized that <i>decision makers</i> are not only rescue authorities, at the national or provincial level, but also populations themselves at the local level: once local people are trapped in isolated areas because of flooding, they have first to rely on themselves before external help can be received. Mapping at commune level highlights this condition.
<p>11.</p>	<p>Projects:</p> <p>QB1-01: Disaster prevention planning and inundation mapping QT2-29: Flood modelling; QT1-06 Integrated assessment of environment damaged caused by natural disasters in Quang Tri Province with use of GIS DN1-03: inundation mapping QN1-02: inundation mapping QN2-16: flood modelling of the Thu Bon, De Vong, Tuong Giang, and Tam Ky River systems</p>



Program Title:

Relocation Planning and Development

Primary Objective:

To provide adequate support in terms of planning when relocation of at-risk populations from natural disaster prone areas is necessary. Direct link with creation of alternative forms of income is required.

Implementation Strategy:

Ongoing process with difficult social issues. Has immediate, short, and long-term time scale. Implementation on local and provincial level.

1.2 RELOCATION PLANNING AND DEVELOPMENT

This program will provide Technical Assistance (TA) for community and infrastructure development to communes in which relocation or resettlement from natural disaster vulnerable areas has begun or in which relocation or resettlement is planned. The need for the flood-displaced population to relocate or to resettle is often clearly apparent: the areas from which they are being relocated or resettled are either heavily damaged from past floods or are extremely vulnerable to future flooding.

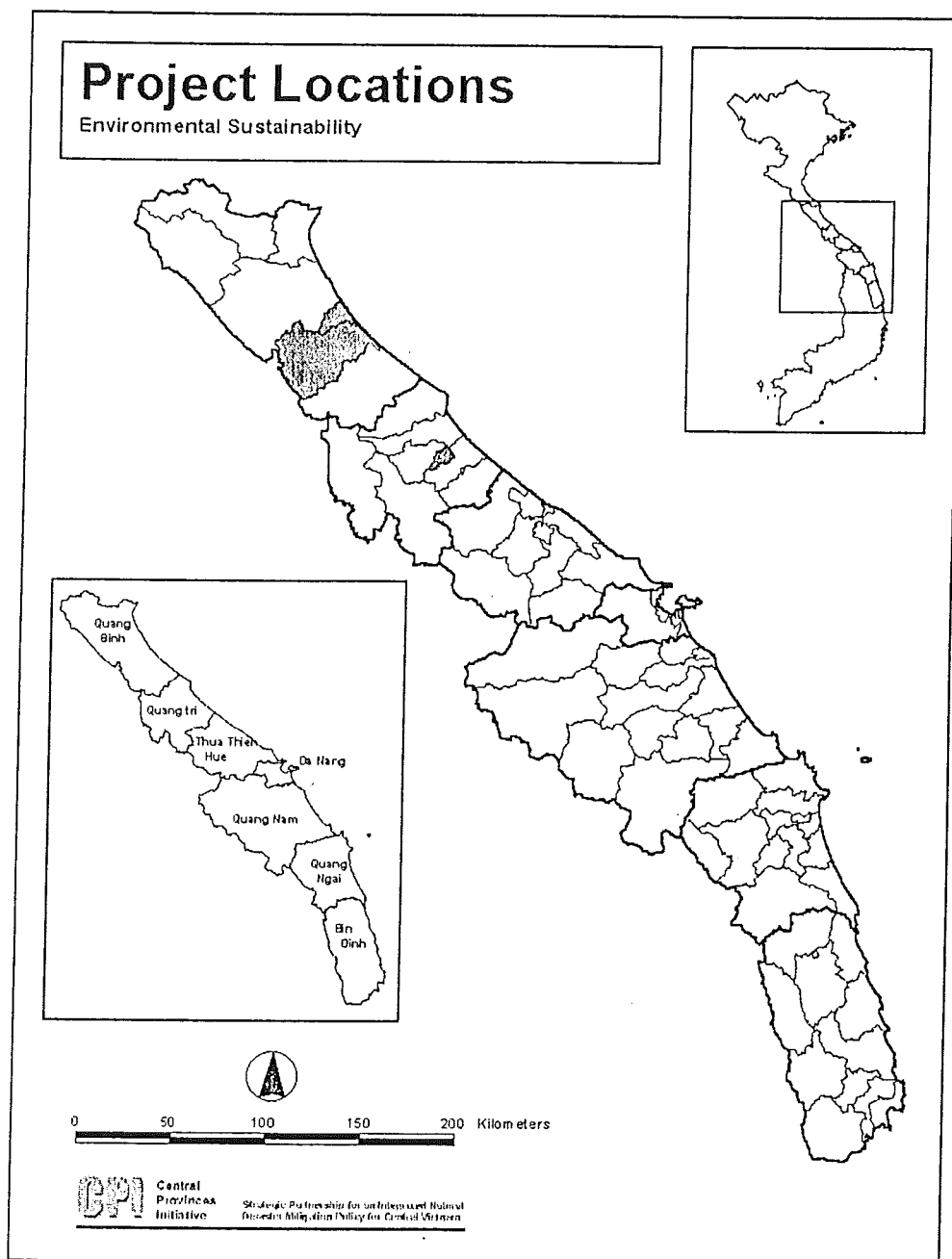
Relocation is moving people close to their existing houses. Resettlement is moving people to completely new areas. Relocation is highly preferred to resettlement.

As part of the national resettlement framework, all resettlement is voluntary and the government provides some assistance. Most of the resettlement sites visited are near the former homes of the flood-displaced populations. A major difference between resettlement sites is the level of infrastructure development. Some of the sites are in a *natural state* and thus unimproved; other sites are partially populated and have some infrastructure already in place. The TA being proposed will complement the government-assisted self-help programs in place and thus facilitate community participation in structuring the newly relocated communities.

1	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Major floods in Central Vietnam in 1999 destroyed many homes and damaged even more. Some populations were displaced immediately; others have returned to their damaged homes, but are vulnerable to future flooding. As part of the national migration and resettlement plan, provincial officials have identified sites to which the displaced populations can relocate. Some of the displaced populations are already residing in these sites in some of the Central Provinces. However, the infrastructure in these relocation sites is often woefully undeveloped.</p> <p><i>Opportunities:</i> By working with a team of community development specialists, the community participants will be able to determine their own future, thereby empowering themselves and gaining a stake in their new living areas.</p>
2	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To assist flood-displaced populations in identifying and planning for the infrastructure needed to develop their new communities ▪ To assist in providing the desired infrastructure in such a way that the newly established communities participate actively in their community's development
3	<p>Strategy:</p> <p>To be eligible for this assistance, newly established relocated communities will have to meet certain pre-conditions that indicate their willingness to participate in developing their communities. These pre-conditions should include rudimentary plans, a list of perceived needs, and other evidence of community involvement. The TA Team will then work with a new relocated community, its leaders, and relevant government officials to develop solid proposals for infrastructure development. The team will also assist with the submission of proposals to Donors.</p>
4	<p>Schedule:</p> <p>Immediate and short term.</p>

5	<p>Outputs and Benefits: Outputs: Proposals for needed infrastructure; the eventual provision of the needed infrastructure. Benefits: Identification and development of relevant infrastructure; increased involvement of the community in developing their new community; the provision of needed infrastructure.</p>
6	<p>Inputs: One national expert and one international expert who speaks and understands the Vietnamese language will form a team that will provide Technical Assistance for relocation planning and the associated required infrastructure development.</p>
7	<p>Risks: The TA Team may be unable to elicit the participation of the communities in determining the development of their new communities. The TA Team may be unskilled in writing solid proposals for infrastructure development. No donors will be willing to underwrite the infrastructure development identified in the proposals.</p>
8	<p>Alternatives: Do nothing and let the new communities <i>make-do</i> with inadequate infrastructure, bypass community involvement and identification of relevant infrastructure, and simply write proposals for the provision of infrastructure without community participation.</p>
9	<p>Project Cost: Total cost estimated at US\$ 100,000 per year for one national and one international expert.</p>
10	<p>Expert Comments: The program being proposed will provide Technical Assistance (TA) for relocation planning and needed infrastructure development to communes in which resettlement from vulnerable areas has begun or in which resettlement is planned. The justification for this program is as follows:</p> <ul style="list-style-type: none"> ▪ The need for the flood-displaced population to relocate is often clearly apparent: the areas from which they are being relocated are either currently heavily damaged or vulnerable to future flooding ▪ As indicated by all government officials interviewed, all resettlement is voluntary. ▪ The Vietnamese government provides some assistance, but for the most part, most resettlement schemes are <i>self-help</i> programs. The TA assistance being proposed is intended to augment this concept of <i>self-help</i> and to enable the inhabitants of the new areas to determine the structure of their community ▪ Most of the resettlement sites visited are near the former homes of the flood-displaced populations. Thus, if the inhabitants of the new settlement areas rely on work from their former homes for their livelihood, they can easily commute. Because of the proximity of the new settlement areas to their former homes, <i>relocation</i>, rather than <i>resettlement</i>, is a more appropriate term for this movement of natural disaster vulnerable people ▪ The <i>relocation</i> sites visited showed varying levels of infrastructure development. Some of the sites were totally unimproved; other sites have only some infrastructure in place ▪ The purpose of the Technical Assistance being proposed is to provide for needed infrastructure in such a way that ensures community participation in structuring the new communities

	<ul style="list-style-type: none"> ▪ Although people living in some natural disaster vulnerable areas are to be relocated before the coming flood season, the relocation needs to be implemented with provincial assistance or as part of the National Resettlement Program. The projects involved in this program, therefore, will be implemented as immediate projects
<p>II.</p>	<p>Projects</p> <p>QB1-08a: Relocation of people from eroded areas QB1-08b: Relocation of people from floods and sand intrusion areas QT1-05a: Hai Lang District relocation QT1-05b: Trieu Phong District relocation QT1-05c: Gio Linh relocation* QT1-05d: Dong Ha Town relocation TH1-02a: Duong Hoa Commune, Huong Thuy District relocation TH1-02b: Thuy Bang Commune, Huong Thuy District relocation TH1-02c: Phong Son Commune, Phong Dien District relocation TH1-02d: Phong An Commune, Phong Dien District relocation TH1-02e: Huong Tho Commune, Huong Tra District relocation TH1-02f: Huong Van Commune, Huong Tra District relocation TH1-02g: Hai Duong Commune, Huong Tra District relocation TH1-02h: Vinh Hien Commune, Phu Loc District relocation TH1-02i: Strengthen and develop resettlement near Tam Giang ferry, Quang Dien District DN1-04a: Hoa Phu, Hoa Nhon, Hoa Bac, Hoa Lien Commune resettlement DN1-04b: Hoa Khuong, Hoa Phong, Hoa Tho, Hoa Xuan, Hoa Phuoc, Hoa Tien Commune resettlement DN1-04c: Hoa Qui Commune, Ngu Hanh Son District resettlement QN1-03: Resettlement for people from eroded areas QG1-01: Resettlement for people from eroded areas at Son Tinh, Tu Nghia, Mo Duc, Duc Pho, Son Ha, Son Ha, and Son Tay</p>



Program Title:

Environmental Sustainability

Primary Objective:

To integrate environmental issues into natural disaster mitigation measures on the basis of predetermined guidelines and procedures.

Implementation Strategy:

Short and medium-term implementation can be achieved, starting with a Provincial Environmental Management Plan.

Environmental Sustainability

1.3.1 ENVIRONMENTAL SUSTAINABILITY

The severe floods and typhoons that impacted Central Vietnam in late 1999 caused environmental damage such as water pollution of domestic water wells, landslides and slope failures, riverbank and beach erosion, and sand deposition on cultivated areas. On the other hand, environmental improvement like reforestation contributes to a decline in the effects of natural disasters. Thus, more sustainable approaches for disaster mitigation planning are needed from an environmental viewpoint in order to ensure improved quality of life for the communities affected by natural disaster, as well as to maintain the quality of the environment.

The aim of this program is therefore to develop a methodology to integrate sustainable environmental development concepts into disaster mitigation planning to ensure that environmental issues are adequately addressed. Although the necessity of research and development of methodologies for environmental sustainability have long been recognized, little scientific data on the relationship between environment and natural disasters are available at present, and provincial government capacity is not adequate to use such data even if it existed. Thus, this program will also aim to build capacity of national counterparts to ensure that environmental sustainable development is incorporated into planning for natural disaster mitigation.

The program components of assistance by the Donor community are as follows:

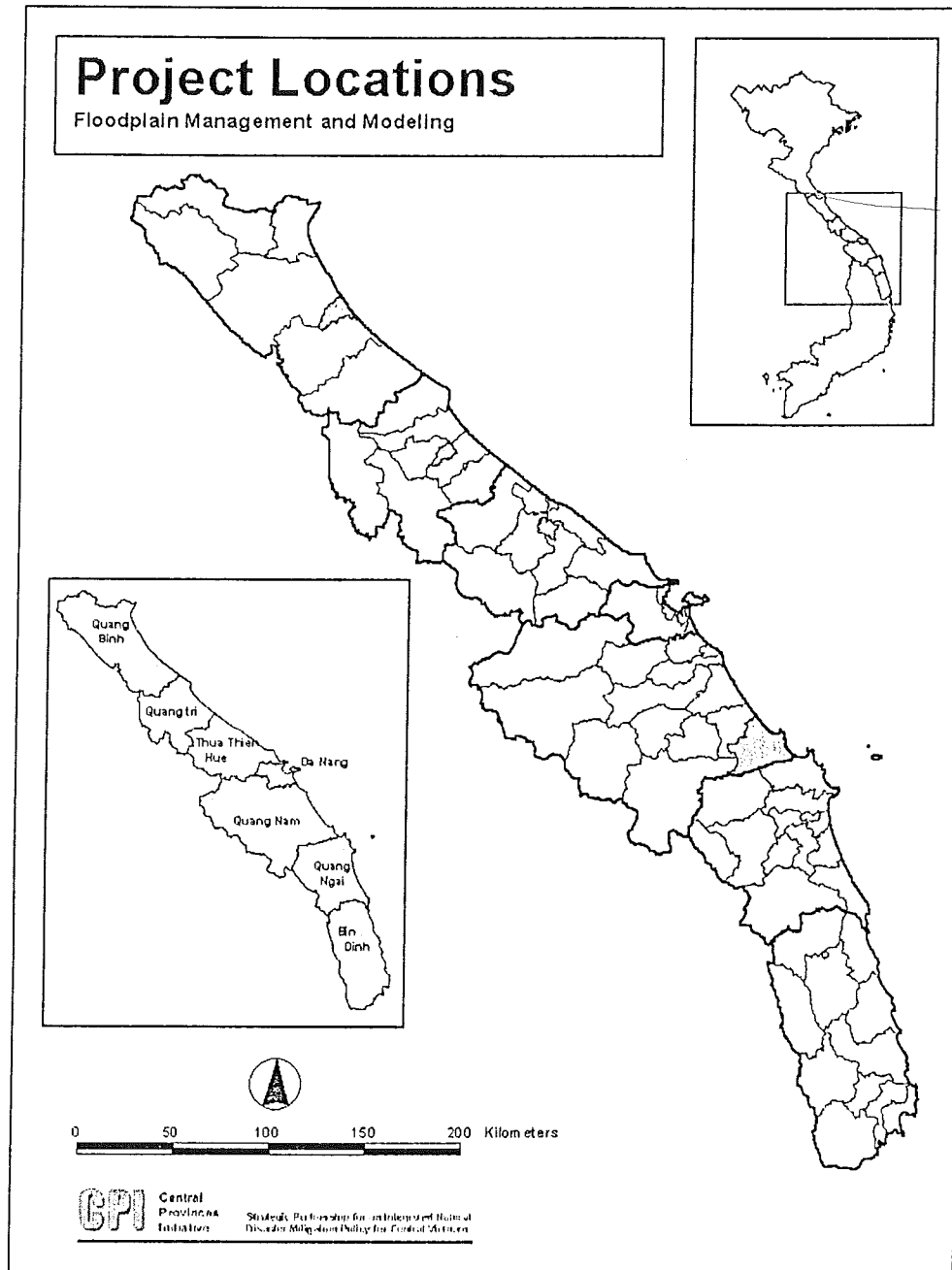
- 1) Technical assistance for capacity building of national staff of agencies concerned about the environment, including preparation of environmental management plans and the supply of basic-measurement equipment.
- 2) Technical Assistance for the establishment of environmental monitoring systems, development of databases, including Geographic Information Systems (GIS), and research into the relationship between natural disaster mitigation and environmental protection.
- 3) Technical Assistance for integration of environmental considerations into natural disaster mitigation measures including development of Environmental Guidelines and implementation of Environmental Impact Assessments (EIA).

1.	Problems and Opportunities: <i>Problems:</i> Years of war, under-investment, and over exploitation of natural resources have been extremely devastating to the environment in Central Vietnam. Chemical defoliation, over-logging of watershed forests and improper agricultural practices have contributed to a decline in the ability of the environment to mitigate the effects of natural disasters. Recent floods, as well as other natural disasters, have damaged the provinces in Central Vietnam through landslide and slope failures, riverbank and beach erosion, sand sedimentation on agricultural land, and in many other ways. <i>Opportunities:</i> In protecting the environment and rehabilitating environments already degraded, government officials have an opportunity to introduce the concept of <i>environmental sustainability</i> to local communities. In applying practices that incorporate <i>environmental sustainability</i> , the effects of natural disasters will be mitigated.
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2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To integrate environmental considerations into natural disaster mitigation planning and development ▪ To mitigate natural disasters from an environmental viewpoint ▪ To introduce the concept and practice of <i>environmental sustainability</i> to the <i>grassroots</i> level of Vietnamese society
3.	<p>Strategy:</p> <ol style="list-style-type: none"> 1. Departments of Science, Technology and Environment (DOSTE) of each province will have the implementation responsibility for this program, under the coordination of and with assistance from the Ministry of Science, Technology and Environment (MOSTE) at the central level. 2. The initial stage of this program will be to prepare a provincial Environmental Management Plan (EMP) consisting of sub-plans of monitoring, research, and development. Preliminary training of staff and supply of basic equipment including a system for GIS will also be implemented during the initial program stage. 3. Based on the EMP, periodic data collection through monitoring, establishment of databases, research, and development will be implemented step-by-step. 4. Basic components of research and development are as follows: <ol style="list-style-type: none"> 1) To identify environmental damage caused by floods and/or other natural disasters 2) To study the relationship between natural disasters and environmental degradation 3) To develop guidelines for the environmental implications of a disaster mitigation proposal, which will be utilized by decision-makers selecting disaster mitigation measures
4.	<p>Schedule:</p> <p>Immediate and short term for the initial stage. Medium to long term for monitoring and research. Note: An EIA should be implemented during the planning stage of each project.</p>
5.	<p>Outputs and Benefits:</p> <p>Outputs: Establishment of an environmental monitoring system, environmental databases, and guidelines for project design; increased capacity for national staff working in matters related to the environment; an integration of environmental considerations into natural disaster management.</p> <p>Benefits:</p> <ul style="list-style-type: none"> ▪ Sustainable development from an environmental viewpoint will be achieved ▪ Provincial Governments' capacity to integrate environmental issues into investment projects for disaster mitigation planning will be strengthened ▪ Environmental damage from natural disasters will be mitigated ▪ The mechanism of environmental degradation from natural disasters will be identified
6.	<p>Inputs:</p> <p>Technical Assistance: for capacity building at the national level; for developing environmental monitoring systems and databases; and for the integration of environmental considerations into natural disaster mitigation measures.</p>

7.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Capacity building of the Provincial Department of Science Technology and Environmental (DOSTE) and related agencies is a prerequisite ▪ Long term and continuous monitoring and research are needed ▪ Cross provincial and cross department cooperation is needed
8.	<p>Alternatives:</p> <p>To do nothing would result in poorer environmental planning, a lack of essential environmental-planning and impact data, and the exclusion of environmental considerations in natural disaster mitigation measures.</p>
9.	<p>Project Cost:</p> <ul style="list-style-type: none"> ▪ The Donor cost for implementing the initial stage of this program is estimated at US\$ 500,000 per province, which includes TA for preparation of Environmental Guidelines and Environmental Management Plans, preliminary training of staff, and basic measurement equipment supply. Subsequent costs will be estimated based on the outputs of the initial stage ▪ Costs for EIA studies will be included in each project cost estimate
10.	<p>Expert Comments:</p> <ol style="list-style-type: none"> 1. Since capacity of DOSTE to implement this program is not enough in terms of number of experts, equipment, and technology at present, capacity building, both institutional and individual, will be a top priority for this program. The goal is to influence the attitude and perceptions of experts and decision-makers involved in investment and development planning in order to strengthen the link between environmental protection and natural disaster mitigation policy. Current capacity building programs in Vietnam should be used as much as possible 2. GIS is a useful tool for this program. GIS can be used to provide the basis to evaluate the proposed projects; to identify the potential implications of the disaster mitigation proposals and their environmental impact; and to provide the basis for sustainable development planning. Training courses in GIS would be utilized in association with inundation mapping proposals 3. Guidelines for environmental implications of a mitigation proposal should be developed in the course of this program. The guidelines can be used by decision-makers of mitigation planning. Zoning is an effective means controlling floodplain and watershed development and should be discussed in the guidelines 4. Although this program is not urgent, immediate commencement, especially for initial stage of this program, is recommended 5. In considering the environmental implications of a mitigation proposal, it is necessary to conduct EIA for relatively large-scale structural projects, and alternative approaches should be taken. Although EIA already forms parts of the planning process in Vietnam, TA by international experts is still needed

11.	Projects: TA: Integration of environmental considerations into natural disaster mitigation Environmental impact assessment (EIA): Disaster mitigation projects; to be implemented for all relatively large scale structural projects TA: Environmental management and monitoring QB1-04: Socio-economic development of buffer zone of Phong Nha-Ke Bang QB1-05: Integrated assessment of natural resources and environment, plan and sustainable development of Nhat Le River Basin QB1-06: Establishment of environmental monitoring stations in Dong Hoi and procurement of environmental monitoring equipment QT1-06: Integrated assessment of environmental damaged by natural disaster in Quang Tri Province
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Program Title:

Floodplain Management and Modeling

Primary Objective:

To provide adequate floodplain planning and management tools; to strengthen the associated technical capabilities and technical services of the provinces.

Implementation Strategy:

May start immediately at all levels of cooperation between provinces, institutes, universities, and other institutions. Technical Assistance programs are an adequate means of support for modeling and related studies.

Floodplain Management and Modeling

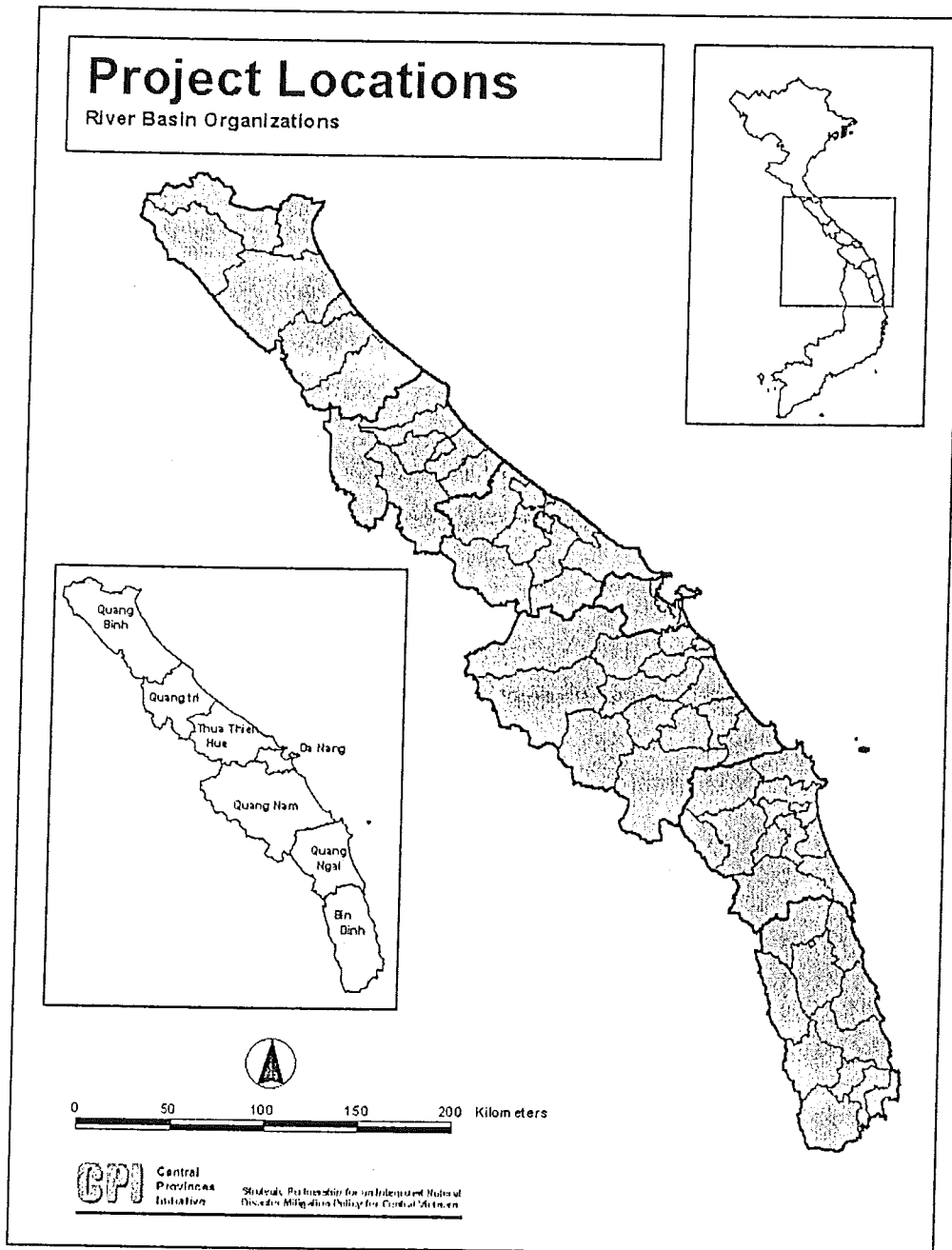
1.3.2 FLOODPLAIN MANAGEMENT AND MODELLING

Several provinces presented projects for developing or applying existing hydraulic flood models to their river systems, especially to downstream river basin floodplains. But in many cases floodplain modelling projects, including dykes, irrigation canals, anti-saline systems of dykes and dams, and estuary development, are presented without preliminary studies which can be assisted by such flood modelling. The impact of such modelling projects on flood mitigation or on flood strengthening is therefore unclear. Nonetheless, a program of Floodplain Modelling will benefit the Central Provinces substantially and widely through the use of computer hydraulic models as cross-cutting planning tools. This is also compatible with the need of integrated river basin organizations. Indeed, if developed enough, these models can help provide maps for risk exposure of floodplains, and can also be used to assess scenarios for alternative development or protective works. It is strongly recommended that a program of floodplain modelling be initiated and that the capability to do this modelling on a continuing basis be pursued through an integrated program in all flood-prone provincial areas.

1	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Some provinces presented projects for developing or applying existing hydraulic models of their river systems in order to study new projects that would protect drainage systems, reservoirs, and other works from flooding. But in many cases floodplain projects, including dykes, irrigation canals, anti-saline systems of dykes and dams, and estuaries development, were presented without preliminary studies that could be augmented by flood modelling. The impact of such modelling on flood mitigation or flood strengthening is therefore not clear.</p> <p><i>Opportunities:</i> The development of floodplain modelling would allow provincial officials to begin implementing floodplain management in a more comprehensive manner.</p>
2	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To provide adequate planning and modelling tools for crosscutting river basin and floodplain planning and management activities ▪ To apply such tools and models for the development of flood risk exposure plans ▪ To take into account that the results will be used by decision-makers who may not be technically knowledgeable; to develop a model that is easy to understand ▪ To strengthen the capacities of the provincial technical services for developing and using such tools ▪ To facilitate interaction between authorities, planners, scientists, and others for optimal exchange of knowledge
3	<p>Strategy:</p> <ul style="list-style-type: none"> ▪ Review and evaluate existing planning tools and hydraulic models currently in use in the Central Provinces and elsewhere in Vietnam, according to requirements for dealing with the specific conditions of Central Vietnam river basin systems ▪ Make technical requirements clear and prepare proper Terms of Reference for support of the planning tools and models ▪ Link modelling development with the development and risk exposure plans as addressed in 1.1.1 Disaster Management Planning and 1.1.2 Disaster Preparedness

4	<p>Schedule: Medium and long term.</p>
5	<p>Outputs and Benefits:</p> <p><i>Outputs:</i></p> <ul style="list-style-type: none"> ▪ Floodplain models that employ such comprehensive tools as hydro-informatic systems and mathematical models ▪ Training courses that facilitate the transfer of technology for developers, and information courses for decision-makers at the regional, inter-provincial, and national levels <p><i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ This program will address the different issues from a perspective of integrated river basin catchment management ▪ Hydraulic models will aid in understanding the process of flooding, drainage, and tidal impacts that have occurred during past floods ▪ The influence of any future development plans or structural works can be assessed by using these models
6	<p>Inputs: Hydraulic engineering, planning, and systems-development expertise.</p>
7	<p>Risks:</p> <ul style="list-style-type: none"> ▪ To choose the wrong type of model from among several families of models that correspond to various levels of assumptions ▪ Not to be aware or to forget that all models have specific limitations: a model is developed according to preliminary assumptions which limit the extent of applicability of any particular model. Users need to ensure that any model used is appropriate for the specific application ▪ Not to have enough data to correctly calibrate the model, even if the model is correctly chosen. The quality of any model prediction depends completely on the quality of data provided ▪ To develop models without enough expertise, and without sufficient testing of their reliability. For example, a one-dimensional model of a whole river system may be appropriate in the upstream watershed where the valley is narrow; but once a system becomes a floodplain with the spreading of the flows, a two-dimensional model is more appropriate
8	<p>Alternatives: Too many projects are not properly supported by flood modelling studies. No donor should agree to fund physical flood mitigation projects for which the impact on floodwater discharge cannot be appropriately assessed. In the current state of the art, all flood mitigation structural solutions should require some form of critical performance assessment using hydraulic modelling.</p>
9	<p>Planning Cost: Variable for each project. Some national institutes have developed their own one-dimensional models, and have begun to develop two-dimensional models. But these models are only reliable and adapted for site specific topographical features. Some external software is currently available, and co-operation with institutes or agencies from elsewhere in Vietnam could be developed. To date, hydraulic modelling has usually been financed through grants, which limits their level of development for use for study of actual large-scale loan construction projects.</p>

<p>10.</p>	<p>Expert comment:</p> <ul style="list-style-type: none"> ▪ From a physical point of view and as a first assumption, rivers in the central provinces have many common features such as short rivers, steep slopes upstream, broad distribution of the flow in the downstream floodplain, and impacts of tide in the lower regions. And, considering also that there are specific unique hydraulic conditions, such as the lagoon system in Thua Thien Hue, or Thu Bon River running along the coast before it finally opens to the sea, it appears therefore that floodplain modelling is an essential tool whose results should be available to floodplain managers and decision-makers. Also, it is recognised that the capacities of the provinces to undertake such modelling should be strengthened, together with new model applications ▪ It is necessary to choose between complicated models that include all hydraulic features, or more simple models so that a comprehensive methodology can be developed and transferred to other floodplains through a model of risk exposure planning ▪ These hydraulic studies should be accompanied by geomorphologic studies ▪ From an organisational point of view, project QT2-29, which has the clearest objectives among the various projects received by the mission, is a good example of possible co-operation between a local department, DOSTE of Quang Tri Province, and a national center, the Institute of Geography within the National Centre for Natural Sciences and Technologies (NCNST) in Hanoi ▪ As modelling tools take some time and funds to be developed and are usually polyvalent, we should encourage initiatives of inter-governmental co-operation. National institutes or agencies usually have a greater level of international co-operation than they have of inter-governmental co-operation ▪ Internationally, a transition has occurred to now use two-dimensional floodplain modelling as the norm. Recent development of a range of commercially available software packages enables low cost development of specific application models on standard computer systems. However, the expertise to use such models needs to be developed in a concerted program of capacity building so that the expectation in the medium term, that all proposed project impacts in the floodplain can be appropriately modelled and evaluated, is fulfilled
<p>11.</p>	<p>Projects:</p> <p>QB1-01: Disaster prevention planning and inundation mapping</p> <p>QT2-29: Flood modelling</p> <p>TH2-29: Flood and tidal model of hue and its lagoon</p> <p>QT1-06: Integrated assessment of environment damage by natural disasters in Quang Tri through use of GIS</p> <p>QN2-16: Flood modelling of the Thu Bon, De Vong, Tuong Giang, and Tam Ky River systems</p>



Program Title:

River Basin Organizations

Primary Objective:

To establish an organization that can plan and manage complex projects, in particular, cross-province issues, in an integrative manner; to enhance natural-disaster mitigation, including flood control, through River Basin Organization management.

Implementation Strategy:

The time scale varies from medium to long term. Provinces and their Departments should be the implementing agencies.

1.3.3 RIVER BASIN ORGANIZATIONS

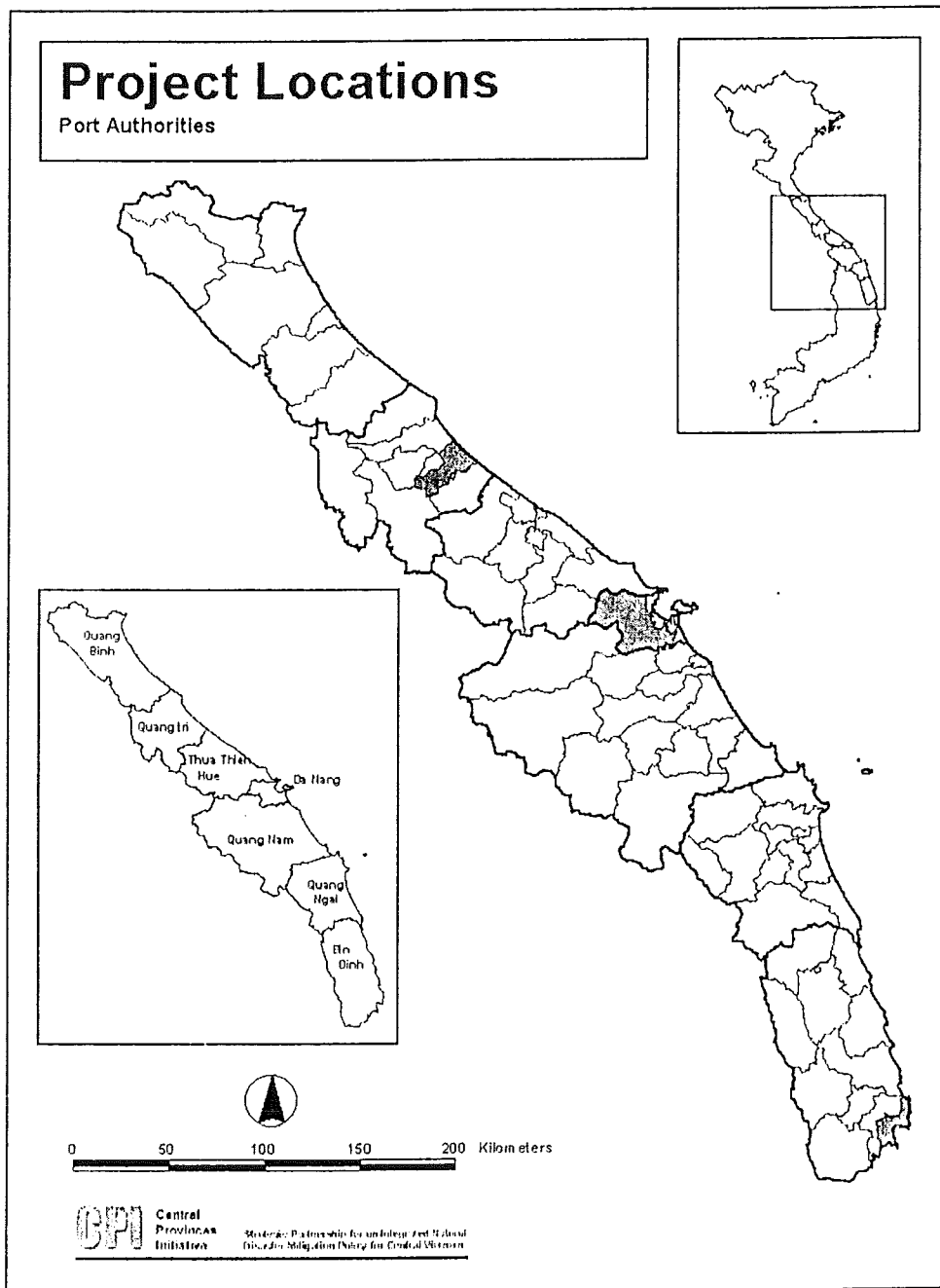
This program is designed to support an integrated approach to River Basin Management and to support the formation and operation of River Basin Management Organizations (RBOs). An integrated management approach is crucial for the development and utilisation of a river basin. The river systems within the Central Provinces are often extremely complex and the effects of the many and varied activities within their river basins have wide-ranging impacts. Members of the Multi-donor Mission discussed this issue with Provincial Authorities; both parties recognised the need for the establishment of River Basin Organisations.

The nature and responsibilities of the individual RBOs will depend upon the circumstances and needs of the basin in question. In many cases basin management will be within the confines of one province. Other basins span more than one province; in these cases RBOs will provide for enhanced inter-provincial cooperation in relation to water resources and natural disaster planning and management. This program is therefore aimed at highlighting the importance of adopting an intergrated approach to river basin management.

1.	Problems and Opportunities: <i>Problems:</i> Without river basin management organizations, it is difficult to develop an integrated approach to planning, implementation, and management issues for natural disaster mitigation. <i>Opportunities:</i> River basin management organizations will be able to deal with natural disaster issues that relate to a particular river basin, even when the basin encompasses more than one province. In cases where river basin catchments span more than one province, the existence of an RBO will provide a structure that will include representatives from all provinces involved, thereby allowing for enhanced coordination and sharing of experience.
2.	Objectives: <ul style="list-style-type: none">▪ To improve river basin management▪ To support the development and operation of River Basin Organizations (RBOs)▪ To enhance the integrated management of river basins in Central Vietnam
3.	Strategy: The institutional aspects under which such RBOs will be formed have yet to be developed.
4.	Schedule: Medium and long term.

5.	<p>Outputs and Benefits: Outputs: A planning and management structure for the River Basin Management Organization in which issues can be dealt with systematically and comprehensively. Benefits:</p> <ul style="list-style-type: none"> ▪ A systematic and integrated approach to the analysis of upstream and downstream impacts will provide a framework for gauging the effectiveness of natural disaster mitigation activities ▪ The integration of natural disaster mitigation activities within one overall river basin management plan enhances cooperation between Provinces and Departments, thus ensuring the best utilisation of resources and the consideration of all related coordination issues ▪ RBO's will provide forums for conflict resolution in cases where planned activities might negatively affect the interests of particular stakeholders
6.	<p>Inputs: An inter-departmental management organisation will provide the necessary cross-sectoral expertise required for the preparation of integrated plans for river basin catchment management.</p>
7.	<p>Risks: To be effective, RBO's need to have a clearly defined and appropriate role. There is a risk that they might act in parallel with existing institutions. To be effective, RBO formation must be based on a clearly felt need of the province or adjoining provinces.</p>
8.	<p>Alternatives: To continue the present systems would undermine the potential for enhanced intra- and inter-Provincial coordination. Alternatives exist with regard to the institutional environment under which RBO's will be established and under what authority they will function. The roles and responsibilities of such organisations would have to be defined in detail and may vary depending on the needs of different provinces. To do nothing would result in the continuation of planning and operation as at present, with different authorities addressing the needs and tasks for which they are responsible, thereby limiting the ability of the province or adjoining provinces to develop and implement integrated plans for natural disaster mitigation.</p>
9.	<p>Planning costs: Variable. Costs would depend upon the role and responsibilities assigned to the RBO's. It is likely that responsibility for the design and implementation of some of the natural disaster mitigation projects will come within the defined scope of an RBO.</p>
10.	<p>Expert overview: In the long term the development of suitable management structures to address the management of river basins in an integrated way is crucial. RBO's are a fundamental way to achieve such development.</p>

11.	Projects: During the Mission, only one specific request was received for an RBO project, from Da Nang Province. However, the importance of an integrated river basin management approach is clearly appreciated. Therefore, potential projects are: DN: River Basin Organization TTH: Thua Thien-Hue Huong River basin management (board) QN: Study of Han River as part of Quang Nam Vu Gia - Thu Bon river basin. QT and QN: O Lau River basin program with cross-border, inter-provincial cooperation
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Program Title:

Port Authorities

Primary Objective:

To establish institution-building and physical projects as essential elements of port safety; to include beaconing, access (through dredging), and other natural-disaster safety issues.

Implementation Strategy:

Implementation in the short and medium term needs to be considered as part of the overall improvement in the task of integrated coastal zone management.

Port Authorities

1.3.4 PORT AUTHORITIES

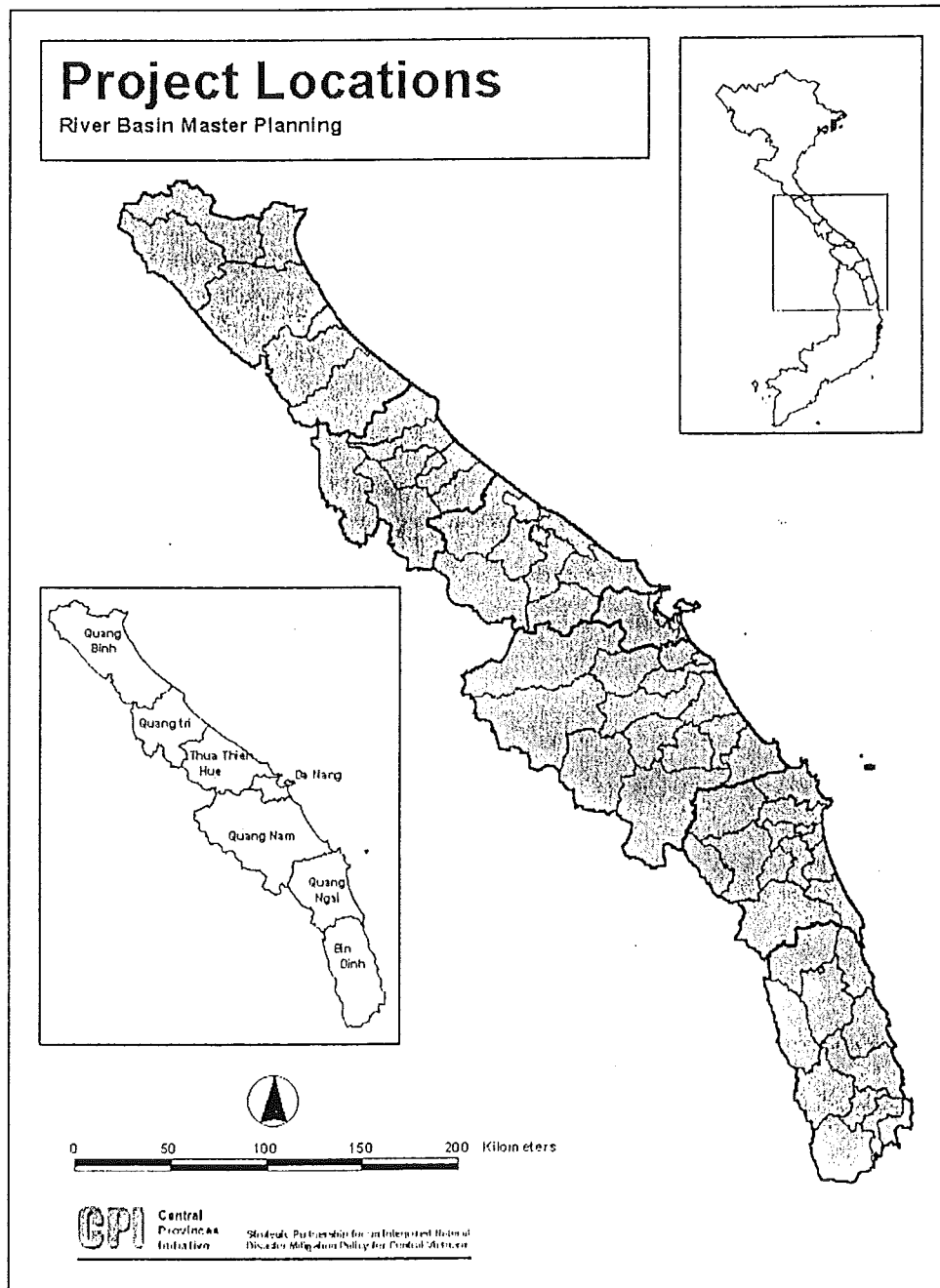
Port development and natural disaster security requires the study of winds, waves, currents, and siltation covering the whole coastal zone area. Protection works such as breakwaters are designed for the whole port, not just for wharves belonging to the Navy, the Department of Fisheries or the Department of Transport. Problems of anchorage security, beaconing, dredging, towing, and traffic management all need an integrated port authority, joining the separate commercial, fishing, military and Coast Guard needs into a comprehensive port development plan.

The creation of Port Authorities would be a major institutional change. It could, however, be set up by appropriate arrangements between the different sectoral administrations; and could also involve local authorities and organizations interested in port development, including the private sector.

For disaster mitigation, a port authority can offer safe anchorage in case of storms, and improvement of navigation security by appropriate breakwaters, lighthouses, beacons, traffic rules, and rescue and safety equipment. Such a port authority covering the whole port area is a prerequisite for enhanced natural disaster mitigation.

1	<p>Problems and Opportunities:</p> <p><i>Problems:</i> The operation of a port involves many diverse interests, organizations, and agencies that deal with a variety of issues. Currently there is no institution that can integrate these diverse issues and coordinate activities related to them.</p> <p><i>Opportunities:</i> The creation of Port Authorities offers an opportunity for an improvement in safety and security, as well as a more efficient use of resources. In addition, these improvements will enhance natural disaster mitigation by coordinating the development of safe havens and anchorage, breakwaters, lighthouses, and beacons. By providing for and properly positioning rescue and safety equipment, a Port Authority will benefit many at the <i>grassroots</i> level, especially fisherfolk and other coastal dwellers.</p>
2	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To increase port security and provide appropriate lighthouses and beaconing ▪ To provide safe anchorage and reduce boat damage from storms and floods ▪ To facilitate port traffic operations by improving overall port management
3	<p>Strategy:</p> <p>A lead national agency will have to be designated to coordinate the activities of the Coast Guard (lighthouses and security), the Transport Department, the commercial port; sand-dredging companies; the Department of Fisheries; and the Navy. Military ports often have commercial activities and security issues are the responsibility of the military.</p>
4	<p>Schedule:</p> <p>Medium and long term: Large port improvements. Immediate and short term: Institutional arrangements.</p>

5	<p>Outputs and Benefits: Outputs: The creation of Port Authorities; large port improvements such as lighthouses, beaconing systems, safe havens for boats, and breakwaters. Benefits:</p> <ul style="list-style-type: none"> ▪ Improved security for ships and sailors ▪ Improved working conditions for all port operations ▪ Upgraded harbors allowing bigger ships access to the port
6	<p>Inputs: Planning and management expertise for developing the institutional arrangements necessary for the creation of Port Authorities; large port improvements as deemed necessary after a Port Authority has been created.</p>
7	<p>Risks: Breakwaters and jetties can be badly located, resulting in erosion or siltation which was not expected. Lighthouses must meet international sea route and mariner requirements.</p>
8	<p>Alternatives: Provinces can wait for a national program of seacoast beaconing, but any delay in providing coastal security will certainly result in losses of life and property in the short term. Lack of overall port management authority and of comprehensive port area security planning will prevent the establishment of safe anchorage, resulting in ship damage in case of storms.</p>
9	<p>Planning cost: Comprehensive port development and security plans need a preliminary study of currents, winds, waves, erosion, and siltation; and professional design of breakwaters, embankments, and wharves. Lighthouse and beaconing plans must be consistent with a national coastal security plan and international maritime requirements.</p>
10	<p>Expert opinion: In one case a project was proposed for building a new wharf for fisheries in an existing harbor (BD2-35: Qui Nhon port) without any consideration about security in the whole harbor, or a safe anchorage location. Problems of security, beaconing, dredging, and traffic management need a major institutional change and a comprehensive port development plan. This requires an integrated port authority, joining the separate commercial, fishing, and military ports requirements, and not just separately managed wharves. This is especially needed for Da Nang, Qui Nhon and Cua Viet Ports. Some safe anchorage projects like DN2-17, 18 could easily be improved by the inclusion of security components such as lighthouses, beacons, and rescue equipment, if they were included in a comprehensive port area security plan. Priority should be given to ports which are divided into military, commercial and fisheries areas, and can offer safe anchorage. Examples are Cua Viet port in Quang Tri; Da Nang port in Da Nang, and Qui Nhon port in Binh Dinh. Safe anchorage locations should also be uniformly distributed along the coast.</p>
11.	<p>Projects list: QT2-06: Cua Viet revetment at the Thach Han River mouth, safe anchorage DN2-17: Tho Quang 1 safe anchorage DN2-18: Tho Quang 2 safe anchorage BD2-35: Qui Nhon fishery port QT1-06: Cua Viet commercial and fishing port coordination and safe anchorage study</p>



Program Title:

River Basin Master Planning

Primary Objective:

To optimize development and utilization of the river basin, including flood mitigation in the rainy season and water supply in the dry season.

Implementation Strategy

Medium time scale. River Basin Management Plans will be formulated in accordance with the Law on Water Resources of 1999.

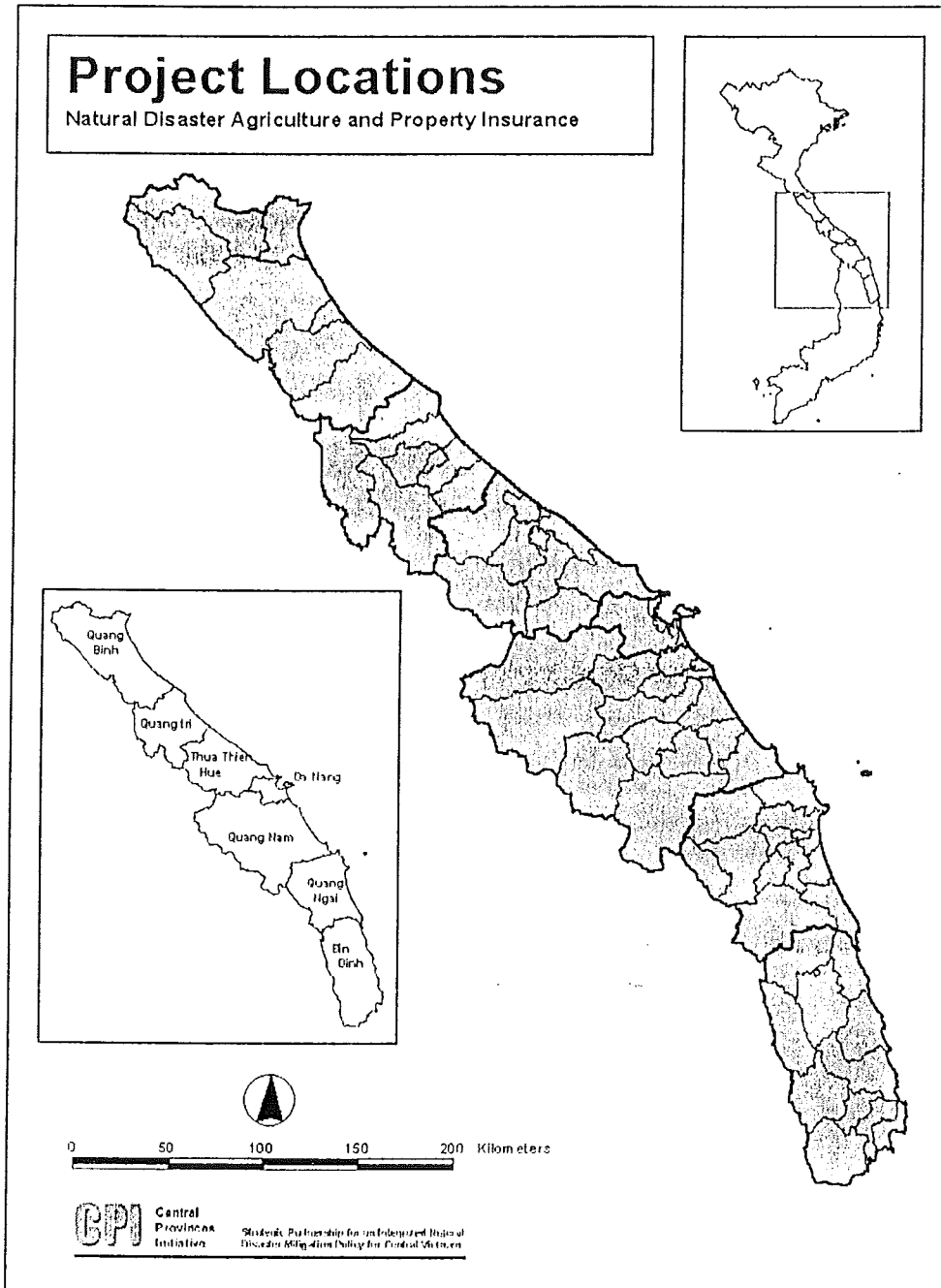
River Basin Master Planning

1.3.5 RIVER BASIN MASTER PLANNING

This program involves the formulation of river basin Master Plans to support an integrated approach to river basin management in line with the policy described in the Law on Water Resources enacted in 1999. Taking into consideration that much of Central Vietnam is prone to a variety of natural disasters, the Master Plans will focus on flood mitigation.

1	<p>Problems and Opportunities:</p> <p>Problems: To be most effective, various projects and programs must be implemented in a comprehensive and integrative manner. Currently this is not being done in Central Vietnam. One such integrative scheme organizes itself around the river basin.</p> <p>Opportunities: By classifying projects and programs within a River Basin Organization (RBOs) it will be possible to see the many interactions among upstream and downstream projects. Because all natural disaster mitigation projects interact and thus affect each other, planning for these projects and programs could be done in a comprehensive manner that encompasses the whole river basin.</p>
2	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To realize optimum total development of various water-related sectors, including both flood mitigation in the rainy season and adequate water supply in the dry season; through a well-balanced combination of structural and non-structural measures ▪ To realize sustainable implementation of projects, operations, and maintenance of water-related facilities in a systemic and integrated way ▪ To prioritize and sequence independent water-related projects in a river basin setting ▪ To select urgent flood mitigation projects from the Master Plan that need to be implemented as soon as possible ▪ To conduct Feasibility Studies for the most urgent flood mitigation projects so that they can be started soon
3	<p>Strategy:</p> <p>River basin Master Planning will be formulated in line with the policy described in the Law on Water Resources enacted in 1999. Effective institutional arrangements such as River Basin Management Organizations are essential for the success of the formulation and implementation of Master Plans, including operation and maintenance of facilities. River basin Master Plans and RBOs will work closely together to mitigate natural disaster in selected river basins. The appropriate and comprehensive development of integrated disaster management requires enhanced planning tools, particularly when proposed projects will have a wide impact on the river basin. Thus, as a second step, it is necessary to develop suitable management structures to address river basin management and organization in an integrated way. Consequently, further studies of management and organization in River Basin Master Planning will be necessary.</p>
4	<p>Schedule:</p> <p>Medium and long term.</p>

5	<p>Outputs and Benefits: <i>Outputs:</i> River Basin Master Planning and River Basin Plans. <i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Reduction of damage from natural disasters ▪ Reduction of total project cost for natural disaster mitigation ▪ Reduction of costs for operation and maintenance
6	<p>Inputs: Regional Planning and Disaster Management Expertise.</p>
7	<p>Risks: If there is no support from an appropriate basin-wide institutional organization like a River Basin Organizations, Master Planning may not be implemented and thus planning may be ineffective.</p>
8	<p>Alternatives: No action: Individual projects or programs within a river basin could be working at cross-purposes and thus produce disparate results.</p>
9	<p>Project Cost: US\$ 1 to 2 million for each principal large river basin in Central Vietnam.</p>
10.	<p>Expert Comment: No specific Master Planning project is listed at this stage. However, it is essential to formulate a comprehensive river basin Master Plan for several important river basins in Central Vietnam. The planning should be formulated focusing on flood mitigation and taking the present damage situation from the 1999 floods in Central Vietnam into consideration. Master Planning should not delay the implementation of urgently needed disaster mitigation projects. Many urgent projects have to be implemented as soon as possible, without Master Planning. Some mature, relatively large-scale structural projects might also be implemented as independent projects in the short term. These immediate and short-term projects will be adopted as important components of any Master Plan to be formulated.</p>
11.	<p>Projects: No specific project is listed at this stage; but important possible projects include: TH1-M/P: River basin master plan for the Huong River Basin; Hue City is located on this floodplain. QNI-M/P: River basin master plan for the Thu Bon River Basin; Da Nang City and Hoi An City are located on this floodplain.</p>



Program Title:

Natural Disaster Agriculture and Property Insurance

Primary Objective:

To develop a national agricultural insurance program that covers crop and farmland loss due to natural disasters.

Implementation Strategy:

A Technical Assistance team will work closely with the BAOVIET Insurance staff. In consultation with Agribank and the Farmers' Union they will determine the available resources for and possible constraints to the establishment of the program.

Natural Disaster Agriculture and Property Insurance

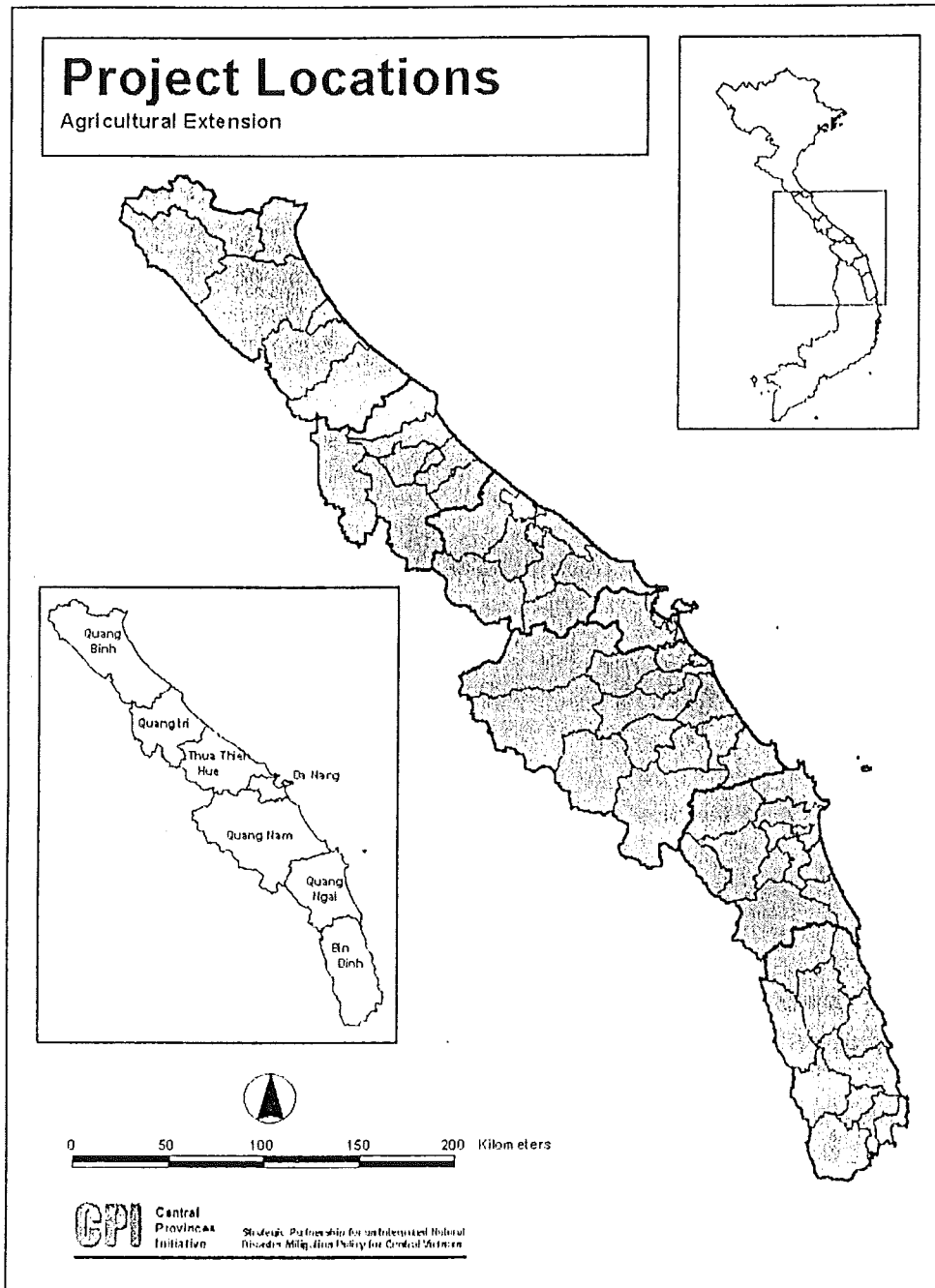
1.4 NATURAL DISASTER AGRICULTURE AND PROPERTY INSURANCE

This program will develop a much needed natural disaster casualty insurance program for agriculture and personal property to respond to floods, droughts and other disaster events.

<p>1.</p>	<p>Problems and Opportunities:</p> <p><i>Problems:</i> The agricultural sector in Vietnam continues to experience a range of natural hazards, the most frequent being floods, windstorms and drought. Each of these natural disasters can destroy vast areas of agricultural output and productive farmland. There are post disaster relief plans in place but these are for the broader community needs such as repairing water channels and other disaster-damaged infrastructure. However, for the individual farmer the options for dealing with disaster-induced crop losses are limited. Farmers <i>self insure</i> using their own savings, but when these savings are exhausted farmers invariably turn to the Government who may pay direct benefits, provide tax exemptions, or render assistance through the banking system with subsidized loans. Each response is on an <i>ad hoc</i> basis. There is no real measure to determine which geographical locations are most in need.</p> <p>The Government seeks to move the agricultural sector away from its dependence on rice by diversifying to other crops, but such diversification is difficult without an adequate facility for financial support and without natural disaster crop insurance.</p> <p><i>Opportunities:</i> Agricultural insurance is an efficient instrument and an institutionalized mechanism for dealing with the problem of crop loss due to natural disasters. Agricultural insurance helps streamline relief efforts and reduces direct and indirect costs to the national economy. Moreover, this insurance infrastructure provides a mechanism for a more accurate measurement of losses and disbursement of compensation immediately after a natural disaster. BAOVIET, the national insurer, and the Ministry of Finance are interested in developing an agricultural insurance programme that includes a strong natural disaster component.</p>
<p>2.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To develop a National Agricultural Insurance programme in Vietnam that deals with both systemic (catastrophic) and non-systemic risks, and incorporates insurance coverage for crop and farmland loss due to natural disasters ▪ To develop the program in a manner that incorporates the input of the farmers, thus better assuring that they secure the natural disaster protection they need

3.	<p>Strategy: The team will work closely with BAOVIET Staff, as well as with staff from the Ministry of Finance (MOF) and the Ministry of Agriculture and Rural Development (MARD). There will be consultation with Agribank and with the Farmer's Union in order to determine the available resources and constraints for the establishment of a National Agricultural Insurance Programme. The team will also develop an underwriting proposal for consideration by the reinsurance market.</p>
4.	<p>Schedule: Immediate and short term.</p>
5.	<p>Outputs and Benefits: <i>Output:</i> A crop distribution analysis; development of a general area yield computer simulation model for risk assessment; recommendations for insurance training; administrative and technological development; and a reinsurance underwriting proposal. <i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Based on a quantification of the natural hazard risks and their effect on crop yields, a determination of future resource requirements can be made ▪ Farmers will have better financial security ▪ Because their possible crop loss is covered by insurance, farmers will be less reluctant to plant more, thereby producing more ▪ Because their risk is reduced, farmers will be less reluctant to borrow in order to finance their harvest, thereby stimulating the local economy
6.	<p>Inputs: A project team consisting of two experts in Agricultural Insurance and Reinsurance design and implementation, and an expert in agricultural loss management.</p>
7.	<p>Risks: Inability to collect adequate information on past years' crop yields; lack of understanding and support from farmers; unwillingness of the reinsurance market to participate.</p>
8.	<p>Alternatives: Do nothing and have the government continue to pay the financial cost of major agricultural losses without any long-term strategy.</p>
9.	<p>Project Cost: Cost of US\$167,700 for stage 1 risk analysis, computer simulation model, and programme structure.</p>

<p>10.</p>	<p>Expert Comments:</p> <p>The Programme being proposed will provide the basis for the development of a National Agricultural Insurance Programme. This programme will be based on new index linked insurance products through which the Governments can transfer a portion of their risk to either the capital market or to the traditional reinsurance market. It is considered that such insurance products can adequately deal with the catastrophic type risks that characterize farming in Vietnam.</p> <p>This Stage 1 project provides the necessary risk analysis and data collection from which an appropriate insurance programme structure can be formulated.</p> <p>Justifications for development of an area index linked insurance product are:</p> <ul style="list-style-type: none"> ▪ It overcomes the moral hazard and adverse selection problems associated with traditional insurance structures ▪ It could be very inexpensive to administer, since there are no individual contracts to write, no on-farm inspections and no individual loss assessments ▪ It uses only data from a single regional index and this can be based on data that is available and generally reliable. It is also easy to market: insurance certificates can be sold like traveller's cheques and presentation of the certificate would be sufficient to claim a payment ▪ The insurance can be sold to anyone. Purchasers need not be farmers, nor even live or work in the region. The insurance should be attractive to anybody whose income is correlated with the insured event, including agricultural traders and processors, input suppliers, banks, and others. Defining insurance certificates in small denominations would raise their appeal to poor people ▪ As long as the insurance is voluntary and unsubsidized, it will only be purchased when it is less expensive or when it is a more effective alternative to existing risk management strategies ▪ A secondary market for insurance certificates could emerge that would enable people to cash in the tradable value of a certificate at any time ▪ For BAOVIET an area based index program would be easy to operate and may provide an opportunity to develop other kinds of insurance products for the rural community ▪ Once an area based index removes much of the catastrophic risk, an insurer can provide farm level insurance to handle independent risk
<p>11.</p>	<p>Projects:</p> <p><i>Stage 1 Project Feasibility Study:</i> This will involve the collection and analysis of crop-yield data from provinces throughout the country. Based on this feasibility study, a proposal will be submitted to the reinsurance market.</p>



Program Title:

Agricultural Extension

Primary Objective:

To support the development of sustainable farming systems.

Implementation Strategy:

Extension services will be implemented in conjunction with infrastructure programs that affect farming systems; extension services may also be implemented as stand-alone programs.

Agricultural Extension

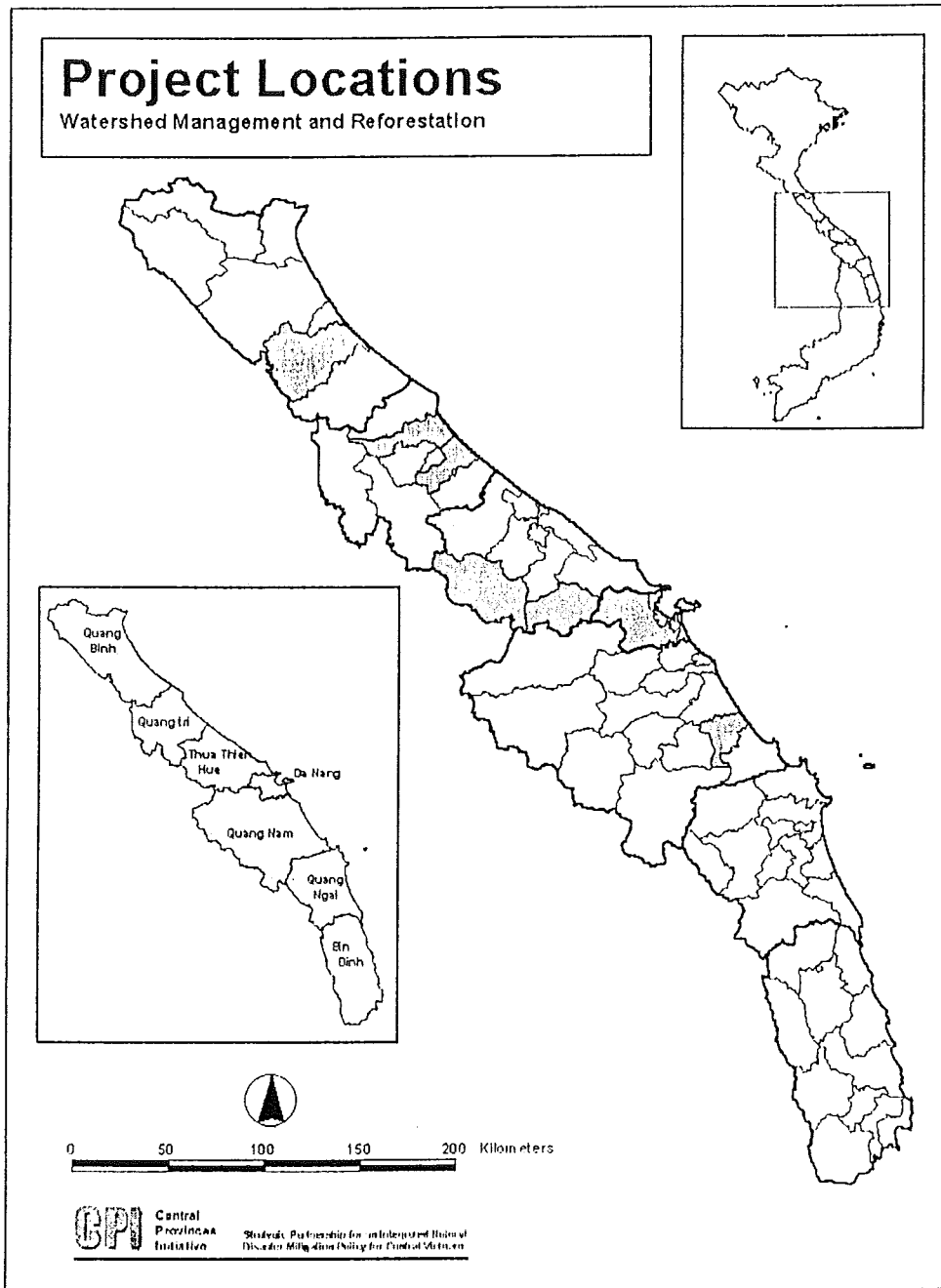
1.5 AGRICULTURAL EXTENSION

The purpose of this program is to assist farmers by providing extension and technical assistance so that they can improve their agricultural practices. Extension packages have been developed to reduce the effects of early flooding, nuisance flooding, and drought. Improvements can be made in the agricultural production system through the enhancement of traditional farming techniques, the introduction of new farming techniques, and the diversification of agricultural production. This program is intended to increase agricultural production in the lowland and the upland areas; it is also designed to allow for holistic consideration of the farming system.

12.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Early floods, nuisance floods, droughts, and other natural disasters destroy crops and increase agricultural input requirements. Poor and near-poor households live in a precarious situation. They often take out loans before the planting season in order to purchase seed and other inputs. Thus, if they lose their crops, they incur a debt because they have no produce to sell, no funds to repay the debt, and no capital to finance future crops.</p> <p><i>Opportunities:</i></p> <p>The combination of better seed varieties and improved agricultural practices can contribute to reduce agricultural losses. Cultivation methods and other improved agricultural production methods enable farmers to adapt and to minimize the effects of natural disasters. The promotion of sloping-land farming technologies and permanent agriculture in upland areas can further improve production capabilities, and reduce erosion and the consequent siltation of water ways. Improved animal husbandry practices and veterinary care can result in livestock being more hardy and better able to cope under stress. Tagging of animals could reduce post-flood conflicts regarding the identification and ownership of livestock.</p> <p>Unless farmers are able to provide primary staple food requirements of their families, they will not be able to consider alternative income opportunities. This program, therefore, addresses very basic needs. It should be given the highest priority, providing the first in a series of steps to enable farmers to increase their incomes, diversify their production, and reduce their vulnerability to natural disasters.</p> <p>A related and interdependent topic, Agricultural Insurance, is dealt with in Section 1.4.</p>
13.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To support the development of sustainable farming systems ▪ To improve production capability, household income, and food security ▪ To improve agricultural extension, input, and market services available to the farmer ▪ To support the development of the agricultural extension sector ▪ To support the development of agricultural extension services which address the needs of all the community, particularly the needs of the poor, rural women, ethnic minorities, and other marginalised groups

14.	<p>Strategy: This type of program can be implemented at various levels depending on the financial and technical capabilities of the donor. Such a program could be implemented as stand-alone projects through MARID, Provincial DARD, District-level SARD, or through NGOs working at the district or commune level. To be successful, the extension service must incorporate relevant interventions within the farming system; interventions that consider the needs of the farmer. For this reason, the program should not be limited to a narrow interpretation of agricultural production, but should be much broader. The program should allow for the inclusion and development of livestock and veterinary services, for the use of appropriate fertilizers and pesticides, for integrated pest management, for the development of non-forest products, and for other services that address farmers' needs.</p>
15.	<p>Schedule: Immediate and short term. Medium and long term.</p>
16.	<p>Outputs and Benefits: Output:</p> <ul style="list-style-type: none"> ▪ Improved agricultural and livestock extension service delivery <p>Benefits:</p> <ul style="list-style-type: none"> ▪ Reduced soil erosion; reduced leaching of soil nutrients ▪ Improved food security ▪ Improved farmer incomes, thus providing opportunities for other income-generating activity ▪ Reduced crop and agricultural-input losses ▪ Farmers more likely to borrow in order to finance their harvest, thereby stimulating the local economy because their risk is reduced
17.	<p>Inputs: A program of this type can stand alone or be an integral part of many other programs or projects. It is important that consideration be given to the need for agricultural-extension support during the planning of the irrigation, drainage, dam construction, and other infrastructure programs. Such programs have a direct effect upon the life and farming-system environment of the rural population. The Government of Vietnam has developed appropriate and effective agricultural extension and farmer-training packages. These packages have been further developed and augmented through support provided by many donors and NGOs. These training courses provide a firm, generic foundation. Because local conditions and cultural considerations influence farming systems, however, effective extension support must take local needs into consideration. The input requirements include provision of:</p> <ul style="list-style-type: none"> - On-farm trials and demonstration plots - Training of extension staff in extension methodologies and technical fields - Material and logistical support to relevant Government and NGO service providers - Possible provision of long term and short term technical assistance
18.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Lack of consideration of gender roles ▪ Extension messages that are inappropriate to the needs of minority and other marginalised groups ▪ Implementation of structural projects without due consideration of their

	impact on the lives and farming systems of the rural people.
8.	Alternatives: Do nothing and have the government and farmers continue to pay the financial cost of major agricultural losses without any long-term strategy.
9.	Project Cost: To be determined
10.	<p>Expert Comments:</p> <p>Interventions in this area will mainly target individual households that will be supported in order to improve and diversify agricultural practices. To establish a village-level institutional framework for the provision of technical support to farmers, programs of this type will support the establishment of a network of village-based extension agents, para-veterinarians, interested groups, and model households.</p> <p>The farm is an integrated system utilizing diverse resources. It impacts upon its environment in many ways. Programs of this type need to promote integrated farming practices that combine different farming activities, ideally activities where waste materials from one activity are used to improve the production of another activity. The promotion of inter-linked practices, rather than the adoption of singular extension messages, should be attempted.</p> <p>Attention should be paid in such program for the improved use of agricultural inputs, integrated pest-management, harvesting and storage systems, as well as for the marketing of agricultural products.</p>
11.	Projects: To date, no projects dealing specifically with agriculture have been proposed. However, support to the agricultural extension sector is very important and should be regarded as a priority.



Program Title: Watershed Management and Reforestation

Primary Objective: To reduce precipitation run off and to provide alternative forms of income for communities. Restoring environmental values is an important objective for natural disaster mitigation.

Implementation Strategy: Forest planting under the five-million hectares program and other integrated forestry programs.

Watershed Management and Reforestation

2.0 STRUCTURAL NATURAL DISASTER MITIGATION PROGRAMS

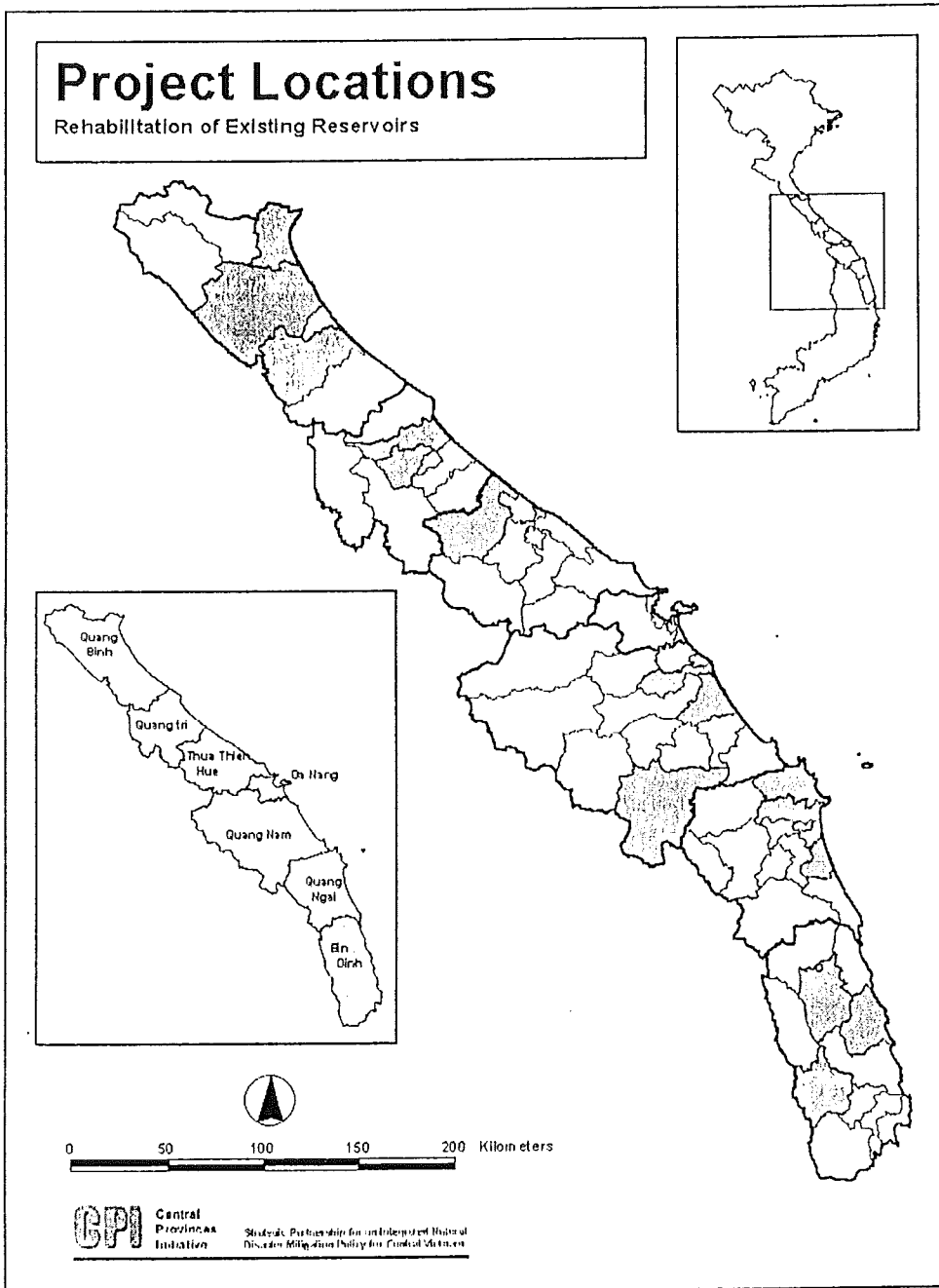
2.1.1 WATERSHED MANAGEMENT AND REFORESTATION

The program involves watershed reforestation initiatives covering a number of provinces. The areas covered by the projects are only a portion of the total watershed areas that can be reforested; but the areas that have been selected by the provinces for reforestation are treated as priority areas for initial reforestation initiatives. It is proposed that reforestation implementation be complemented by an appropriate level of monitoring and recording to help quantify the resulting benefits of the reforestation.

1	<p>Problems and Opportunities:</p> <p><i>Problems:</i> The uplands adjacent to the floodplains in Central Vietnam have been severely denuded of forests. Thus, heavy rainfall now results in shorter runoff times, increased runoff rates, and heavier and excessive sediment loads. Impacts are negative across the basin: worsened floods; reservoir sedimentation; river instability due to high sediment loads; and reduced dry season base flows. The Vietnamese Government has a declared policy of replanting five million hectares of forest nationwide by the year 2010; but the specific initiatives discussed here have no funding currently available. Although the initiatives would appear to have only positive benefits, there appears to be no in-country research results which clearly quantify the benefits.</p> <p><i>Opportunities:</i> Large national programs such as the Five Million Hectare Program do not fill all the reforestation needs in Vietnam. The proposed reforestation program for the Central Provinces can fill a gap in the national program by focussing on upland watershed areas. By employing local people to plant trees and then to maintain sections of the reforested areas, economic benefits for some communes will be realized. Through this program an awareness of the benefits of reforestation and environmental sustainability will be inculcated at the grassroots level.</p>
2	<p>Objectives:</p> <p>To provide multi-purpose, basin-wide benefits in the long term; and short term opportunities for local work, new agricultural pursuits, and, in some cases, relocation from severe flood-prone areas in the lowlands.</p>
3	<p>Strategy:</p> <p>A five-year program, 2000 to 2005, involves early design and infrastructure including nurseries; planning for community involvement; and implementation of planting mostly in years 3 to 5. The ongoing need for more reforestation will demand progressive review and Technical Assistance for this program. There is need to develop a sound program that takes into account infrastructure requirements and community issues.</p>
4	<p>Schedule:</p> <p>Medium and long term.</p>
5	<p>Outputs and Benefits:</p> <p><i>Outputs:</i> Reforested watershed areas; local employment.</p> <p><i>Benefits:</i> Reduced runoff due to heavy rainfall. Substantial reduction in sediment loads. Improved runoff characteristics in all seasons. Overall environmental improvements. Work opportunities in agroforestry and intermediate agricultural activity. Economic improvement for associated communal populations.</p>

6	<p>Inputs: Coordination by the Ministry of Agriculture and Rural Development (MARD); a strong administrative structure that can deal with issues that cut across provincial boundaries. Technical assistance from a forestry expert.</p>
7	<p>Risks: Outcomes that do not justify the expenditure. Replanting fails due to inappropriate design and/or maintenance. Initiative is not supported by the necessary local population. The lack of immediate benefits results in loss of enthusiasm by the program administration.</p>
8	<p>Alternatives: The existing Central Vietnam watersheds are denuded and are causing problems throughout their river basins. In particular, some basins such as the Thu Bon River Basin have severe river stability problems caused by increased sediment loads. Existing small and medium size reservoirs are being threatened by higher flash floods; this issue must be addressed anyway. Water supply in the dry season is said to be increased by 20 percent from forested catchments; and if this is true, the do-nothing option excludes this potential benefit for drought diminution.</p> <p>Reforestation projects can be implemented separately and benefits will accrue. The individual project funding requirements will be smaller. However, the benefits of lessons learned being applied across the program will be at risk. These benefits include better monitoring, research, incremental improvement in techniques, and new policy application for local population incentives and initiatives.</p>
9	<p>Project Cost: Total program cost is US\$ 35 million, including monitoring and reporting.</p>
10	<p>Expert Opinion and Comments: Watershed reforestation is strongly recommended. It is expected that the benefits will be positive across a wide range of physical and community issues. However, the benefits are not easily quantifiable and hence economic justification is also difficult. Site visits and local interviews of local populations are required for any projects. Despite this, opinion is that the program is supportable and is strongly recommended. Of course, benefits on disaster relief from flooding and sediment influx are longer term. Nonetheless, the Government's approach to land allocations and community use of the land means that there will be strong immediate benefits to local communities in employment and improvement in local agriculture. The program provides a framework for learning, monitoring, and technology transfer between the central provinces; this will be important as the program expands in the decades ahead.</p> <p>Prioritisation of Projects All works have a timeframe of immediate start and a number of years for implementation. Therefore, specific priorities are not generally required. However, any project in watersheds of small reservoirs makes good sense; for example, project QN2-13 seems well-planned and worthwhile. Only through such projects will the massive sediment problems in some river systems begin to be addressed.</p>

11.	Projects: QB2-16: Nhat Le watershed reforestation, Quang Binh Project (7.14M) QT2-13: Thach Han watershed reforestation, (4.56M) QT2-14: Ben Hai watershed reforestation (4.70M) TH2-15: Huong watershed reforestation, (5.0M) TH2-16: A Luoi District watershed reforestation (0.04M) DN2-08: Da Nang watershed reforestation QN2-13: Four catchments of reservoirs watershed reforestation (5.14M)
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Program Title:

Rehabilitation of Existing Reservoirs

Primary Objective:

To reduce property damage and the potential loss of life due to dam failure.

Implementation Strategy:

Proper monitoring, warning, and communication systems are to be installed on all dams, starting with the most unsafe structures. Remedial measures will be prioritized. Short, medium and long-term time scale needed.

Rehabilitation of Existing Reservoirs

2.1.2a REHABILITATION OF EXISTING RESERVOIRS

This program involves the inspection, evaluation, repair and upgrading of existing reservoirs and dams in the Central Provinces. These efforts have been clustered into a single program because of similarities in the nature of the specialized technical knowledge needed for inspection, evaluation, design, and construction of repairs, and improvements.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Within the central provinces, there are numerous small and medium sized reservoirs. The primary purpose of these reservoirs is to store water for irrigation. The reservoirs also provide some small degree of flood protection for downstream areas. Most or all of the dams that impound these reservoirs are deficient in design, construction, or maintenance. As a result, the risk of sudden catastrophic failure is significant. Problems affecting the safety of these dams include inadequate spillway capacity, excessive underseepage, leakage of low-level outlet gates, erosive undermining of spillways, and erosion of the upstream dam face by wave wash. These problems also affect the storage of water for irrigation. Irrigation storage is directly affected by the loss of water through underseepage and leaking gates. In addition, some local authorities have recognized the severity of underseepage problems and have intentionally reduced the storage level of irrigation water in order to reduce the risk of dam failure. The potential for loss of life and severe property damage associated with dam failure in central Vietnam is high, since dwellings and small villages are located immediately downstream of most reservoirs and dams.</p> <p><i>Opportunities:</i> Dealing with the problem of reservoir and dam safety deficiency affords the opportunity to improve the safety of those living downstream, reduce erosion, and increase the storage capacity of the deficiency reservoirs.</p>
2.	<p>Objectives:</p> <p>To reduce the potential for loss of life and property damage associated with the catastrophic failure of dams by improving dam safety. A secondary objective is to restore the functionality of these dams by increasing the supply of water for irrigation.</p>
3.	<p>Strategy:</p> <p>Implementation will involve donor funded training for national engineers in the inspection, evaluation, and design of remedial actions for dams. These engineers would then carry out the inspection and evaluation program. Donor funded technical assistance would also be provided during execution of the inspection and evaluation program. A report will be developed for each planned remedial action. The report will be the basis for seeking funding from donors, lenders, or governmental sources. Remediation of dam safety problems identified to date should begin immediately and proceed concurrently with the inspection and evaluation program. Remedial measures should be prioritized based on the severity of the problem and the probable consequences of failure of individual dams.</p>

4.	<p>Schedule: Immediate and short term: training of engineers; feasibility studies; and high priority remedial measures. Medium and long term: completion of the inspection and evaluation program.</p>
5.	<p>Outputs and Benefits: <i>Outputs:</i> Feasibility studies concerning remedial action; remedial action report; repair of damaged dams. <i>Benefits:</i> Implementation of a Dam Safety Assurance Program can significantly reduce the potential for sudden failure of dams and the associated loss of life and property damage. In addition, this program can also restore the capability of reservoirs to impound water for irrigation purposes, which will enhance agricultural productivity thereby reducing poverty and hunger in the Central Provinces.</p>
6.	<p>Inputs: Engineering training; dam inspections and evaluations.</p>
7.	<p>Risks: There are few technical or organizational impediments associated with dam safety. Methods of inspection, evaluation, and remedial actions are well established in other nations and the need to improve dam safety is widely recognized in Vietnam. There are, however, some financial risks as the cost of remedial actions can be quite high.</p>
8.	<p>Alternatives:</p> <ol style="list-style-type: none"> 1. No Action: The potential for catastrophic failure will gradually increase and the functionality of the reservoirs will be further reduced as the reservoirs and dams age. 2. Dam Failure Warning Systems: Warning systems can reduce the potential for loss of life. However, any warning system must rely on the judgment of on-site personnel and cannot be expected to be highly reliable. Warning systems would not significantly reduce property damage or allow irrigation capacity to be restored. 3. Abandonment of Reservoirs: Abandonment would require removal of part or all of the dams. While the potential for loss of life and property damage would be reduced, all economic benefits would be lost. 4. Resettlement of downstream populations: Resettlement could achieve the program objectives but the social and economic costs would be great.
9.	<p>Planning Cost: Donor cost for the initial phase of this program is estimated at US\$ 300,000. The initial phase includes training and technical assistance for execution of a dam safety inspection and evaluation program. The cost of remedial measures identified to date is estimated to be US\$ 32 Million.</p>
10.	<p>Expert Opinion and Comments: The failure of dams, especially during flood events, represents a serious risk to the lives and livelihood of people living downstream. Donor support could vary from modest technical assistance for establishing an inspection and evaluation program, to a much larger program of remedial construction. Initial outputs, in the form of feasibility studies for remedial efforts for individual high-priority remedial measures should begin immediately. Remedial measures for Vuc Tron and Cam Ly Reservoirs are suggested as high priorities.</p>

2.1.2b CONSTRUCTION OF NEW RESERVOIRS

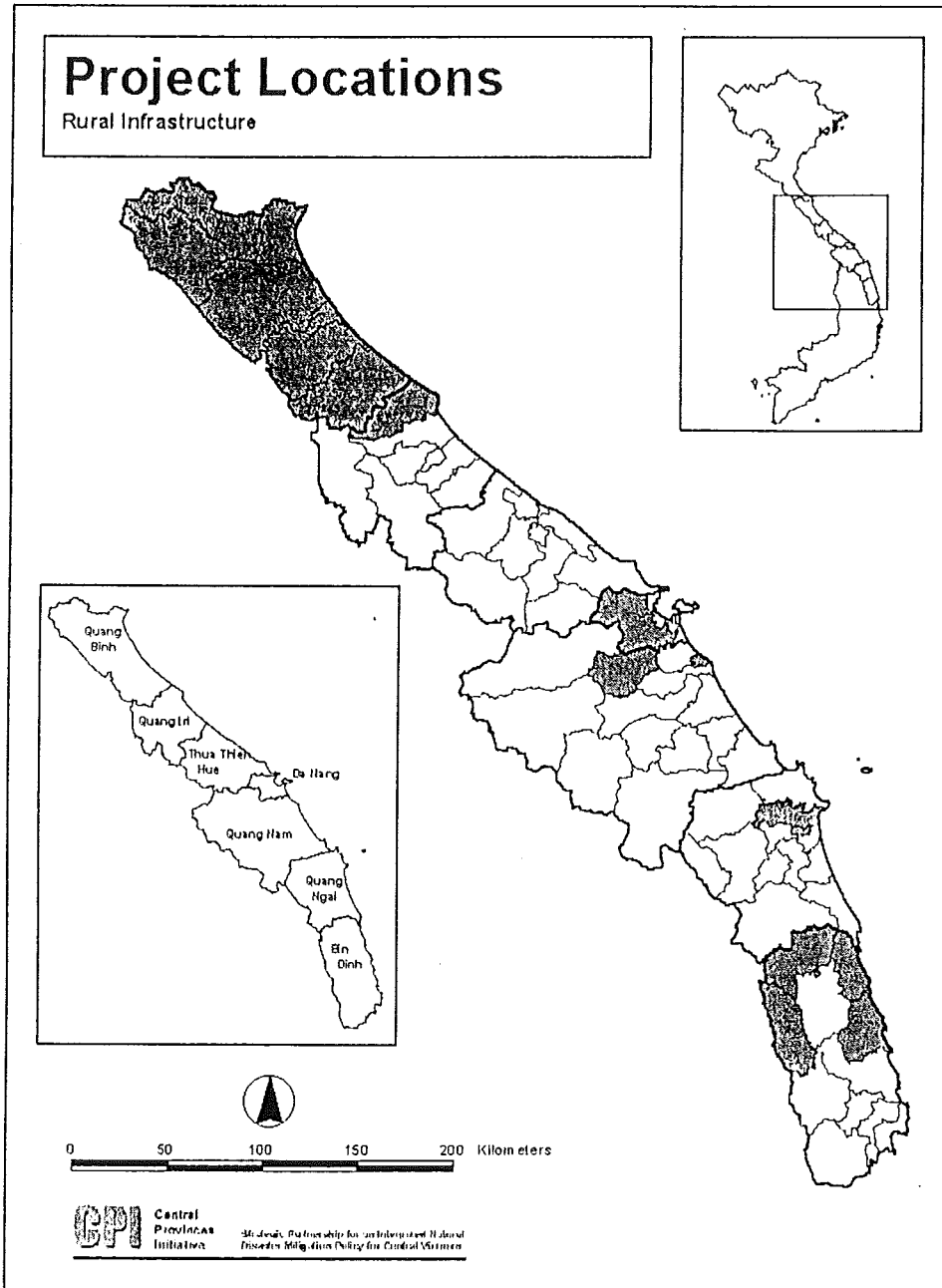
The program involves proposed new reservoir construction projects in the central region of Vietnam. Those projects are divided into two categories: (1) Large-scale multi purpose reservoirs and (2) small-scale irrigation purpose reservoirs. Large-scale multi purpose reservoirs will have considerable effect on all social sectors of a province. Therefore, it is essential to implement these large-scale projects in order of precedence, taking into account an integrated development strategy for the entire central region of Vietnam.

1	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Every year Central Vietnam is severely damaged by floods and droughts.</p> <p><i>Opportunities:</i> The construction of new reservoirs is one of the most effective structural solutions for mitigating natural disasters, including floods and droughts. The building of new reservoirs will provide an economic boost to the communes that will supply the labor for the construction. By providing more water for irrigation, new reservoirs will also increase the amount of agricultural land. By providing hydroelectric power, new reservoirs will improve the standard of living and the economy in many rural areas.</p>
2	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To provide water resources for such purposes as irrigation in the dry season ▪ To reduce flood inundation in the rainy season by storing flood runoff in reservoirs ▪ To generate hydropower ▪ To control salinity downstream in the dry season through controlled reservoir water release
3	<p>Strategy:</p> <p>These are long term, costly projects that must undergo pre-feasibility and feasibility studies before planning and design of the project can be implemented.</p>

4	<p>Schedule: Immediate and short term, medium and long term, depending on the stage of the project.</p> <p>Large-scale multi-purpose reservoirs</p> <ol style="list-style-type: none"> 1. Planning and design: immediate to short term. Several projects are already under feasibility study stage as shown below 2. Implementation: mid to long term. No priority order is given at this stage, except as given in the Expert Comment below <ul style="list-style-type: none"> - Feasibility study stage: <ul style="list-style-type: none"> QT2-24: New Construction of Rao Quang Reservoir; feasibility study to be approved by June 2000 TH2-20: New Construction of Ta Trach Reservoir; feasibility study to be completed by June 2000, proposed implementation period is 7 years including time for the detailed design BD2-36: New Construction of Dinh Binh Reservoir; feasibility study to be completed by June 2000 - Pre-feasibility stage: <ul style="list-style-type: none"> QB2-14: New Construction of Ho Bang Reservoir; feasibility study is under preparation QG2-14 New Construction of Nuoc Trong Reservoir; pre-feasibility study is to be completed by December 1999 <p>Small-scale irrigation purpose reservoirs</p> <ol style="list-style-type: none"> 1. Planning and design: immediate to short term 2. Implementation: immediate, short to mid term (No specific priorities are required) <ul style="list-style-type: none"> - Pre-implementation stage: <ul style="list-style-type: none"> QB2-15 New Construction of Phu Hoa Reservoir; the proposal was submitted to Government and approved. Construction to be started in 2000 with government funds QT2-23: New Construction of Ai Tu Reservoir; feasibility study has been approved by Government. Construction to be started in 2000 using government funds; however, project not yet funded. - Feasibility study stage: <ul style="list-style-type: none"> None - Pre-feasibility stage: <ul style="list-style-type: none"> QB2-11: New Construction of Rao Da Reservoir; the proposal is under preparation QT2-28: New Construction of Da Mai Reservoir <p>Other reservoirs at preliminary conceptual stage Projects TH2-21, TH2-22, DN2-19, DN2-20, QN2-17</p>
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5	<p>Outputs and Benefits: <i>Outputs:</i> New reservoirs; hydroelectric power; irrigation outlets; expanded area for cultivation. <i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Enhanced agricultural productivity by increasing the quantity of water available for irrigation ▪ Development of the provincial economy by supplying new water resources and hydroelectric power to industries and cities ▪ Improved living standards of inhabitants by supplying more water and electricity ▪ Reduced flood damage ▪ Reduced water borne diseases through reducing flood inundation ▪ Increased total land area available for cultivation ▪ Improved productivity of aquaculture by controlling salinity downstream
6	<p>Inputs: Pre-feasibility studies; feasibility studies; planning and design of the reservoirs; construction.</p>
7	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Negative impacts on the ecosystem ▪ Difficulties of resettlement of people displaced from the reservoir area ▪ Difficulty in obtaining funding for large projects ▪ Possibility of downstream damage, including local scouring of foundations such as bridge piers; river bank erosion; and seashore erosion caused by a decrease of sediment transport
8	<p>Alternatives: <i>Flood Mitigation</i></p> <ol style="list-style-type: none"> 1. Afforestation: This will be effective to some extent; however, it will be a long time before its effects are well developed 2. River Training: Construction of a continuous embankment and/or revetment throughout the entire reach of a river is not realistic and not advisable. Continuous embankments might increase potential flood risk. Also, sustainable maintenance of the entire river course seems financially and technically difficult 3. Floodplain management: Allowing intentional inundation of low-lying areas will be effective, if other non-structural measures of flood protection are adopted at the same time <p><i>Water Supply</i> No alternative solution can be seen.</p> <ol style="list-style-type: none"> 1. Surface river water: In view of the seasonal flow regime, it is difficult to satisfy potential water demand without reservoirs for dry season water regulation 2. Groundwater: the potential of groundwater use is limited
9	<p>Project Cost: (million US\$) US\$ 330 to 360 million in total: Large-scale reservoirs cost: US\$ 314 to US\$ 344 Small-scale reservoirs cost: US\$ 18 (Quang Binh: US\$ 70; Quang Tri: US\$ 49; Thua Thien Hue: US\$ 110 to US\$ 140; Quang Ngai: US\$ 50; Binh Dinh: US\$ 54)</p>

10.	<p>Expert Opinion and Comments:</p> <p>The water resource potential in Central Vietnam is very seasonal. The efficiency of water use remains rather low, however, due to this seasonal flow regime. Thus, large-scale multi-purpose reservoirs are strategically necessary, not only to mitigate natural disasters, but also to achieve proper development of the regional economy through a stable water supply and with hydropower.</p> <p>Large-scale multi-purpose reservoirs will have considerable impact on all social sectors of a province. It is necessary that large-scale reservoir projects be implemented in order of precedence taking into account an integrated development strategy for the entire central region in Vietnam. However, it is difficult to give priority order to any individual project at this time because of the limitation of the mission's assessment period. It is essential to conduct screening and ranking processes for proposed large-scale reservoirs by formulating a Central Vietnam River Water Management Master Plan; including consideration of both water resource development and flood mitigation. The Master Plans should not preclude the planning and/or implementation of projects with high priority. Some mature large-scale reservoir projects might be implemented prior to completion of the Master Plan as independent projects.</p> <p>In view of flood mitigation needs, it is also necessary to evaluate and place these reservoirs as a component of a river basin plan. Therefore, it is also important to formulate separate Flood Control Master Plans on selected important river basins in order to facilitate the consideration of these reservoirs effectively in combination with other structural and non-structural flood mitigation measures in each basin.</p> <p>An environmental Impact Assessment is an essential requirement in any new reservoir feasibility study to avoid and reduce environmental risks that might be caused by the construction of the new reservoir. Similarly, a relocation study and plan is required for any population that will be displaced by the new reservoir area.</p>
11.	<p>Projects:</p> <p><i>Large-scale multi-purpose reservoirs:</i></p> <p>QB2-14: New construction of Ho Bang Reservoir (US\$ 57 million) QT2-24: New construction of Rao Quang Reservoir (US\$ 43 million) TH2-20: New construction of Ta Trach Reservoir (US\$ 110-140 million) QG2-14: New construction of Nuoc Trong Reservoir (US\$ 50 million) BD2-36: New construction of Dinh Binh Reservoir (US\$ 54 million)</p> <p><i>Small-scale irrigation purpose reservoirs:</i></p> <p>QB2-11: New construction of Rao Da Reservoir (US\$ 9.3 million) QB2-15: New construction of Phu Hoa Reservoir (US\$ 2.6 million) QT2-23: New construction of Ai Tu Reservoir (US\$ 3.6 million) QT2-28: New construction of Da Mai Reservoir (US\$ 2.5 million)</p> <p><i>Other reservoirs at preliminary conceptual stage:</i></p> <p>TH2-21: New construction of Huu Trach Reservoir TH2-22: New construction of Song Bo Reservoir DN2-19: New construction of Cu De Reservoir DN2-20: New construction of Trung An Reservoir QN2-17: New construction of Nong Son Reservoir</p> <p>Note: () denotes estimated cost in million US\$</p>



Program Title:

Rural Infrastructure

Primary Objective:

To provide rural infrastructure for safety in times of natural disasters, including adequate numbers of disaster-resistant shelters and safe transportation corridors needed for performing rescue and relief operations.

Implementation Strategy:

Supported by Government and Donors, implement on the local and provincial level. Includes roads, railways, schools, health clinics, public buildings, and private housing.

Rural Infrastructure

2.2.1 RURAL INFRASTRUCTURE

Rural infrastructure improvement for natural disaster mitigation in Central Vietnam requires a large long-term program, based mostly on local community self-help; on local authority; on province, district and commune-level resources; and on help and guidelines from the central government and international donors.

But some infrastructure development should be prioritized when this infrastructure is an essential component for rescue and relief plans. This infrastructure includes:

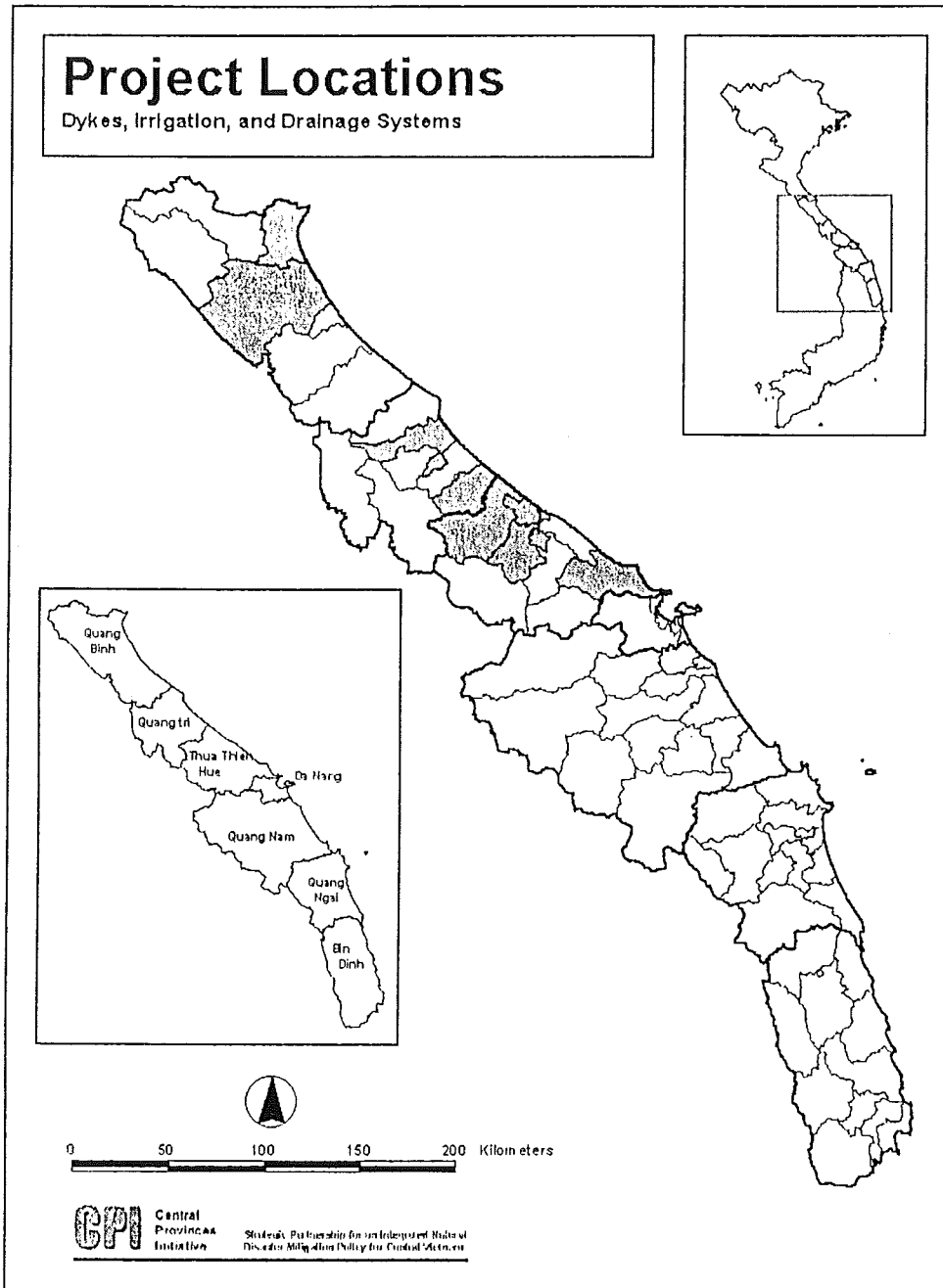
- In hilly upstream watersheds:
 - Access roads to reservoirs which might have catastrophic failures, avoiding the area likely to be flooded
 - Evacuation roads for households in disaster-prone areas, providing unobstructed access to safe shelter
- In the flood-prone lowland plains:
 - Two-storey safe shelters built at central places in villages, including markets, schools, health clinics, and other public buildings, with easy access by outside stairs
 - Access roads or canals to two-storey safe shelters
 - Reinforced access roads to potentially inundated villages; such roads could be used for relief operations even before the flood water has gone down
 - Safer storage places for small boats in time of storms

Special attention should be given to natural disaster resistant infrastructure at river crossings, which become the most dangerous points during floods because of high velocity floodwater currents. Low water crossings should have safety ropes or chains to help people cross so that they are not swept away. If it is too costly to build a bridge, a light narrow crossing structure will help pedestrians and cycles to cross water courses safely.

1.	<p>Problems and Opportunities:</p> <p>Problems: During flooding many people have drowned, especially at river crossings, when trying to find shelter. Relief operations have been hampered because rural roads had become inundated and their roadbeds turned to mud, thus making them impassable for motor vehicles.</p> <p>Opportunities: Infrastructure that is used every day can be adapted to withstand or mitigate the effects of natural disasters. With a little imagination, and often at minimal cost, rural infrastructure can be retrofitted to serve a dual purpose: to facilitate every-day life and work, and to aid during times of natural disaster. <i>Grassroots</i> participation will be a necessary and important component of this program. Villagers can identify where in their communities they are most vulnerable during natural disasters and perhaps suggest how this vulnerability can be reduced by altering infrastructure design and placement.</p>
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2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To provide a way for emergency evacuation of people from flooded areas ▪ To provide access to safe shelters during storms and floods ▪ To provide access routes for relief and rescue operations ▪ To build safe shelters in all flood and storm prone areas in schools, health clinics, public building, and other local structures ▪ To promote community participation in identifying areas of vulnerability and infrastructure that should be retrofitted to reduce vulnerability to natural disasters.
3.	<p>Strategy:</p> <p>A national implementing agency should work at the local level with those who are most affected by natural disasters. Community involvement should be paramount in the choice of disaster mitigation solutions and in the implementation of disaster resistant public works.</p>
4.	<p>Schedule:</p> <p>Immediate term: Safe water-crossing projects Short to medium term: Small-scale disaster resistant infrastructure projects</p>
5.	<p>Outputs and Benefits:</p> <p><i>Outputs:</i> Infrastructure upgraded and adapted to withstand natural disaster <i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Improved security for households and people in flood prone areas ▪ Improved working conditions and resources for agricultural activities ▪ Improved rescue and relief system where infrastructure has been retrofitted
6.	<p>Inputs:</p> <p>A designated national implementing agency; local community involvement and participation; construction and renovation work.</p>
7.	<p>Risks:</p> <p>A long-term risk could be to encourage people to live in dangerous areas because they think natural disaster security has been improved.</p>
8.	<p>Alternatives:</p> <p>Lack of safe and passable access to disaster prone areas is a major drawback for rescue and relief operations.</p>
9.	<p>Planning cost:</p> <p>Planning will be included into prioritized projects within other programs of reservoir-security improvement and flood-prone area disaster mitigation planning.</p>

<p>10.</p>	<p>Expert Opinion and Comments: Most rural roads projects fail to take disaster mitigation into consideration. No safe water-crossing improvement has been proposed by any central province so far. The projects would be more easily prioritized if they were clearly related to:</p> <ul style="list-style-type: none"> ▪ An upstream reservoir and dam breach emergency action plan ▪ A floodplain safe shelter location and access plan ▪ Two-storey buildings projects belonging to sectoral programs including schools and health centers, rather than being the outcome of a local community approach such as what is the best location for a two-storey safe haven in a village ▪ A European Commission-funded NGO project in Thua Thien Hue implemented by CODEV and IFRC is attempting to address such local communities needs at the village and the commune levels in Phu Vang District ▪ Priority should be given according to the number of casualties in villages during the 1999 floods, or according to the expert assessment of the risks of natural disaster events
<p>11.</p>	<p>Projects list: QB2-17: Four shelters QB2-22: Seven projects of rural commune roads in QB districts QB2-23: Six projects of provincial roads repair and Bellay bridge elements QT2-19: Construction of buildings in Vinh Linh TH2-17: 300 km of rural roads in flood-prone areas DN2-15: Nine projects for road consolidation QN2-07: 332 km of upgrading of rural roads and 4 bridges QN2-08: Two-floor primary schools in flood-prone areas QN2-09: Two-floor clinics in flood-prone areas QG2-09: 300 km inter-commune roads QG2-10: Two-floor schools in flood-prone areas QG2-11: Two-floor clinics in flood-prone areas BD2-22 to 27: Six projects for rural roads totalling 100 km long BD2-28 to 30: Bridge repair BD2-31: Phu My district hospital BD2-32: Primary schools for 20 coastal villages</p>



Program Title:

Dykes, Irrigation, and Drainage Systems

Primary Objective:

To provide adequate conditions for runoff, including protection of low-lying areas; to minimize damage in the floodplain during flooding.

Implementation Strategy:

Main issue for improvement of the overall flood disaster situation. Crucial in terms of planning and operational conditions, and for restoring agricultural systems after a natural disaster.

Dykes, Irrigation, and Drainage Systems

2.2.2 DYKES, IRRIGATION, AND DRAINAGE SYSTEMS

Natural disaster resistant dyke and irrigation system repair and upgrading are required in almost all provinces in Central Vietnam. As a precursor to project construction, the design of the dykes and irrigation and drainage systems should be subject to critical review to ensure economical design and appropriate use of materials for long term safety. While reinforced dykes and irrigation systems can be accepted in terms of floodplain management, dykes which have been destroyed by very high velocity flows should not be rebuilt in place; these dykes should be aligned in combination with better planned flood-flow paths. To do so, and for proper planning of such structures and other proposed facilities in the floodplain and estuarine lagoon areas, a computer flood model of the dyke and irrigation system should be developed. The urgency of dyke repair means that some dykes will be reestablished prior to modeling and experience; and technical overview will be needed for such proposals. The modeling will be used to determine locations and levels of obviously sensitive proposals as well as providing a critical tool for other proposals for water resource structure repair in the floodplain.

1.	<p>Problems and Opportunities:</p> <p>Problems: Recent floods have destroyed some irrigation protection dykes, irrigation channels, and drainage systems. Also, maintenance of some constructed systems requires regular repair. Some dykes have been destroyed by high velocity flood flows which suggests that the location of some dyke systems is not optimal. Damage to dykes usually occurs from poor material being attacked by flood overflow; or in some cases by wave attack from wind or boat wake waves along adjacent waterways.</p> <p>Opportunities: The late 1999 flooding in the Central Provinces have indicated that the placement of some dykes is not optimal. They can now be realigned in such a manner that they can better withstand future flooding. The use of better materials in repairing and upgrading the irrigation dyke systems will also mitigate future damage. This program provides an opportunity to protect agricultural land from flooding and thereby increase production.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To provide protection to agricultural lands against early and nuisance floods ▪ To provide dyke protection economically, taking into account maintenance costs ▪ To ensure that flood protection does not have a serious impact on other infrastructure in the floodplain.
3.	<p>Strategy:</p> <p>Integrate review, planning and modelling into one overall agricultural and flood mitigation program: enlist provincial support and donor support for construction and modelling. Prioritize in such a way that urgent works can proceed as other proposed works are reviewed.</p>
4.	<p>Schedule:</p> <p>Immediate term: Review of construction techniques for urgent works and construction of some works.</p> <p>Short term: Modelling.</p> <p>Medium term: Repair and construction of non-urgent works.</p>

5	<p>Outputs and Benefits: Outputs: Improved, more disaster-resistant dyke, canal, and drainage systems Benefits:</p> <ul style="list-style-type: none"> ▪ Improved agricultural practices including economic benefit from increased agricultural production ▪ Reduced maintenance costs and much reduced repair costs after floods and storms ▪ Quick return to production after floods and storms ▪ Economic improvement for associated communal populations
6	<p>Inputs: System-design review; systems modelling; construction-technique review; repair, renovation, and construction of the systems.</p>
7	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Construction technique used is not optimal; it is either too expensive or not strong enough ▪ Flood-modelling tasks are not pursued once urgent construction is performed ▪ Cross-provincial cooperation is not achieved ▪ Works are subject to damage from flood levels not contemplated in the design ▪ Urgent works are found subsequently to be inappropriate
8	<p>Alternatives: Do Nothing: Some schemes will be adversely affected in coming years if not repaired. Also, if repair is implemented but not upgraded, the same damage can re-occur. Lack of modelling and planning will lead to ad-hoc dyke construction in the floodplain which will seriously impinge on other flood prone areas. Separate Projects: The absence of overall planning and checking will lead to the same outcomes as the do-nothing alternative, but in a shorter time frame.</p>
9	<p>Project Cost: Total program US\$ 9.0 million; urgent design US\$ 0.2 million; construction over three years US\$ 7.3 million; model development and use US\$ 1.5 million.</p>
10	<p>Expert Comment: It is sensible to plan and implement agricultural protection measures and irrigation and drainage systems that <i>live with the floods</i>. The objectives must be to provide security for crops in small floods, and security of infrastructure in moderate to large floods. The objectives are directed to economic improvement for the farming community and a profitable overall community that will encourage and support small industry workers. Maintenance of infrastructure can be expected, but the designs should be sufficient to avoid the need for regular major maintenance works. The program proposed appears to meet these objectives, but no economic analysis has been performed yet. In the medium term, it appears clear that engineering analyses on a broader scale, using computer modelling of the floodplain, must be implemented to ensure that dyke, irrigation and drainage works do not seriously affect other uses and users in the floodplain and that very large floods do not cause disastrous damage to the infrastructure or to other infrastructure as a result of the remediation work. In general, one can accept the total work package. Some projects will, however, need more critical review. However, similar initiatives in these and other floodplains in the Central Provinces are sure to be promoted and there is an urgent need to develop planning and modelling institutional capability so that such works are compatible with disaster mitigation and economic growth for all communities.</p>

11. Projects:

QT2-01: Hai Lang flood protection and embankment upgrading project

TH2-01: O Lau River dykes

TH2-04: Dykes at Nho Lam, Nghia Lo

TH2-13: Su Lo pumping station, Huong Tha District

TH2-25: Troi Lake and Nong River irrigation scheme

TH2-27: Dien Hong dyke and canal

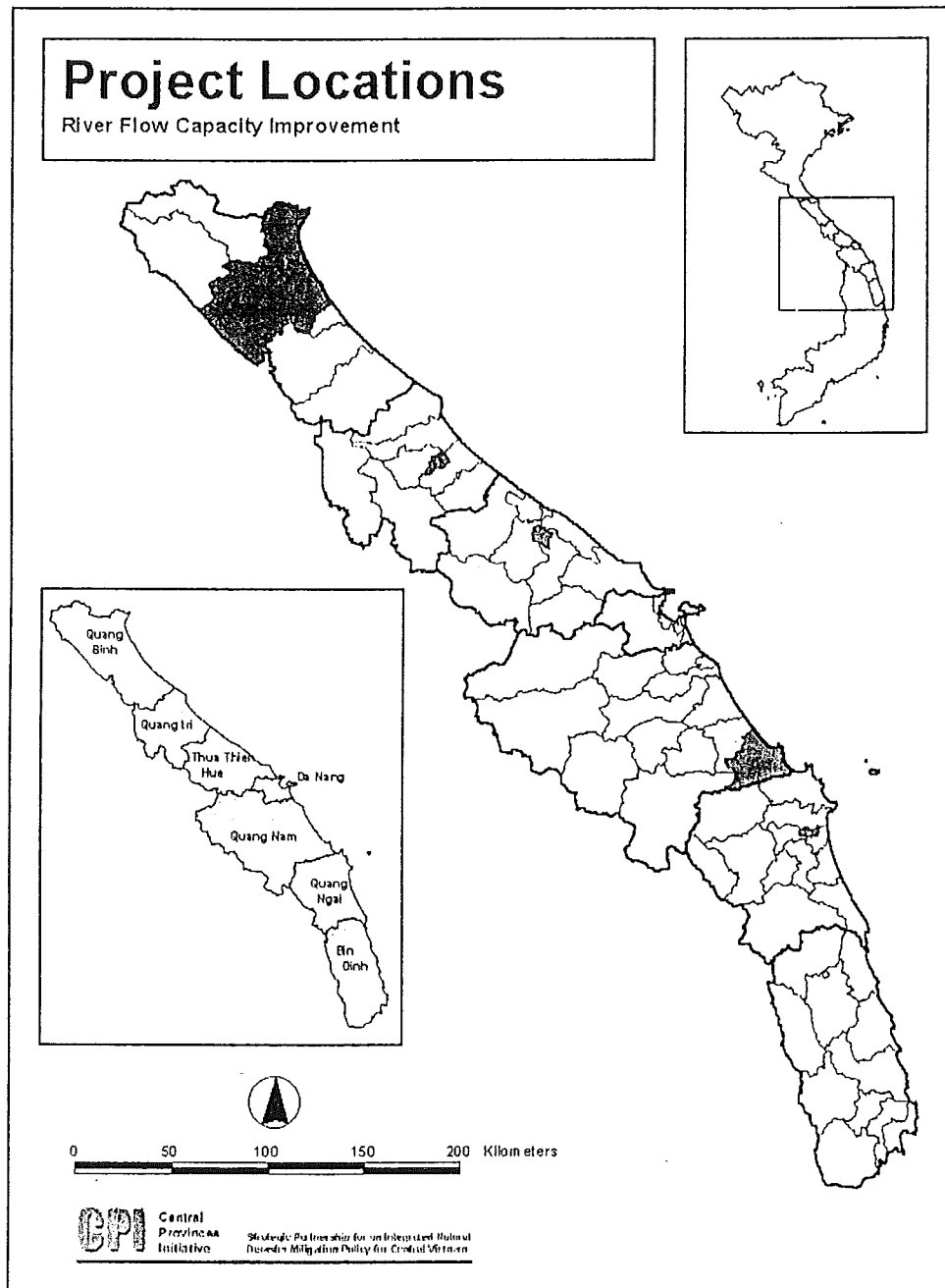
TH2-31: Khe Lang dike project

QT2-17: Kinh Mon irrigation system

QB2-08: Drain constructions in Quang Binh

QT2-29: Flood modelling

TH2-29: Flood and tidal model for Hue and its lagoon



Program Title:

River Flow Capacity Improvement

Primary Objective:

To restore and maintain the flow capacity of rivers and channels in low-lying areas. Adequate flow capacity reduces property damage, loss of life, and loss of livelihood.

Implementation Strategy:

Execution of adequate dredging and planning of future maintenance dredging on the basis of an integrated approach, including allocation of regional dredging capacity.

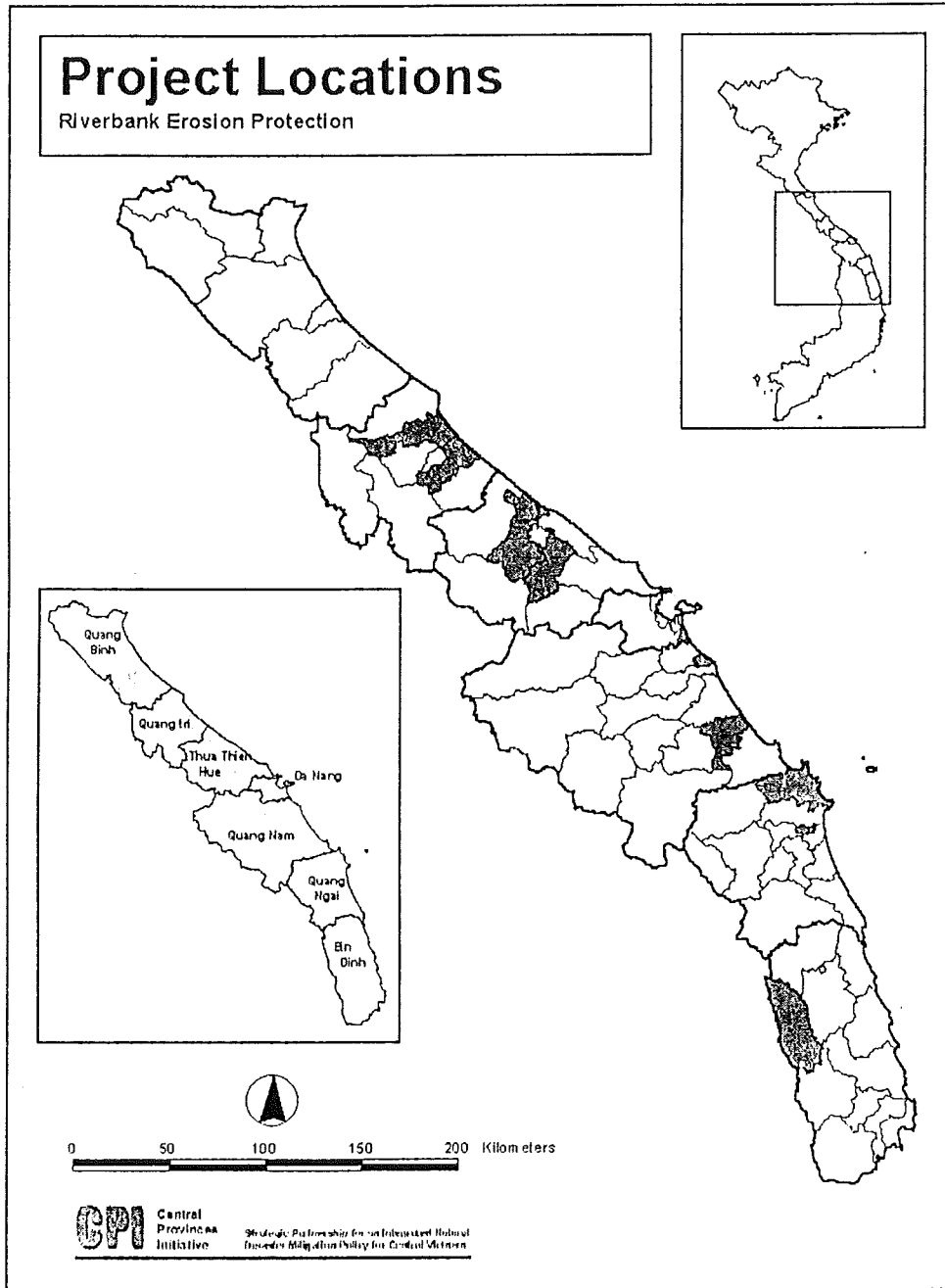
River Flow Capacity Improvement

2.2.3a RIVER FLOW CAPACITY IMPROVEMENT

More effective natural disaster mitigation in Central Vietnam will benefit from the transfer of better technologies for the planning and implementation of river protection and flood distribution systems through river flow capacity improvement. These works need to be considered in a single program because these works have a significant positive and negative hydraulic effect on the passage of floods. Riverbank erosion protection aimed at protecting existing infrastructure and riverside land is treated in a separate program.

1.	<p>Problems and Opportunities: <i>Problems:</i> Flood damage reduction may be accomplished by a combination of various structural measures. These include construction of dykes, floodways, and reservoirs; enlargement of existing river channels by dredging; and creation of new diversion channels. Within the Central Provinces, coastal and estuary dyke construction has been the preferred historical method of flood protection. While these dykes have been effective during small floods occurring early in the year, the existing dykes are not adequate to withstand floods of the magnitude experienced in November and December of 1999. Since dykes can impede the passage of floodwaters, it appears that the existing dykes may have actually worsened flooding conditions in 1999. <i>Opportunity:</i> By evaluating alternative comprehensive systems of hydraulic works to determine the best system, and then modifying existing dykes where necessary, more effective flood mitigation in Central Vietnam can be attained.</p>
2.	<p>Objectives: To reduce loss of life; to reduce damage to infrastructure and damage to property associated with flooding by improving the capacity of rivers and channels to pass floodwaters and by improving protection of floodplains.</p>
3.	<p>Strategy: Implementation will involve donor funded training for national hydraulic engineering staff in the use of existing planning methodologies. The national engineering staff would then apply these methodologies in the development of master plans for structural flood damage reduction. Significant construction of new dykes, channel enlargements, or waterway diversions should not be undertaken until such planning methods have been employed. Repairs and minor modifications aimed at reducing the damage associated with overtopping of dykes should be undertaken while systems master plans are being developed.</p>
4.	<p>Schedule: Immediate term: Initial training. Short term: Technical assistance; application of planning methodologies. Medium and long term: Construction, repair, and renovation of dyke systems.</p>
5.	<p>Outputs and Benefits: <i>Outputs:</i> Dyke system master plans; improved dyke systems; improved river flow. Benefits: The transfer of technologies used in the evaluation of river protection and flood distribution systems will lead to significant improvement in structural measures for flood damage prevention.</p>
6.	<p>Inputs: Analysis of various planning methodologies; application of approved</p>

	methodologies to construction, repair, and renovation of weak dykes.
7.	<p>Risks: There are some organizational impediments associated with this effort. The need to develop comprehensive plans based on a quantified knowledge of physical, social, economic, and environmental impacts of various alternatives is recognized as a medium to long-term need. However, attention of the various national organizations involved in flood control remains focused on more immediate needs.</p> <p>There are few technical risks because the methodologies are well established in many Donor countries. The only financial risk is associated with the aforementioned organizational impediment. It is possible that governmental organizations may not view long-term planning as a high priority and choose not to devote resources to the application of planning technologies.</p>
8.	<p>Alternatives: While there are a number of methodologies in use in other countries and each of these has advantages and disadvantages, the only alternative to the use of flood models is the continued use of the <i>trial and error</i> method of systems design.</p>
9.	<p>Planning Cost: The donor cost for the initial phase of this program is estimated at US\$ 400,000. The initial phase includes training and initial technical assistance for execution of basin planning methodologies for river protection and flood distribution systems.</p>
10.	<p>Expert Opinion and Comments: While the benefits will not be realized immediately, physical solution using river flow capacity improvement for flood damage reduction can be greatly improved by the application of basin master planning methods. Vietnam has a significant number of capable national engineers who could, with some training and assistance, apply these methods. Because dykes, channels, and diversions can have significant physical, economic, and social impacts, development of this type of physical disaster remediation should be discouraged unless all possible impacts have been carefully evaluated.</p>
11.	<p>Projects: QB2-08a: Flood flow/run-off drains in Cong Hoi Tre (Ta Gianh) QB2-08b: Flood flow/run-off drains in Va Cong Bac Trach (Huu Gianh, Bo Trach) QB2-08c: Flood flow/run-off drains in Hoan Trach (Ta Ly Hoa) QT2-29: Flood modeling TH2-29: Flood and tidal model for Hue and its lagoon QN2-16: Flood modeling of the Thu Bon, De Vong, Tuong Giang, and Tam Ky River systems QG2-07: Flood releasing way for the Thoa River</p>



Program Title:

Riverbank Erosion Protection

Primary Objective:

To reduce riverbank erosion and subsequent damage to infrastructure and the loss of land.

Implementation Strategy

The most threatened sites will receive priority. Emergency repair will be carried out, preferably under a program of priority areas. Flexible measures using new technologies are preferred. Short, medium and long-term time scale.

Riverbank Erosion Protection

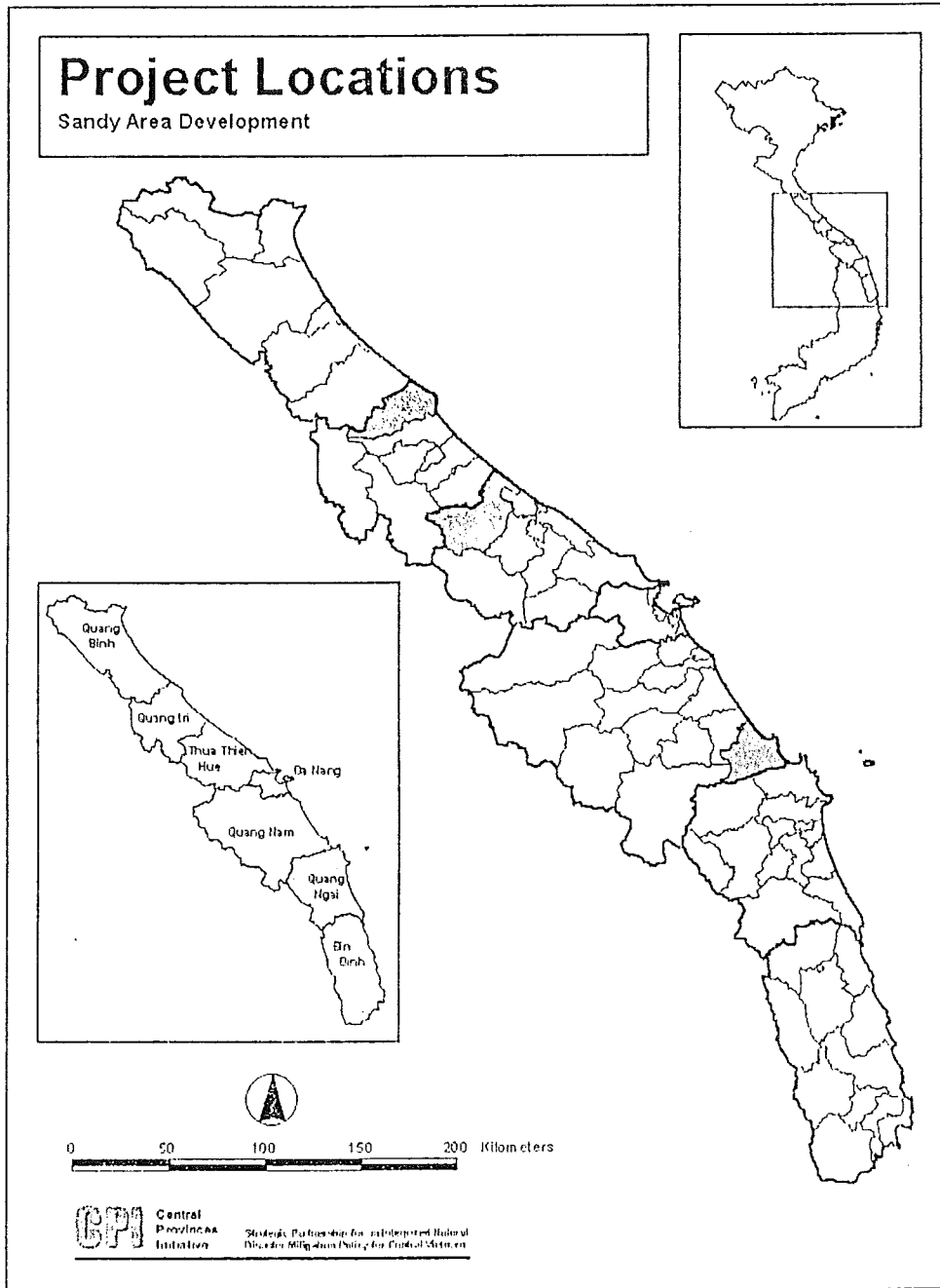
2.2.3b RIVER BANK EROSION PROTECTION

Flood mitigation in Central Vietnam will benefit from the transfer of the technologies for the design and construction of riverbank protection. These efforts have been combined into a single program because of the technical similarities of the work.

1	<p>Problems and Opportunities:</p> <p>Problems: In Central Vietnam there are numerous locations where riverbanks are eroding. While erosion is a continuous process, the severity increases markedly during floods. In some locations, riverbank erosion threatens to create a connection between saltwater and freshwater areas, thereby threatening the livelihood of farmers who rely on the freshwater resource. A number of methods have been employed in Vietnam to reduce riverbank erosion with varying degrees of success. Internationally, a wider variety of bank protection methods have been developed and some of these may prove to be more cost effective than those currently in use in Vietnam. Bank erosion protection, when used on a limited scale to protect high-value riparian resources, has no systemic impact. Therefore, bank erosion protection may consider as an element separate from a comprehensive watershed plan.</p> <p>Opportunities: By controlling bank erosion, threatened agricultural land can be saved, as can bankside buildings and the their related infrastructure: roads, water supply systems, and flood protection dykes. In some cases, there is an opportunity to prevent saltwater intrusion by stabilizing eroding riverbanks.</p>
2	<p>Objectives:</p> <p>To reduce damage to infrastructure and the loss of land associated with the erosion of riverbanks in the Central Provinces.</p>
3	<p>Strategy:</p> <p>Implementation will involve donor funded training for national engineers in the design and evaluation of benefits for riverbank erosion protection. These engineers will then prepare feasibility studies with donor funded technical assistance. A site-specific feasibility study will be developed for each planned project. The study will be the basis for seeking funding from donor, lender or governmental sources. Once funding is secured, construction will begin.</p>
4	<p>Schedule:</p> <p>Immediate term: Completion of the initial training of engineers; feasibility studies Short term: Construction of high priority sites. Medium and long term: Construction of other selected sites.</p>
5	<p>Outputs and Benefits:</p> <p>Outputs: Feasibility studies; project proposals; construction of revetments and other riverbank stabilization technologies.</p> <p>Benefits: Implementation of bank erosion protection can significantly reduce the potential for loss of land and damage to infrastructure associated with bank erosion. In addition, bank erosion protection and associated overland erosion protection can prevent avulsions, which create undesirable connections with nearby rivers or lagoons. Agricultural production should increase in areas that were formerly threatened with riverbank erosion.</p>

6	<p>Inputs: Training for engineers; donor funding.</p>
7	<p>Risks: There are few organizational impediments associated with bank protection. The need to provide this protection is widely recognized in Vietnam. There are, however, some technical risks. While methods of protecting riverbanks against erosion are well established in Vietnam and in other nations, such methods are not completely reliable. The complexity of physical interactions and the diversity of soils found along riverbanks inhibit the achievement of a high degree of technical reliability. There are also some financial risks as the cost of bank protection can be quite high. Financial risks may be overcome by concentrating bank protection efforts in those areas where damage reduction benefits are the most significant. Even in areas where damage reduction benefits are considerable, however, there is always the risk that by reducing erosion at one point it is simply being shifted to another point in the river system.</p>
8	<p>Alternatives: There are only two alternatives to providing bank protection. Relocation of adjacent assets and no-action. The viability of each alternative is a function of site specific considerations and should be evaluated for each site.</p>
9	<p>Planning Cost: The donor cost for the initial phase of this program is estimated at US\$ 200,000. This includes training and initial Technical Assistance for the execution of a program for prevention of riverbank erosion at specific sites. The cost of the implementing work identified to date is US\$ 36 million.</p>
10	<p>Expert Opinion and Comment: Based on the number of projects of this type identified by the provinces, bank protection represents a significant need. The scope of donor support could vary from a modest technical assistance effort to a large-scale construction program. Bank protection measures are likely to be consistent with any overall systems plan. Technical assistance transfer can proceed immediately and construction can be implemented in the short term. There are a number of sites where construction of erosion protection could be implemented immediately, if donor funding is made available. These include the Thach Han River (project QT2-10) and the Ke Binh Ky Revetment (project DN2-01).</p>

II.	Projects: QT2-03: Revetment works on the Ben Hai River QT2-04: Revetment works on the Ben Hai River QT2-05: Revetment works on the Ben Hai River QT2-06: Revetment works on the Thach Han River QT2-07: Revetment works on the Thach Han River QT2-08: Revetment works on the Thach Han River QT2-09: Revetment works on the Thach Han River QT2-10: Revetment works on the Thach Han River TH2-07: Revetments on Ba River-section at Phong An (700m long) TH2-08: Hai Cat Minh Mang revetment, Huong Tra District TH2-09: Dia Linh revetment, Huong Tra District (287m long) TH2-10: Nguyet Bieu revetment, Hue City TH2-11: Huong Ho revetment, Huong Tra District (480m long) TH2-12: Dien Hon Chen revetment, Huong Tra District TH2-14: Revetment on Bo River, Huong Tra District, Quang Dien -Phong Dien (9,000 m long) DN2-01: Ke Binh Ky revetment QN2-05: Revetment for the Thu Bon River and Vu Gia River QN2-05a: 6.9 km section by World Bank QN2-05b: Remaining sections (40 km length) QN2-05c: Cua Dia river revetment and anchorage project QG2-02: My Phuoc revetment-Tinh Ha, Tra Khuc River (1,530 m long), QG2-03: Binh Trung dyke and revetment, Tra Bung River BD2-20b: River training system: Con River system, Ha Thanh, La Tinh and Lai Giang River system
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Program Title:

Sandy Area Development

Primary Objective:

To improve the utilization and management of a potentially rich land resource; to provide alternative forms of income for people in low-lying areas.

Implementation Strategy:

Build on the promising pilot projects already established. Further support to be given to the growth of alternative crops. Implementation can be carried out at all levels of government.

Sandy Area Development

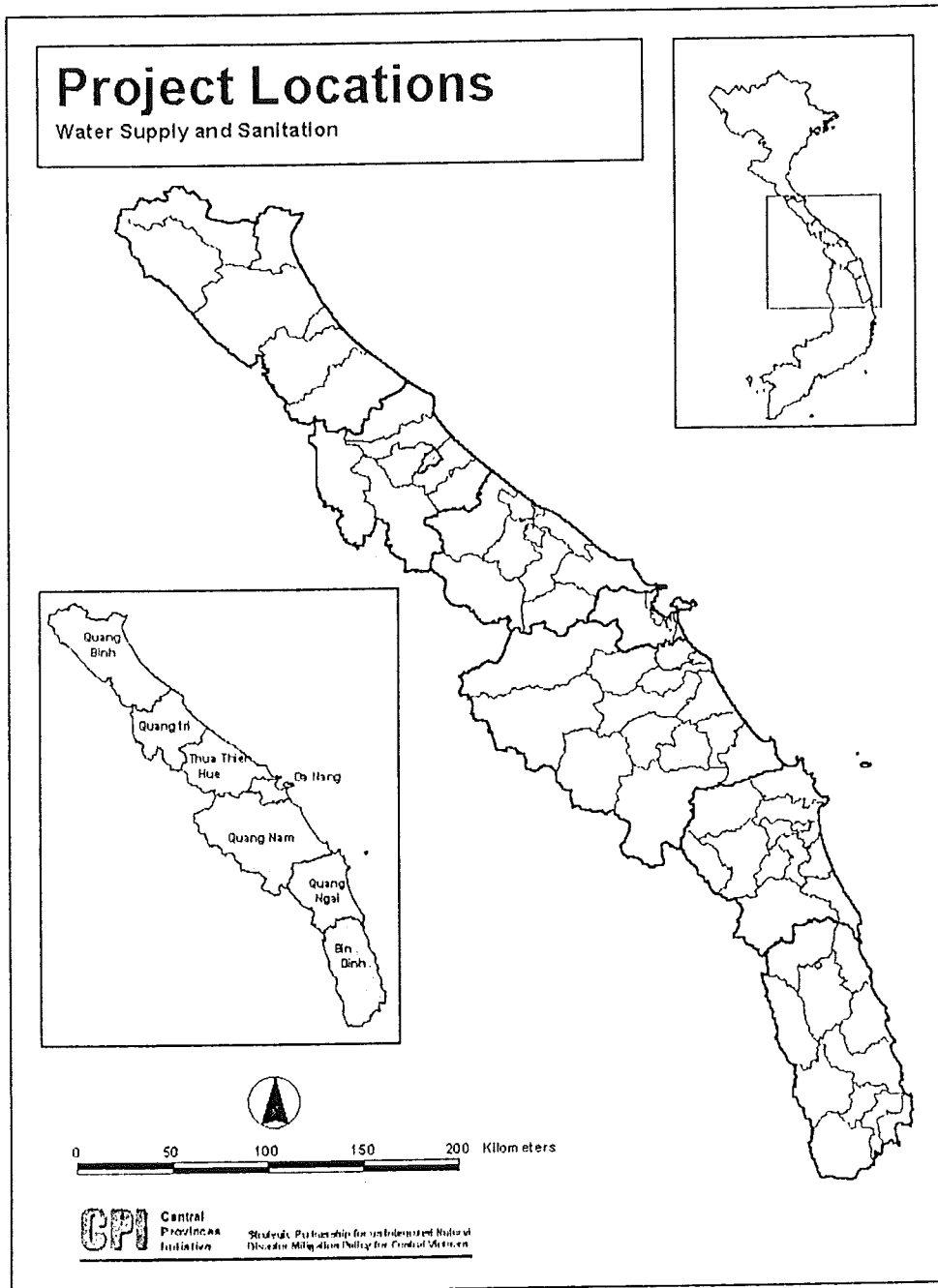
2.2.4 SANDY AREA DEVELOPMENT

Three Central Provinces, Quang Tri, Thua Thien Hue, and Quang Nam have expressed interest in the further development of their sandy land areas. Notably, Quang Tri has made considerable sandy area land progress and has developed a well-thought-out plan to utilise and enhance productivity within these areas. The sandy land areas consist of two types: the coastal sandy lands and the inland sandy lands. In coastal sandy land areas, the basic development plan proposed and tested by Quang Tri Province has been to restrict the runoff water coming from the coastal sandy areas flowing to paddy areas by redirecting this runoff water to the east and directly to the ocean. Tree windbreaks are planted in 100 m by 100 m grids; this allows for vegetable cultivation within resulting blocks once the sand has stabilized. In inland sandy land areas, the development plan is to use drip irrigation and other water application schemes to develop agricultural capacity.

1.	<p>Problems and Opportunities:</p> <p>Problems: Sandy areas along the coast and even some kilometers inland are the result of geological and meteorological forces of nature. However, recent flooding in some Central Provinces has upset the balance of this ecosystem. During flooding, there has been an inordinate amount of runoff, resulting in an inordinate amount of sand transfer. Sand is also being transferred by coastal winds. Reduction of runoff can be accomplished by redirection of floodwater flow back to the sea, which will increase infiltration and thereby reduce runoff. Reduction of sand transfer by wind can be accomplished by planting trees that will serve as windbreaks.</p> <p>Opportunities: By reducing floodwater runoff, the sandy areas can be made more arable, thus providing opportunities for increased agricultural production. Farming the land will provide more farm employment. It will also help to stabilize the soil, making it less prone to runoff during flooding. Furthermore, by planting trees that serve as windbreaks, sand transfer due to high winds will be reduced, making it possible for farming to take hold in what was once unstable soil. If these sandy areas can sustain agricultural production, they can become sites for the relocation of people living in areas vulnerable to flooding and to other natural disasters.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To improve the utilisation and management of new potential land resources ▪ To reduce flood levels ▪ To reduce sand transfer and loss of productive land due to sand transport during flooding and due to high winds ▪ To increase the agricultural productivity of the land
3.	<p>Strategy:</p> <p>The Program may be divided between:</p> <ol style="list-style-type: none"> 1. Structural elements: Embankments, sand dykes, and drainage canals must be built. Implementation will be at the district level 2. Non structural activities: These will include tree planting, land distribution, farmer training, and similar activities. Implementation will be by MARD with district/commune level management
4.	<p>Schedule:</p> <p>Short term for Quang Tri and Thua Thien-Hue Provinces. Medium and long term for Quang Nam Province.</p>

5.	<p>Outputs and Benefits: Outputs: Stabilized land suitable for cultivation; infrastructure that supports and enhances land stabilization; drip irrigation systems; an agricultural force skilled in fruit and vegetable cultivation techniques; sites suitable for possible resettlement. Benefits: The sandy areas to be developed are often in impoverished communities where soil conditions are poor and where there are limited land resources. The primary benefit, therefore, will be to improve income levels in these particularly poor communes. Direct benefits are:</p> <ul style="list-style-type: none"> ▪ Increased available land area for cultivation ▪ Alternative household income through cash crop production ▪ Improved household nutritional values ▪ Reduced household dependance on rice cultivation ▪ New areas for resettlement of people from natural disaster-prone areas ▪ Reduced siltation in inland water courses <p>The construction of sand dyke roads will also provide islands of refuge and facilitate emergency access for rescue and relief operations during peak flood events.</p>
6.	<p>Inputs: Planting of trees; training of farmers; land allocation; construction of structural works needed to stabilize the soil.</p>
7.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Scouring at ocean outlet points ▪ Population not interested in participating due to long time for economic return ▪ Poor provincial cooperation reducing potential positive impacts
8.	<p>Alternatives: Afforestation of sandy lands without cultivation. This may be an alternative if vegetable or other cash crops prove to be uneconomical. Individual provincial efforts or Donor support to develop separate systems. The advantages to joining within a program or close cooperation among individual projects are synergies in research and development. It is clear that there are many lessons to be learnt from the Quang Tri Province experience. Left as they are, at the very least, these areas should be planted with protective forests.</p>
9.	<p>Planning Costs: Quang Tri Province US\$ 4.6 million (US\$ 200/ha); Thua Thien-Hue Province US\$ 180,000 (US\$ 18/ha) The program could be divided into blocks and funding could be linked to particular blocks if funding levels are limited.</p>
10.	<p>Expert Opinion and Comments: Quang Tri Province has developed detailed plans. The planning, activities, and the work done in Quang Tri Province are considerable and this project is in principle ready for financing. Likewise, Thua Thien-Hue Province has made considerable investments in road infrastructure in sandy areas. In Thua Thien-Hue the inland sandy area was thought to be suitable for sugarcane production, but since the closure of the sugarcane factory alternative agricultural plans will be required. The situation in Quang Nam is less clear.</p>

11.	Projects: QT2-18: Sandy area program (22,500 ha) TH2-30: Sandy area development (10,000 ha) QN2-14: Sandy area development (7,500 ha)
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Program Title:

Water Supply and Sanitation

Primary Objective:

To improve rural health and hygiene and to prevent pollution of water supplies after flooding. Education will be an important component of implementation.

Implementation Strategy:

The program can start immediately and merge with existing education programs conducted by provincial departments and NGO's. If independent, coordination with existing programs is encouraged.

Water Supply and Sanitation

2.2.5 WATER SUPPLY AND SANITATION

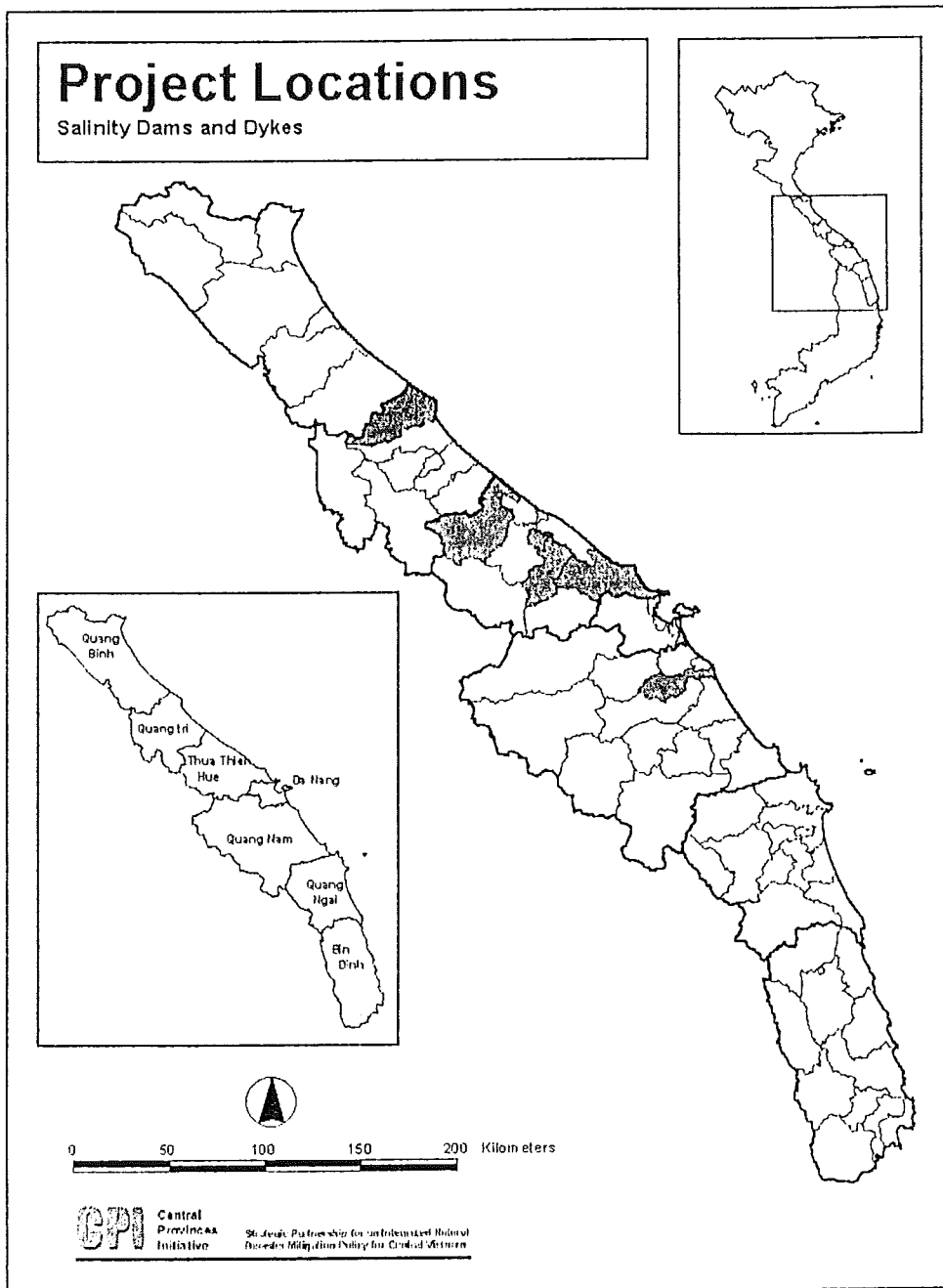
This program will mitigate the effects of future natural disasters. It will also, by stressing the importance of environmental sanitation and hygiene, improve the quality of drinking water for rural households. In their respective presentations on the 1999 flood damage, all the Central Provinces indicated that during and after the flooding rural communities faced the problem of being unable to obtain clean drinking water. But only in Quang Tri Province was a clear proposal submitted that would deal with this concern. Nonetheless, the issue of improving water supply and sanitation, especially during and after floods, is common to all Central Provinces.

The majority of the rural population living in the lowland areas has access to ground water through shallow tube wells and hand dug ring wells. Communities living west of Highway No. 1 and into the uplands also use tube wells and hand dug wells where ground water conditions allow. Where ground water sources do not exist, communities only have access to polluted surface water sources. Some minority communes and hamlets have been provided with piped water supply systems from natural springs in the hills. But sanitation around the wells is poor and few wells have adequate aprons to protect the water source from seepage of contaminated surface water. Statistics on households with and without latrines was not collected; but many latrines are found to be very rudimentary and open air defecation is common.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> During major floods, open wells become polluted requiring disinfection after the flooding. During the normal annual rainy season, wells are polluted through activity around the well and subsequent seepage and contamination of the wells. Ministry of health chlorination of wells after flooding events is not very effective because flood transported sediment in wells reduces disinfectant effectiveness.</p> <p><i>Opportunities:</i> Because the rainy season is not the appropriate time to correct the problem of well-water pollution, the work must be done during the dry season. Open wells have the advantage of being easy to maintain. Where appropriate, open wells should be used instead of tube wells with suction hand pumps. Wells should be emptied and cleaned out; the filter gravel replaced; and then the wells should be chlorinated. In addition to providing clean, unpolluted water, community awareness of the importance of sanitation and hygiene can be raised through this program.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To improve rural health and environmental hygiene ▪ To reduce the immediate impacts of major flooding events on drinking water quality and environmental sanitation ▪ To improve drinking water quality and environmental sanitation during normal seasons ▪ To increase community awareness of the importance of sanitation and hygiene

3.	<p>Strategy: The Program will most appropriately be implemented under DARD or the Red Cross with strong coordination and cooperation with the Provincial Departments of Health and Education. Such a program requires the integrated efforts of all these sectors. Program preparation will be required to plan a program of suitable size and scope to justify donor involvement and Technical Assistance. Technical Assistance is justified on the basis of providing expertise to advise on options relating to water service delivery and other technical options.</p>
4.	<p>Schedule: Immediate and short term: Program planning, preparation, and implementation.</p>
5.	<p>Outputs and Benefits: <i>Outputs:</i> Cleaner wells; the addition of concrete well-aprons where appropriate; installation of new wells or overhead tanks where necessary. <i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Improved health and sanitary conditions ▪ Reduced loss of life, especially among the very young and old who are most at risk ▪ A better educated public
6.	<p>Inputs: Program preparation; technical assistance; rehabilitation and construction of water works.</p>
7.	<p>Risks</p> <ul style="list-style-type: none"> ▪ Programs are designed to address technical aspects only and fail to address the multi/sectoral needs of an effective water supply and sanitation program ▪ The program does not respond to service delivery demands and therefore faces problems with operation and maintenance after construction ▪ Community programs are not demand based, leading to people returning to their present polluted sources ▪ Legal issues of maintenance committee legal status; right to open and use bank accounts; and other issues are not addressed ▪ Inappropriate donor support and interference in private sector areas, such as in the design and manufacture of hand pumps and spare parts, leads to donor dependency ▪ Community contributions, donor contributions to community initiatives, and community ownership of the process are not achieved at the beginning ▪ The Government is presently in the process of defining a new strategy regarding drinking water supply. This initiative of the Government has been assisted by the Danish Government. It is important that the program approach reflects the ideas established within the Government's new strategy that is being developed
8.	<p>Alternatives:</p> <ul style="list-style-type: none"> ▪ To do nothing. The poor, the young, and the weak are at health risk in a good year; and at high risk during and after flooding events ▪ Such a program that responds to expressed needs must be flexible in terms of offering choice of service level and in terms of the service delivery mechanism ▪ Many alternatives of choice of water and sanitation should be available to communities, with communities making choices in relation to their labour contribution and willingness to pay

9.	<p>Planning costs: (approximate indicative direct costs)</p> <ul style="list-style-type: none"> ▪ Cost per well tubewell: US\$ 100 (US\$ 20 per capita) ▪ Cost per ring well: US\$ 100 (US\$ 20 per capita) ▪ Cost per small community overhead tanks with household connections: US\$ 20 to 40 per capita ▪ Cost per gravity hill supplies: US\$ 20 to 40 per capita ▪ Community contributions to the above costs need to be determined. They should be incremental in relation to service level, with clear selection criteria and screening criteria of the target group
10.	<p>Expert Opinion and Comments:</p> <p>This program represents valuable assistance both in the short and long term, and provides many benefits to the poorest of the poor, the young, and the weakest populations.</p> <p>In most rural areas the water supply and sanitation services are limited. Open ring wells are common in lowlying areas; also common are tube wells attached to suction handpumps. Depending on ground water conditions, rural populations west of Highway No. 1 use surface water and well water. Piped water systems in the uplands are not common. In lowlying areas most rural people gain access to domestic water either from their own wells or from private wells. Communal wells are less common. The approach adopted by government to providing water supplies in lowlying areas are presently two fold: 1) either through the subsidy of supplying rings and other materials to enable individual households to invest in their own wells; or 2) through overhead tanks and pipe distribution systems.</p>
11.	<p>Projects</p> <p>QT2-16: Drinking water and environmental sanitation program.</p>



Program Title:

Salinity Dams and Dikes

Primary Objective:

To protect fresh water sources and minimize the effect of salinity intrusion by means of adequate structures, but not interfere with flood water run-off requirements.

Implementation Strategy:

Support existing projects or start new ones at any level immediately, preferably within the framework of a Master Plan. Program to be jointly funded under donor-supported programs.

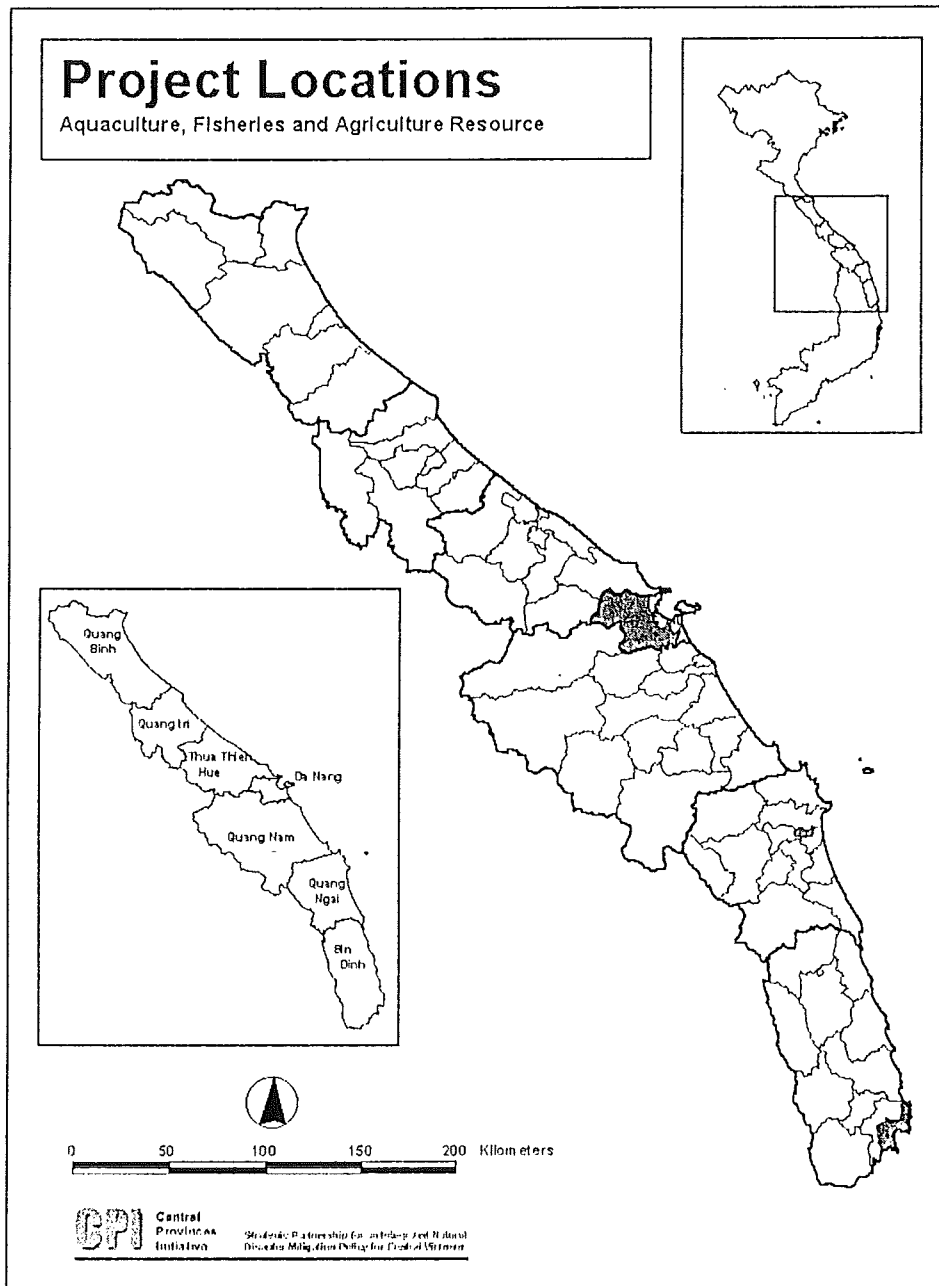
Salinity Dams and Dikes

2.2.6 SALINITY DAMS AND DIKES

This program will protect estuaries against saltwater intrusion into rice fields, irrigation structures, and pumping stations, and secure fresh water supply for domestic use and agricultural irrigation.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> Rice fields and other irrigated agricultural areas are affected by saltwater intrusion in the dry season, when river flows and estuarine water levels are low. Salt intrusion is often the main reason why only one crop of rice is possible per year, when a second crop is desirable and would raise living standards considerably.</p> <p>Fresh water for households and industries is also affected by saltwater intrusion, and this has negative economic consequences for industries and health consequences for the public. On the other hand, anti-salinity dams and dykes can impede the flow of floodwater to the sea and contribute to longer and higher inundation from flooding.</p> <p><i>Opportunities:</i> In controlling saltwater intrusion, it is possible to design and implement a system of moveable gates that can block saltwater during the dry season, but be opened in the flood season to allow the discharge of floodwaters to the sea. By controlling saltwater intrusion, less agricultural land will be lost, thereby maintaining agricultural production and preserving rural livelihoods.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To prevent or minimize saltwater intrusion
3.	<p>Strategy:</p> <p>Implementation will be by the Department of Dyke Management and Flood Control of the Ministry of Agriculture and Rural Development in each province.</p>
4.	<p>Schedule:</p> <p>Short term: Study and planning. Medium term: Implementation.</p>
5.	<p>Outputs and Benefits:</p> <p><i>Outputs:</i> Installation of new anti-salinity structures; rehabilitation of anti-salinity structures where necessary.</p> <p><i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Improved protection against salinity intrusion due to low water levels in estuaries ▪ Improved design of anti-salinity structures with improved capacity to allow flood water flow to reach the sea ▪ Poverty alleviation by increasing rice and other irrigated crop production ▪ Reduced economic losses to industry and improved public health
6.	<p>Inputs:</p> <p>Hydraulic study of delta systems; construction and replacement of anti-salinity structures.</p>
7.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Some of the needed structures are very small; they may not be of interest for donor funding ▪ Changes to ecosystems ▪ Local losses to fisheries and aquaculture

8	<p>Alternatives : Do nothing: anti-salinity structures exist already in most areas where needed. But they are often poorly designed to:</p> <ol style="list-style-type: none"> 1. Effectively stop saltwater intrusion 2. Allow floodwater discharge to reach the sea <p>Alternatives are:</p> <ol style="list-style-type: none"> 1. Upstream dams. 2. Movable or fixed anti-salinity dams on the outlet of lagoon systems where applicable. Movable structures have the advantage that they do not form any obstruction during flood run-off in the rainy season; while salt intrusion can be controlled completely in the dry season.
9	<p>Planning and construction cost: Salinity dam on the Sa Lung River: US\$ 1,790,000 Dykes on the O Lau River: US\$ 1,000,000 Dykes at Vinh Giang, Vinh Hong and Vinh My: US\$ 660,000 Dyke at Huong Phong: US\$ 1,540,000 Salinity dam at Thao Long: US\$ 7 to 10 million; this 600 m long dam is by far the biggest anti-salinity structure and should protect some 10,000 ha of rice field; a feasibility study by French Cie SAFEGE exists and has been approved by the government; therefore, this dam could be considered as a independent project Salinity dam at Tung Lam US\$ 290,000 Salinity dam at Duy Thanh Thao Long: US\$ 3,710,000</p>
10	<p>Expert Opinion and Comments: The issue of salinity intrusion is of major importance for sustainable development. In terms of flood control, however, it is of utmost importance that anti-salinity structures do not obstruct the discharge of floodwater during the flood season. In this respect, it is recommended that all fixed structures that form such an obstruction to flood water should be replaced by movable structures. It is recommended that all new gates and dams be designed and built according to this principle. In designing relevant systems for salinity control, it is important to recognize that delta areas have a complicated network of water flow into different channels and canals. A comprehensive approach should be taken in addressing this problem, one that will avoid:</p> <ul style="list-style-type: none"> ▪ Localized solutions that move the problem to another location rather than solving the problem ▪ One large dam downstream that replaces many small structures upstream ▪ Possible economy of less dykes and pumping stations
11	<p>Projects: QT2-22: Salinity dam on the Sa Lung River TH2-01: Dykes on the O Lau River TH2-02: Dykes at Vinh Giang-Vinh Hong and Vinh My TH2-03: Dyke at Huong Phong TH2-23: Salinity dam at Thao Long DN2-05: Salinity dam at Tung Lam QN2-01: Salinity dam at Duy Thanh</p>



Program Title:

Aquaculture, Fisheries and Agriculture Resources

Primary Objective:

To develop new areas for aquaculture production and to provide adequate facilities for improvement of the standard of living of poor households.

Implementation Strategy:

Implementation should be done under provincial, district, and commune authority. This program has an indirect effect on disaster mitigation, but a more direct effect on poverty alleviation. Time scale varies from short to long term.

Aquaculture, Fisheries and Agriculture Resources

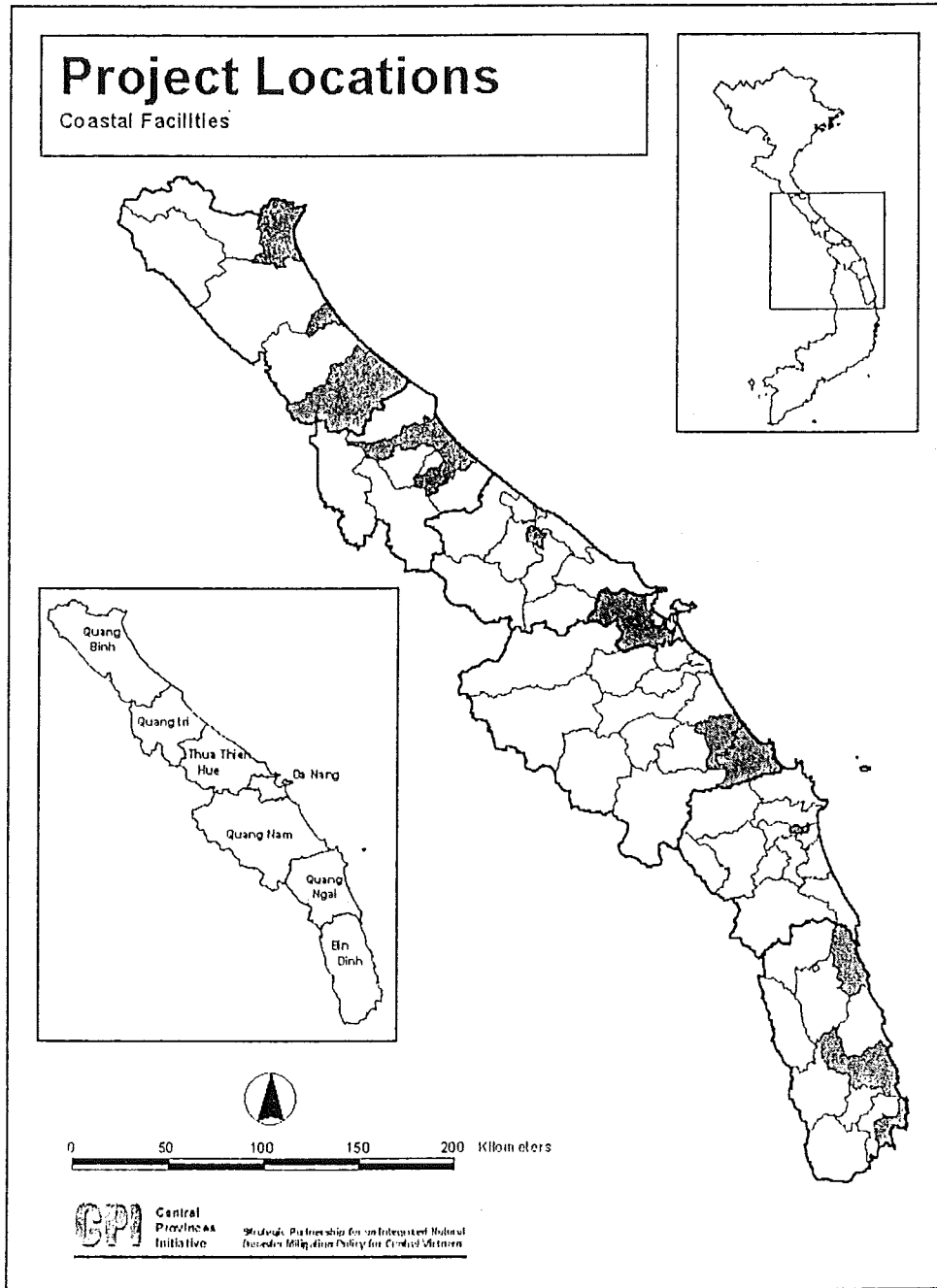
2.2.7 AQUACULTURE , FISHERIES, AND AGRICULTURE RESOURCES

There is a need in the Central Provinces to promote the utilization and management of estuarine resources for the production of shrimp, fish, shellfish and other estuarine products. Aquacultural production and the production of paddy rice in estuarine areas are very much interrelated in terms of water management and intra-commune livelihood development. The majority of the plans and proposals concerning irrigation and related structures at river estuaries impact directly or indirectly upon aquaculture activities and thereby upon the lives of fishermen and farmers who gain their livelihood from a finely balanced estuarine ecosystem. The majority of proposals for agriculture and aquaculture development give little consideration to the influence of one project upon other nearby projects. Only in Da Nang Province was there an aquaculture project that was designed in such a way that it had little impact upon neighboring agricultural areas.

It is important to stress that any intended program of aquaculture, fisheries and agriculture resources should be based on a community management approach, one that involves local fishermen, farmers, and other stakeholders. For such a program to be effective, it is essential to use a participatory approach that incorporates conflict resolution.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> The Central Provinces have considerable areas of inland water and estuarine waters which lend themselves to aquaculture production. Generally, aquaculture farmers and fishermen bordering estuarine areas who exploit the considerable production possibilities of the estuary are not the poorest people and their economic returns are high. Livelihoods are, however, continually at risk from floods and environmental changes within the drainage basin and estuary system. Recent advances made in aquaculture production techniques continue to enhance the production capability and importance of these areas. The late 1999 floods, however, caused considerable changes to salinity levels; disrupting production and undermining previous investment in this sector.</p> <p><i>Opportunities:</i> This program provides an opportunity to integrate aquaculture and agriculture in such a way that minimal harm is done to either sector. Although a relatively prosperous sector already, increased aquaculture production will result in increased employment opportunities.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To develop new areas for aquacultural production and to provide aquaculture production opportunities for poor households ▪ To improve the management and utilisation of estuarine and inland waterways
3.	<p>Strategy:</p> <p>The program will be implemented by DARD.</p>
4.	<p>Schedule:</p> <p>Short term: Da Nang Province. Medium and long term: The sector program.</p>

5.	<p>Outputs and Benefits: Outputs: Coordinated programs of aquaculture, fisheries, and agriculture resource development. Benefits: There are many benefits of program support to aquaculture production interests by clustering and then integrating these activities into basin management programs. These benefits include:</p> <ul style="list-style-type: none"> ▪ Improved planning of aquacultural activities in relation to individual basin management plans ▪ Improved training and cross flow of information on new technologies and management practices <p>The benefits of supporting the development of aquacultural production activities include:</p> <ul style="list-style-type: none"> ▪ Significantly improved incomes ▪ Improved planning and resolution of conflicts, with a consequential reduction in terms of inappropriate practices such as illegal fishing techniques ▪ Improved utilisation of areas marked for aquaculture production ▪ Improvements to drainage systems and thus lower flood levels
6.	<p>Inputs: Planing; technical assistance; institutional strengthening.</p>
7.	<p>Risks:</p> <ul style="list-style-type: none"> ▪ Imbalance between aquaculture and agricultural activities giving too much emphasis to aquaculture at the expense of paddy farmers ▪ Lowland areas being converted from rice paddy areas to fish ponds, with returns from aquaculture per ha being higher. Ponds requiring additional higher embankments adversely affect flood flows
8.	<p>Alternatives:</p> <ul style="list-style-type: none"> ▪ Support to fishermen on an individual estuarine area has merit, but there is also added benefit from considering estuarine production within the central provinces under one coordinated program ▪ To do nothing would result in lower productivity, poorer planning, and demarkation of production protected areas
9.	<p>Planning Costs: Not known. In the case of Da Nang, the requested donor support is for 1.3 billion VND or just under US\$ 100,000; but this does not take account of the overall needs of the sector.</p>
10.	<p>Expert Opinion and Comment: That the investment in Da Nang should be briefly reviewed in regard to the economic and environmental consequences of the investment; but pending this review the investment appears justified in the short term. There is considerable merit in providing support to the Central Provinces in this sector and, through cooperation with other programs, in enhancing technical capabilities to ensure improved planning and balancing of interests between agriculture and aquaculture.</p>
11.	<p>Projects: DN2-08, QG2-1, BD2-1; also, closely associated with river mouth opening, irrigation and drainage, and water modeling programs in estuarine areas.</p>



Program Title:

Coastal Facilities

Primary Objective:

To provide safe access and protection for fisherfolk and mariners during typhoons and other extreme storm conditions. Safe shelter includes proper beaconing and well-marked approach channels.

Implementation Strategy:

The implementing agency will coordinate development between the different Ministries and Authorities involved in the administration of coastal facilities.

Coastal Facilities

2.3.1 COASTAL FACILITIES

Natural disaster mitigation in Central Vietnam requires projects related to river mouth improvements, the upgrading of fishing harbor facilities, and safe havens/anchorage. The objectives for these separate projects are:

1. Flood mitigation, by dredging channels to improve floodwater flow
2. Improving fishing harbors with wharves, access channel improvement, and possibly breakwaters
3. Safe anchorage of boats in case of storms, with lighthouse and beacons for the refuge entrance

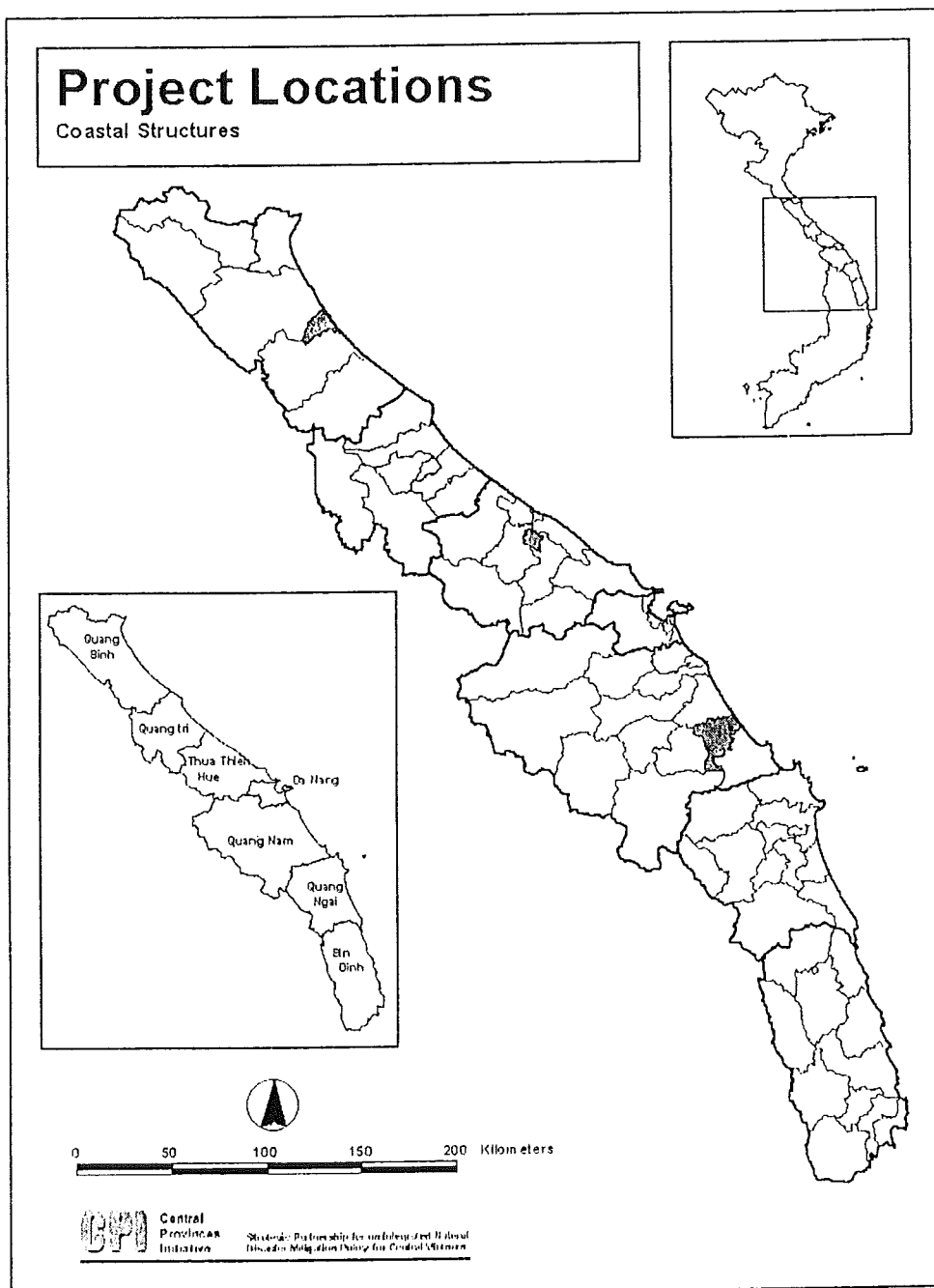
Providing safe anchorage is related to the more general goal of coastal security, an important part of any natural disaster mitigation strategy in Central Vietnam. It should be a normal component of any port development project. But separate port management by the Department of Fisheries, the Coast Guard, in some cases the Navy, and the Department of Transport in commercial ports is a major obstacle to a comprehensive port development and security program. An institutional change is needed for an integrated Port Authority to manage problems of security, beaconing, dredging, traffic management, and other common coastal facility functions.

Flood mitigation through channel dredging considers river mouths as part of the more general river basin approach to flood mitigation. Coastal facilities encompass a broader range of issues that relate to estuarine resources development for which another specific program for aquaculture, fisheries and agriculture resources protection is proposed.

1.	<p>Problems and Opportunities:</p> <p><i>Problems:</i> During floods and storms, especially typhoons, loss of life can occur when fishermen who are at sea cannot find a safe haven in time. Over time river mouths in Central Vietnam have silted up and thus become more shallow. This impedes the discharge of upstream floodwaters, thus causing upstream flooding and inundation. Shallow river mouths also restrict river and coastal transport and shipping, and block access to possible safe havens.</p> <p><i>Opportunities:</i> By identifying appropriate sites and constructing safe havens and anchorages, the number of boats destroyed or sunk in every flood or storm by high current velocities and by wind will be significantly reduced. By dredging and thus deepening river mouths, floodwaters will discharge more quickly; upstream flooding and inundation will be reduced.</p>
2.	<p>Objectives:</p> <ul style="list-style-type: none"> ▪ To combine related projects in such a way that facilitates integrated development of coastal ports ▪ To save human lives and to reduce boat wreckage ▪ To reduce floodwater levels upstream of the river mouth ▪ To provide more marine resources by improving fishing harbor facilities
3.	<p>Strategy:</p> <p>A lead national agency must coordinate the activities of the Department of Fisheries, the Coast Guard for lighthouses and security, the Department of Transport for commercial ports, dredging companies, and the Navy for military ports that also have commercial activities.</p>
4.	<p>Schedule:</p> <p>Immediate term: Small fishing ports; safe anchorages; lights and beacons.</p>

	Medium term: Large port improvements.
5.	<p>Outputs and Benefits:</p> <p><i>Outputs:</i> Upgraded port facilities; deepened river mouths; safe havens and anchorages; lighthouses and beacons; breakwaters, embankments, and wharves.</p> <p><i>Benefits:</i></p> <ul style="list-style-type: none"> ▪ Improved security for fisherfolk ▪ Improved working conditions ▪ More and better resources for fishery-related activities ▪ Upgraded harbors that allow access for bigger fishing boats ▪ Less flooding and inundation in upstream flood plains
6.	<p>Inputs:</p> <p>Study of currents; site identification and survey for safe havens; design of breakwaters, embankments, and wharves; plans for lighthouse and beaconing systems; construction of works.</p>
7.	<p>Risks:</p> <p>Breakwaters and jetties can be badly located; this can result in erosion or siltation where not expected.</p>
8.	<p>Alternatives:</p> <p>The availability of proper ports and access to safe havens for fishermen is of utmost importance and must have highest priority. Any delay in providing coastal security will result in loss of human life. Flood mitigation schemes upstream cannot wait for river mouth dredging. Both immediate term requirements have to be met as soon as possible and must be implemented. A do-nothing scenario is therefore not an acceptable option.</p>
9.	<p>Planning cost:</p> <p>Most harbor entrance improvements need a preliminary study of currents, winds, waves, erosion, and siltation; and professional design of breakwaters, embankments, and wharves. Lighthouse and beaconing plans must be consistent with a national coastal security plan and with international maritime regulations.</p>
10.	<p>Expert Opinion and Comment:</p> <p>Priority should be given according to the number of fishing boats benefiting from each project. The largest fishing ports are in Quang Binh Province at Dong Hoi (Nhat Le), in Da Nang Province on the Han River, and in Binh Dinh Province at Tam Quan and Qui Nhon. The safe anchorage locations should also be located at a regular intervals along the coastline. Few projects are presented as safe anchorage except at Cua Tung at the Ben Hai River mouth.</p> <p>Most projects are presented as fishing port improvement, and do not include safe anchorage because the Marine Products Department is not in charge of security or beaconing. But most good fishing port projects can easily be supplemented by the proper security components of lighthouses, beacons, and means of rescue.</p> <p>The Qui Nhon project calls for building only a new wharf for fisheries in the existing harbor, without any consideration about security in the harbor, safe anchorage locations, or flood mitigation. Coordination of port security, beaconing, dredging, and traffic management will need a major institutional change under comprehensive port development plans. In a separate summary, it has been recommended that integrated port authorities be created. These</p>

	<p>authorities would join together the separate commercial ports, fishing ports, and military ports which are often merely separately-managed wharves. This is especially needed in the cases of Da Nang, Qui Nhon, and Cua Viet ports.</p> <p>Considering the impact that dredging has on river basin and coastal zone management, to the extent possible, dredging should be combined into the overall scheme.</p> <p>Dredging for floodwater discharge is important in cases where a lowlying plain upstream of the river mouth needs drainage. But such projects are often presented by DARD without connection with the Department of Fisheries. Thus, the project is not connected to fishing harbor improvement, although floodwater discharge necessarily involves dredging river mouths. Some projects presented as simple river revetments (QT2-06 Cua Viet) or beach protection (QB2-01 Nhat Le) would be better placed as part of a river mouth or fishing harbor scheme, or both. The purpose of this program is to have a more comprehensive approach to prevent such inconsistent and fragmented development.</p> <p>Lights, beacons, rescue boats, and security facilities must meet international standards and regional treaties regarding sea rights.</p>
<p>11.</p>	<p>Projects list :</p> <p>QB2-01: Nhat Le-Bau Tro sea revetment at Dong Hoi fishing port entrance</p> <p>QB2-07: Canh Duong sea revetment at Roon river mouth</p> <p>QB2-25: Lighthouse</p> <p>QB2-26: Safe anchorage at Nhat Le and Cua Dinh at Gianh River mouth at Roon</p> <p>QB2-27: Dredging of estuaries at Roon</p> <p>QT2-06: Cua Viet revetment at the Thach Han river mouth</p> <p>QT2-21: Au Tru safe anchorage at Cua Tung at Ben Hai River mouth</p> <p>TH2-24: Thuan An old and new outlets</p> <p>DN2-17: Tho Quang 1 safe anchorage</p> <p>DN2-18: Tho Quang 2 safe anchorage</p> <p>QN2-05: Cua Dai at Thu Bon river mouth</p> <p>QN2-10: Ky Ha bay project</p> <p>QG2-07: Flood release by dredging at the Thoa River</p> <p>QG2-13: Storm warning station at Sa Huynh</p> <p>QG2-12: Project for upgrading Sa Huynh fishing harbor</p> <p>BD2-33: Tam Quan fishing port</p> <p>BD2-34: De Gi fishing port</p> <p>BD2-35: Qui Nhon fisheries port</p>



Program Title:

Coastal Structures

Primary Objective:

Using an integrated approach, to reinforce and restore coastal structures to protect against flooding and failure. Solutions that combine natural coastal features and appropriate technology are preferred.

Implementation Strategy:

Pilot projects will be developed in combination with the dredging of port entrances and river outlets. New training programs will be used to expand and strengthen existing organizations.

Coastal Structures

8.	<p>Alternatives:</p> <p>In terms of alternatives, the possibilities seem to vary between copying and replicating what has been done and built before, and the introduction of new techniques that have proven their quality and suitability elsewhere, but for which little experience exists in Vietnam. In terms of reconstruction, this means repair of existing damage, the same way as was done before with the same probability for future damage as before; versus introduction of new state-of-the-art technology for reconstruction, maintenance and repair of sandy coasts and river outlets.</p>
9.	<p>Planning Costs:</p> <ul style="list-style-type: none"> ▪ As far as is known, costs are given below for each projects ▪ In case no figure is given, it is believed that for that project the pre-feasibility stage is due to start or has already started ▪ Any TA program of a Donor is believed to be adequate to support this process ▪ In order to maximize the effect of training and capacity building, further integration between specialists and universities should be promoted
10.	<p>Expert Opinion and Comments:</p> <p>All investments in coastal structure works must be done as far as applicable and possible in direct combination with related works along the same coast, in the vicinity nearby, or even inland. For instance, a combination of dredging works and rehabilitation of a sea dike along a beach can be considered when close to an outlet as in Quang Binh Province. In line with all modern approaches in coastal engineering, the application of new hard and fixed structures must be evaluated and compared with soft sandy solutions before any design or rehabilitation project commences. Adequate support by foreign experts and related companies is preferred and available, in order to speed up and to improve the quality of the learning curve. Any Donor Technical Assistance in this respect is believed to be able to provide adequate support, and consequently is seen as an absolute requirement. Present donor programs facilitate such support.</p> <p>The problem of closing the gaps in the lagoon in Thua Thien-Hue Province and attendant problems need to be dealt with immediately. This project could be executed as a pilot project and would require little further preparation for actual execution and completion within a few months.</p> <p>It is essential to further investigate the benefits of further integration of river mouth dredging and coastal maintenance.</p> <p>Where and when environmental values are at stake, which is basically always, the application of methods that relate to nature is essential. This applies in particular to coastline maintenance and reconstruction by application of beach nourishment, and the proper planning of downstream effects when applying fixed structures. Some local experience with these techniques may exist, but there is need for further improving local practice, both in terms of quality and in terms of scale, starting with relatively simple and not too complex projects, and gradually expanding into bigger projects. In order to do so, support from foreign experts including contractors is seen as a requirement.</p>

	<p>As indicated above, to maintain harmony with the natural coastal system, use, as much as possible, modern techniques such as beach nourishment. Due to the characteristics of the natural, sandy coastal system in Central Vietnam, this is preferred from a technical point of view. By using modern techniques, experience with this type of solution is increased and so is the understanding of the system itself with increasing ability to respond adequately to damage.</p> <p>Where coordination can be made between coastal repair works and, for example, the dredging of a port or channel, significant cost savings can be achieved.</p> <p>Where there is urgent need for rehabilitation and repair, emergency work can be done according to existing practice, with the intention of implementing state-of-the-art technology where and as soon as possible.</p>
<p>11.</p>	<p>Projects</p> <p>QB2-21: Nhat Le-Bau Tro Sea Groyne, Quang Binh Province, (US\$ 0.86 million is a low estimate)</p> <p>DN2-27: Sea Revetment, Da Nang Province, (US\$ 1.43 million)</p> <p>QN2-12: Potential River breakthrough breach at Tam Thanh, new opening to be planned for, including related structures, Quang Nam Province (costs unknown)</p> <p>TH2-24: River Breakout Gap (new inlet), Thua Thien Hue Province, (US\$ 3.6 million, estimate)</p> <p>TH2-28: Sea Dike Rehabilitation near Cong Quan Cua, Thua Thien Hue Province (costs unknown)</p>

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Attachment 5

Empowerment of Communities that Live with Floods

By
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Funded under Project VIE/98/012

EMPOWERMENT OF COMMUNITIES THAT LIVE WITH FLOODS

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1. EXECUTIVE SUMMARY

This report was completed as a part of an assignment to assess community and social issues in the multi-donor technical mission to develop a natural disaster mitigation strategy in Central Vietnam. The mission spent two weeks working in the central coastal region of the country, from Quang Binh Province in the north to Binh Dinh Province in the south. Most field visits took place with other experts focused on other topics, were no longer than three hours at each site, close to the main highways, and organized by government officials.

From the mission, the findings mentioned in the report are:

1. People have lived with floods for centuries, using traditional mitigation and emergency responses based on traditional community and social ties.
2. People have made use of available skills and materials to cope with floods, with mixed results.
3. Flood warning systems are poor and most persons rely on informal information sources.
4. With clear exceptions, evacuation, rescue and relief responses are inefficient.
5. Roles of mass organizations in flood mitigation are not formalized.
6. Local management of flood mitigation resources and infrastructure is weak and lacks transparency.
7. Relocation and resettlement schemes for flood-displaced households and communities remain too top-down and under-funded.
8. Roles of international donors and NGOs in flood mitigation are not well-coordinated and focus mainly on relief.

Coupled with the large number of projects put forth by local authorities and evaluated by the multi-donor mission team, the following suggested projects should be considered to improve the capacity of people in the central provinces at an individual, household, and local level to minimize losses from annual flooding in Central Vietnam:

1. Advanced disaster mitigation and preparedness program in Hoi An town;
2. Traditional disaster mitigation and preparedness program in pilot rural communes;
3. Incentive program for commune/village Committees for Flood and Storm Control (CFSCs) purchase of cellular phones;
4. Capacity development of flood insurance, casualty insurance, and life insurance programs;
5. Public service announcement campaign on television and radio prior to the flood season; and
6. Presentation of water safety and first aid courses, and awareness programs to all villages.

All of these ideas have been incorporated into the sector projects prepared by the mission, and a commentary on each program is provided.

2. BACKGROUND

2.1 Community and social issues in the multi-donor technical mission

This report is the result of 12 days of field work in five of the seven central coastal provinces included in the multi-donor mission to develop a comprehensive natural disaster mitigation strategy. The United Nations Development Program (UNDP) felt that the inclusion of a Community Development Expert position, based on the Terms of Reference listed in this report, would be a valuable contribution to the mission. The community expert's input into the mission was intended to provide advice on the incorporation of social and community issues within all the proposals prepared by other experts in the team.

Most information collected from this mission comes from discussions with government officials, international experts and donors, rural and urban households, and individuals living in the provinces visited.

3. FINDINGS FROM THE MISSION

In the late rainy season of November-December 1999 in the central provinces of Vietnam, residents were afflicted with two unusually large rain storms, separated in time by three weeks. These storms, together, were larger than any other rain storms in people's memory. Consequently, residents and government officials have become determined not to repeat any mistakes made during the 1999 flooding, and to prepare better for future rainy seasons.

Based on information from the most recent joint Government and donor poverty report, *Attacking Poverty*¹, the central provinces of Vietnam with more than 8 million people in the region was in 1998 10.6% poor. Most other families are just on the border of poverty, a national phenomenon shown in Figure 1. It may be seen that even any small casualty losses can easily push people into poverty.

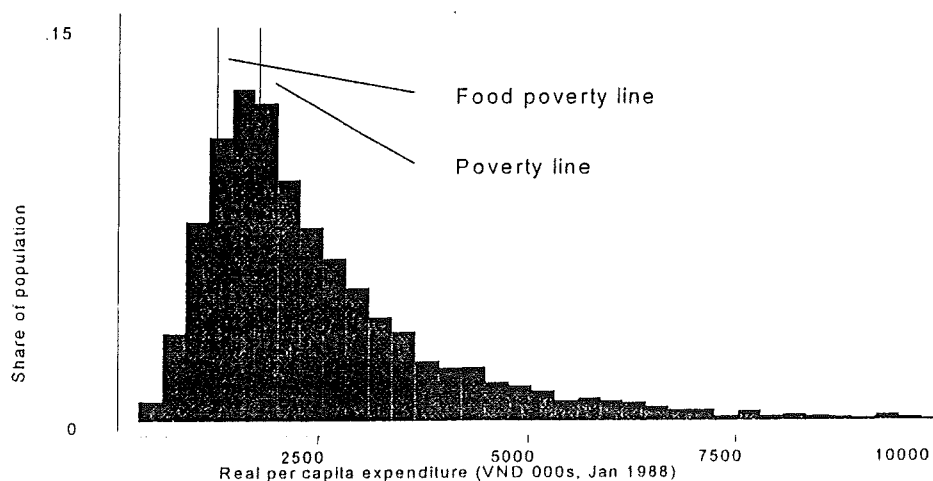


Figure 1. Poverty assessment of people in Central Vietnam, from *Attacking Poverty*, Poverty Working Group, Hanoi, 1999

¹ *Attacking Poverty*, Poverty Working Group, Hanoi, 1999

Nevertheless, people have become accustomed to the general phenomenon of storms in the late fall of each year, and they live with them. This is the first and most important of the following nine findings that were arrived at during the mission.

3.1 People have lived with floods for centuries, using traditional mitigation and emergency responses based on traditional ties

The lowland Kinh people in the Central Provinces have been for centuries and remain primarily rice farmers. In many areas, clan ties are strong, and some villages of more than one hundred households have under ten surnames. Families are close knit and patriarchal. Most families practice ancestor worship, regardless of whether they are practicing Buddhists or Catholics. In many areas, burial grounds have been placed on higher ground than housing clusters and are well kept.

Currently, in well managed, productive land with irrigation, farmers can get two rice crops of unequal yields a year: a winter-spring rice crop from around the lunar new year to May, and a higher yield spring-autumn rice crop sown directly after, extending to September. Farmers have thus fit their cropping systems to avoid the three months of October, November, and December when storms are common. On average, this means avoiding the four to six typhoons that annually land on the coastline of Vietnam, with the center and northern central provinces most commonly affected.

During this non-productive storm period, farmers work on their livestock, and prepare for protecting themselves from disasters. This disaster preparation includes storage of paddy and disaster relief supplies in the rafters of the home, building up banks of streams and other waterways with soil/clay; and, if wealthy enough, preparing boats and round dinghies for transport in high waters. When the flood season hits, it is not uncommon for people to have land surrounding their homes inundated for 1 to 2 days, or even to have water in their homes. Flood water levels, however, are usually manageable and lower than 50 cm in depth.

Even when the largest floods in memory came in 1999, some localities handled the situation quite well, as the example of Hai Hoa Commune shows:

Hai Hoa Commune, nether-lands with high rice yields and temples

Driving through Hai Hoa Commune in Hai Lang District, Quang Tri, one is struck by the abnormal number of temples and pagodas. According to one Swedish agricultural economist who studies this area, per crop rice yields exceed 6 tons/hectare. In the 1999 floods, many of the 900 local families were taken by surprise as the water rose rapidly on November 1 in the late afternoon. During the main flood season, Hai Hoa is quite familiar with flooding, as some of its land is 0.5 meters below sea-level. But in 1999, the waters came fast and were swift. At the flood peak, floodwaters reached 1.88 m high above the land surrounding the Commune People's Committee building. The choice place of refuge for the people was in the attic areas of their homes, some staying there as long as 3 days. Some families were even able to set up rudimentary cooking facilities in these "attics", but most had little to eat. A number of people swam out of their houses to more permanent refuge in two-story buildings, such as local schools. This included families located in the lowest areas of the commune, whose houses were flooded for up to 14 days. In sum, the greatest losses of Hai Hoa Commune was the paddy stored in the cooperatives and in individual households, as the harvest had just taken place. Only three people died in the flood, although some 62 houses were washed away.

3.2 People have made use of available skills and materials, with mixed results

Even though some places in Central Vietnam experienced relatively little loss in the 1999 flooding, others places experienced significant losses. More than 700 deaths occurred in the region over the two months of flooding, showing that natural disaster mitigation and preparation is lacking in some areas. Annually, storms can inflict extensive damage; in the period 1971 to 1994, more than 6 million tons of rice production were lost as a result of flood and typhoon damage in Vietnam.

No full accounting of the reasons for the death of people in the 1999 flooding was available. But, according to Government and Red Cross officials, most deaths occurred when persons were trapped in the attic areas of their homes with water rising up through the doors and windows to the roof level; or from ill-equipped rescue attempts; or while attempting property recovery. For flooding deaths in houses, mostly middle-income families were affected as their concrete houses allowed no avenue for escape; poor farmers with thatched huts could push themselves through the roof to safety.

Nearly all children living in this central region of Vietnam learn to stay afloat in water over their head, using adapted dog-paddling and breast stroke swimming. Reportedly, the only non-swimmers are women from other areas who marry into flood-prone areas. But except for fisherman, swimming skills are rudimentary. More importantly, nowhere are there organized water safety courses for any population. There is thus little awareness of proper forms of water safety or rescue. Without further appreciation of this lack of water safety skills, even well meaning rescuers will continue to lose their lives in great numbers.

The target population has also collected a variety of materials and equipment to prepare themselves for the floods. As most of this home-made rescue equipment is constructed from materials intended for other uses, the equipment tends to have a high rate of failure. For example, during the storm period, most families stored paddy for either seed or food in nylon bags that are produced to sell feed. In the 1999 floods, these bags either were lost completely or, as they are not waterproof, their contents soaked for days. Days after the floods, one could find farmers everywhere drying out their paddy; some persons interviewed on this mission reported that their paddy had soaked for too long and went bad.

Even in the most modern city in the area, Da Nang, some important rescue items are available; others are not. Fishing supply stores have adequate stock of locally produced life vests (VND 85,000), imported life vests (VND 225,000), and ring buoys (VND 45,000). These fishing supply shops and local bookstores, however, have no written materials on safety at sea; and only technical books from the Construction Press² on wind storms and building safe homes to resist such storms.

3.3 Warning systems are poor and most persons rely on their own information sources

Although there are undoubtedly exceptions, both rural and urban residents get only general warnings from Vietnam television and radio without clear guidance for preparation or evacuation when large storms or floods occur. Since many storms begin

² Bo Xay Dung, Bao, loc, va cong tac phong chong (Typhoons, cyclones, and ways to mitigation). Nha Xuat Ban Xay Dung, 1999.

Nevertheless, people have become accustomed to the general phenomenon of storms in the late fall of each year, and they live with them. This is the first and most important of the following nine findings that were arrived at during the mission.

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During this non-productive storm period, farmers work on their livestock, and prepare for protecting themselves from disasters. This disaster preparation includes storage of paddy and disaster relief supplies in the rafters of the home, building up banks of streams and other waterways with soil/clay; and, if wealthy enough, preparing boats and round dinghies for transport in high waters. When the flood season hits, it is not uncommon for people to have land surrounding their homes inundated for 1 to 2 days, or even to have water in their homes. Flood water levels, however, are usually manageable and lower than 50 cm in depth.

Even when the largest floods in memory came in 1999, some localities handled the situation quite well, as the example of Hai Hoa Commune shows:

Hai Hoa Commune, nether-lands with high rice yields and temples

Driving through Hai Hoa Commune in Hai Lang District, Quang Tri, one is struck by the abnormal number of temples and pagodas. According to one Swedish agricultural economist who studies this area, per crop rice yields exceed 6 tons/hectare. In the 1999 floods, many of the 900 local families were taken by surprise as the water rose rapidly on November 1 in the late afternoon. During the main flood season, Hai Hoa is quite familiar with flooding, as some of its land is 0.5 meters below sea-level. But in 1999, the waters came fast and were swift. At the flood peak, floodwaters reached 1.88 m high above the land surrounding the Commune People's Committee building. The choice place of refuge for the people was in the attic areas of their homes, some staying there as long as 3 days. Some families were even able to set up rudimentary cooking facilities in these "attics", but most had little to eat. A number of people swam out of their houses to more permanent refuge in two-story buildings, such as local schools. This included families located in the lowest areas of the commune, whose houses were flooded for up to 14 days. In sum, the greatest losses of Hai Hoa Commune was the paddy stored in the cooperatives and in individual households, as the harvest had just taken place. Only three people died in the flood, although some 62 houses were washed away.

3.2 People have made use of available skills and materials, with mixed results

Even though some places in Central Vietnam experienced relatively little loss in the 1999 flooding, others places experienced significant losses. More than 700 deaths occurred in the region over the two months of flooding, showing that natural disaster mitigation and preparation is lacking in some areas. Annually, storms can inflict extensive damage; in the period 1971 to 1994, more than 6 million tons of rice production were lost as a result of flood and typhoon damage in Vietnam.

No full accounting of the reasons for the death of people in the 1999 flooding was available. But, according to Government and Red Cross officials, most deaths occurred when persons were trapped in the attic areas of their homes with water rising up through the doors and windows to the roof level; or from ill-equipped rescue attempts; or while attempting property recovery. For flooding deaths in houses, mostly middle-income families were affected as their concrete houses allowed no avenue for escape; poor farmers with thatched huts could push themselves through the roof to safety.

Nearly all children living in this central region of Vietnam learn to stay afloat in water over their head, using adapted dog-paddling and breast stroke swimming. Reportedly, the only non-swimmers are women from other areas who marry into flood-prone areas. But except for fisherman, swimming skills are rudimentary. More importantly, nowhere are there organized water safety courses for any population. There is thus little awareness of proper forms of water safety or rescue. Without further appreciation of this lack of water safety skills, even well meaning rescuers will continue to lose their lives in great numbers.

The target population has also collected a variety of materials and equipment to prepare themselves for the floods. As most of this home-made rescue equipment is constructed from materials intended for other uses, the equipment tends to have a high rate of failure. For example, during the storm period, most families stored paddy for either seed or food in nylon bags that are produced to sell feed. In the 1999 floods, these bags either were lost completely or, as they are not waterproof, their contents soaked for days. Days after the floods, one could find farmers everywhere drying out their paddy; some persons interviewed on this mission reported that their paddy had soaked for too long and went bad.

Even in the most modern city in the area, Da Nang, some important rescue items are available; others are not. Fishing supply stores have adequate stock of locally produced life vests (VND 85,000), imported life vests (VND 225,000), and ring buoys (VND 45,000). These fishing supply shops and local bookstores, however, have no written materials on safety at sea; and only technical books from the Construction Press² on wind storms and building safe homes to resist such storms.

3.3 Warning systems are poor and most persons rely on their own information sources

Although there are undoubtedly exceptions, both rural and urban residents get only general warnings from Vietnam television and radio without clear guidance for preparation or evacuation when large storms or floods occur. Since many storms begin

² Bo Xay Dung. Bao, loc, va cong tac phong chong (Typhoons, cyclones, and ways to mitigation). Nha Xuat Ban Xay Dung, 1999.

as tropical low pressure systems out at sea, people can be warned of their arrival days in advance through the mass media. However, such warning is not now being done effectively.

Moreover, when a storm lands, warnings stop. Thus, without up-to-the-hour meteorological information, people retreat into the attics of their houses if water levels rise in their homes. The Hydrological and Meteorological Service has three storm levels of severity that they use to report on storms and floods; more knowledgeable residents may understand their significance and act accordingly. But based on what people said in interviews conducted for this mission, most people do not know how to interpret the Hydromet information.

Also, getting the message out to the people is not always easy. For a significant number of households television remains a luxury they cannot afford. Further, telephone coverage is poor in most rural areas; and even in areas with telephone lines, poor farmers remain disconnected. At the village level, the village headman, if well off, is self-sufficient to both receive and transmit information; if not, there is usually one well-off household in the village that people depend upon. Thus, the village headman or a well-off household could be the source of disaster warning information.

3.4 With clear exceptions, evacuation, rescue and relief responses are inefficient

In 1995 following a large flood, villages along the central coast in Quang Tri Province established Local Committees for Flood and Storm Control (CCFSC). These Committees were reportedly formalized later in 1998 to fall under the Provincial Committee for Flood and Storm Control (PCFSC) system in the province.

Nevertheless, formalization has not apparently gone beyond this action. In three villages visited on the mission, the local CFSC groups are loosely formed: in one village they are only made up of the families with boats that could be used for rescue in the event of a flood. And nowhere, besides Hoi An City, had these local committees been supplied with rescue materials or training. Evacuation plans are not formalized; those people interviewed maintain that during a flood, they will go back to the evacuation site they went to in November and December 1999.

Hoi An City, a notable exception of preparation

The ancient city of Hoi An is located near the geomorphologically unstable mouth of the Thu Bon River. The highest flood waters on record came in 1964, reportedly 3.40 meters above low water level. The November 1999 floods reached 3.21 meters. Although more than 900 houses were either washed away or damaged from the November and December 1999 combined floods, to the surprise of many, no lives were lost. Undoubtedly this was due to the relatively well planned evacuations to city shelters for more than 4,500 persons; another 5,000 persons found shelter near their homes. Apparently, for those in Hoi An City, future preparedness will be even better. In their plan for the year 2000, the City has issued instructions to offices that will play a role in warning, including TV and radio; and preparedness, including public security and infrastructure departments. These organizations are to be staffed 24 hours per day, seven days per week during the disaster season. Safe havens have also been identified.

3.5 Roles of mass organizations are not formalized

General mobilization of the populace to support Party and Government initiatives is firmly in the hands of mass organizations. Natural disaster rescue, relief, and rehabilitation for disasters is not officially the function of mass organization except for the Vietnam Cross. Although the Vietnamese National Red Cross is like a mass organization, it is quite distinct from other mass organizations as it plays little or no role in political mobilization; and its organized system in most areas ends at the district level of government. With the assistance of foreign donors, the Vietnamese Red Cross has improved its capacity for relief and rescue in selected communes throughout the Central Region of Vietnam.

This, however, has not stopped these mass organizations from being heavily involved in disaster relief activities with an apparently informal delegation of responsibilities based on the capacities of their members:

- *Veteran's Association:* Over the duration of the 1999 storm and flooding, members led evacuation, rescue, and recovery operations. According to one top Ministry of Agriculture official responsible for storm and flood control in the Central Provinces, this is a leading mass organization involved in preparedness, rescue and relief.
- *Youth Union:* Members were also involved in physically demanding tasks during the 1999 flood disaster and relief operations. In Da Nang City, the Youth Union has established 55 *Flood Rescue and Relief Pioneer Clubs* made up of 3,000 of its 42,000 person membership.
- *Women' Union:* Members were mobilized to assist with relief in the 1999 floods, particularly for the preparation of food and water supplies that were distributed to flood victims.

All these mass organizations, along with others and government offices, successfully conducted campaigns to collect monetary and in kind donations nation-wide.

3.6 Local management of resources and infrastructure is weak and lacks transparency

Since the beginning of the Doi Moi reform program, the Government has tried to allow for greater local control of local resources, with the core economic unit as the household, rather than the collective. It is common for communes to have public welfare funds and disaster preparedness funds from which to contribute to the maintenance and construction of local buildings, roads, bridges, dykes, and other small scale infrastructure projects. In most projects completed by communes, able bodied people are obliged to provide local labour.

The percentage for land use taxes are mandated locally for infrastructure projects. Communes must prepare proposals and collect local contributions. District construction offices check each proposal. The proposal must ultimately receive approval by the District People's Council including: the Commune, the District Finance Office, and the District Construction Office. This will be the Transport/Agriculture Office if the construction is a bridge or part of an irrigation system.

As local taxes are uniformly regressive, both the Government and donors have kept a watchful eye on the new phenomenon of the growth in these local taxes. One of the Government's answer to this problem is the introduction of Government Decree No. 29 of May 1998 on the exercise of democracy in communes popularly known as the *Grass-roots Democracy Decree*. This Decree is to legalize people's direct participation in local decision making, as well as to establish transparency and accountability as mechanisms at commune level and upwards for the supervision of public programs and locally financed projects. It thus aims to improve *governance* at the local level.

From the mission field visit, however, it is apparent that neither local management of infrastructure construction nor grass-roots democracy has taken a strong hold in the villages in Central Vietnam. In one of the wealthy fishing villages visited, the headman pleaded for donor assistance to upgrade the village's roads and to build a safe anchorage for boats; complaining that he could only get 5 days of labour per year from each capable resident to help him maintain the village's infrastructure. This is despite the condition to fulfill Lao Dong Cong Ich, or public welfare labor requirements, whereby capable residents must donate labor for 10 days per year to local infrastructure works.

3.7 Relocation schemes remain too top-down and under-funded

The mission made a distinction between *resettlement*, moving from current housing to a wholly new ecological area; and *relocation*, moving from current housing to a similar area close by, sometimes within the same commune. Resettlement was not considered by the mission.

Throughout all seven provinces affected by the 1999 floods, there are plans to move thousands of families from natural disaster prone floodplains and unstable river banks to safer ground. Given reasonable compensation and assistance in settling into new areas, it was apparent to the mission that most families are pleased with the moves. In some sites, people were moved or plan to be moved less than 5 km away from their original residences; these people will be allowed to maintain use rights on their original lands.

Although officials responsible for these programs all tell of how they have discussed relocation plans with target populations and claim that all people move only on a voluntary basis, households are given little choice. In no case did the mission find schemes that compared the costs of installing infrastructure in current disaster-prone areas to make them less disaster prone, versus the cost of relocation to new areas. Further, it seems that no person or family unit is given the option of where to relocate. For families that hold strong religious beliefs, moving from the lands of their ancestors is not easy to accept.

At present, most relocation areas have rudimentary infrastructure and are on poor quality lands. New arrivals in relocation areas receive a small grant to build new houses and may be supplied with a tube-well. It appears that most provinces hope foreign donors will fill the present gaps and fund the construction of more reliable infrastructure and provide adequate assistance to relocated families.

3.8 Roles of international donors and NGO's are not well co-ordinated or focus mainly on relief

Since 1990, Vietnam has witnessed phenomenal growth in assistance programs of international NGOs, some of which have programs in the Central Coastal Region. Project strategies and activities vary considerably between different NGO's.

NGO funded and supported programs based in Da Nang Province and Thua Thien-Hue Province are involved in:

1. Integrated rural development
2. Nutrition
3. Infrastructure
4. Health
5. Agricultural production

At present, locally, only the Federation of Red Cross and Red Crescent Societies is explicitly involved in disaster mitigation and preparedness activities that come out of its current relief program. Even the large Rural Infrastructure Development Fund (RIDEF) project in Quang Nam and Da Nang, a main donor to the Government's Disaster Management Unit and an agency supported by the United Nations Development Program and the United Nations Capital Development Fund, has no activities related to natural disaster mitigation.

During the relief and rehabilitation of the 1999 floods, however, nearly all international donors and NGO's in the central region participated in relief operations. In general, NGO's procured relief funds from their home governments and then worked with local officials to distribute relief aid. For example, a German NGO, Malteser, that is conducting a nutrition program, became the conduit for European relief assistance for the flood. World Vision, which is conducting a community development project along with assistance to the disabled, became a conduit for American relief assistance.

**Assistance to My Dang, Binh Chanh, and Binh Son Villages,
Binh Son District, Quang Ngai Province**

In 1992, these fishing villages lost 70 fishermen at sea when a sudden typhoon struck the area they were fishing in. In addition to assistance from government sources, foreign donors sent assistance. The US Government, through Save the Children U.S., distributed \$25,000 in aid to families who lost a family member in the storm, in addition to general assistance to local health clinics. In 1997, Save the Children returned to Binh Son District to implement its nutrition education program.

4. RECOMMENDATIONS FOR EMPOWERMENT OF COMMUNITIES

Any integrated program for community disaster mitigation and preparedness should be tailored toward different levels of development in urban and in rural areas. This is recognized in the outline of possible areas for improvement and which Vietnamese organization/office should be responsible as shown in the logical framework in Figure 1.

Based on this logical framework, a preliminary list of projects, explained below and added to the Mission's proposals, should be considered.

4.1 Advanced disaster mitigation, preparedness program in Hoi An Town

As Hoi An town is already well on its way to having well designed natural disaster mitigation plans, foreign assistance to create a modern model for community flood safety based on natural disaster mitigation in the Central Coastal region should be effective here.

Last year Hoi An Town initiated a comprehensive program to prepare its residents for the coming flood season; the program was obviously successful with the result that there were no deaths from the massive 1999 floods. But despite the relatively small human losses, more can be done to improve the natural disaster mitigation and preparedness of the town. Additionally, Hoi An Town is an important historical center of Vietnam, designated as one of four locations in Vietnam as a World Heritage Site.

Activities in a project to assist Hoi An Town in natural disaster mitigation would include:

1. Procurement and storage of disaster supplies, provisions, and equipment
2. Study tours for local disaster management officials overseas to Holland, to the U.S., or to Japan
3. Training for local disaster management committees
4. Improvement of public information systems, based on participatory methods, including focus groups

As a modern model of disaster mitigation in this region, Hoi An Town will help give Vietnam an example at home of what the rest of the country should strive for, in addition to helping to preserve an important international historical site.

4.2 Traditional disaster mitigation, and preparedness programs in pilot rural communes

In addition to urban areas, it is vital to improve disaster mitigation in rural areas, where the majority of poor Vietnamese live. Beside, modern models for urban areas, donors should also develop pilot rural commune programs where all households are assisted with appropriate technology in flood mitigation and disaster preparedness.

The necessarily for this need results from visiting rural farmers who have been able to use local materials to help them in this effort. The focus should be on identifying local high-risk communes and progressive local households to serve as pilots in these communes. Flood mitigation and disaster preparedness materials and activities should all be inexpensive and locally available.

Some suggestions for this program are:

1. Supply of water proof plastic bags to protect critical family documents and ancestor records
2. Supply of used waterproof drums, such as used oil cans, for water proof paddy and seed storage
3. Supply of inexpensive personal flotation devices made of Styrofoam
4. Supply of inflatable dinghies for use by village flood mitigation committee members
5. Conducting training for village CFSCs, including national study tours
6. Conducting first aid and water safety courses
7. Improving provision of public information on disasters and floods; done in a participatory way, including focus groups

Ideally, most of these activities could be conducted by the following organizations and under the following existing projects:

1. Red Cross disaster preparedness local grass roots training progress
2. UNDP Disaster Management Unit project
3. Locally-based international NGO's with ongoing rural development projects in the central provinces

4.3 Incentive program for commune and village CFSC purchase of cell phones

Coupled with the natural disaster mitigation pilot programs suggested above, a program to ensure all communes and villages have access to a two-way emergency communication system should be instituted. For two-way local emergency communication purposes, all commune and village leaders should have access to a mobile phone.

The main problem, it appears, is the payment of communication user fees. Still, creative schemes should be instituted in conjunction with mobile phone providers if the mobile phones are primarily to be used to prepare for, to warn against, and to respond to natural disasters.

This program could easily fall under the same existing projects listed above and be implemented by the same organizations:

1. Red Cross
2. UNDP-Disaster Management Unit
3. Locally-based international NGO's with rural development projects in the central area of the country

4.4 Capacity development of casualty and life insurance programs

Currently, most life and casualty insurance is sold with the same face value in a given area to make the insurance scheme simple. Additional *loss of life* insurance, outside what is obligated for fishermen, is not readily available. In addition, incentives are not strong for local insurance offices to expand their services; salespersons do earn commissions, but these commissions are low. Local manager salaries are set according to the scales of all state owned enterprises.

Insurance programs should be more available and be flexible to cover all types of natural disasters. The state owned enterprises that monopolize the insurance industry should improve and provide disaster related insurance policies. This insurance could include:

1. Disaster insurance for agricultural crops
2. Disaster insurance for fisherfolk
3. Disaster insurance for housing and personal property

Activities to help the insurance sector with international insurance expertise include:

1. Development of disaster related insurance products
2. Assistance to Bao Viet for production of promotional materials
3. Instituting pilot flexible disaster insurance schemes in selected agricultural and fishing villages.

4.5 Public service announcement campaign on television and radio prior to the rainy season

A large range of general or area specific messages could be broadcast to improve public awareness of disaster preparedness. A short campaign should be initiated with Vietnam Television and Radio and a local provincial advertising company. Different announcements should be targeted towards all types of residents at risk, with technical and non-technical content such as:

1. The rating system for tropical storms and the different levels of related danger
2. What to do and what not to do, including the important information of not escaping into the attic area of the house if there is no escape route in case of a flash flood
3. Where to get more information on preparedness activities.

This project would be best mobilized under the UNDP-funded Disaster Management Unit.

4.6 Coverage of water safety and first aid courses and awareness programs to all villages

Schools or other organizations should provide courses in water safety, first aid and disaster awareness. Implementation of this program would most easily be done under both the UNDP-funded DMU project, which has already tested a small course book for elementary school training, and the Vietnam Red Cross.

4.7 Summary

With the projects and improvements in current programs in local disaster preparedness described in the previous sections, coupled with the necessary structural solutions recommended by other experts on the multi-donor mission, rural communities and people in the Central Coastal region of Vietnam will be able to cope even better with the storms and floods that they are destined to endure every year.

5. TERMS OF REFERENCE FOR SOCIAL DEVELOPMENT SPECIALIST

Background

As recommended by the Government of Vietnam and donor community at the CG meeting in December 1999, UNDP, together with the Royal Netherlands Embassy, is co-ordinating a strategic partnership of donors and the Government to work on a flood mitigation plan for the Central Provinces of Vietnam. Under the leadership of the Ministry of Agriculture and Rural Development (MARD), a partnership was formed among the Government and most of the donors in Vietnam. In January 2000, a joint UNDP-Netherlands Embassy mission was sent to the Central Provinces to prepare a TOR for a future Government-Donor mission to the afflicted area. The subsequent TOR indicated that the mission would carry out a comprehensive study of provinces damaged by the late 1999 flooding and would make specific recommendations for development projects for these provinces. The donors and the Government also agreed to prepare a program for the actions to be implemented before the 2000 flood season.

The comprehensive mission will be undertaken by a team of 20 international and some national experts under supervision of MARD. According to its TOR, the mission will be divided into four groups to investigate the following issues:

1. Management and co-ordination of integrated natural disaster mitigation policy
2. Institutional arrangement and capabilities
3. Emergency response, continuing relief, and rehabilitation support
4. Environmental and sustainable development; social development; and relocation of flood-displaced households

The social development specialist will participate in the mission and conduct a study of the issue of community empowerment and participation in flood prevention and mitigation. This study is important because the impact of the recent floods was limited because of the assistance provided by individual members of the village or community who were living in the flooded areas. As a result of the timely actions of those at the *grassroots* level, a question has been raised: how do we build on their capabilities and further strengthen the capacity of farmers and communities to protect themselves during flooding? In addition to the creation of flood-prevention groups, participatory flood-prevention planning is one answer to this question. To further identify how best those at the local level can respond and cope during emergencies, UNDP has included an expert with sound experience in community empowerment and community participation in the comprehensive mission.

Objective of the study

The overall objective of the specialist's mission will be to assess how farmers' groups can help themselves by planning for and implementing flood-fighting action plans. The specialist will then formulate concrete recommendations for Government and donor support for community empowerment in flood prevention and mitigation. As expected outputs, the final report should answer the following questions:

1. How did communities and farmers help each other to overcome the recent floods? What were their constraints at that time? What are their expectations for sustaining themselves during future floods?

2. To what extent have farmers and communities been equipped and organized to cope with floods?
3. What is the current institutional environment to support farmers and communities in their efforts to protect themselves during heavy flooding?
4. What are current Government policies? How should they be changed to facilitate the mobilization of farmers and communities in preventing and mitigating flood impacts?
 - 4.1. How can communities and farmers participate in the various disaster management works to be provided by government and donors to ensure project targeting, effectiveness, accountability, and transparency? These works include disaster awareness and preparedness, rescue and relief, mitigation of impacts, and monitoring/impact assessment;
 - 4.2. What work can be delegated to the communities and best done by the communities themselves? For example, are local preparedness planning: the procurement of needed resources, both human and material: and financial matters best handled at the local level?
 - 4.3. How can the capacity at local levels be strengthened to ensure community empowerment and community participation?

Specific tasks

Duties: The specialist will receive guidance from the UNDP Unit of Social Development, but will work under the direct supervision of the mission team leader. The specialist will carry out specific tasks as follow:

1. Study background documents on the flooding in the Central Provinces in late 1999. These documents are available from the Government and the Fact-finding Mission Report, as well from donors. The study should focus on how farmers and communities were affected by the floods, and how they were able to rely on themselves during those difficult times.
2. Review and assess Government policies and the implementation of programs established after the November/December 1999 flooding that relate to flood mitigation and preparedness for the coming flood seasons in Central Vietnam. This should include any related guidelines or manuals for implementation of the policies and programs. The review will focus on the community empowerment and participation implications of the policies and programs.
3. Review and assess the institutional framework and capacity of the local institutions, focusing on district and commune levels for implementation of these policies and programs. Specify barriers, challenges, and problems inherent in the implementation process.
4. Carry out fieldwork with other mission members to evaluate the impacts of flood on the social life of poor farmers, and to assess how farmers can manage by themselves to help their community to cope with the floods. What difficulties did they meet during their fight against the 1999 floods? What are the constraints in the local institutional and policy framework for supporting, mobilizing, and co-ordinating the efforts of people and communities in flood prevention, planning, and management.
5. There may have been an attempt to assess the impact of the flooding on poverty levels in the flood-stricken areas. If such information is available,

collect completed province, district, and commune poverty assessments and data from both before and after the 1999 floods. If these assessments have not been carried out, the consultant can facilitate PLAs/PRA's in a few representative communes so that the farmers can assess the impact of the floods on their livelihood; the effect of relief provided by their own communities, by government at all levels, and by national and international agencies; and the work done on disaster management and preparedness. The specialist should assess how the needs of farmers for disaster prevention can be met via a participatory approach. The specialist should also assess how farmers can best develop a plan for disaster preparedness for the coming flood season. PRA/PLA tools can also be used to assess the capacity of those at the *grassroots* level to implement a participatory approach.

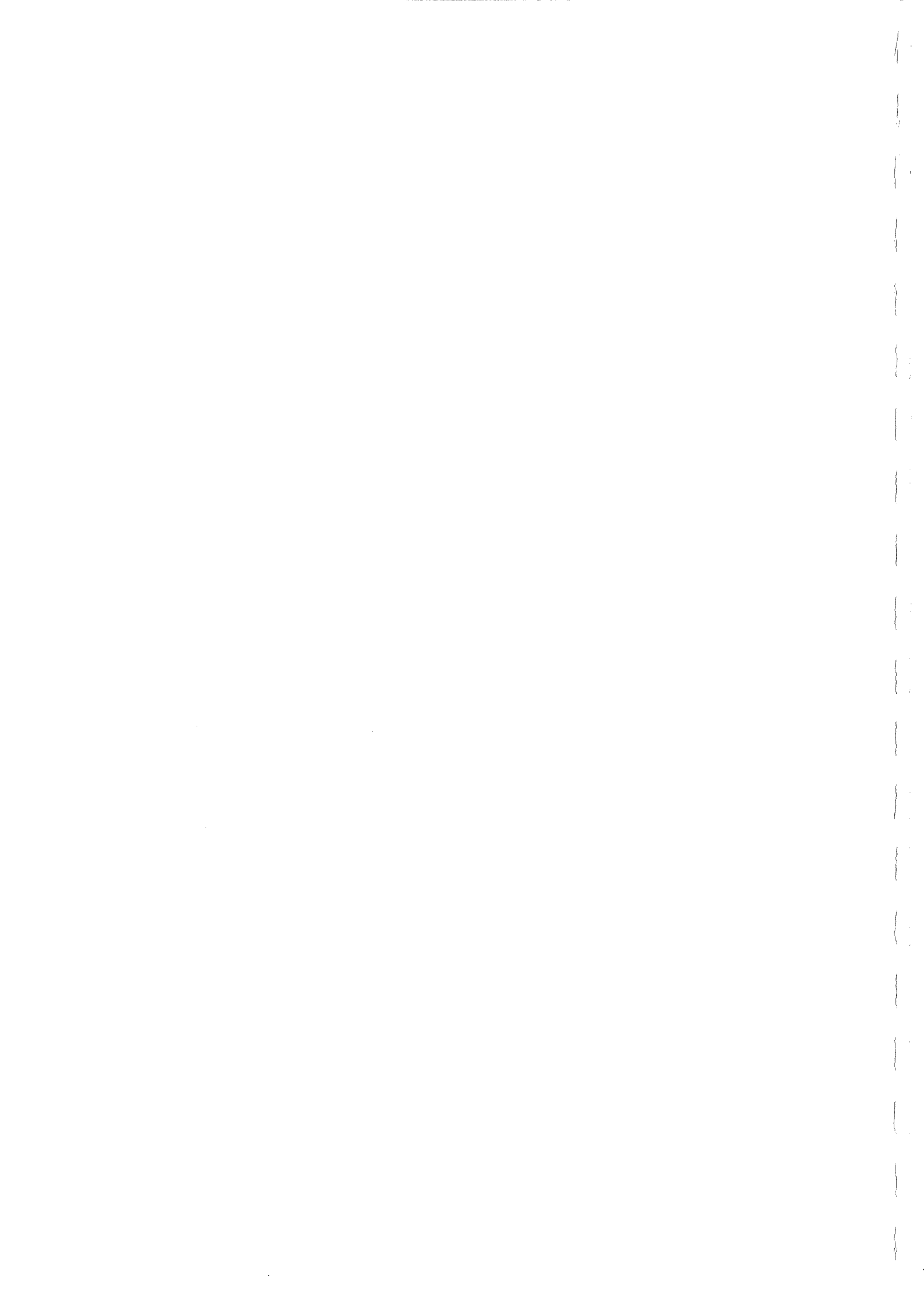
6. Prepare an analytical report on community empowerment and participation in flood management in Central Vietnam. The report needs to address the background situation and needs to include analyses of all aspects of the problem based on the provided background information and field data. The report then must clearly identify problems to be addressed and make concrete recommendations for solving problems in the short and long term. Specific proposal ideas for capacity building and investment projects in the region should be included.
7. Discuss the report with the mission members and the Government; and integrate their comments and opinions into the report.
8. Work as a representative from UNDP when requested.

Figure 1. Logical Framework for Integrated Local Area Programs in Flood Disaster Management

Level	Systems	Suggestions for improvements: by whom
Commune/Village	<p>Infrastructure management</p> <p>Rescue equipment</p> <p>Evacuation plans</p> <p>Communication/information</p> <p>Communal health & sanitation</p>	<p>User groups, fees, taxes, commune borrowing instituted with transparency, under democratic systems: Govt.</p> <p>Appropriate, depending on area: Commune/village CFSCs</p> <p>Full plans for all HHs: Commune/village CFSCs Cell phone coverage to commune/village CFSCs points: Govt.</p> <p>Safe water supply, medical equipment: Govt., health service</p>
Household	<p>Farming and off-farm production</p> <p>Property/supplies protection methods</p> <p>Insurance</p> <p>Health & sanitation</p> <p>Communication/information</p> <p>Safe housing</p>	<p>Demonstrations with new crops/livestock: Extension Service</p> <p>Demonstration households established: MOs</p> <p>Pilot incentive programs: Government, Bao Viet Insurance</p> <p>Demonstration programs: Health Service, MOs</p> <p>Courses, brochures: Commune CFSCs, Mos, Red Cross</p> <p>Demonstration households: MOs</p>
Individual	<p>Water safety</p> <p>First Aid</p> <p>Disaster awareness</p>	<p>Courses/contests in schools: Ed. Departments, Red Cross</p> <p>Courses: Education Departments, Red Cross</p> <p>Courses, materials: Commune CFSCs, MOs, Ed. Department</p>



Advance



Attachment 6

Environmental Sustainability and Natural Disaster Mitigation

By
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and
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**ENVIRONMENTAL SUSTAINABLE DEVELOPMENT
IN NATURAL DISASTER MITIGATION PROJECT PLANNING,
SELECTION, AND PRIORITIZATION**

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ENVIRONMENTAL SUSTAINABLE DEVELOPMENT IN NATURAL DISASTER MITIGATION PROJECT PLANNING, SELECTION, AND PRIORITIZATION

1. INTRODUCTION

Sustainable approaches for natural disaster mitigation project planning, selection, and prioritization are clearly needed in Central Vietnam. Recent floods, droughts, and typhoons have clearly underlined the vulnerability of this part of the country to natural disasters.

Poverty, which is inevitably linked with environmental degradation and inappropriate environmental management practices, are partly the result of survival strategies of the rural poor. For the poor, for example, forests represent a source of food, income, and fuel wood. The result is that river catchments face serious soil erosion problems due to deforestation. It would be futile therefore to attempt to commence with an effective natural disaster mitigation action program without focus on poverty reduction and environmental sustainability as a necessary first element of the program.

This report on environmentally sustainable development has been prepared for the Multi-donor mission to Central Vietnam, in support of the Central Province Initiative Partnership (CPI-Partnership) to Mitigate Natural Disasters in Central Vietnam. During this work a number of immediate to short term measures, and medium to long term measures have been outlined and proposed as being most relevant to mitigate against future natural disasters in the Central Region of Vietnam

The goal of this program is to develop an environmental methodology to assist in the selection and prioritization of natural disaster mitigation projects. An environmental methodology based on sustainable development concepts, which takes into account sustainable natural resource management, considers existing environmental conditions, and incorporates a participatory approach to ensure community interests are necessary in the program and project decision making process.

The overall objectives of this sustainable environmental methodology are therefore:

- To strengthen Provincial Governments capacity to integrate environmental issues into investment projects for natural disaster mitigation planning
- To raise awareness of sustainable development issues among planners, decision makers, and communities for natural disaster mitigation
- To demonstrate capacity and awareness by integrating regulatory, economic, and voluntary approaches to addressing priority problems by selecting priority projects in the Central Provinces which both mitigate against future problems arising from the major flooding which occurred in late 1999, and meet sustainable environmental development objectives

2. KEY ELEMENTS OF THE APPROACH

To achieve the CPI-Partnership objectives, the Partnership methodology will pay particular attention to the following:

- *Strengthening of local institutions:* To build human capacity and social development
- *Networking:* To sensitize the main participants involved in development planning and investment decision-making for natural disaster mitigation to the benefits of environmentally sound and sustainable development
- *Policy options and institutional issues:* To identify any structural or institutional factors which currently discourage natural disaster mitigation planners from considering environmental issues in mitigation planning

The Partnership methodology will seek to identify a number of small scale pilot projects within the community which meet the objectives of alleviating poverty and take account of environmental protection and social issues. The pilot projects will also assist in building capacity within Vietnam to ensure that environmentally sustainable development is incorporated into planning approaches for natural disaster mitigation planning.

Using these pilot natural disaster mitigation projects, the aim is to develop:

- Working models, procedures, policies, and standards that can be replicated
- Support tools including handbooks, guidelines, checklists, and manuals
- Systematic documentation of the methodology to be followed
- Modules and materials that can be used for training
- A cadre of trained professionals
- The development of environmentally sound proposals in each of the Central Provinces

2.1 Sustainable Development

Within the National Strategy and Action Plan for Mitigating Water Disasters, it is specified that "*the development of watersheds, floodplains, and coastal areas must meet the needs of today's generation but not inhibit future generations from meeting their needs as well*". Thus, there is a need to operationalise sustainable development objectives so that they can be put into practice in a meaningful context.

One of the first needs to be addressed in future development planning is to be able to forecast both the immediate impacts of disaster mitigation projects, and the resulting cumulative environmental effects of the projects. The appropriate and comprehensive development of integrated disaster management requires enhanced environmental planning tools, which further involves the full participation of the communities themselves in the planning process. The planning process must ensure participatory project preparation, which takes specific account of the poorest sections of society including marginalised and disadvantaged groups.

There is a need for a change in attitude with regard to project planning. Planners and decision-makers need to provide more alternatives to project proposals and to consider more widely the implications of natural disaster mitigation interventions. For example:

- Should irrigation projects consider future provision for extension of service delivery development, assess to credit, and agricultural input requirements
- How should credit programmes consider the need for meaningful agricultural insurance mechanisms for loan applicants in the event of a disaster, and the related need for changes within the national credit policy environment

2.2 Methodologies for Operationalizing and Measuring Environmental Sustainability

There are two principal approaches to operationalizing and measuring environmentally sustainable development, which can be adopted to put into practice sustainable development objectives for natural disaster mitigation planning. These are a *sectoral approach* and a *problem specific* approach.

Sectoral Approach to Environmental Planning

An example of a sectoral approach to environmentally sustainable development is a Strategic Environmental Assessment (SEA). SEA as a program and project planning and management method is especially well suited to Central Region natural disaster reduction program and project preparation.

A Strategic Environmental Assessment is an overall measurement of the effects of competing programs and projects upon each other with the view of directing environmentally sound programs and projects to where they are most needed. Using SEA as an overall management tool also facilitates the maintenance of a chosen environmental quality rather than simply monitoring problem related indicators or minimizing impacts of environmental interventions. SEA is particularly pertinent in Central Vietnam where there is significant environmental deterioration and where the related impacts of structural natural disaster mitigation projects may have numerous negative effects. A SEA used as a framework for project planning will offer a tool to direct environmentally risky projects away from sensitive areas; and direct environmentally beneficial projects to areas already facing serious problems. It will also provide planners with the necessary screening methods needed to select programs and projects based on pre-selected environmental criteria.

The commitment of government authorities and local communities to the SEA process is crucial. When program and project preparation is made with sensitivity and sound justification, and with extended discussions at every stage of the preparation process, then forces can be joined behind the SEA approach. Further, it is important to involve official authorities, the private sector, the non-government sector, and impacted communities.

The SEA approach is relatively new and unknown in Vietnam. Therefore, it is suggested for the purpose of this methodology that a *problem-specific* approach to sustainable development be initially adopted, but enhanced by concepts inherent within a SEA. This will allow for the proper environmental focus when screening, selecting, and targeting natural disaster mitigation activities; where environmental criteria result in a self-selecting procedure which guides project siting and technical content.

Preparation of the SEA Protocol

The complex multi-stakeholder situation in the Central Vietnam, with its numerous environmental problems, needs a comprehensive framework for natural disaster mitigation program and project preparation. SEA provides such a contextual framework, well suited to the existing physical situation.

One of the first SEA tasks will be to agree on a protocol for program and project preparation and to agree upon the use of SEA if deemed useful by all parties. Some key principles to be addressed in the protocol are:

1. A screening mechanism to determine if and when SEA is needed
2. The roles and responsibilities of communities, authorities, and other stakeholders
3. Techniques for the participation of various groups in the SEA

In addition, three principles may be used to measure the efficiency of a planned program or project activity under the SEA based on the question "How does the planned measure reduce vulnerability to the effects of natural disasters, create opportunities, and ensure equity on a sustainable basis?"

1. Reduce vulnerability

Many people in the Central Provinces live in a precarious situation, particularly the poor and near-poor households; where illness, failure of crops, or natural disasters may destroy the family economy and start a downward slide. In a program context the methods of reducing vulnerability are numerous. Initiatives to address these issues may include social funds, funds held within savings groups, reduction of health costs, and reduction of educational costs. Many infrastructure improvements such as water management to reduce the effects of flooding will reduce the disaster vulnerability of households in the program area. Similarly, water supply systems lower the incidence of illness.

2. Creating opportunity for the poor people to improve their situation

Many of the proposed disaster mitigation programs should be primarily designed to have impact on poor households. Poor households can be offered an opportunity to increase their assets in terms of land holding, finance, housing, and other factors. In the project-planning context, the program may promote schemes of enhanced employment, credit, and other pro-poor initiatives.

3. Ensuring equity and even distribution of the economic growth of the area

In the SEA context this means equal opportunity for everybody to access the program schemes, transparency, and accountability of the decision making processes; and participatory methods of planning and decision making, to ensure that the voice of the target population is heard.

This SEA approach would still allow for the identification of specific policies and activities that bring about desired changes to specific target problems such as salt water intrusion into water resources and aquaculture; damage to agriculture; relocation and resettlement of communities in at risk areas, and other natural disaster problems. If the impact on a target problem is reduced or eliminated over time as intended, then sustainability can be said to have been achieved in that target problem area. The sustainability achieved in a given economic sector or a community is also the aggregate of the sustainability achieved in the individual target problems within the water basin.

Sustainability Indicators

It will also be necessary to define and agree with the provinces for appropriate *sustainability indicators* which will be used to measure changes in the impact of the target problem over time. This will determine how the target population is responding to the policies or measures implemented for impact alleviation or elimination. The monitoring tools and indicators will be selected based on their relevance to environmental, social, and economic conditions; the priorities identified in the Central Provinces of Vietnam for natural disaster mitigation; and the environmental and sustainable development goals for the target river basin. The indicators to be established need to be measurable by available data and must provide a clear representation of progress being made at the local level of government and the community.

Development Indicators

For each target problem, sustainability indicators will be developed to measure the extent to which the proposed solution or policies are reducing negative environmental impacts over time; and therefore by this definition giving more sustainable development. In this approach, there will be a need to highlight appropriate policy options or policy scenarios and to verify sustainable development through a process of public participation and feedback.

Sustainability indicators and development indicators will be tested to address individual target problems in the seven Central Provinces. These will be monitored and measured quantitatively to evaluate whether the program and project policies are working. If the impact of a given target problem is found to be diminishing over time, then it will be said to be moving towards sustainability.

Development of a Local Sustainable Development Indicator (LSDI) will be made to measure how a community's quality of life is improving or deteriorating over time by taking into account the sustainability of the activities undertaken.

2.3 Urban and regional planning

In Vietnam, planning is currently based on long term strategic planning, and short to medium term annual development planning at both the regional and the local level. Future investment planning considerations identified within natural disaster mitigation programs for the provinces need to be reviewed to evaluate whether a program or project adversely impacts upon pre-determined sustainable development criteria, and which could impact upon future natural disasters both positively and negatively. Strategic plans will be reviewed to evaluate how sustainable development principles, combining economic development and natural disaster mitigation, can be incorporated into the key decision making process for natural disaster mitigation. Plans which will be considered are long term strategic plans, medium term five year plans, annual plans, regional plans, and local development plans. A table showing how these different plans should be considered is given below.

The table below shows the use of SEA in the different levels of the planning process. The SEA will mainly work as an overall management framework and be effective in the higher level of planning and decision making where policies, guidelines and criteria are formulated. When individual projects of any size or nature are proposed, they will still go through the EIA process. The advantage of the Strategic Environmental Assessment is:

1. Risky or unsustainable projects will be screened away in early
2. The planning process will guide inappropriate projects away from sensitive areas
3. The planning process will give alternatives to projects with negative environmental impacts for achieving the same goals

Plan Context	Example of Contents	Stakeholders Involved	Method of Planning
Contextual Framework	- Statements of agreed policies - Objectives	National	SEA - Environmental assessment of the impacts of the agreed policies
Development Framework	- Specific guidelines - Screening criteria - Loan criteria	National Provincial	SEA - Environmental screens - Forecasting of impacts of guidelines
Commune Plans	- Common goals - Proposed development plans - Priority issues - Master plans - Common restrictions - Natural resource management plans	District Commune NGO	Vision planning Participatory planning Gender analysis
Individual Projects	- Proposed projects - Loan applications	All clients and client groups	Environmental Impact Assessment (EIA) Monitoring and Evaluation

2.3.1 Institutional Reform

Some of the policy measures that may be recommended by natural disaster mitigation programs and projects within provinces may require institutional reform, such as the need to establish river basin management organizations. A realistic review of proposed institutional arrangements must be made taking into account the Vietnamese government functions now, and any proposed changes in the future. A participatory approach must be adopted throughout the project cycle in which the guidance of a spectrum of government officials will be sought. This will ensure that recommendations are rigorous in terms of bringing about more sustainable approaches to development planning, are politically acceptable, and are able to be implemented in the local context.

2.3.2 Legislative Reform

There are at present no suitable regulations in Vietnam that require agencies responsible for disaster mitigation planning to take environmental concerns into account. In this methodology, a rapid, comprehensive review of natural disaster mitigation planning, resource management, land use planning, and river basin management legislation will

be carried out. This will evaluate whether existing project provisions fully take account of and fully integrate appropriate standards of environmental performance and assessment.

During the last decade in Vietnam, the enabling environment for rural development has improved significantly through a number of policy and legislative changes at the national level. Land ownership and the use of land has been liberalized through Land Use Rights under new Land Laws. This has resulted in large areas of land being taken into tenure by individual farmers and has also resulted in diversification of agricultural production. Similarly, laws and policies have enhanced the framework for forest land allocation to communities and individuals.

There have also been significant changes in the marketing of agricultural inputs, and the marketing of agricultural produce has been liberalized. Credit institutions like the Vietnam Bank for Agriculture and the Vietnam Bank for the Poor have been established to provide subsidized credit directed to the poor. However, the requirement to create sustainable rural credit institutions serving the needs of poor and marginalised groups are beset with problems. On the other hand, possibilities do exist if lessons are learned from the activities of small credit and savings groups supported by mass organizations such as the Women's Union and the Farmer's Union.

2.3.3 Participatory Planning Process

An essential element of this approach will be to promote a transparent and participatory planning process involving all concerned players within the river basin, including community leaders, and representatives from social unions. This will be achieved through a decision making and consensus building process within communities, which are directly impacted upon during natural disasters. A participatory approach can be promoted by developing strategic Sustainable Development Action Committees, and local level Residents Groups in key areas.

The key to successful implementation of a genuinely participatory approach will be to achieve a balance between meaningful participation and consensus, and program and project implementation schedules. Clear and realistic targets must therefore be set. Decisions once made, must be clearly documented, disseminated, and immediately acted upon.

2.3.4 Good Governance

Good governance at the project level requires the participation of stakeholders in the project planning process and transparency in decision-making. Principles of accountability will be followed allowing project stakeholders to access information and to participate in the detailed planning process. This will require considerable development time during project preparation and implementation. Transparency, including the clear and understandable presentation of plans, and avoiding technical jargon in dealing with stakeholders, is also an important requirement of good governance.

At the national level, the *Grassroots Democracy Decree* is an important supporting initiative, which provides an opportunity to improve the transparency of local government and to provide households with more information about local government activities and finances. This decree is in the early stages of implementation, but will

work towards the same goals as the methodology; and both initiatives will support each other.

2.3.5 Tools for Environmental Planning

The SEA method will form the overall framework for natural disaster project planning. In the different stages of project preparation, appropriate methods and different tools will be used. A short overview of the following methods and their suitability is given below:

- Sustainable Development Vision (SDV)
- Participatory Rural Assessment (PRA)
- Gender Analysis
- Planning Standards and Guidelines
- Environmental and Social Impact Assessment (EIA)
- Geographical Information Systems (GIS)
- Monitoring and Evaluation Criteria (M&E)

The selection, refinement, and application of planning tools to move the programs and projects towards their objectives will be made. This will be performed on the basis of technical considerations, and also on the basis of achieving maximum value in terms of realizing the essential capacity building and participatory components of each program and project.

Sustainable Development Vision (SDV)

It will be necessary to develop what is called a *Sustainable Development Vision (SDV)*. The SDV will incorporate considerations of all strategic national, regional and provincial concerns including economic plans, development plans, and programs; existing local land use and investment plans; central area redevelopment proposals; ministerial, departmental and community plans and programs; and other relevant components. It will offer an opportunity to visualize real benefits and disbenefits, in particular to obtain an early indication of the broad order of costs and likely environmental implications of proposed disaster mitigation measures.

Participatory Rural Assessment (PRA)

Vision planning using Participating Rural Assessment (PRA) and Rapid Rural Assessment (RRA) at the village and commune level is important. It is also a necessary tool to be utilized with the SEA as it carries the idea that there are many ways to reach the same future condition. This corresponds well with the idea of finding environmentally sustainable alternatives for program and project proposals. PRA will be used for both baseline information gathering as well as for planning for pilot projects. The methodology will use PRA and RRA methods such as poverty mapping, resource mapping, seasonal calendars, and others relevant tools. The important issue will be to collect information from all groups. These groups are most importantly women from low income households, groups of ethnic minorities, invalids, and other marginalised populations.

Gender Analysis

Gender roles and division of labour between gender and age groups assessed through Gender Analysis will be part of project planning. Women's focus groups and formal women's organizations will also be consulted and their co-operation sought. Women are strategically posed in all poverty related questions in many ways. Firstly as a target group, women suffer from poverty often in the situation when they are sole income providers for the family. Secondly, women even in two adult families, are in charge of the household

food supply, household economy, family health, and the social duties of caring for the young and old. Women therefore are the main source of important information on household level issues as well as being most suitable to be project planners as well as managers of projects and programs.

Planning Standards and Guidelines

Planning Standards and Guidelines provide the framework within which disaster planning should be undertaken. Planning guidelines and standards will be used for preparing all sustainable development plans for programs and projects.

Geographical Information Systems (GIS)

A Geographical Information System (GIS) is a powerful tool for environmental planning. The methodology will make as much use of this tool as possible in providing the basis to evaluate proposed programs and projects to understand the potential implications of disaster mitigation proposals, to assess environmental impact, and to provide the basis for sustainable development planning. GIS can be used to predict land suitability, model the effects of mitigation on river basins, compile environmental baseline data, and other work. It is however, important not to use GIS mechanically or out of context. Further, GIS must be accepted through stakeholder and community participation in the planning process. Attention must also be paid to clear presentation of the GIS data.

Training courses in GIS and the use of mapping software will be utilized, in association with flood inundation mapping. The intention is to develop GIS in the provinces to fulfil the following objectives:

- Archiving of all data which are to be used in natural disaster mitigation planning
- Database preparation with appropriate thematic content to facilitate sustainable land use planning
- Linkage of a range of data sources and tools to flood plain zones, natural resource maps, environmental problems, environmentally sensitive and vulnerable areas, and development planning maps
- Retrieval systems which can be operated by key staff in provinces with only limited GIS training
- Graphical reporting with maps, charts, and graphs
- Multi-criteria or overlay analysis and scenario modelling
- Capacity building through the provision of manuals and training for local departments with emphasis on basic GIS skills, data retrieval, and mapping

Hydrological Modelling

Hydrological modelling is particularly useful when forecasting the impacts of different program and project alternatives and when trying to find strategic solutions to flooding and river erosion problems. But the first task, even before runoff models can be validated, is creation of a hydrological measurement network that does not currently exist in Central Vietnam.

Flood Inundation Mapping

Flood inundation mapping is a valuable tool for reviewing and anticipating the effects of different mitigation activities. It is also valuable for raising public awareness and for providing effective materials for disaster training and education.

Environmental and Social Impact Assessment (EIA)

EIA is a well-established environmental management tool in Vietnam. EIAs are generally prepared by the donor or by a consultant or other organization appointed by a donor or government agency. In considering the environmental implications of a mitigation proposal it is necessary to consider all sectors that might be affected and the linkages and synergies between them, short and long term impacts, the reversibility of impacts, and alternative approaches that may be taken.

Monitoring and Evaluation Criteria

Monitoring and Evaluation is also an essential planning tool. Early on in the development of the methodology, evaluation criteria will be developed to assess the degree to which alternatives meet objectives. Later in the process, performance monitoring and evaluation criteria will be needed to assess success in meeting both natural disaster mitigation goals, socio-economic development objectives, and sustainable development targets.

Monitoring and evaluation of the mitigation programs proposed by both local and Central Government and the various international donors will be undertaken as part of the methodology. A system for monitoring and evaluation will be devised so that counterpart staff can continue to monitor short term progress; and to review, monitor, and adjust the long term plans as they are implemented. To ensure quality, transparency, accountability, efficient use of resources, and realization of the natural disaster reduction objectives, the Partnership needs to have reliable information about implementation. The monitoring and evaluation system needs access to local and community resources to be able to do this work. Community monitoring systems require the development of appropriate community development tools, as well as documentation and training programs for local level Partnerships.

The monitoring system will follow the same indicators defined for the baseline situation. It will also monitor changes in management practices, effectiveness of incentives, and area distribution of the projects in relation to environmentally damaged or sensitive areas. Decision makers need to have a system to feed the management information back into program and project implementation and the planning process. This means that there needs to be feedback throughout the project cycle.

2.3.6 The Role of Environmental and Socio-Economics in Sustainable Development Planning

In the methodology, there will be a need to prioritize financial decisions in developing sustainable plans for natural disaster mitigation in the Central Provinces. There are clearly limited financial resources available to address the economic, social, and environmental problems arising from the frequent natural disasters which beset this region. One of the key issues that must be addressed is the need to effectively prioritize projects for funding by central government, local government, and the Donor community; so that revenues are found to fund much needed infrastructure and environmental improvements.

The integration of environmental economics into investment planning is therefore critical to ensure that sustainable development happens in practice. This requires that the following two main principles are observed:

- Decisions over resource use should be based on their true long-term costs. There is a need to introduce financial incentives to motivate economic actors to use resources in line with their true costs. This entails internalizing environmental and social costs into the price of resources.
- The most cost-effective options for reducing environmental damage should be found. This is critical in showing the most environmentally effective options available within a limited budget.

A number of instruments and concepts of environmental economics will be recommended for testing or consideration by policy makers; and where feasible, some of the instruments will be tested within a number of the mitigation programs and projects. These may include:

- Internalizing environmental and social externalities
- Environmental cost-benefit analysis (CBA)
- Benefit valuation
- Market-based instruments
- Financial project appraisal

Targeting the Poor

The problem of many initiatives, after defining the desired target group, is how to target the group accurately. For example, many employment programs or subsidized credit schemes do not reach the intended target group. This problem can be addressed by:

- Having clear poverty indicators of economic and social nature including income, land assets, family size, occupation, educational level, health, and nutritional status
- Having self selecting screening methods

Targeted employment schemes, which are a means to raise the incomes of the poor in disaster prone areas, can for example be labour-intensive disaster mitigating infrastructure development projects. The daily wage rate has then to be low only to attract the workers. Likewise credit schemes can be directed towards small-scale economy, such as poultry keeping that will not attract wealthier loan-seekers.

2.3.7 Role of an Environment Investment Fund

The use of environmental funds will also be considered to provide funding to help channel much needed resources to natural disaster problems which impose real and significant costs on society. Environmental funds can ensure that resources are used in a cost-effective manner. Consideration of using these funds for financing small scale demonstration projects which meet the three criteria of disaster mitigation, poverty alleviation, and sustainable development will be considered. Example pilot projects which may be considered include evaluation of alternative farming systems on sand and seawater intrusion areas in the coastal flood plain; relocation of communities on at risk areas in the coastal flood plain; soil resource surveys in upland areas to evaluate appropriate crops; new forestry options; and other similar schemes.

2.4 Capacity Building

Professional capacity building, both institutional and individual, will be a top priority in the methodology. The goal is to influence the attitude and perceptions of professionals and decision-makers involved in natural disaster mitigation planning in order to strengthen the link between environmental protection policy and natural disaster mitigation development policy. Capacity building activities will be considered through training, networking, and information dissemination.

2.4.1 Training

Another objective of the methodology is to provide in-depth, on-the-job training to the target audience in all relevant subject areas of real local need that are important for bringing about sustainable development planning and investment for natural disaster mitigation in Central Vietnam. This will include an assessment of training needs, identification of support tools, and development of a strategy for training for professional capacity building.

A training program will be prepared drawing on the lessons learned in each of the natural disaster mitigation program areas implemented in the Central Provinces. This will include preparation of new training materials building upon existing materials. Training materials will be tested and adapted as appropriate during a trial implementation period. A train the trainers approach will be adopted to ensure that national counterparts are able to sustain this capacity building initiative. EIA training for both practitioners and decision makers will be offered.

In the methodology, consideration will be given to strengthen the capacity to undertake and review EIA's in Central Vietnam by providing a comprehensive set of procedures together with tools such as checklists and guidelines relating to disaster mitigation.

2.4.2 Networking

Networking including communication, co-ordination, collaboration, and informal consultation between the main actors in natural disaster mitigation planning and environmental management are still weak in Vietnam. This lack of effective networking is likely to hinder the integration of policies and measures for sustainable development in natural disaster mitigation. It is proposed to identify forums and mechanisms for networking to try and overcome resistance to full and open communication; and to test innovative and creative ideas in the Central Provinces. This networking will be integrated into the new flood warning network, which is likely to be built in the near future.

Adopting uniform procedures, such as the environmental screening requirements of major donors, is needed. Work ongoing in the upper catchment areas of the O'Lau River Basin in Thua Thien Hue and Quang Tri Provinces, and afforestation programmes planned in Quang Tri are all examples of where cooperation and cross learning are likely to reduce development costs and to pay development dividends.

2.4.3 Information Dissemination

Another key aspect of capacity building is the effective dissemination of information to all stakeholders and interested parties. A CPI Partnership web site has already been developed to provide a focus for dissemination of information relating to natural disaster mitigation in Central Vietnam. Including sustainable development issues in the selection of appropriate natural disaster mitigation projects will further enhance this information exchange.

Other information technology mechanisms will be reviewed for the Partnership such as local resource centres to disseminate information to the community as a whole in order to achieve a fully participatory approach to disaster mitigation. Dissemination of information at the grass-roots level can be a powerful tool to bring about changes in both attitude and practices to promote local and regional sustainable environmental development.

2.5 Public Awareness and Gender Equity

Broad public participation in environmental decision-making is included in the policies and procedures of most multilateral and bilateral donor organizations; as well as being government policy in Vietnam. The guiding principal behind Public Participation and Consultation is that popular support for an initiative can be greatly increased if the public is adequately and comprehensively informed; and if planners and developers actively seek their views. It proposes that the community be involved in the preparation of the Sustainable Development Vision (SDV) in each program area.

It is proposed that the CPI-Partnership will work with each of the Provincial People's Committees to find ways of involving the local communities directly in the formation of the SDV and in the development of sustainable development plans through natural disaster mitigation. The cost of the public participation program will be funded through the Partnership, and a pilot project involving an awareness campaign in one of the river basins will be selected during program implementation.

Gender Equity

In the context of this project, the approach will be to promote gender equality to the greatest possible extent. Two of the most important vehicles for achieving this will be:

- *Public participation:* Efforts will be made to recruit a proportionate number of women stakeholders to participate in public forums, representations, and discussions.
- *Professional capacity building:* Every effort will be made to ensure that as many women as possible are included within the on-the-job and more formal training that is undertaken as part of the CPI-Partnership.

3. GENERAL APPROACH IN EACH PROVINCE

The CPI-Partnership approach to a more sustainable environmental policy for natural disaster mitigation is a three-step procedure. The approach will be tested based on individual river basins in each of the Central Provinces. The methodology involves three main stages, summarized as follows:

- Stage 1:** Inception and awareness raising
- Stage 2:** Background research, mitigation project implementation, and working model development
- Stage 3:** Consolidation and documentation

These three steps are summaries in the table below:

Stage/Activity
<p>Stage 1. Inception and Awareness Raising</p> <p>A technical project support unit will be developed with key professionals at the provincial level to facilitate collaboration in:</p> <ul style="list-style-type: none"> - Developing the SEA protocol - Planning and implementation of stakeholder seminars - Selection of natural disaster mitigation projects to be included as pilot projects within the program framework - Background studies - Building a Sustainable Development Action Committee and selecting members to participate - Developing local Residents Groups - Implementation of Sustainable Development Action Committees (SDAC) in the Province including representatives from the community, the tourism industry, civic interests, relevant local government and People's Committees, and selected resident representatives of the area. An adequate number of women representatives will be required
<p>Step 2: Background Research, Mitigation Project Implementation, and Working Model Development</p> <p>Background studies that are relevant to the overall objectives of the Partnership will be conducted at the central and provincial level. These reports will constitute the diagnosis of the present situation in the provinces. These reports will also be important to assist in establishing priorities for natural disaster mitigation actions and in developing a long-term vision for environmentally sustainable natural disaster mitigation activities.</p> <p>Examples of proposed background studies are shown in Table 1.</p> <p>Pilot project implementation</p> <p>The pilot projects selected for testing of the Sustainable Development Vision (SDV) will be implemented. Development of a working model on strategic disaster management planning will be based on inclusion of mitigation projects by local government, central government, and the international Donor community. After identification of the main environmental issues, a consultative process involving the relevant stakeholder groups will be undertaken to establish the following:</p> <ul style="list-style-type: none"> - How the proposed mitigation projects correlate with the priorities for action based on the Sustainable Development Vision - Reconfirmation of medium and long term objectives - Final workplan for the production of the working model

Stage/Activity

Step 3. Consolidation and Documentation

Experience gained through the success of different natural disaster mitigation programs and projects meeting the SDV will be documented and made accessible in an appropriate format for natural disaster mitigation planners.

Project experience will be summarized and used to develop a training course for natural disaster mitigation. Experience will also develop support tools to aid natural disaster mitigation planners in the screening of projects.

4. REQUIRED INFORMATION, AND STUDIES

A wide range of background studies economic analysis and outputs are required for the sustainable environmental methodology for natural disaster mitigation assessment outlined above. These requirements are given in Table1.

TABLE 1
Examples of Background Studies for Evaluation of Priorities
for Natural Disaster Mitigation Projects

1. Background Studies

The following background studies will be performed:

General Analysis of River Basins

- Socio-economic surveys
- Land use planning in the river basin in the short, medium, and long term
- Description of the biophysical and geophysical characteristics of the river basin
- Institutional framework directed towards disaster mitigation and environmental planning mechanisms
- Review of development plans impacting on the river basin
- Review of policies and laws affecting the region, and future plans in the pipeline relating to natural disaster mitigation and environmentally sustainable development
- Environmental management programs ongoing or in preparation
- Others, depending on the particular characteristics of the river basin

Rapid Environmental Impact Assessment

- Impact assessment of ongoing unplanned development such as tourism in the area to give a preview of likely future impact
- Impact assessment of any future development plans which may impact upon disaster mitigation such as dam and reservoir development
- Identification and inventory of the key environmental areas impacted as a result of major floods, and use of GIS to map this information

Natural Resource Survey and Analysis

- Ecological characteristics
- Water resources, water quality, and river basin studies
- Soil erosion and land degradation
- Flora and fauna

Mitigation Project Implementation

- Implementation of selected mitigation projects which meet the objectives of the SDV
- Evaluation of projects

2. Working Models

Elaborate, test, and document a working model for natural disaster mitigation planning. In order to develop this working model, research must be undertaken to investigate a number of important economic issues which will form the basis of short, medium, and long terms plans. A number of measures will be considered including the measurement and valuation of environmental benefit, cost-benefit analysis, distribution of income, and user charges.

TABLE 1 (continued)
Examples of Background Studies for Evaluation of Priorities
for Natural Disaster Mitigation Projects

3. Economic Analysis

The economic analysis will focus on the trade-offs between competing benefits. Economic impact, may include:

- The loss of agricultural production to farmers from destruction of agricultural land by sand intrusion
- The social and environmental costs of the clean up of wells and underground water aquifers due to pollution, compared with the cost of supplying treated drinking water
- Reduced income in aquaculture threatened by deterioration in water quality
- Value of the flood plane and impacts on paddy fields by sand intrusion
- Improvements to community infrastructure and alternative livelihoods, versus relocation of communities
- Loss of future tourist revenue as periodic disasters reduce the natural attractiveness of heritage sites and tourist areas

4. Action Plan

Preparation and implementation of a short-term action plan to address the most urgent problems.

5. Community Development Plans and Design Guidelines

Preparation of Integrated Community Development Plans and Design Guidelines. This will incorporate a definition of natural disaster mitigation options and a mitigation strategy formulation.

- Documenting and defining the project cycle for the provincial and commune level
- Creating project options in the village level project cycle
- Forecasting the effects of different village level projects and management practices
- Defining environmental screening methods to be used in the village level project cycle
- Defining methods and incentives for directing field level projects to environmentally damaged areas for their improvement
- Defining methods and incentives for changing environmentally harmful management

