



Enabling poor rural people
to overcome poverty

VIET NAM

Environmental and Climate Change Assessment

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Main report

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Abbreviations and acronyms

ADB	Asian Development Bank
AFD	French Development Agency
AusAID	Australian Agency for International Development
BOD	Biological Oxygen Demand
CCFSC	Central Committee For Flood And Storm Control
CBDRM	Community-based Disaster Risk Management
CIDA	Canadian Development Agency
COSOP	Country Strategic and Opportunities Program
DFID	United Kingdom's Department for International Development
DRM	Disaster Risk Management
DONRE	Division of Natural Resources and Environment
EC	European Commission
GAP	Good Agricultural Practises
GHG	Greenhouse Gas
GSO	General Statistics Office
ICD	International Cooperation Department/MARD
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
JICA	Japan International Cooperation Agency
MARD	Ministry of Agriculture and Rural Development
MIT	Ministry of Industry and Trade
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOLISA	Ministry of Labor, Invalids and Social Affairs
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry Of Science And Technology
MOT	Ministry of Transportation
MPI	Ministry of Planning and Investment
NGO	Non-governmental Organization
NSNDPRM	National Strategy for Natural Disaster Prevention, Response and Mitigation
NTP-RCC	National Target Program to Respond to Climate Change
PES	Payment for Environmental Services
PEt	Potential Evapotranspiration
PPP	Public-Private Partnerships
RCC	Response to Climate Change
RCC-ARD	Action Plan To Respond To Climate Change In The Agriculture And Rural Development Sector During The Period 2011-2015 With A Vision To 2050
SEDP	Socio-Economic Development Plan
UN	United Nations
USAID	United States Agency for International Development
VASS	Vietnam Academy Of Social Sciences

Executive Summary

Introduction

This report was prepared for informing IFAD's Country Strategic Opportunities Program (COSOP) 2012 – 2017 for Viet Nam. In preparation of this report a brainstorming workshop was held on 9 May 2011 in Hanoi bringing together key national research institutes working on climate change (CC) and environment related issues, ministries of agriculture and environment and bilateral and multilateral donors. This workshop provided insight into the current status of CC research and interventions related to the agriculture and rural development (ARD) sector and also, highlighted gaps in understanding of specific CC issues. A follow up analysis was undertaken of 3 target provinces (Tra Vinh, Ha Tinh and Ha Giang) to understand on-the-ground CC impacts in the representative agro-ecological zones.

On 28 September 2011, IFAD supported a policy discussion forum convened by the Ministry of Agriculture and Rural Development (MARD) for presenting the MARD's Action Plan to Respond to CC 2011 – 2015 with Vision to 2050 together with the Ministry of Natural Resources and Environment's (MONRE) National Target Program to Respond to CC (NTP-RCC). This was the first meeting where a discussion was undertaken on the respective ministries CC policy frameworks. The meeting was attended by a number of departments from the 2 ministries, national and regional research institutes and universities, CC NGO Network and bilateral and multilateral donors. IFAD presented its preliminary analysis of the climate change impacts on the ARD sector and possible areas of intervention and received guidance from the participants on further refining the analysis and priority selection for inclusion in the COSOP. Also, a policy issues note was drafted as an output of the meeting, which is helping guide policy discussions on further strengthening the pro-poor aspects of adaptation to CC in the ARD sector.

Field visits were undertaken to Tra Vinh, Ha Tinh and Ha Giang together with the COSOP design team to further analyze how the respective Provinces are addressing CC issues in their development planning and also, to consult with the District, Commune and farm levels on their experiences with CC and natural disaster occurrences. These insights further helped with ensuring that the proposed recommendations were consistent with local realities and would provide solid orientation to the strategic objectives of the COSOP.

Vulnerability Analysis

Viet Nam has been predicted to be one of the countries most vulnerable and likely to be significantly impacted by climate change. With its "megadeltas" and high population concentrations within the Mekong and Red River Deltas, the IPCC's Fourth Assessment characterized Vietnam as a "*Hotspot of key future climate impacts and vulnerabilities in Asia*". Long term predictions for the country show that expected impacts on the agriculture and rural development sector will primarily derive from changes in temperature, rainfall and sea level. A 2007 World Bank study concluded that a 1 meter rise in sea level predicted for 2100 would directly result in a loss of more than 5% of the country's land area, more than 7% of agricultural lands, more than 10% of GDP and 28% of wetlands; and impact about 11% of total population and urban areas. Of the 84 countries studied, Vietnam was in the top five mostly greatly threatened by sea level rise.

Irrespective of climate change, people in Vietnam have long been subject to natural disasters. Globally, it has been ranked as a "Natural Disaster Hotspot", ranking 7th on economic risk, 9th on the percentage of land area and population exposed, and 22nd on mortality from multiple hazards. With the majority of the population living in low-lying river basins and coastal areas, more than 70 percent of the population is estimated to be exposed to risks from multiple natural hazards. National statistics show every year natural disasters cause an average of 750 deaths and result in annual economic losses equivalent to 1.5 percent of GDP. The trend is toward increasing losses. Between 1989 and 2008 property losses averaged of US\$240 million per year. The average annual losses during the last four years of that period were some three times the longer term average. In terms of human

exposure, floods are responsible for almost 60 percent of impacts on the population, followed by storms and drought. In economic terms, storms are responsible for about 55 percent of losses, followed by flood and droughts. In the uplands – where a large percentage of the ethnic minorities reside and who are greatly reliant on rainfed, hillslope agriculture – detailed information on natural disaster impacts is not readily available, however flash floods, drought and landslides tend to be major concerns. Scenarios for future impacts of climate change predict that losses from natural disasters will greatly worsen over the course of the 21st century.

CC Impacts on ARD Sector

Total annual temperature is projected to increase between 8% and 11% by 2100. In most regions, the number of days when temperatures exceed 25°C will increase notably while the number of days when temperatures drop below 20°C will decrease significantly. The IPCC 4th Assessment Report estimates that with every degree of warming, rice yields could be expected to fall by 10 percent. Presently many of the rice cultivars in use in Viet Nam are already close to their heat threshold and so a 1°C increase in temperature would lead to widespread mortality in the absence of the introduction of more heat tolerant varieties. However, even that may be problematic as The International Rice Research Institute (IRRI) has stated that if temperatures stay above 35°C for one hour while rice is flowering, the heat will sterilize the rice pollen.

Please refer to “Table 1 Current, observed climate trends” on page 22.

Water demand for agriculture may increase two or three-fold compared with that of 2000. Tropical plants will tend to shift further north and towards higher altitudes. Shifts in eco-agricultural zones could cause loss of varieties of indigenous breeds or species, although this may also extend the ranges of some crops. Moisture stress in crops will be exacerbated and areas of crops requiring wet or moist conditions will decrease. Evapotranspiration rates will increase, increasing crop water usage and the damaging effects of drought. Yield changes will vary widely across crops and agroecological zones. An estimate of potential crop yield losses across climatic zones, utilizing alternative scenarios for rainfall without CO₂ fertilization, suggest that by 2050 rice yields could decline from 6% to 42% and from other crops between about 3% and 47%. The areas of the country showing the largest potential yield declines are the Central Highlands, the North East, North Central Coast, Red River Delta and the North West.

The predicted 33 cm rise in sea level by 2050 would increase the area inundated by flooding to a depth greater than 0.5 m by an estimated 276 000 ha and the area affected by saline intrusion (threshold value equals salinity of greater than 4 g/l) would increase by 420 000 ha; IFPRI predicts that it would also result in a 13 percent decrease in total rice production from the Delta (compared to the 2007 total rice harvest). An estimated 13% – 590,000 ha – of the nation’s rice production area may be lost by 2050. Further yield impacts would result from early crop maturation and/or increased pest and disease pressures. The suitability of different post-harvest and crop storage practices may also be affected, increasing post-harvest losses. Overall, in the absence of adaptation measures, yields will likely be reduced for rice, maize, cassava, sugarcane, coffee, and vegetables. Impacts are predicted to be more significant under dry scenarios than wet ones. Hydrological changes and sea level rise will affect the availability of fresh water or even physically change the agricultural landscape. Climate change may also threaten the growth and reproduction of livestock and increase the incidence and spread of diseases. Impacts and risks from climate change will vary by climatic and geographic region as well as by both demographic and social factors. The tables below provide summaries of the range and types of predicted impacts.

COSOP Baseline Poverty Analysis

Of particular concern is the nexus between climate risk and poverty. In a World Bank study on the social dimension of adaptation to climate, village-level interviews found that community members considered factors directly related to climate to be among the main causes of poverty. According to the authors of the study “*drought and hazard damage were brought up again and again as a main cause of poverty.*” Vulnerability to climate change is socially differentiated. Impacts of extreme weather events are related to poverty status, access to resources, and social security systems. Groups that are already the most socially vulnerable (women, ethnic minorities, and the disabled) are likely to be disproportionately less able to adapt to climate changes.

One impact of particular importance of climate change is the increased susceptibility to health problems (e.g., lack of safe drinking water, nutritional impacts resulting from impacts on agricultural outputs). The rural poor, and especially these socially vulnerable groups, are also exposed to greater risk given their direct reliance on agriculture and the natural resources base for their livelihoods as well as their greater exposure to natural disasters and their lack of assets and capital to recover or to shift to alternative livelihoods. According to the World Bank, the lowest 20 percent of households arranged by household expenditure per person, both in rural and urban areas will experience larger reductions in real standards of living due to climate change than those in the top 20 percent of households. The effects will also be quite uneven across regions: households living in the Central Highlands region will be the hardest hit because of a decline in agricultural value-added of up to 30 percent.

Coping strategies

Recent analysis by government found that shifts have been occurring in climatic variables over the last century. Of note are the findings of increases in average annual temperatures, in variability of both rainfall and temperature between years and within seasons, of the typhoon season tending to end later and, possibly, the increased occurrence of higher intensity storms. While there are no systematic studies of the question of how the rural poor are currently coping with climate risk and climate change, there is a growing body of case studies and reports that presents a varied picture. In general, the building evidence seems to show that where the impacts are easily recognized (e.g., changing onset of the rainy season) and the adaptation response is relatively simple, low cost and requires minimum collective action (change planting date), private adaptation is taking place and farmers are coping. Where these factors do not hold, the situation may be more difficult and households are not able to adequately cope.

Further insight can be obtained through anecdotal evidence compiled from work by IFAD and others. This strongly suggests that current climate-related risks are having significant impacts – in some areas and on some vulnerable groups – on agricultural livelihoods. Natural disasters and high levels of uncertainty associated with the observed, increasing inter-seasonal and inter-annual variability in temperatures and rainfall are already leading to changing behaviours in response. Examples include, shifting from annual crops to livestock production due to drought in the mountains of northern Vietnam and the Central Highlands; and high percentages of farmers changing cropping patterns, calendars, varieties and cultural practices due to drought and reduced water availability.

Among the principal adaptation strategies that households will have to pursue as climate change impacts are increasingly felt will be:

- Agriculture: changes in sowing dates, switch to drought-tolerant crops, adoption of salinity-tolerant rice varieties, adoption of new crop varieties, switching to rice-fish rotations or to mariculture, out-migration and/or wage labor.
- Aquaculture: given the capital intensive nature of aquaculture, adaptation will be very difficult for smallholders and the poor as high cost investments will be required in such things as feed and pumping of more water to maintain water & salinity levels).
- Forestry: most adaptation measures will be outside of the hands of the rural poor in the absence of facilitation by government as key measures tend to require access to new technologies and genetic materials, e.g., adoption of new species and silvicultural practices for drought resilience; and improved pest management, including genetic selection and IPM strategies

Flood & coastal protection: households and communities will be almost completely reliant on government interventions to build and upgrade sea dikes and flood defences to protect infrastructure and agricultural land; the only other alternative is migration from impacted areas that are no longer habitable.

IFAD's Targeting Strategy

IFAD's targeting strategy as regards integrating climate change concerns into its next COSOP should remain substantially the same as its current targeting strategy. Firstly, sensitivity to climate risk and climate change impacts is a direct function of social vulnerability. Therefore, in Viet Nam, it is the rural poor who are the most sensitive and, among the rural poor, it is the ethnic minorities, women and children who are the most vulnerable. Secondly, poverty reduction is one of, if not the best, way

to enhance household and community-level capacity for adaptation. And, to increase resilience to climate change impacts, good rural development and natural resources policies and programs will be good adaptation policies and programs. Thus, those factors that drive IFAD's overall prioritization for the 2012-2017 period will be substantially compatible with those factors that would otherwise drive a climate risk-oriented prioritization. Having said that, however, in weighing its geographic priorities for investment under the next COSOP, IFAD should give extra weight and consideration to the following regions as areas where the rural poor are particularly sensitive and exposed to climate risk and climate change threats. In order of priority, those regions are:

- Mekong River Delta – on a poverty head count basis (i.e., not on poverty rate) the Delta has a very large population of rural poor and it the region in the country that is likely to suffer the greatest impacts from climate change.
- Central Highlands – because of its high rates of poverty, large ethnic minority population and the prevalence of rainfed, subsistence agriculture among the rural poor, the Central Highlands are highly sensitive to climate change risk and natural disasters. In addition, the Central Highlands is already a zone to which many migrants are coming today, but with the future displacements of populations from the coastal areas and Mekong River Delta, undoubtedly the Central Highlands will see greatly increased in-migration in future decades.
- Northern Mountains – the northern mountains are the areas with the highest rates of poverty in the country and the largest ethnic minority populations. It is also probably the area most sensitive to the impacts of climate risk and natural disaster because of those factors. IFAD already has a strong presence in the Northeast, but as yet no presence in the Northwest.

Central Coast, both northern and southern – poverty rates are similar in the North Coast to those of the Central Highlands (29 percent) and there are areas in both North and South with pockets of ethnic minorities as well as poor rural communities dependent upon fishing or rainfed agriculture. A very high percentage of the population in this region is exposed to climate change and natural disaster risk. In the semi-arid south, scarce water resources and drought are severe limitations and risk factors. In many parts of the Central Coast the structure of the economy is rapidly changing to being industrial and service-based. Very limited opportunity (water and natural resources constraints) for greatly enhancing agricultural livelihoods exists over the long term.

National institutional context

For the ARD sector, the principle orienting frameworks for medium-term responses to Climate Change are the National Target Program to Respond to Climate Change (NTP-RCC) and the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development Sector Period 2008-2020. Both of these were approved and issued in 2008, the former by the Office of the Prime Minister and the latter by the Ministry of Agriculture and Rural Development (MARD). Subsequently, in 2011, MARD issued its Action Plan To Response To Climate Change Of The Agriculture And Rural Development In Period 2011-2015 And Vision To 2150 (RCC-ARD).

The National Target Program to Respond to Climate Change (NTP-RCC) is the umbrella program and guiding framework for the Government of Viet Nam's efforts in adaptation and mitigation of climate change risk. The Ministry of Natural Resources and Environment developed the program and is responsible for its implementation. The current program, which covers the period from 2009 to 2015, has the global objectives of: (i) assessing potential impacts of climate change; (ii) ensuring that a climate change response action plan is developed by each sector; (iii) initiating efforts to move the country towards a low-carbon economy, and (iv) contributing to global efforts for the mitigation of GHGs.

The NTP-RCC primarily represents only a first step in what will be a much longer process for taking the broad vision that it provides for the entire country and the affected sectors and translating it into specific priorities, strategies and action plans. The agenda it puts forward is primarily one of research, planning, communication, and inter-institutional and inter-sectoral coordination efforts. The development of detailed and explicit climate change responses are left, in the first instance, for the other ministries to specify through their own sectoral action plans. The NTP simply establishes the requirement that all other line ministries, provinces and cities produce climate change action plans. As such, the NTP-RCC is not a climate change strategy, though reportedly MoNRE is now working on the preparation of such a strategy.

For the implementation of the NTP-RCC a series of seven priority areas, with their associated tasks and projects, were identified for the period of 2009-2015. Among these are three specific task areas where IFAD has both the institutional mandate and a comparative advantage to directly support the NTP-RCC:

- Awareness enhancement and human resources training for the Women's and Youth's Unions, the Provincial administration system, social organizations, media and the community; dissemination through public media for climate change information and information exchange as relevant to agriculture, rural development and disaster risk management; and awareness raising actions for the general public through social organizations, MARD/DARD, and local governments (Provincial, District and Commune).
- Develop and implement action plans to respond to climate change with MPI to work with Provincial Planning and Investment Departments to develop guidelines for mainstreaming climate change issues into the SEDP development and implementation processes at the Commune, District and Provincial-levels; support Provincial (DPI, DARD, DONRE) efforts to develop climate change response plans at the Commune, District and Provincial-levels; support the development of policies and mechanisms that encourage investment into the clean development mechanism, emissions reduction, and environmental protection; in coordination with MOLISA, support research and development of policy proposals and measures for poverty reduction among those populations and in those areas most vulnerable to climate change; support Provincial People's Committees efforts to assess impacts of climate change and sea level rise on their Provinces and localities and develop (pro-poor) action plans to respond; support MARD's (and the DARD's) development and implementation of action plan to respond to climate change, in particular for those aspects relevant to mainstreaming climate change issues into (pro-poor) strategies, programs, plans and planning of the Ministry; and support the development and implementation of measures to respond to climate change in trade activities within specific, IFAD-supported, value-chains.
- Develop and implement science and technology programs on climate change through support for MARD and DARD in areas of adaptive research and development (policy and technology) – relevant to IFAD's target group (rural poor, ethnic minorities, women and youth) and pro-poor agriculture and rural development – for mainstreaming climate change issues into environmental protection programs, natural resources management, natural disaster prevention, and marine research programs.

MARD's "*Action Program In Response to Climate Change of the Agriculture and Rural Development Sector During 2011-2015 and Vision to 2050*" establishes priorities for the next four years. The overall objective of the Action Plan is to improve the climate change response capacity of the agriculture and rural development sector in order to (i) minimize climate change-related damages; (ii) reduce the agricultural sectors greenhouse gas emissions; (iii) protect the lives of people exposed to climate risk and sea level rise related natural disasters; and (iv) create opportunities for sustainable agriculture and rural development within the context of climate change. Priority thematic areas within the Plan include protection of populations and agricultural lands in the coastal zones; stabilizing agriculture, forestry and salt production; ensuring food security (especially, rice production); the safety and integrity of the dyke system and other productive infrastructure important for agricultural production; natural disaster prevention and control; and economic growth that reduces both poverty and greenhouse gas emissions.

To achieve the objectives of the Action Plan, MARD has specified a series of seven policy, strategy, capacity building and awareness raising tasks to be accomplished: (i) further evaluation of climate change and sea level rise impacts on ARD and development of mitigation and adaptation measure and solutions; (ii) development of specific programs/projects in response to projected impacts; (iii) awareness raising; (iv) training and development of human resources to respond to climate change challenges and create development opportunities; (v) integration of climate change and sea level rise concerns into action plans, policies, strategies, planning and sector/field/local development plans; (vi) cooperation with International Governments and donors to mobilize resources, knowledge and experience for the implementation of the Action Plan; and (vii) monitoring, inspection and evaluation of the implementation of the Action Plan.

In addition, MARD has specified a series of priority investment projects to be carried out as a response to predicted climate change impacts as well as current climate risk (natural disasters). The investment projects comprise a range of hydraulic works to protect areas of high population density and valuable agricultural land and aquaculture areas from salinity intrusion and flooding; rural development-related infrastructure; agriculture, primarily GHG mitigation through improved rice irrigation practices and biofuel crops and development; reduction of vulnerability to flooding, including relocation of households from high risk areas; forestry, primarily reforestation (mangroves and plantations) and fire control; and fisheries and aquaculture, including hydraulic infrastructure for aquaculture production and protection. MARD has estimated the total cost of the Action Plan as being 72,402 billion VND, of which 0.6 percent is for the seven “software” tasks (402 billion VND). In the “hardware” investment projects some 69 percent is for hydraulic works (50,000 billion VND); 8 percent for rural development-related infrastructure (6,000 billion VND); 7 percent to agriculture (5,000 billion VND); 5.5 percent each to forestry and fisheries/aquaculture (4,000 billion VND each); and 4 percent to reduction in communities’ vulnerability to flooding (3,000 billion VND). Geographically, 86 percent of financing is for coastal and delta regions; 8 percent is nationwide; 2.8 percent for the North and North Central Regions; 1.4 percent for the Central Highlands; 1.1 percent for agricultural research infrastructure (location unspecified) and 0.7 percent for the Northwest region.

As a first cut Action Plan for the ARD sector, the RCC-ARD is overall a reasonably good framework in that it clearly sets out to provide a serious response to the concerns and issues that climate change raise for the sector. The vision to 2050 is comprehensive and recognizes the very wide and complex range of interventions that will have to take place in order to support adaptation and enhance the resilience of vulnerable populations throughout the country, not just in the coastal areas and deltas but also inland and among the rural poor in the uplands. Within that longer term vision the Plan does mention many of the types of policy, institutional, investment and technical responses that will be required to achieve the specific goal it lays out of “*Ensuring that organization, individuals, communities and other entities involved benefit equally from the climate change mitigation and adaptation activities*”. Very importantly, the Plan recognizes that “one-size does not fit all” and so the importance of flexibility and locally adapted responses.

On the other hand, within the 2011-2015 action framework it is not completely clear how the broader vision to 2050 will translate into locally-adapted (and adoptable and effective) schemes for adaptation. No principles, criteria or priorities are specified for involvement of the diverse stakeholders that must be engaged – from the private sector, local communities and authorities, social organizations and NGOs, Provincial governments, etc. – to execute the Action Plan as well as to refine and develop its next phases. The plan is very heavily focused on a limited set of specific hard investments in the coastal areas to combat sea level rise and its effects along with a set of GHG emission reduction (mitigation) investments. With over 90 percent of the funding earmarked for specific hard investments, there appears to be little room for strengthening capacity for local action or other “soft” investments of the type that are important to building capacity and resilience for the long term. Important themes of adaptation for non-irrigated and/or non-rice farmers are largely absent as are investments in strengthening extension and research to support farmer adaptation. Poverty reduction and food security are treated in a limited fashion. Some proposed GHG mitigation investments are the only ones identified for a “pro-poor” climate change response. For food security, important adaptation investments are proposed for rice, however important as that is, the issue of food security among the rural poor – particularly ethnic minorities and other vulnerable populations – is left out of the five year action plan.

Nonetheless, for IFAD, there are a number of potentially relevant activities that provide an opportunity to integrate concerns for the most vulnerable groups among the rural poor, for the development of pro-poor policies and approaches for climate change adaptation and mitigation; and to establish a bridge between field-level learning and national policy dialogue. All of these elements are still very much incipient within the current Action Plan framework and fit within IFAD’s comparative advantages. In addition, they open the potential to promote the “retro-fitting” of existing programs through mainstreaming of climate proofing tools into SEDP planning and implementation processes. In the aggregate they could provide a coherent approach to be systematically applied across the IFAD

portfolio of: vulnerability assessment (physical, social, livelihoods); identification of requirements to climate proof current livelihoods and of opportunities for new/alternative sustainable livelihoods in a context of climate change; climate risk and climate change awareness, education and capacity building to enhance local capacity and resilience; community based natural resources management, integrating disaster vulnerability reduction through local land use planning and alternative investments in vulnerable and protection zones; development of knowledge networks among farmers and researchers to identify successful adaptive behaviors and extend them to other groups and communities; support for PPP in the context of climate smart value chains; and knowledge management, to bring “learning for the field” to policy discussions and donor coordination forums.

Comparative advantage and opportunities for innovation

IFAD has a number of strong comparative advantages upon which it can capitalize to both ensure that its portfolio and investments in Viet Nam are climate smart as well as a platform for engagement with Government and development partners on Government policies, strategies and initiatives for climate change adaptation and mitigation. One principal advantage derives from IFAD’s basic mission to enable poor rural people to overcome poverty and its agenda of targeting activities toward enabling the rural poor to improve their food security and nutrition, raise their incomes and strengthen their resilience. This is because increasingly the international community working with Viet Nam is reducing its support for rural development and poverty alleviation. This situation is reflective of a number factors: (i) Viet Nam’s overall success in reducing poverty, (ii) its recently achieved Middle-Income Country (MIC) status and World Trade Organization Membership that has as some donors (especially, bilateral donors) amending their policies from a ‘development cooperation relation’ to a ‘partnership relation’ with non-refundable aid decreasing and the focus shifting more to technical support and trade/business promotion; (iii) an ongoing shift in concessional financing in favor of hard loans from both bi-lateral donors and multi-lateral sources (e.g., Viet Nam is now an IDA-blend country), also a function of achievement in poverty reduction and MIC status; and (iv) shifting government and donor priorities. In terms of climate change, IFAD by focusing on pro-poor adaptation and mitigation will be supporting critical ARD objectives which arguably do not yet receive the attention they merit in the context of current climate change policy and strategy in the agriculture and rural development sector.

The other strong comparative advantage that IFAD brings into the next COSOP period is the knowledge, experience and institutional relations and capital that it has developed through its current portfolio. A great deal of what IFAD is currently supporting remains directly relevant to and necessary for developing and implementing a strategy for climate smart investment in Viet Nam: targeting of the most vulnerable populations among the rural poor (ethnic minorities, women, children and youth); participatory local planning processes and integration into the SEDP; improvements in access to and quality of rural services (extension, credit, input supply); market access and pro-poor value chains; sustainable, natural resources-based livelihoods; capacity building at all levels for improving the management of development processes and outcomes; strengthening of social capital through formation and support for local groups and the mass organizations on which they depend; strategic support to local and Provincial-level agencies and authorities to adapt and implement central government rural development policies under those programs that have been decentralized to them for their management. IFAD has also developed good working relationships with the authorities of the Provinces in which it works and that relationship has extended to the national level where IFAD is recognized as an important source of finance, innovation and generation of learning among both the donor community and the concerned Ministries (principally MARD, MPI and MOF. IFAD has the institutional capital and recognition required to engage at all levels, from the field to the national-level, and create a space and opportunity to support, influence and strengthen Government’s strategies and initiatives for climate change adaptation and mitigation.

Finally, in the short to medium-terms, the major opportunities for achieving effective and durable pro-poor responses to climate change lie in synergistically combining concerns for disaster risk management, climate risk and climate change threats, through local planning instruments and processes, into the SEDP process. As the principal planning instrument that government utilizes to orient all public financing of relevance for the ARD sector, by mainstreaming into the SEDP the potential exists to institutionalize pro-poor, climate smart development approaches and see them replicated across the entire country.

Sustainability

Environmental protection and consideration for climate and natural disaster risk and vulnerability reduction have not been core concerns of Government's ARD sector programs. This state of affairs has raised serious concerns (e.g., *2010 Vietnam Development Report*) about the sustainability of economic growth based on over-exploitation of natural resources and of failure to integrate disaster risk management into program investments (e.g., each year flooding destroys a lot of P135 investments). The introduction of "climate proofing" planning approaches and instruments would simultaneously support improved environmental and disaster risk planning as well. Planning instruments for climate proofing ARD investments would need to be put in place (and linked) from the Provincial-level sectoral planning, to the District-level operational (and land use and zoning) planning to Commune/Village-level planning. Local processes would thus be informed by "climate proof" sustainable livelihoods/value-chain and infrastructure planning. At the local levels, natural disaster risk and vulnerability reduction would be an integral part of the "climate proof" planning process. Development of participatory land use plans that identify vulnerable areas (drought prone soils, flash flooding, landslides, inundation, water supply, etc.) and orient investment would be essential as would the linkage of the local land use planning to District land use planning in order that the land use plans are actually utilized as instruments to orient institutional responses and public investment.

Partnerships

Institutional partners: IFAD's principal institutional partners for implementation will be:

- Government, National: (i) MARD – for issues of policy, coordination and prioritization of investment project orientation. It is recommended that IFAD support MARD's coordination and policy dialogue functions through ICD and its ISG program. (ii) MPI – for issues of integration of climate change considerations into the SEDP, IFAD should offer support to MPI for them to achieve this commitment, which is a part of the NTR-RCC. (iii) MONRE – for purposes of coordination of IFAD's overall support and contribution to climate change response in the ARD sector. This can be done most effectively through the SP-RCC. (iv) MOLISA – for coordination of questions of integration of climate change concerns into the local SEDP planning process for making the national poverty programs "climate smart" in their investments and implementation.
- Government, Provincial: (i) the People's Committee's at all levels are charged with policy implementation and approvals of plans (SEDPs). They are a focus for awareness, capacity building, local policy discussion, recipients of outputs from knowledge management activities, and for raising "lessons from the field" to central level for policy dialogue; (ii) DPI – the Departments of Planning (from Provincial to District) are charged with implementing the SEDP process; and (iii) DARD – for analysis, planning, research and technology transfer for climate change adaptation in production systems and for implementation of CBDRM.
- Donor partners: as previously mentioned the current pipeline of activities in climate change adaptation and mitigation shows very little planned from 2013 onwards. At present some of the principal opportunities appear to lie with:
 1. JICA – is carrying out a master planning exercise in the Mekong River Delta. An IFAD pro-poor adaptation to climate change program could capitalize upon that plan and put into place planning and livelihood elements for the rural sector and rural poor for master plan implementation;
 2. World Bank is developing a \$150 million "Mekong River Delta Water Management for Rural Development" (2012-17) under which IFAD might find opportunities to partner, particularly around support to the most vulnerable populations. In addition, World Bank has expressed interest in exploring opportunities to collaborate with IFAD on translating seasonal and other weather forecasts (including ENSO patterns) into practical advice for farmers (planting decisions, irrigation, pest and disease measures) as well as early warning systems for financial institutions, input suppliers. This is a proposal under development, in which initial applications would likely be before coffee in the central highlands. Other crops, locations, and types of farmers could be targeted while approaches are proven and refined. Also, a Central Highlands project is in the pipeline for which Bank staff have expressed an interest and willingness to explore collaboration, though at this time no specifics were available. Finally, the World Bank is implementing a grant from the UK/DFID to provide technical assistance for enhancing capacity in

MONRE, MOIT, MARD, MPI and MOF to formulate and implement climate change policies. This ends in 2014. Any support for MARD and policy research should be done in close collaboration with the Bank to avoid potential overlap.

Possibilities for additional financing

Mitigation financing mechanisms are only very slowly coming on-line and views are somewhat pessimistic as to what might be accomplished at COP 17 in Durban in November this year. How much effort is merited – beyond nationally-financed mechanisms – in trying to capture mitigation financing is debatable when achieving pro-poor adaptation is clearly the highest priority. Climate change adaptation interventions should be prioritized and, in those cases where adaptation presents the opportunity – at a reasonably low transaction cost – to leverage additional benefits for the rural poor from mitigation, it would make sense to do so.

National-level financing offers more attractive, short to medium term opportunities, for mobilizing additional financing. In particular, the Government Decree 99 of 2010 has established a scheme to implement the Policy on Payment for Forest Environment Services (PFES). It still remains to work out the specific criteria, content and measures for implementing the policy; however it is expected that by the end of 2013 that the piloting of the policy would be completed and, subject to review, ready for subsequent full roll out. Among the stated objectives of the policy are that the PFES should “*contribute to ensuring harmony and balance of the living environment: to conserve biodiversity; to prevent and limit adverse impacts of natural disasters (flood, drought, soil erosion, desertification, carbon sequestration and retention, air environment pollution; greenhouse gas emissions; climate change, etc.)*.” It also recognizes that to be effective, that the state will have to move forward at a strong pace to allocate forest lands and assign or provides contracts for forest use on a “stable and permanent manner to organizations, households and village communities” in order for the PFES to be of use.

Among the stipulations already made are: (i) river basin master plans will serve as the basis for identifying forest areas, liable payers and potential payees of forest environment services payment in each basin; (ii) the general census on forests, being carried out during 2010-2015, will provide the basis for the implementation of the policy; (iii) that hydrologic services (water quality, seasonal flows, other) will be considered and hydropower plants, water supply utilities, industrial water users drawing from natural sources, and aquaculture facilities will be subject to payments plants, as a basis for the payment for and monitoring of the quality of forest environment services; and (iv) other eligible services will include carbon sequestration; avoidance of deforestation; habitat services, particularly (fishery) spawning grounds, food and natural seeds sources; industrial production establishments using water directly from water sources. Among the main target groups for the PFES payment are the 30 percent of the population that lives in mountainous regions (high percentage ethnic minority). Greenhouse gas (GHG) emissions reductions (methane) through improved livestock manure management for alternative energy (biogas) and crop/soil fertility management (bio-slurry) is already fairly well advanced and SNV is supporting the government with marketing the GHG emission reduction certificates. Bio digesters provide a multiple benefit response to improving rural households’ well-being.

Knowledge management

It is proposed in the COSOP that knowledge management become a central thrust of IFAD’s support, including and especially for climate change related-learning. IFAD projects, through their community presence, experience and knowledge, should be capitalized upon for developing systematic and structured learning and knowledge dissemination processes for “pro-poor, climate smart” agriculture and rural development. The goal would be to inform both Provincial-led implementation efforts and to bring “learning-from-the-field” into national policy discussions. For the former, supporting Provincial governments through learning is extremely important given the decentralization of fiscal resources and management responsibilities to them and their needs to learn in near-real time in order to improve practices, methodologies, efficiencies and outcomes. For the latter, at the national level there is significant unmet stakeholder demand for consultation on policy implementation and “learning-from-the-field” in support of high-level policy dialogue.

The agenda for knowledge management would require consultation with key stakeholders, however an example of potentially relevant work would be: The RCC-ARD is very focused on “hard” approaches for planned adaptation whereas “soft” approaches and autonomous adaptation are equally important, particularly for diverse smallholder systems. There is, however, only limited and largely ad hoc efforts to systematize learning on soft approaches (e.g., from CBDRM processes) and collect empirical and anecdotal evidence of ongoing smallholder adaptation processes in response to current conditions (natural disasters and climatic variability). ARD climate change adaptation policies need to look beyond structural works to farm and land use management practices and land use shifts. To do so, it would be important for IFAD to support systematic efforts, at both Provincial and national-levels (MARD) to initiate learning from ongoing efforts and experiences.

One option to consider is the establishment of a thematic ad hoc group (TAG) in MARD at the national level for “RCC-ARD knowledge management” and learning from the field. This mechanism was successfully utilized in the past, through ISG, to support MARD and international donors in ODA coordination and policy dialogue, for example for the implementation of the Comprehensive Poverty Reduction and Growth Strategy (CPRGS) in Agriculture and Rural Areas. Ideally the coordination mechanisms would also support forums/workshops at Provincial and national levels to inform policy dialogue and deliberations. Such forums would have broad stakeholder representation and be held for the purpose of reviewing lessons and generating discussion on policies and strategies for climate change response.

Risks and risk management

During the period of the COSOP the most important climate risk factors will be those that are associated with the immediate needs to integrate disaster risk management and vulnerability reduction into village, Commune, and District-level planning. Not only are public investments being undermined by a lack of attention to disaster risks and vulnerability, but also there is growing evidence that natural disasters are a causal factor in changing temporary poverty to structural poverty (i.e., inability to recover from recurrent natural disasters keep household that otherwise would rise above the poverty level, below the poverty level). As noted in a recent World Bank publication, policies and systems that can effectively cope with existing weather variability will be more successful in adapting to future climate change than those that cannot. Climate change is the long-term face of weather variability. Hence, it is important to enhance the capacities of agricultural and water systems to cope with current weather variability and build resilience into such systems. Managing these risks will be critical to achieving broader poverty reduction and development objectives.

To manage these risks, a series of responses are identified, ranging from local interventions (implementing and supporting the National Disaster Risk Management Strategies “Community-based Disaster Risk Management” framework of local planning and institutional strengthening, local land use planning, Commune and District-level land use zoning, climate proofing planning tools for SEDP planning, etc.) to provincial and national-level support for knowledge management and integration into the SEDP process of “climate smart” local-level planning. Key partners for this work are the Provincial People’s Committees, MPI (charged with the SEDP process), MOLISA and MARD (charged with policy and planning for the ARD sector and rural poverty reduction programs).

Table a. Proposed Elements for Consideration in the COSOP Results Management Framework

Strategic Objective	Outcomes for Achievement of Strategic Objectives	Milestones showing progress towards strategic objectives
<p><u>National-level</u> Pro-poor Policies for Agriculture & Rural Development Sector's Response to Climate Change</p>	<ul style="list-style-type: none"> • Transparent targeting criteria on social vulnerability & sensitivity to climate risk. • RCC Action plans with pro-poor strategy • ARD DRM & poverty reduction programs with RCC strategy 	<ul style="list-style-type: none"> • Provincial KM activities (IFAD provinces) & national stakeholder coordination mechanism (MARD) informing ARD sector high-level policy dialogue • Provincial assessments (IFAD provinces) of ARD sector vulnerability to CC by social vulnerability & sensitivity to impacts criteria • Provincial Departments of Planning & Investment (IFAD Provinces) with guidelines for integration of RCC & CBDRM into SEDP planning
<p><u>Provincial-level</u> Institutional & implementation arrangements for NTP-NRD, ARD-RCC, Provincial Disaster Risk Management Action Plans & other relevant rural poverty reduction programs aligned</p>	<ul style="list-style-type: none"> • SEDP process functions to integrate poverty reduction, DRM & climate proofing concerns into ARD public sector investment programs • Pro-poor targeting criteria for RCC applied to ARD public sector investments • ARD public sector investments climate proofed 	<ul style="list-style-type: none"> • Capacity building program (IFAD provinces) for local government staff & communities on implementation of CBDRM/RCC-ARD & integration into SEDP developed & being implemented. • Incentive system for District/Commune integration of CBDRM/RCC/NTP-NRD into SEDP (IFAD supervision, Project indicators, Project-based incentives, e.g., additional funding for success) • Climate proofing tools for (IFAD provinces) District/Commune SEDP planning developed & tested • Principal adaptation pathways identified for agroecoregions, barriers to adaptation analyzed, & institutional response strategies defined (DARD in IFAD Provinces)
<p><u>Operational-level</u> SEDP planning & investment climate smart</p>	<ul style="list-style-type: none"> • Locally tailored strategies for RCC & CC adaptation developed & under implementation at District/Commune-levels (IFAD Districts) • Community-based disaster/climate risk mitigation models tested (IFAD Provinces) • No. of rural poor households reporting losses from natural disasters/weather-related phenomena declining 	<ul style="list-style-type: none"> • No. of Districts & Communes (IFAD Districts) applying "climate smart" livelihoods planning tools • No. of Districts & Communes (IFAD Districts) with operational CBDRM/CC schemes (steering committees trained; community hazard & vulnerability maps developed/updated; annual community plans on DRM/CC adaptation developed; community monitoring implementation) • Proxy indicators for increased CC resilience (losses from natural disasters/weather-related phenomena) developed, integrated in M&E system, & baseline established (IFAD projects)

IFAD's mission is to enable poor rural people to overcome poverty. To achieve this, IFAD has established an agenda for the 2011-2015 period of targeting its activities toward enabling the rural poor to improve their food security and nutrition, raise their incomes and strengthen their resilience. Within this context, IFAD has set a goal to become "climate-smart" by ensuring that climate risk is systematically integrated into its core policies, programs, and activities. IFAD has singled out the agricultural sector as requiring particular focus as this sector is where poverty reduction, food security and climate change intersect. The purpose of this paper is to identify the challenges faced by Viet Nam's agriculture and rural development (ARD) sector with respect to climate variability and predicted climate change impacts and propose adaptation and, where relevant, mitigation measures for ensuring that the investments under Viet Nam's COSOP are climate smart.

I. Introduction

IFAD's Climate Change Strategy.

1. The goal of IFAD's Climate Change Strategy is to maximize impact on rural poverty in a changing climate. The focus in pursuing this goal is one where climate change is taken as cross-cutting issue along with the range of other development challenges that IFAD's existing mandate and comparative advantage of working with smallholders oblige it to respond to. To achieve this goal, the Strategy prioritizes the following three areas: (i) support to innovative approaches to helping smallholder producers – both women and men – build their resilience to climate change; (ii) help smallholder farmers to take advantage of available mitigation incentives and funding; and (iii) inform a more coherent dialogue on climate change, rural development, agriculture and food security. IFAD's target groups are the poorer, most climate-change-affected people – whose livelihoods depend largely on agriculture and natural resources – particularly women producers and ethnic minorities.
2. The International Fund for Agricultural Development (IFAD) is in the process of developing the Country Strategic and Opportunities Program (COSOP) for Viet Nam. The COSOP will span the period 2013–2017 and define an investment program of approximately US\$130 million. Building on the experience of the last COSOP, the intent is to integrate IFAD's Climate Change Strategy into the upcoming COSOP, making it "climate smart". The current COSOP for the period 2008 – 2012 endeavored to address climate change issues through strategic objectives aimed at securing access and generating benefits from natural assets for communities of rural poor in marginal, upland areas. In practice, however, only limited adaptation responses were built into the ongoing projects' designs.
3. In the new COSOP, particular attention will be given to supporting "*agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals.*"¹ In the context of Viet Nam, this will mean supporting the implementation of Government's policies and strategies for responding to climate change, primarily the Ministry of Agriculture and Rural Development's Action Plan for Climate Change² and, under the National Target Program for Response to Climate change, the efforts of the Ministry of Planning and Investments to integrate climate change adaptation into the Socio-Economic Development Planning process. Two additional government strategies/programs of high relevance that provide context and policy orientation for IFAD's climate smart investment strategy in 2013-2017 are: the National Strategy For Natural Disaster Prevention, Response And Mitigation To 2020 and The National Target Program On Building A New Countryside During 2010-2020 (*Tam Nong*) and its associated Five Year Plan Of 2011-2015 for Agriculture And Rural Development. IFAD's two latest projects³ were developed within the context of *Tam Nong* and the Five Year Plan. In all cases, IFAD's strategy for climate smart

¹ From FAO's (2010) "Climate-Smart" Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation."

² Action Plan To Respond To Climate Change In The Agriculture And Rural Development Sector During The Period 2011-2015 With A Vision To 2050

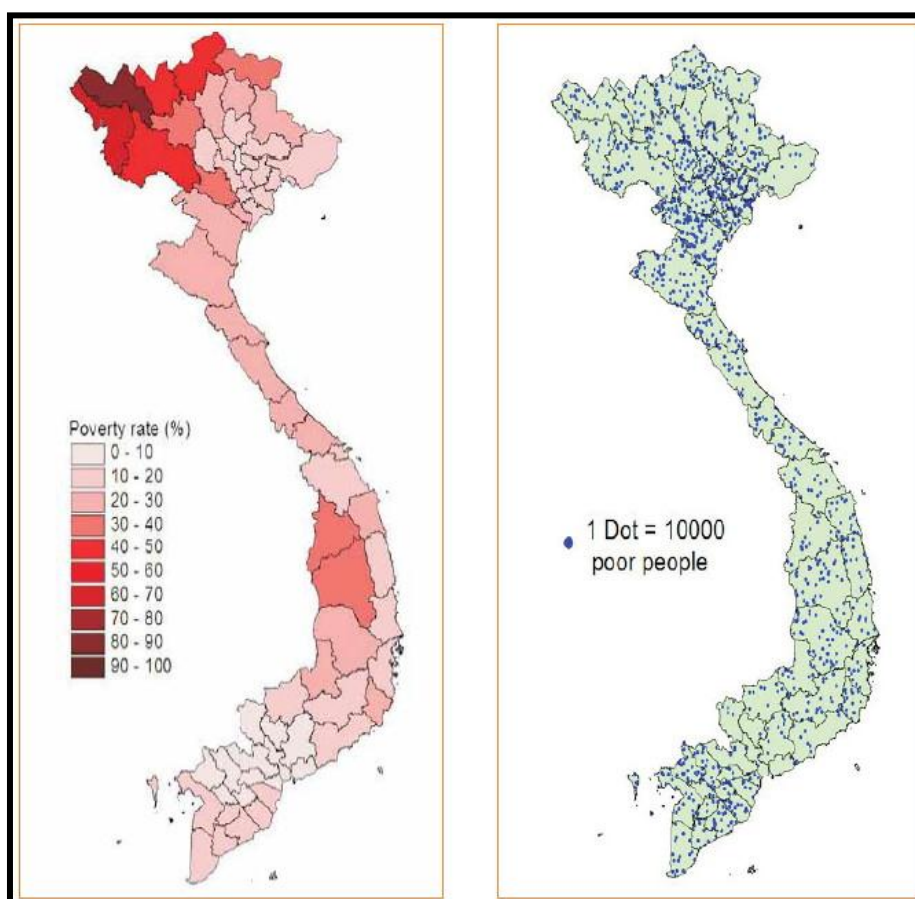
³ Economic Empowerment of Ethnic Minorities in Poor Communes of Dak Nong Province and, especially, Agriculture, Farmers and Rural Areas Support Project in Gia Lai, Ninh Thuan and Tuyen Quang Provinces. This latter specifically sets out to build Provincial capacity for the implementation of Tan Nong, which is decentralized to them for implementation.

investment should seek to ensure that it is a value-added investment for the Government of Viet Nam by focusing on where IFAD has a strong comparative advantage, and on those aspects that are directly relevant to IFAD's target population – on being a strategy for pro-poor climate change response.

Poverty and the Rural Sector

4. Following two decades of strong economic growth, in 2009 Viet Nam crossed the per capita GDP threshold dividing low-income countries and middle-income countries, achieving “lower-middle-income country” status (World Bank, 2010a). Accompanying its economic growth, poverty rates declined sharply. Over the period rates of poverty consistently decreased, going from 58 percent in 1993 to 14.5 percent in 2008. More than 28 million people are estimated to have been lifted out of poverty (Viet Nam Academy Of Social Sciences, 2011). The most current estimates, for 2010, put the poverty head count at 10.1 percent (CIA, 2011).
5. While both rural and urban populations have experienced significant decreases in poverty rates, rural areas remain disproportionately affected by poverty. In 2008, the poverty rate in rural areas – 18.7 percent – was roughly three times that of urban areas. As about 72 percent of Viet Nam's population lives within rural areas, poverty may be characterized as predominately a rural phenomena. Poverty also has strong ethnic and geographic dimensions. Disproportionate progress has been made in reducing poverty amongst the different ethnic groups. In 2008, rates of poverty were 9 percent for the majority Kinh/Hoa peoples and 50.3 percent among the other ethnic minorities (Viet Nam Academy Of Social Sciences, 2011).
6. Geographically, data from 2008 indicate that the Southeast and the Red River Delta have the lowest rates of poverty in the country (3.5 percent and 8.1 percent, respectively). Whereas in the Northwest, where a high percentage of the population are ethnic minorities, the incidence of poverty is many times higher at 45.7 percent. The Northeast, Central Highlands and the North Central Coast displayed similar incidences of poverty – slightly less than 25 percent, as did the South Central Coast and Mekong River Delta with rates of around 13 percent (VASS, 2011).
7. Combining the ethnicity and geographic perspectives: poverty rates countrywide are most severe in the Northern and the Central Highlands where 75 percent of Viet Nam's minority populations live, most of whom remain rural residents (World Bank, 2009). In these regions, the poverty headcount among the Tay, Thai, Muong and Nung minorities was estimated at 45.2 percent and, for all other ethnic minorities as about 73 percent (Baluch et al, 2010). While poverty incidence is highest in these two regions, in terms of absolute numbers as shown in Figure 1, the poor are actually concentrated in the regions of the Red River and Mekong Deltas (VASS, 2011).
8. Children and women are particularly vulnerable and may often be more strongly impacted by poverty in the rural areas. In Viet Nam, most poor children live in rural areas. Among ethnic minority children poverty is especially high. Using multi-dimensional criteria to assess poverty (i.e., not only economic criteria, but also criteria related to child development needs: education, health, housing, clean water, sanitation, not working at an early age, and social protection), the two regions with the highest rates of poverty among children were the Northwest and the Mekong River Delta. In the Mekong River Delta, the rate of multi-dimension poverty was the highest in the country, at 52.8 percent (GSO, 2009).

Figure 1. Poverty Rates And Spatial Distribution Of Poverty At The Provincial Level
Provincial Poverty Rate (%) **Provincial Poverty Density**



Source: Nguyen Viet Cuong et al, 2009 as presented in VASS, 2011

9. From a gender perspective, Viet Nam's progress in reducing disparities has been striking. Regionally, Viet Nam stands out a success and example in closing gender gaps. There do, however, remain a number of challenges as regards gender and development that leave women more vulnerable to the impacts of poverty. In particular, (i) ethnic minority women and girls lag behind ethnic minority men and Kinh and Chinese women in accessing health and education services and economic opportunities; (ii) women's role in the agricultural sector is increasingly important – they now outnumber men – yet the importance of their role is not fully recognized and supported through rural development policy and programs; and (iii) progress in increasing the number of women in decision making has been slow and inconsistent (World Bank, 2006; GSO, 2011).
10. These and other factors have been shown as having causal linkages to poverty. Among the factors contributing to falling below the poverty line are exposure to risks from natural disasters, crop and livestock epidemics, harvest losses, and other risks to production and; for remaining below the poverty lines, factors related to natural capital (having no or insufficient land for cultivation, lacking capital and productive assets, having land but lacking funds for investment), poor education and awareness, and lack of external support, such as technical assistance (VASS, 2011). To all of these factors, women tend to have greater exposure, including those related to natural disaster and production risks. Poor women are often the most exposed and sensitive to due their involvement in agricultural livelihoods on disaster-prone lands. They are also the less endowed and empowered to recover from disruptions and for shifting to alternative livelihoods (Fortier, 2010).
11. The vulnerability issue also extends to households of the non-poor. Recent work (Baluch and Hoa, 2010) suggests that while large numbers of households have moved out of poverty, many have not moved far above the poverty line and remain vulnerable to exogenous shocks that might

cause them to fall back into poverty. Among the relevant factors (vulnerabilities) identified were global economic downturns, rises in food and fuel prices and natural disasters (floods).

Agricultural Sector

12. Over ninety percent of the poor and almost three-quarters of the population live in rural areas, making agriculture and rural development critical to Viet Nam's overall development. In 2010 agriculture (including forestry and fisheries) accounted for an estimated 20.6 percent of GDP (CIA, 2011), 24.9 percent of exports (World Bank, 2011a) and 62 percent of employment (GSO, 2011). The majority of the rural population makes its living by growing and selling crops, raising and selling livestock and fish, and from forest products. Rice, livestock (including poultry) and fish accounted for over 69 percent of gross agricultural production value in the 2007 – 2009 period, contributing an average of 32 percent, 22.1 percent and 14.9 percent, respectively over the three year period (FAOSTAT, 2011; GSO, 2011a).
13. Agricultural GDP has continued to rise steadily over the last decade, its average annual growth (in constant US\$) running 4 percent (FAOSTAT, 2011). Nonetheless, growth in the industrial and service sector's have consistently outpaced it and agriculture's share of GDP has been steadily declining at an average rate of about 2.3 percent per annum⁴ for the last twenty years. Contributing some 32.5 percent of GDP in 1990, it fell to 20.6 percent in 2010. According to World Bank (2011a), a slow but steady sectoral transformation appears to be underway, with traditional sectors – agriculture and industry – experiencing lower and declining growth while service sector growth is picking up. The report observes that Viet Nam's agricultural sector growth had been based on the ability to generate very large food surpluses and agricultural commodities for exports. A process that was facilitated by the rapid integration of Viet Nam's economy into the rest of the world's through a series of trade agreements. The long term sustainability of this model is, however, in question given the heretofore excessive reliance on natural resources and increasingly adverse environmental consequences. See Box 1.
14. Agricultural employment in Viet Nam is, to a certain extent, correlated with poverty. Overall labor productivity in the sector is low relative to other sectors – one-fifth of the industrial sector's and one-quarter of the service sector's – such that wages and earnings also tend to be correspondingly lower (MOLISA, 2010). Between 1993 and 2008, a period in which poverty was significantly reduced overall, there was only a modest drop in the percentage of poor households working in agriculture: from 51.3 percent to 47.3 percent (VASS, 2011). Lacking adequate education and skills, poor households have tended to remain in purely agricultural jobs with low income while better off households work in non-farm sectors (VLSS, 2011).
15. Long term trends for the sector are difficult to predict. Some factors are clear such as the more rapid growth of urban population, as people move to the cities in search of greater opportunity. Rural population has been growing at only 0.2 percent to 0.3 percent per annum since 2002 whereas urban population has been growing at 3.2 percent to 3.4 percent over the same period. Projections show rural population peaking in 2014/2015 and declining slowly over the next decades, with urban population eventually exceeding rural in around 2038/39 and, by 2050, rural population declining to about two-thirds of its current level. The shift of population to urban centers and the growth and diversification of demand for non-farm goods and services will increasingly induce individuals and households to leave agriculture for other sectors.
16. The long term outlook for the agricultural sector will also depend greatly on medium-term outcomes as Viet Nam develops its commerce and trade opportunities associated with WTO membership and pursues its goals to achieve high-middle income country status and, eventually, high income status. The agricultural sector has been on a path towards integration into the global economy for over 20 years, and the country's 2007 membership in WTO has both reinforced this direction and raised the stakes for Viet Nam's ARD sector. The sector is now being exposed to competition within an open, global market while any remaining protectionist measures and mechanisms are being dismantled. Some few commodities – most notably rice, coffee, tea, rubber, cashews, black pepper, and fisheries – are leading the way, however, the agricultural export sector still primarily markets raw and primary agricultural products with relatively little

⁴ Calculated from FAOSTAT, 2011a; World Bank, 2011a; and GSO, 2011a

value-added value processing or incremental benefit to the farmers/producers. Increasing competitiveness and taking advantage of opportunities to develop more value-added processing capacity within the new economic environment provided by WTO membership will ultimately be the responsibility of the private sector (including farmers). Government's role will also be critical to developing more efficient regulatory processes, improving provision of key services (e.g., for meeting sanitary and phytosanitary requirements, in promoting GAP) and that policy-making is informed by a good understanding of markets, quality, value chains and logistics.

17. Success in meeting these challenges will undoubtedly bring new economic opportunities, but not necessarily to poor and small producers. Many observers have pointed out the risks associated with the types of growth favored by WTO membership, which often encourages more rapid migration and urbanization and increased land sales. Under these conditions there is a real risk that new vulnerable groups and pockets of poverty could be generated. Thus an additional challenge will be to ensure that the poor – especially ethnic minorities and other vulnerable groups – and small producers are benefitted rather than hurt by the WTO agreement.
18. Vietnam's recent achievement of lower-middle income status is a significant milestone in the country's economic development. Building the path to the next important milestone – achieving high income status – will be a long-term undertaking. Among others, it will be necessary to raise skill-levels and increase the labor forces' capacity for innovation, develop financial systems to efficiently supply needed investment and venture capital, and enhance efficiency and competitiveness through development of economies of scale and aggregation within value chains. Current rural development policies strongly support just such improvements. For the ARD sector, however, the implementation of these policies will not *a priori* benefit the poor and small producers. Just as economies of scale and agglomeration effects can support enhanced competitiveness, they can also lead to displacement, rapid urbanization and increasing inequality. Rural wages already tend to be significantly lower than urban wages and poverty highly correlated with agricultural employment and living in rural areas. If the outcome of policies to increase competitiveness and efficiency are to maintain or further depress already low earnings and wages, the rural sector will not enjoy the fruits on the broader economic growth – a problem already occurring for ethnic minorities and in pockets around the country, as previously discussed. Successfully promoting pro-poor and inclusive economic growth in rural areas – the vision set out in the new policy for rural development (*Tam Nong*) – will be very challenging.

Box 1. Challenges To Sustainable Natural Resources Management For Continued Economic Growth And Poverty Alleviation

The following is extracted from the 2010 Vietnam Development Report (World Bank, 2010), which was jointly developed by sixteen development partners in consultation with NGOs, academics, researchers, and independent consultants.

Vietnam's economic growth has been fueled by intense exploitation of natural resources. Utilization of land has intensified, water resources are increasingly stretched, natural forests have been logged, capture fisheries have depleted their resource base, and mineral resources are increasingly exploited. Nothing is wrong with using natural resources for economic growth, but sustainable development requires that renewable resources be harvested at a level that allows for replenishment, and proceeds from exploiting non-renewables be invested in other forms of capital.

The overall growth of the economy, population growth, urbanization, and industrialization are all combining to increase water pollution, urban air pollution, and the extraction of natural resources. To some extent this is counterbalanced by increasing efficiency in the use of natural resources, technological progress and the structural shift from agriculture toward industry and services. But the net result is still one where pressures on the resource base and pollution continue to increase.

Much about the long-term impacts of climate change is uncertain. But enough is known already to prompt action: temperatures will increase, the sea level is rising, and saltwater intrusion will increase further. Precipitation is likely to exacerbate droughts and floods, and it is likely that extreme climate events will become more frequent and intense, while the current level of impact is quite significant and warrants countermeasures. Climate change stresses will require adaptation measures and the most relevant sectors are agriculture and water management — including urban flood management.

The entire economy is increasingly integrated into the global system. Most of Vietnam's surface water resources come from outside the country. Vietnam will be affected by the massive hydropower plants being planned in the Mekong River. The wood processing industry of Vietnam is quite strongly import-dependent for raw material. Many of its products are intended for export, and new legislation in external markets, prohibiting trade in illegally harvested wood products (USA, EU; similar laws forthcoming from Australia), is placing new demands on Vietnam. The marine fisheries and aquaculture industries are also very export-oriented, and the former competes with foreign fleets in international waters. Some important marine products export markets will require proof of sustainable resource management in Vietnam.

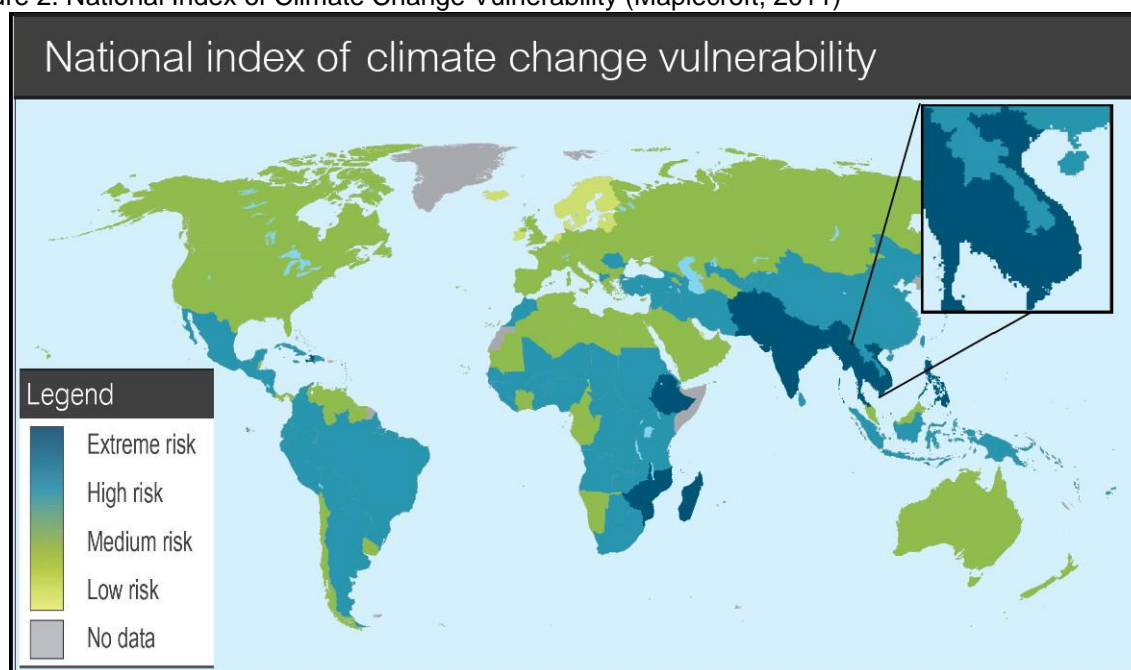
Vietnam is already engaged in a dynamic reform process and its recent history of successful economic reform bodes well for future reforms. Government policy provides for a transition from a centrally planned economy toward one that is increasingly market-oriented, with a socialist orientation. Part of this is a process of devolution of decision making to lower levels of government. As this process further unfolds, at times the goals of efficiency, environmental sustainability, and equity will be quite compatible — witness the growth pattern of recent decades combined with poverty alleviation. But there are also trade-offs between these goals. In particular, economic growth that puts a "zero price" on environmental impacts will send markets and decision makers the wrong signals and undermine the benefits of development. Efficient markets may not produce results that are acceptable from an equity perspective, and so on. Thus reforms have to be pursued with an eye to multiple and sometimes competing goals. There are also important gaps between theory and practice that need to be addressed, especially as regards good policies requiring adequate resources for successful implementation.

II. Climate Change in Vietnam and the Rural Sector

Relevance of Climate Change to ARD

19. Viet Nam has been predicted to be one of the countries most vulnerable and likely to be significantly impacted by climate change. Globally, it has been ranked as a “Natural Disaster Hotspot”, ranking 7th on economic risk, 9th on the percentage of land area and population exposed, and 22nd on mortality from multiple hazards⁵ (Dilley et al, 2005). With its “megadeltas” and high population concentrations within the Mekong and Red River Deltas, the IPCC’s Fourth Assessment characterized Vietnam as a “Hotspot of key future climate impacts and vulnerabilities in Asia” (Cruz et al, 2007). Roughly 40 million or more Vietnamese live in and around the deltas and along the coast. More recently, a UK-based firm specializing in the provision of risk intelligence services to private investors and organizations⁶, ranked Viet Nam as an “extreme risk” country, and 13th of 170 countries, in terms of its vulnerability to the impacts of climate change over the next 30 years (Maplecroft, 2010).

Figure 2. National Index of Climate Change Vulnerability (Maplecroft, 2011)



Source: Maplecroft. 2011. *Climate Change Vulnerability Map 2011. Climate Change Vulnerability Index*

20. Long term predictions for the country show expected impacts to derive primarily from rising sea levels and changes in rainfall and temperatures. While there is yet a great deal of uncertainty about the intensity and rates of the changes that climate change will bring – with the degree of uncertainty increasing as attempts are made to downscale the global models to predict outcomes at more local (e.g., provincial levels) – there is a high degree of confidence that the aggregate impacts of climate change through the 21st Century for the agricultural and rural sectors will be daunting. A 2007 World Bank study (Dasgupta et al) concluded that a 1 meter rise in sea level would directly result in a loss of more than 5% of the country’s land area, more than 7% of agricultural lands, more than 10% of GDP and 28% of wetlands; and impact about 11% of total population and urban areas. Of the 84 countries studied, Vietnam was in the top five mostly greatly threatened by sea level rise.

⁵ Sea level rise, floods, and storms.

⁶ The company provides risk management services (risk intelligence and corporate responsibility solutions) for social, environmental and political risks; including for identification, management and mitigation of operational, supply chain and distribution network risks.

Climate Risk.

21. A better appreciation of the longer term risk from climate may also be had from looking at impacts from past weather-related disasters. Irrespective of climate change, people in Vietnam have long been subject to natural disasters. From 1953 to 2010, nearly 25,000 people died in natural disasters and another 77 million were affected. Total damages have been estimated at over USD 7 billion. Typhoons (tropical cyclones) have been the main hazard. More than 80 typhoons have hit Vietnam between 1953 and 2010 and were responsible for 75% of the deaths and 60% of the affected people. Coastal areas, particularly in the northern half of the country, have been the most impacted. Floods, with around 60 major events, have been the second major natural disaster-related cause of loss of life, property and livelihoods. An estimated 5,000 people (25%) have been killed and 25 million (33%) affected by floods in the past almost fifty years (McElwee, 2010). Scenarios for future impacts of climate change suggest that these losses will greatly worsen over the course of the 21st century.
22. While it is important to note that extreme weather events are not themselves “climate change”, analyses (ISPONRE, 2009; MONRE, 2010) are showing indications of shifts in climatic variables over the last century (Table 1). Of particular note are the findings of increases in average annual temperatures, in variability of both rainfall and temperature between years and within seasons, of the typhoon season tending to end later and, possibly, the increased occurrence of higher intensity storms.

Table 1. Current, observed climate trends

Climate Zone	Temperature	Rainfall	Sea Level	Extreme Events
Countrywide	1911-2000- Intra-seasonal and inter-annual variability increasing.	<ul style="list-style-type: none"> • 1911-2000: No clear trends in annual averages • 1958-2007: 2% decrease in annual average 	<ul style="list-style-type: none"> • 1993-2008: Mean rise of 3 mm/yr. • 1956-2007: Total rise of about 20 cm 	Typhoons: Recent years, typhoons of higher intensity occurring more frequently; season tends to end later
	1958-2007: Increase of 0.5 ^o - 0.7 ^o C in annual averages			
Climate Zone	Temperature	Rainfall	Extreme Events	
North West	Winter temperatures increased at a faster rates than the country average	1958-2007: Northern zones have seen a decrease in annual rainfall.	Cold fronts: Significant decrease in occurrence over last 20 years, but anomalous events occurring more frequently (e.g., 38 day damaging cold Jan./Feb. 2008)	
North East				
Red River Delta & Quang Ninh ²				
North Central Coast	Summer temperatures increased at slower rates than the country average	1958-2007: Southern zones have seen an increase in annual rainfall.	Typhoons: Some storms' tracks showing abnormal movements southwards	
Central Highlands				
South Central Coast				
South (SE & Mekong River Delta)				

Source: ISPONRE, 2009; MONRE, 2010. 1 Data Red River Delta Region. 2 Coastal province in North East region.

23. The empirical evidence lends greater credence to the anecdotal evidence that is being compiled at the levels of communities and with stakeholders in the rural sector. Recent work by IFAD and others (IFAD, 2011a; Le Duc Ngoan. 2011; Le Ngoc Thach et al, 2010; MARD, 2010; McElwee, P. 2010) strongly suggests that current climate-related risks are having significant impacts – in some areas and on some vulnerable groups – on agricultural livelihoods. Natural disasters and high levels of uncertainty associated with increasing inter-seasonal and inter-annual variability in temperatures and rainfall are already leading to changing behaviors in response. Examples include, shifting from annual crops to livestock production due to drought in the mountains of northern Vietnam and the Central Highlands; and high percentages of farmers changing cropping

patterns, calendars, varieties and cultural practices due to drought and reduced water availability. Table 1 in Annex II summarizes some of the findings on community and farmer perceptions of changes, impacts and their coping strategies.

24. Of particular concern is the nexus between climate risk and poverty. In a World Bank study on the social dimension of adaptation to climate, village-level interviews found that community members considered factors directly related to climate to be among the main causes of poverty. In one particular instance, poor households participating in interviews maintained that they had been non-poor up until 2008 when flash floods caused them to lose a significant portion of their assets. Due to drought and crop losses the following year they had been unable to recover. According to the authors of the study *“drought and hazard damage were brought up again and again as a main cause of poverty.”* (McElwee, 2010). In other case studies (Lâm Thái Dương, 2009), a review of the natural disaster history in a community in Ha Giang found that in the ten years between 1998 and 2008 there had been a total of ten major events causing losses from floods, landslides, cold spells, and typhoon-associated storms.
25. These are not isolated cases. Viet Nam’s Poverty Reduction Strategy and Country Development Plans, in the 2006-2010 SEDP, had as a primary indicator that the number of poor people falling back into poverty due to natural disasters would be halved (GFDRR, 2011). Globally, Viet Nam is one of the ten countries most affected by natural disasters (CRED, 2010). With the majority of the population living in low-lying river basins and coastal areas, more than 70 percent of the population is estimated to be exposed to risks from multiple natural hazards. National statistics show every year natural disasters cause an average of 750 deaths and result in annual economic losses equivalent to 1.5 percent of GDP. However, since damage and loss data are chronically underreported, real totals may be much higher. (GFDRR, 2011). The trend is toward increasing losses. Between 1989 and 2008 property losses averaged of US\$240 million per year. The average annual losses during the last four years of that period were some three times the longer term average (MONRE, 2010). In terms of human exposure, floods are responsible for almost 60 percent of impacts on the population, followed by storms and drought. In economic terms, storms are responsible for about 55 percent of losses, followed by flood and droughts (GFDRR). In the uplands – where a large percentage of the ethnic minorities reside and who are greatly reliant on rainfed, hillslope agriculture – detailed information on natural disaster impacts is not readily available, however flash floods, drought and landslides tend also to be major concerns. Table 2 in Annex II summarizes the severity and types of risks by region.
26. Given that Viet Nam is inherently vulnerable to climate-related risk, climate change itself will pose a serious challenge to the country over the long term. For the agriculture and rural development sector, the principal impacts from changing climate will be channeled through changes in temperature, rainfall and sea level rise. The potential magnitude of these changes have been estimated for Viet Nam’s Second National Communication to the United Nations Framework Convention On Climate Change (MONRE, 2010) based on a “medium emissions scenario”⁷. Figures 3a and 3b and Table 2, below, show the predicted changes as per this climate change scenario.

⁷ Climate change scenarios were developed based on GHG emission scenarios – high (A2), medium (B2), and low (B1) – from the IPCC’s Fourth Assessment Report. The scenarios assume different development pathways and degrees of cooperation in reducing GHG emissions over the coming decades.

Figure 3a. Predicted changes in temperature and rainfall – 2050

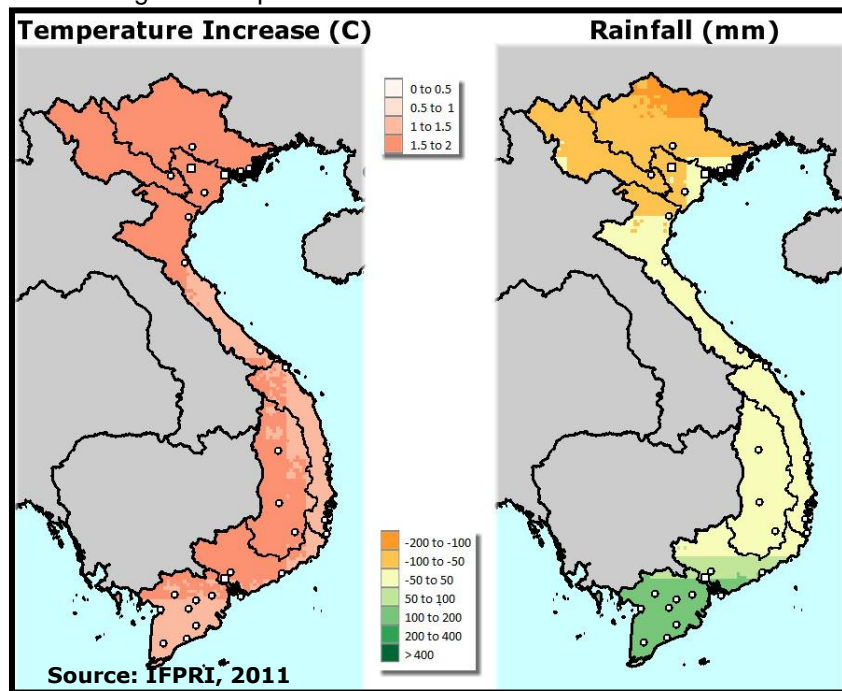
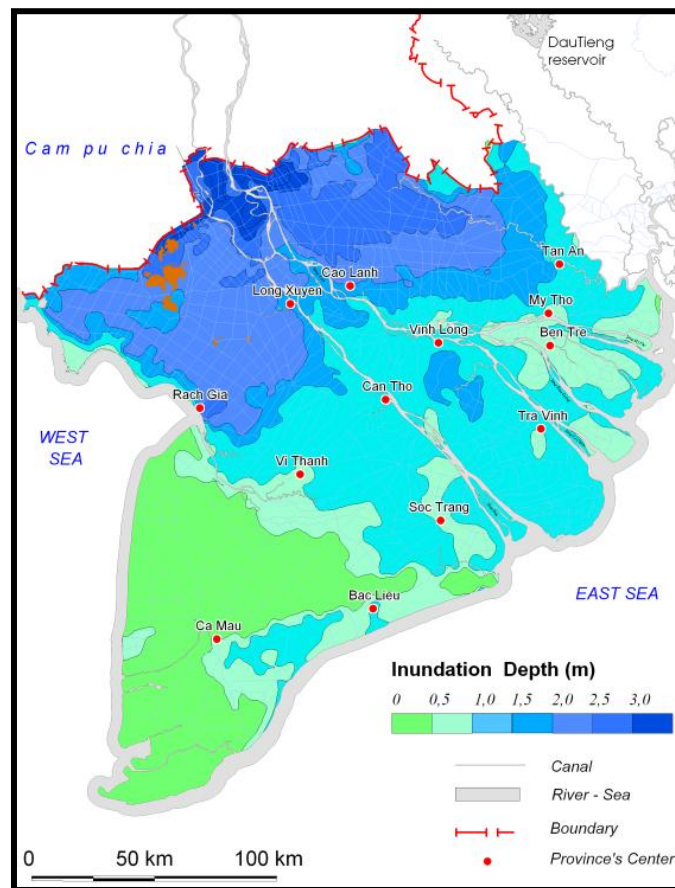


Figure 3b. Sea level rise of 0.3 m over current conditions – 2050



Predicted changes between the present and 2050 do not vary significantly between the different scenarios (i.e., low vs. medium vs. high emissions)⁸. Rather it is later in the century (the 2070 and 2100 predictions) when divergence between the scenarios becomes of greater practical significance. For purposes of the current strategy, however, it is the short to medium-term scenarios that are of relevance for planning over the next five years within a context of potential impacts by 2050.

Predicted Climate Change Impacts

27. Of greater moment than the estimates of the potential changes are the predictions as regards the impacts resulting from those changes. Annex II details predicted climate change impacts as presented in the Government of Viet Nam's Second National Communication To The United Nations Framework Convention On Climate Change (MONRE, 2010). The following is a summary of predicted impacts both from that document as well as from other sources:⁹

- **Vulnerable Populations.**

Vulnerability to climate change is generally socially differentiated. Impacts of extreme weather events are related to poverty status, access to resources, and social security systems. Groups that are already the most socially vulnerable (women, ethnic minorities, and the disabled) are likely to be disproportionately less able to adapt to climate changes. One pathway that might be particularly important in terms of effects of climate change would be increased susceptibility to health problems: diarrhea and water-borne infectious diseases; lack of safe drinking water; a potential increase in endemic areas for malaria, dengue, and other vector-borne infectious diseases linked to water and temperature; nutritional impacts resulting from impacts on agricultural outputs; and mental health impact of disaster-related stress. The rural poor, and especially these socially vulnerable groups, are also exposed to greater risk given their direct reliance on agriculture and the natural resources base for their livelihoods as well as their greater exposure to natural disasters and their lack of assets and capital to recover or to shift to alternative livelihoods.

- **Water Resources.**

Annual flows of rivers in the North and northern areas of the North Central Coast are expected to increase. In contrast, annual flows of rivers in the southern area of North Central Coast to the northern area of South Central Coast are expected to decrease. Flood peaks in most rivers will increase while dry season low flows will decline. Potential evapotranspiration will show rapid increases in the South Central Coast, with the Mekong Delta regions having the greatest increases. After 2020, groundwater levels are expected to drop drastically. Increases in the incidence of severe drought, especially during the dry season, and in inter- and intra-seasonal rainfall patterns will create much greater uncertainty as to moisture availability, inter-annually for crop and livestock production and intra-annually for overall availability of water resources. Increases in the incidence of extreme rainfall events will exacerbate the impacts of flooding (inundation and flash floods) as well as concentrate rainfall within shorter time periods leading to decreases in soil and groundwater recharge, particularly in uplands and sloping areas and potentially greater crop moisture stress.

Table 2. Climate change scenarios by climate zone (baseline: 1980-1999)

⁸ The range of predictions for 2050, between the minimum "low" and the maximum "high", for temperature increase are 0.8°C – 1.5°C; for rainfall are an increase between 0.7% - 3.9%. and for SLR are an increase of 28 mm – 33 mm. The medium emissions scenario is well represented within these prediction brackets.

Sources: Bingxin Yu et al, 2010; IFAD, 2011b, ISPONRE, 2009; Fortier, 2010; McElwee, P. 2010; MONRE, 2008 & 2010; World Bank, 2008, 2010b & 2011c

Climate Zone	Change In Temp (°C) & Rainfall (%)	Narrative
Coastal Vietnam – Sea Level Rise: 2020: 11-12 cm 2050: 28-33 cm 2100: 65-100 cm		
North West	<ul style="list-style-type: none"> • 2020: 0.5 • 2050: 1.2-1.3 • 2100: 1.7-3.3 	<ul style="list-style-type: none"> • Cold fronts: decrease in frequency w/NW more affected; increase variability of occurrence; mid-winter peaks diminish. • Temperatures: increase in hot spell occurrences in mid- & lower elevations; hot season at lower elevation longer & cold season shorter; increase evaporation & decrease relative humidity. • Rainfall: strong increase variability in dry season; increase incidence severe drought, esp. final months of dry season; increase incidence extreme rainfall events – intensity, scale, duration & rainy periods; in NE mountains “drizzly” rainfall decrease between dry & wet seasons; increase variability in onset/end of dry and rainy seasons; rainfall more concentrated in peak months.
North East	<ul style="list-style-type: none"> - • 2020: 1.4-1.7 • 2050: 3.6-3.8 • 2100: 4.8-9.3 	
Red River Delta & Quang Ninh (Coastal Province NE Region)	<ul style="list-style-type: none"> • 2020: 0.5 • 2050: 1.2-1.3 • 2100: 1.6-3.1 <p>-----</p> <ul style="list-style-type: none"> - • 2020: 1.6 • 2050: 3.9-4.1 • 2100: 5.2-10.1 	<ul style="list-style-type: none"> • Tropical cyclones: may increase frequency & intensity; inter- & intra-annual variability increase; typhoon season start earlier/end later • Cold front: decrease frequency & intensity; increase inter- & intra-annual variability; • Temperature: increase normal & maximums; increase hot spell occurrence, intensity & duration; cold season warmer & shorter; warm season longer & more severe; increase evaporation. • Rainfall: long term increase in rainy season & increase variability in dry season; increase variability in rainfall & onset/end dry & rainy seasons; increase incidence extreme rainfall events – intensity, scale, duration & rainy periods; increase incidence drought; decrease in “drizzly” rain w/ increase end winter/beginning spring drought. • Sea level: increase rate of rise (5-6 mm/year)
North Central Coast	<ul style="list-style-type: none"> • 2020: 0.5-0.6 • 2050: 1.4-1.5 • 2100: 1.9-3.6 <p>-----</p> <ul style="list-style-type: none"> - • 2020: 1.5-1.8 • 2050: 3.8-4.0 • 2100: 5.0-9.7 	<ul style="list-style-type: none"> • Tropical cyclones: may increase frequency & intensity; inter- & intra-annual variability increase; typhoon season start earlier/end later/become shorter • Cold fronts: decrease in incidence; season shorter, intervals between fronts longer. • Temperature: increase normal; windy season (dry, hot westerly winds) arrive earlier/end later; increase number & duration hot spells; cold season in North shorter & southern boundary of cold season will move to higher latitudes; hoarfrost in North (rare now), will cease occurrence; increase evaporation. • Rainfall: long term significant increase in rainy season; increase concentration rainfall in current higher rainfall months; dry season little change in South, but North May & June may be permanently dry and hot like in South; North decrease “drizzly” rain; increase daily/monthly/annual maximums in Central Coastal strip; increase incidence & severity of drought. • Sea level: increase rate of rise (5-6 mm/year)
South Central Coast	<ul style="list-style-type: none"> • 2020: 0.3 • 2050: 0.9-1.0 • 2100: 1.2-2.4 <p>-----</p> <ul style="list-style-type: none"> - • 2020: 0.7 • 2050: 1.6-1.7 • 2100: 2.2-4.1 	
Central Highlands	<ul style="list-style-type: none"> • 2020: 0.4 • 2050: 0.8 • 2100: 1.1- 	<ul style="list-style-type: none"> • Cold fronts: Decrease in incidence (already increasingly rare) • Tropical cyclones: May penetrate deeper inland. • Temperature: increase in normal & maximum, esp. lower elevations &

	<p>2.1 ----- - • 2020: 0.3 • 2050: 0.7 • 2100: 1.0-1.8</p>	<p>mid-/lower reaches of major rivers; increase hot spells in lower elevations, hollows & river valleys; increase hot season duration in mid-/lower elevations & decrease cold season in mid-/high elevations; increase evaporation, contributing to severe drought in early months of year.</p> <p>• Rainfall: Long term increase in rainy season & strong increase variability in duration dry season; overall increase in variability w/ increase maximum daily/monthly/annual rainfalls; increase incidence & severity droughts in latter half of winter; increase variability in onset/end of rainy & dry seasons.</p>
South (Southeast & Mekong River Delta)	<p>• 2020: 0.4 • 2050: 1.0 • 2100: 1.4-2.6 ----- - • 2020: 0.3 • 2050: 0.7-0.8 • 2100: 1.0-1.9</p>	<p>• Tropical cyclones: may remain unchanged but increasingly track south during Sept./Nov. period.</p> <p>• Temperature: increase in normal & maximum; increase incidence & severity hot spells early months of year; increase evaporation w/increase dryness, esp. April & May</p> <p>• Rainfall: Long term increase rainfall in rainy season; increase variability in dry season; distribution across southern areas will change significantly; increase inter-annual & intra-seasonal variability in rainy season; increase rainfall intensity & maximum daily/weekly/ monthly amounts (to level equal/nearly equal to South Central)</p> <p>• Sea level: increase rate of rise (5-6 mm/year)</p>

Source: ISPONRE, 2009; MONRE, 2010

- **Coastal zones.**

With rising sea level, areas impacted by flooding will expand. The Mekong River Delta, which would be most impacted, could see as much as 90% of its total area subjected to flooding. Sea-level rise will also to greater risk of saltwater intrusion in rivers and groundwater, resulting in very serious social and economic costs and displacement of populations and economic infrastructure and activities. Climate change may also seriously impacts coastal ecosystems, biological reserves and forests, especially mangrove forests. By 2100, almost 5,500 km² of arable lands may be lost, equivalent to about 9 percent of all arable lands, as would some 168 km² of aquaculture area and 320 km² of forest land be submerged. Loss of mangrove would be almost complete, unless accommodations are made in master plans in coastal zones for mangrove forests to migrate and/or be established further inland.

- **Agriculture.**

Total annual temperature is projected to increase between 8% and 11% by 2100. In most regions, the number of days when temperatures exceed 25°C will increase notably (Table 3) while the number of days when temperatures drop below 20°C will decrease significantly. Water demand for agriculture may increase two or three-fold compared with that of 2000. Tropical plants will tend to shift further north and towards higher altitudes. Shifts in eco-agricultural zones could cause loss of varieties of indigenous breeds or species, although this may also extend the ranges of some crops. Moisture stress in crops will be exacerbated and areas of crops requiring wet or moist conditions will decrease.

Table 3. Predicted changes in number of degree days above 25° C

Region	Base Yr.	Number of Days			Increase Over Baseline (%)		
	2000	2020	2050	2100	2020	2050	2100
Northwest	124	143	176	207	15%	42%	67%
Northeast	164	173	190	212	5%	16%	29%
Red River Delta	166	172	189	209	4%	14%	26%
North Central Coast	192	203	223	251	6%	16%	31%
South Central Coast	275	290	337	365	5%	23%	33%
Central Highlands	79	94	134	230	19%	70%	191%
Mekong River Delta	365	365	365	365	0%	0%	0%

Evapotranspiration rates will increase, increasing crop water usage and the damaging effects of drought. Total output from spring rice crops is expected to decline more than that of summer crops outputs and significant production losses are expected in all of the major grain crops (Table 4a). Winter maize productivity may increase in the Red River Delta but decrease in Central Coast and the Mekong River Delta. Yield changes will vary widely across crops and agroecological zones under climate change and estimates of these will also vary depending on assumptions about the impact of increased atmospheric CO₂ concentrations¹⁰ and rainfall. An estimate of potential crop yield losses across climatic zones, utilizing alternative scenarios for rainfall¹¹ without CO₂ fertilization, are given in Table 4b. The predicted 33 cm rise in sea level by 2050 (Figure 3b.) would increase the area inundated by flooding to a depth greater than 0.5 m by an estimated 276 thousand ha and the area affected by saline intrusion (threshold value equals salinity of greater than 4 g/l) would increase by 420 thousand ha. An estimated 13% – 590,000 ha – of the nation’s rice production area may be lost by 2050. Further yield impacts would result from early crop maturation and/or increased pest and disease pressures. The suitability of different post-harvest and crop storage practices may also be affected, increasing post-harvest losses.

Table 4a. Potential impacts of climate change on three main crops up to 2030 and 2050 using MONRE’s medium emissions scenario (A1B, B2 of IPCC)

Item	Up to 2030		Up to 2050	
	Quantity (1000 ton)	Rate (%)	Quantity (1000 ton)	Rate (%)
1. Rice	-2,031.87	-8.37	-3,699.97	-15.24
1.1. Reduction due to natural disaster	-65.27	-0.18	-65.27	-0.18
1.2. Reduction due to change in potential yield	-1,666.6	-8.10	-3,634.7	-14.97
- Spring rice	-1,222.8	-7.93	-2,159.3	-14.01
- Summer-autumn rice	-743.8	-8.40	-1,475.4	-16.66
2. Maize	-500.4	-18.71	-880.4	-32.91
3. Soybean	-14.38	-3.51	-37.013	-9.0

Source: Nguyen Van Viet, 2011

¹⁰ Fertilization by increased CO₂ levels should theoretically increase yields. But, its potential role is both contentious and difficult to estimate since it will depend ultimately on which factors constrain plant growth. Estimates of yield losses, without accounting for CO₂ fertilization, thus provide an upper bound for potential losses.

¹¹ Given the uncertainty of impacts on rainfall, it is useful to look at both wetter and drier scenarios for Viet Nam. The predicted impacts on crop yields from the driest (IPSL-CM4) and the wettest (GISS-ER) show significant differences from MonRE’s medium emission scenario.

Table 4b. Potential impacts of climate change on 2050 crops yields using IPSL-CM4 (driest), GISS-ER (wettest) and MONRE's medium emission scenarios.

Agroecological zone	Potential impacts of climate change without adaptation
North-West	Rice yield declines by 11.1 percent to 28.2 percent; yields of other crops decline by 5.9 percent to 23.5 percent. Generally, the Dry scenario results in more yield reduction than the Wet scenario. MoNRE scenario has the least yield reduction.
North-East	Rice yield declines by 4.4 percent to 39.6 percent; yields of other crops decline by 2.7 percent to 38.3 percent. The largest yield reduction can be with either the Dry or Wet scenarios, depending on crops. MoNRE scenario has the least yield reduction.
Red River Delta	Rice yield declines by 7.2 percent to 32.6 percent; yields of other crops decline by 4.1 percent to 32.9 percent. The largest yield reduction can be with either the Dry or Wet scenarios, depending on crops. MoNRE scenario has the least yield reduction.
North-Central Coast	Rice yield declines by 7.2 percent to 32.6 percent; yields of other crops decline by 4.1 percent to 32.9 percent. The largest yield reduction can be with either the Dry or Wet scenarios, depending on crops. MoNRE scenario has the least yield reduction.
South-Central Coast	Rice yield declines by 8.4 percent to 27.0 percent; yields of other crops decline by 4.0 percent to 20.9 percent. Generally, the Dry scenario results in more yield reduction than the Wet scenario. MoNRE scenario has the least yield reduction.
Central Highlands	Rice yield declines by 11.1 percent to 42.0 percent; yields of other crops decline by 7.5 percent to 45.8 percent. The largest yield reduction can be with either the Dry or Wet scenarios, depending on crops. MoNRE scenario has the least yield reduction.
South-East	Rice yield increases by 4.3 percent in the dry scenario, remains the same in the wet scenario, and declines by 8.8 in the MoNRE scenario. Yields of other crops decline by 3.0 percent to 22.7 percent. The largest yield reduction can be with any of the three scenarios, depending on crops.
Mekong River Delta	Rice yield declines by 6.3 percent to 12.0 percent; yields of other crops decline by 3.4 percent to 26.5 percent. The largest yield reduction can take place under any of the three scenarios, depending on crops.

Source: World Bank (2010b)

Overall, in the absence of adaptation measures, yields will likely be reduced for rice, maize, cassava, sugarcane, coffee, and vegetables. Impacts are predicted to be more significant under dry scenarios than wet ones. Hydrological changes and sea level rise will affect the availability of fresh water or even physically change the agricultural landscape. Climate change may also threaten the growth and reproduction of livestock and increase the incidence and spread of diseases

Box 2. How Conservative are Predictions of CC Impact in Viet Nam?

In the face of uncertainty it is often preferable to err on the side of being overly conservative, particularly when the potential cost of being overly optimistic would be high. For purposes of strategic planning for climate change, the Government of Vietnam selected a midrange, "medium emissions" scenario (group: A1B, B2) in 2009 as the basis for modeling potential climate change impacts on the country. That midrange scenario roughly entails averages of 2.3°C of global warming and 75 cm of sea-level rise before the end of this century. Is this scenario sufficiently conservative?

Modeling work done by a number of other parties working on climate change in Vietnam (e.g., IFPRI, Can Tho University, World Bank, others) generally complement the MONRE scenario with other IPCC scenarios. The purpose of doing so is to provide a more comprehensive view of the range of potential outcomes, given the uncertainty in the models and scenarios. For example, given the particular uncertainty in Viet Nam over climate change impacts on rainfall, both IFPRI and World Bank have included the "driest" and "wettest" model scenarios, in addition to MONRE's, in an attempt to better define that potential range of outcomes and impacts.

Also of interest to this question is the recent UN (2011) response to Vietnam's Second Submission to the IPCC. The response states: "The B2 scenario will lead to an average annual temperature rise in Viet Nam by 2100 of about 2.3°C...however, recent scientific data suggests that the world is still on a high emissions pathway, and according to the A2 high emissions scenario, the average annual temperature rise would be as much as 3.6°C in the north-central coastal region." The high emissions scenario doubles the estimated temperature increase in north; doubles or triples the number of heat waves annually; increase rainy season rainfall (with attendant increases in extreme rainfall events, flooding, landsliding); and predicts that dry months would see an average rainfall decrease by 20%, especially in the southern regions.

Finally, the United States Geological Survey (Doyle et al, 2010) released a report on sea level rise (SLR) in the Mekong Delta that noted subsidence has not been accounted for in the country's SLR scenarios. Though reliable data for Viet Nam is lacking, most similar deltas around the world are subsiding at a rate greater than current SLR. They suggest that the rate of subsidence could be as great as 9 mm/yr or 1.5 times the predicted rate of SLR.

- Forestry.

Impacts on forest ecosystems and flora will be diverse. By 2100, native forest cover comprised of closed evergreen forests and closed tropical moist semi-deciduous forests, among others, will significantly decrease. The latter forest-type is likely to be the most affected by climate change. The extent of *Chukrasia tabularis* (Burmese Almondwood) forests are projected to decrease by 70 percent and of *Pinus merkusii* (Sumatran Pine) forests by 58%. In coastal zones, mangrove, indigo and Melaleuca forests may be severely threatened by sea level rise. It is anticipated that there will be changes in boundary distribution of primary and secondary forests. Increasing temperature in combination with abundant solar radiation, could accelerate photosynthesis processes facilitating increased carbon uptake. However, due to an increase of evapotranspiration, soil moisture would be reduced, and, as a consequence, the biomass growth index of forest trees could decline. Risk of forest fires in all regions, primarily during the dry-hot season, will be greatly heightened. Warmer conditions will facilitate the spread of forest pests, hampering the growth of forest ecosystems. A forestry growth model suggests that climate change will increase the variability of plantation yields across the country without having a major impact on the average yield, potentially increasing management costs to ensure appropriate species/site matching and silvicultural practices.

- **Aquaculture.**

Climate change will adversely impact coral reefs, maritime and estuarine sea grass beds; salinization in coastal zones will cause the loss or retreat of mangrove forests. The accompanying loss of habitat will cause reduction in those stocks of fish, mollusks and crustaceans dependant upon these habitats¹². The intrusion of saltwater into freshwater estuaries and coastal lagoons will cause the replacement of freshwater species by their brackish and saline water counterparts. Impacts on the aquaculture subsector could include damage and loss of ponds in exposed coastal areas due to increased coastal erosion and rising sea level, loss of suitable land area for aquaculture caused by coastal inundation, and rising feed costs if climate change adversely affects coastal marine fisheries. Rising water temperatures may have adverse impacts on overall fishery health (wild and farmed) arising from an increased incidence of diseases and parasitic infections. Changes in the availability of fresh water for aquaculture would not only impact fisheries' health but possibly lead to more competition/conflict between agriculture, aquaculture, and other sectors over access to high-quality water. The main impacts on aquaculture would accrue from increased flooding and salinity. Freshwater catfish farming in particular could face an uncertain future as a result of rising prices for feedstuffs and the costs of maintaining water quality as salinization increases. On the other hand, some fish species, such as catfish, may grow more rapidly with higher temperatures but be more vulnerable to disease. Aquaculture is currently estimated to employ some 2.8 million people, while 2010 export revenue is expected to be about \$2.8 billion. Catfish farming accounts for more than 50 percent of total aquaculture revenues.

- **Transportation.**

Industrial facilities, equipment, power stations and transmission lines in coastal zones will face submergence and increased risk of flooding. A 1 meter rise of sea level could submerge 11,000 km of road infrastructure.

- **Human health.**

Direct health impacts would occur as a result of increased incidence of heat waves and natural disasters. Indirectly, rising sea level and temperature affecting agricultural land may impact food security and increase the risk of food shortages. Warmer conditions will facilitate the spread of infectious diseases and epidemics.

Potential Economic Costs

Impacts and risks from climate change will vary by climatic and geographic region as well as by both demographic and social factors. In Annex II, Tables 3a-c provide summaries of the relevant potential climate change impacts and climate risks for the ARD sector. These are broken down by climatic region and subsector (crops, livestock, fisheries, forestry, water, and infrastructure) and vulnerability by region, sector, and communities. World Bank (2010b) estimated the macroeconomic effects of

¹² Seagrass beds and mangroves are critically important habitat for very large numbers of benthic and coral reef dwelling species. Research in some parts of the world (e.g. Jamaica) have shown that up to 90% of commercial fish may rely on seagrass beds and mangrove forests at some point in their lives.

climate change without adaptation in 2050 on the rural sector to represent a loss to overall GDP between 0.7% to 2.4%. Loss of agricultural value-added would be between 5.8% and 13.9%. The macroeconomic effects would not be evenly distributed geographically or amongst the population. The regional GDP of northern Viet Nam was estimated to lose 2.6% to 6.6% whereas the south would still show positive growth of 0.8% to 1.1%. Among rural households, consumption by the lowest quintile would decrease by 2.6% to 6.5% versus that of the top quintile with an estimated decrease of 0.4% to 1.7%.

28. World Bank (2010b) also estimated the annual costs for adaptation in the rural sector for the period 2010-2050. The estimate does not include the livestock sector – 30% of total agricultural value-added in 2009 (FAOSTAT, 2011) – since there is not good evidence to assess how different climate scenarios may affect animal growth rates and dairy yields. For the cropping sector alone, the estimated price tag for adaptation is over US\$6.4 billion.

Priority Regions for IFAD.

29. As IFAD’s mandate directs it to work with the poorest and most marginalized and vulnerable segments of rural society, of primary relevance is to ensure that IFAD’s efforts to be “climate smart” substantially benefit that target group. Recent work by the World Bank – *The Social Dimensions of Adaptation to Climate Change in Vietnam* (McElwee, 2010) – is informative in this respect. The study analyzed exposure to climate change risk (absolute numbers of households potentially

Table 5. Estimated annual cost (2005 prices, without discounting) over the period 2010-50 for Climate Change Adaptation

Sector	Cost, US\$ million ¹	Adaptation Responses
Agriculture	160.0	<ul style="list-style-type: none"> Autonomous adaptation: change in sowing dates, switch to drought-tolerant crops, adoption of salinity-tolerant rice varieties, adoption of new crop varieties, & switching to rice-fish rotations. Planned adaptations: (a) increase spending on research, development, & extension to raise average yields by 13.5%, & (b) increase irrigated land ~688,000 ha (~50% for rice & remainder mostly maize & coffee)
Aquaculture	130.0	Likely to be autonomous as capital intensive and growing rapidly: better feed conversion; improvements in marketing & upgrading of dikes (reduce flooding & salinity); semi-intensive & intensive shrimp producers may pump more water (maintain water & salinity levels). Since the industry is, adaptation is likely to be autonomous with the costs borne by operators.
Forestry	Modest	Key measures: (a) changes in land use planning to facilitate the migration of mangroves inland; (b) adoption of plantation species & silvicultural practices for drought resilience; (c) improved pest management, incl. genetic selection & IPM strategies; & (d) herbicides/biological control of exotic weeds. Financial costs likely to be modest, but institutional issues may not.
Flood & coastal protection	540.0	Build & upgrade sea dikes & flood defenses to protect urban infrastructure and the most valuable agricultural land.

Source: World Bank, 2010b

threatened) as well as sensitivity to climate change risk (poverty, climate sensitive resource dependency, ethnic minorities, women and children, migration – high levels of in-migration, education, and illness/health/sanitation). A principal constraint on the analysis was the coarse resolution of the regional and national climate projections that allowed only for conclusions at the level of the climatic regions defined by MONRE. The results showed that the greatest numbers of households potentially threatened are in the North and South Central Coasts and Mekong River Delta and that the greatest sensitivity (vulnerability) to potential threats occurs in the Northwest, Central Highlands, and Mekong River Delta. In the table below, these results are combined with findings from the ADB’s natural disaster and damage severity study (ADB, 2008) that categorized, by region, the occurrence and severity of natural disasters. By including the phenomena whose current and historic impacts are “severe” to “very severe”, some additional insight is provided as to current climate risks and priorities in the short to medium terms. As presented in Table 6, the

highest priority regions are the Mekong River Delta, the Central Highlands, the Northern Mountains (especially the Northwest) and the Central Coast (especially the North Coast).

III. Country Response to Climate Change Threats in the Rural Sector.

Government of Viet Nam's Climate Change Strategy.

30. For the ARD sector, the principle orienting frameworks for medium-term responses to Climate Change are the National Target Program to Respond to Climate Change (NTP-RCC) and the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development Sector Period 2008-2020. Both of these were approved and issued in 2008, the former by the Office of the Prime Minister and the latter by the Ministry of Agriculture and Rural Development (MARD). Subsequently, in 2011, MARD issued its Action Plan To Response To Climate Change Of The Agriculture And Rural Development In Period 2011-2015 And Vision To 2150 (RCC-ARD).

Table 6. Exposure and sensitivity to (future) climate change risk and disaster severity (current) by region.

Region	Risk From Climate Change				Disaster Severity (Very Severe to Severe)
	Exposure	Sensitivity	Physical	Social	
Mekong River Delta	High	Mod	SLR, flood, saline intrusion, increased rate storms, lack freshwater dry season, long flood duration areas	10% poverty; poor Khmer ethnic minority; rising rates landlessness; large number migrants	Flood, storm, saline intrusion, inundation, storm surge, fire
Central Highlands	Mod	High	Flash flood, drought, flood	29% poverty; Large ethnic minority population; many migrants; high rates subsistence, rainfed agriculture	Flood, flash flood
Northern Mountains (NW & NE)	Low	High	Landslides, flash floods, droughts, storms (E. China Sea)	49% poverty in NW; large, diverse ethnic minority population; high illiteracy, large families, low rates female education; poor access; high rates subsistence, rainfed agriculture	Storm, flash flood, drought
Central Coast (N & S)	High	Mod	Increased rate storms (E. China Sea), storm surge, flood, drought (in South Central)	29% poverty in north, 13% in south; pockets ethnic minorities; many fishing communities; rainfed agriculture dependence	Storm, flood, flash flood, drought and fire (South Central)
Red River Delta	Mod	Low	Storms (E. China Sea), storm surge, flood, flash flood inundation	Relatively low poverty rate but large number of poor; high rates out-migration; female-headed households	Storm, flood, inundation
Southeast	Low	Low	Coastal storms, drought (inland)	Low rate of poverty overall, some pockets (esp. ethnic minority), many migrant workers	Storm, flood, drought, inundation

Source: McElwee, 2010; ADB, 2008

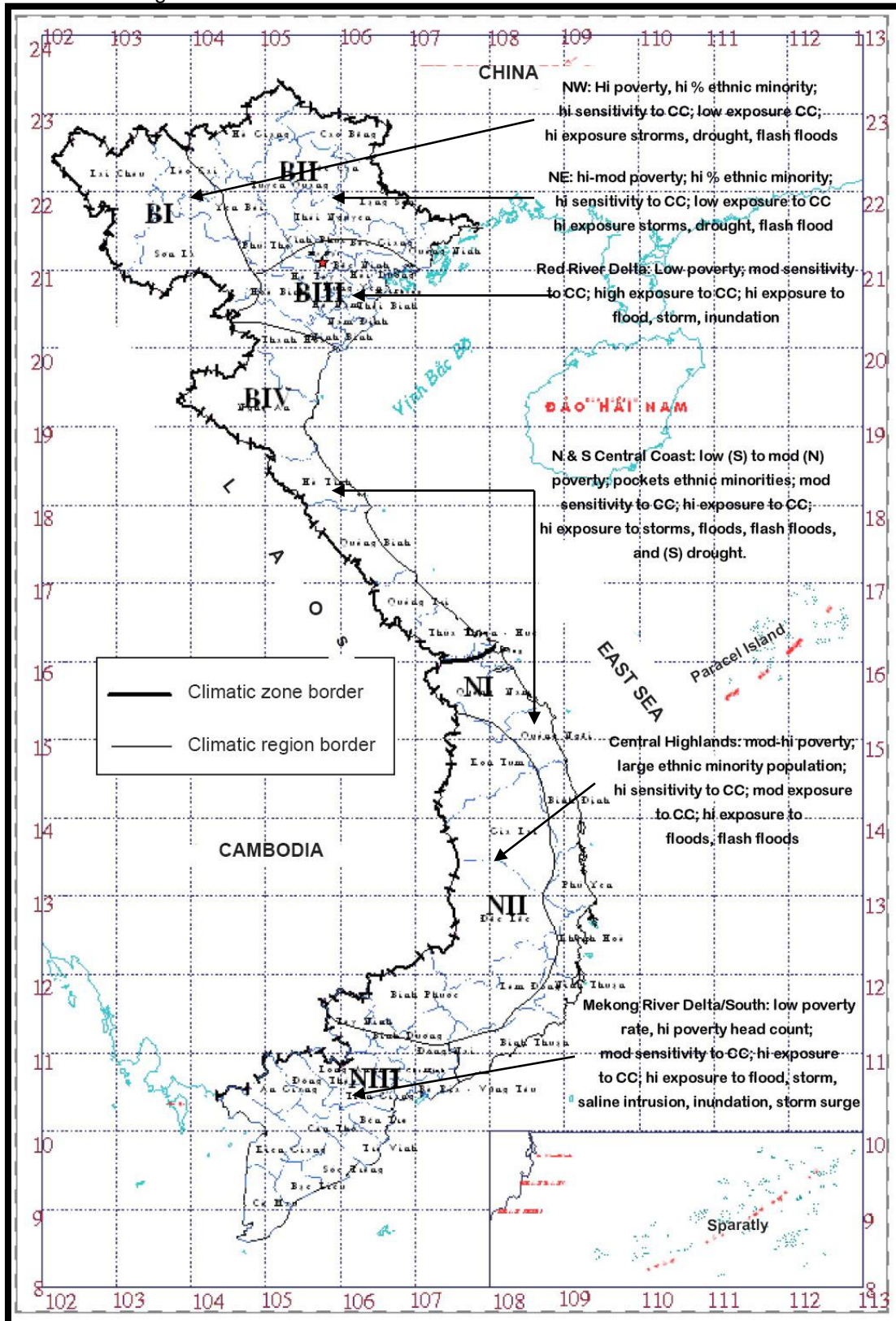
The National Target Program for Response to Climate Change.

31. The National Target Program to Respond to Climate Change (NTP-RCC) is the umbrella program and guiding framework for the Government of Viet Nam's efforts in adaptation and mitigation of climate change risk. The Ministry of Natural Resources and Environment developed the program

and is responsible for its implementation. The current program, which covers the period from 2009 to 2015, has the global objectives of: (i) assessing potential impacts of climate change; (ii) ensuring that a climate change response action plan is developed by each sector; (iii) initiating efforts to move the country towards a low-carbon economy, and (iv) contributing to global efforts for the mitigation of GHGs. To achieve these objectives it establishes an ambitious agenda, comprising a series of nine tasks, that can be grouped into the following two operational areas:

- Development and implementation of the nation's strategic and operational responses to climate change risk: (i) assess the potential magnitude of climate change and its impacts on the country; (ii) identify the appropriate adaptation and mitigation measures required; (iii) develop the action plans for each sector's, Ministry's and locality's climate change response program; (iv) mainstream climate change issues into socio-economic, sectoral and local development strategies, plans and planning processes; and (v) develop and implement those projects required for the execution of the NTP-RCC.

Figure 4. Climatic Regions and vulnerabilities



- Creation and strengthening of the institutional capacity required for climate change response: (i) develop a science and technology program on climate change; (ii) raise awareness and develop the needed human resources; (iii) strengthen the capacities of organizations and institutions; (iv) develop appropriate policies on climate change response; and (v) enhance International Cooperation in function of implementation of the NTP and sector Action Plans.
32. Total cost over the period for implementation of the NTP is estimated at 1,965 billion VND. This amount excludes funding for the implementation of the various sectoral, ministerial and local Action Plans; the cost of which remains to be determined. Domestic sources would account for 50 percent of the total funding, as follows: central budget, 30 percent; local budget, 10 percent; and other private sector and capital contribution, 10 percent. The other half of the resources are to come from external sources (ODA, FDI, etc.). To ensure the required resources, Government has committed to its portion of the financing and to mobilizing the remaining amounts from domestic and international sources, including through offering tax incentives for private investment and combining/integrating climate change response into other programs and projects to leverage additional investments.
33. The breakdown of expenditure areas for the NTP-RCC are: (i) about 72 percent of the resources go to environmental research and governance, as well as training and education activities; (ii) 20 percent of the funds go to specific sectors, including agriculture, social affairs and industry, and (iii) 8 percent is for People's Committees at provincial and municipal levels.

Table 7. NTP-RCC: General implementation arrangements

Agency	Main Responsibility
MONRE	<ul style="list-style-type: none"> • Coordinate NTP, develop annual work plan and budget • Guide and assist ministries/sectors/provinces to develop/implement action plans • Monitor, evaluate and draw lessons (thru DONRE in Provinces) • Coordinate communications and dissemination • Develop and implement MONRE's action plan
MPI	<ul style="list-style-type: none"> • Lead and coordinate efforts to mainstream CC into SEDP process • With MONRE, develop monitoring and evaluation mechanism for NTP • Develop and implement MPI's action plan
Ministries, line agencies, other gov't. authorities	<ul style="list-style-type: none"> • Develop and implement action plans to respond to climate change • Carry out activities assigned by the NTP • Participate in common activities under direction of the NTP Steering Committee.
People's Committees of Provinces & Cities	<ul style="list-style-type: none"> • Develop and implement action plans to respond to climate change • Organize the implementation of NTP approved activities • Ensure correct and efficient use of NTP fund allocations and mobilize additional resources • Carry out M&E as defined in the NTP and periodically report on progress
Social Orgs., NGOs, & Enterprises	<ul style="list-style-type: none"> • Actively participate in climate change response activities according to function and role • Support information, education and communication for climate change response • Mobilize communities for active participation, expansion & dissemination of experience • Implement/participate in the NTP and action plans of Ministries, sectors and localities

34. The institutional arrangements for the implementation of the NTP have been designed to promote integration and mainstreaming into other sectoral plans, programs and projects. A National Steering Committee for the NTP has been established, comprising the Prime Minister and the Ministers of MONRE, MPI, MOF, MARD, and MOFA. Under the Steering Committee an Executive Board is established and, among others, tasked with ensuring inter-sectoral coordination aspects. The Steering Committee comprises: MONRE, MPI, MOF, MARD, MOFA, MIT, MOLISA, MOT, Construction; Information and Communication; Education and Training; Home Affairs; Health; Science and Technology; Culture, Sport and Tourism; Defense; and Public Security. A dedicated office – Standing Office on Climate Change – in MONRE functions as the technical secretariat to the Executive Board. A Standing Office on Climate Change has also been created within MARD and similar offices or functions are established in other ministries. A more detailed summary of the NTP-RCC is provided in Annex III, Section A.
35. For the implementation of the NTP-RCC a series of seven priority areas, with their associated tasks and projects, were identified for the period of 2009-2015. Among these are several tasks where IFAD has both the institutional mandate and comparative advantage (from experiences

and lessons developed in its Viet Nam portfolio) to support (Annex IIIb). In particular, these include the following, within three of the seven priority areas identified for action in the NTP-RCC:

- *Awareness enhancement and human resources training:*
 - Support to the Women's Unions to build and promote awareness on the role of women and gender issues in climate change response amongst other social organizations, MARD/DARD, and local governments (Provincial, District and Commune)
 - Support to the Youth Union to conduct awareness raising programs among youth on climate change and increase involvement of local youth in climate change response planning and actions; promote awareness of the role of youth amongst other social organizations, MARD/DARD, and local governments (Provincial, District and Commune)
 - Develop plans and programs to raise awareness of selected groups in the Provincial administration system, social organizations, media and the community.
 - Support the establishment and dissemination through thematic channels on public media (newspaper, radio, television, web, etc) for climate change information and information exchange as relevant to agriculture, rural development and disaster risk management.
 - Support awareness raising actions for the general public through social organizations, MARD/DARD, and local governments (Provincial, District and Commune)
- *Develop and implement action plans to respond to climate change:*
 - In coordination with MPI, work with Provincial Planning and Investment Departments to develop guidelines for mainstreaming climate change issues into the SEDP development and implementation processes at the Commune, District and Provincial-levels
 - Support Provincial (DPI, DARD, DONRE) efforts to develop climate change response plans at the Commune, District and Provincial-levels;
 - Support the development of policies and mechanisms – in those cases where compatible with primary objectives of poverty reduction, climate change adaptation and/or disaster risk management – that encourage investment into the clean development mechanism, emissions reduction, and environmental protection; and implement pilot projects.
 - In coordination with MOLISA, support research and development of policy proposals and measures for poverty reduction among those populations and in those areas most vulnerable to climate change; including issues of migration, resettlement, gender, and livelihood; and implement pilot projects.
 - Support Provincial People's Committees efforts to assess impacts of climate change and sea level rise on their Provinces and localities and develop pro-poor action plans to respond to climate change and sea level rise.
 - Support MARD's (and the DARD's) development and implementation of action plan to respond to climate change, in particular for those aspects relevant to mainstreaming climate change issues into pro-poor strategies, programs, plans and planning of the Ministry.
 - In coordination with MIT and MARD, at the level the Provinces and specific IFAD-supported value-chains, support the development and implementation of measures to respond to climate change in trade activities; and implement pilot projects.
- *Develop and implement science and technology programs on climate change:* Support MARD and DARD in areas of adaptive research and development (policy and technology) – relevant to IFAD's target group (rural poor, ethnic minorities, women and youth) and pro-poor agriculture and rural development – for mainstreaming climate change issues into environmental protection programs, natural resources management, natural disaster prevention, and marine research programs.

Comments on the NTP-RCC.

36. Through the NTP-RCC the government has demonstrated a strong commitment to seriously address climate change. Still it is primarily represents only a first step in what will be a much longer process for taking the broad vision that it provides for the entire country and the affected sectors and translating it into specific priorities, strategies and action plans. The agenda it puts forward is primarily one of research, planning, communication, and inter-institutional and inter-sectoral coordination efforts. The development of detailed and explicit climate change responses are left, in the first instance, for the other ministries to specify through their own sectoral action plans. The NTP simply establishes the requirement that all other line ministries, provinces and cities produce climate change action plans. As such, the NTP-RCC is not a climate change

strategy, though reportedly MoNRE is now working on the preparation of such a strategy (World Bank. 2011c).

37. Because it is a framework document that addresses only climate change issues in the broadest terms and does so from the perspective of the environmental authority, it is perhaps inevitable that its focus would remain on government and its role in policy and sectoral and financial planning. It will have to be left to the other line Ministries' and their Action Plans for more detailed vulnerability assessments of sectors, sub-regions and populations, communities and groups; for specifying how adaptation will take place and who will be the most vulnerable populations to receive attention; and for developing approaches and strategies that can effectively to combine "hard" adaptation measures (dikes, levees, infrastructure, etc.) with "soft" adaptation measures (increasing institutional capacity, building resilience, strengthening collective local action).

The Support Program to Respond to Climate Change.

38. To coordinate the policy dialogue within government and with the ODA community a Support Program to Respond to Climate Change (SP-RCC) has been established and is managed within MONRE. The SP-RCC serves as a platform for harmonization and coordination of technical and financial assistance for the development of climate change related policies for the implementation of the NTP-RCC. It is funded by a number of donors including Japan, France, Canada and the World Bank (through a technical assistance loan) and has been active since 2009. Through the SP-RCC, MONRE has developed a policy matrix (and its monitoring indicators) to guide the development of the policy measures required for the implementation of the NTP-RCC. The matrix is also serves as an instrument for the orientation and coordination of support from the donor community in climate change policy.
39. The SP-RCC policy matrix is currently comprised of some 55 separate policy outcomes and targets, to be achieved in the 2009-2015 period, across relevant sectors and a number of thematic areas: energy, transportation and construction, forestry, agriculture, waste management, clean development mechanism, water, integrated coastal management, and disaster risk management. Set up in 2009, some twenty-seven policy development activities were accomplished in that year. In 2010 over fifty separate policy actions were completed. A number of these areas would be of interest to IFAD and could be supported either directly through the SP-RCC (as appropriate) or directly through the relevant, participating Ministries and line agencies charged. Particular areas of IFAD's interest might include:
- Mitigation:
 - Forest management – establishment of self-financing mechanisms/PES for sustainable forest management. For IFAD, the potential may exist to re-orient existing Government program financing through local planning process to benefit groups and households whose actions (positive or negative) would impact forest areas whose conservation is important.
 - Agriculture – Identify and promote sustainable agricultural/ecosystems management practices to mitigate climate change and to secure the livelihood of farmers. For IFAD, knowledge management for lessons learned in extension and training; development of farmer networks to capture and disseminate learning and strengthen local capacity for adaptation.
 - Waste Disposal – Integrate policies and mechanisms of management for waste in agricultural sector and implement pilot project on household solid wastes management (reduce, reuse, recycle). For IFAD, biogas and composting for alternative energy and crop/soil fertility management.
 - Adaptation:
 - Integrated Coastal Management – ensure sustainable management of coastal area (livelihoods & ecological system); develop coastal eco-economic models to respond to climate change. For IFAD, support for adaptive research and development (e.g., saline tolerant catfish and rice varieties) for pro-poor climate change response options; upscaling of climate proofing tool developed with GIZ for value chains.
 - Disaster Risk Management – Enhance capacity to forecast extreme events and promote weather "nowcasting" system for early warning in the Northern region; strengthen community based disaster risk management (CBDRM). For IFAD, support for extending system for agricultural forecasts of the ENSO cycles to inform farmers to adjust cropping

- calendars and varieties; replicate and extend CBDRM best practices into local SEDP planning and investment processes.
- Forestry – enhance disaster preparedness (including shore erosion) through implementation of mangrove rehabilitation. For IFAD, mangrove reforestation and protection/rehabilitation as a PES activity and income generator for landless and poor; local land use planning processes to conserve inland areas for mangrove migration with SLR.
- Agriculture: Ensure stable agricultural production and food security through promotion of commercialization of new varieties. For IFAD, upscaling of climate smart value-chains and linkages to smallholder production; identification and conservation of native germplasm (crop varieties) as future adaptation options.
- Cross-cutting Issues – mainstream Climate Change issues into overall planning process and prepare Provincial level SEDP and SEDS in which Climate Change issues are integrated and mainstreamed. For IFAD, dissemination of learning and best practices from participatory community development and value-chain planning within local SEDP processes; institutionalization of participatory, value chain, and climate smart planning into national programs and budgets.

MARD Climate Change Action Plan.

40. In April of 2011 the Minister of MARD signed into effect MARD's "Action Program In Response to Climate Change of the Agriculture and Rural Development Sector During 2011-2015 and Vision to 2050". The plan establishes MARD's priorities for the next four years. The overall objective of the Action Plan is to improve the climate change response capacity of the agriculture and rural development sector in order to (i) minimize climate change-related damages; (ii) reduce the agricultural sectors greenhouse gas emissions; (iii) protect the lives of people exposed to climate risk and sea level rise related natural disasters; and (iv) create opportunities for sustainable agriculture and rural development within the context of climate change. Priority thematic areas within the Plan include protection of populations and agricultural lands in the coastal zones; stabilizing agriculture, forestry and salt production; ensuring food security (especially, rice production); the safety and integrity of the dyke system and other productive infrastructure important for agricultural production; natural disaster prevention and control; and economic growth that reduces both poverty and greenhouse gas emissions.
41. To achieve the objectives of the Action Plan, MARD has specified a series of seven policy, strategy, capacity building and awareness raising tasks to be accomplished:
 - Evaluation of climate change and sea level rise impacts on agriculture, forestry, water resources, aquaculture, salt production, and rural infrastructure; and development of mitigation and adaptation measure and solutions, along with response action plans for each region of the country.
 - Development of specific programs/projects for agriculture, livestock, forestry, aquaculture, water resources, rural development and salt production based upon specific adaptation and mitigation requirements by regions as well as to create new opportunities for sector development created by climate change impacts.
 - Awareness raising, directed at ensuring that sector staff and officials and rural communities are fully informed regarding climate change risks and potential impacts as well as the options for adaptation and mitigation of risks and impacts.
 - Training and development of human resources of the sector, fields and localities to respond to climate change challenges and create development opportunities.
 - Integration of climate change and sea level rise concerns into action plans, policies, strategies, planning and sector/field/local development plans.
 - Cooperation with International Governments and donors to mobilize resources, knowledge and experience for the implementation of the Action Plan.
 - Monitoring, inspection and evaluation of progress in achieving objectives and successfully implementing the Action Plan's priority tasks.
42. In addition, MARD has specified a series of priority investment projects to be carried out as a response to predicted climate change impacts as well as current climate risk (natural disasters). The investment projects comprise a range of hydraulic works to protect areas of high population density and valuable agricultural land and aquaculture areas from salinity intrusion and flooding; rural development-related infrastructure; agriculture, primarily GHG mitigation through improved

rice irrigation practices and biofuel crops and development; reduction of vulnerability to flooding, including relocation of households from high risk areas; forestry, primarily reforestation (mangroves and plantations) and fire control; and fisheries and aquaculture, including hydraulic infrastructure for aquaculture production and protection.

43. MARD has estimated the total cost of the Action Plan over the period as being 72,402 billion VND, of which 0.6 percent is for the seven “software” tasks (402 billion VND). In the “hardware” investment projects some 69 percent is for hydraulic works (50,000 billion VND); 8 percent for rural development-related infrastructure (6,000 billion VND); 7 percent to agriculture (5,000 billion VND); 5.5 percent each to forestry and fisheries/aquaculture (4,000 billion VND each); and 4 percent to reduction in communities’ vulnerability to flooding (3,000 billion VND). Geographically, 86 percent of financing is for coastal and delta regions; 8 percent is nationwide; 2.8 percent for the North and North Central Regions; 1.4 percent for the Central Highlands; 1.1 percent for agricultural research infrastructure (location unspecified) and 0.7 percent for the Northwest region.
44. The sources of financing and the expected percentages from each are not detailed in the Action Plan. The primary sources, however, should substantially be the same as those for the NTP-RCC: central government and local budgets; private sector and other capital contributions; and external sources (ODA, FDI, etc.).
45. The institutional arrangements for the RCC-ARD comprise:
 - A Steering Committee – for oversight, policy orientation and to ensure full participation of all involved agencies.
 - Standing Office of the Steering Committee (SOSC) – coordination, annual work plan and budgeting, orientation of the implementation, monitoring and reporting.
 - MOST and MONRE – “Host” the implementation of the Action Plan and coordinate with the relevant non-MARD agencies for budget and funding approvals; appraisal of proposals and verification of completion of investment activities.
 - ICD – coordinates MARD’s institutional relations with the international cooperation community and is responsible for follow up with them for leveraging of inputs – investment, financial assistance, technical support, capacity building etc. – for Action Plan implementation; coordination with SOSC for attendance of Steering Committee members in forums, workshops, negotiations, and bilateral and multi-lateral cooperation associated with actions under MARD’s administration.
 - Departments of Planning and Finance: coordination of planning and budgeting.
 - MARD and DARD agencies: development, approval, organization and reporting on detailed agency implementation plans; develop and submit proposed annual work plans and budgets to MOST and MONRE (Climate Change Steering Committee Standing Office); and report as required on implementation of the annual work plans.
46. The RCC-ARD Action Plan comprises some 54 separate actions that are policy, strategy and institutionally focused and another 76 investments in, primarily, “hard adaptation”. Particular areas of interest for IFAD support (see Annex IIIa for complete listing) in the implementation of the policy, strategy and institutionally focused activities of MARD’s plan include:
 - Assess vulnerability of the ARD sector to climate change as basis to develop effective supporting policies and activities for climate change affected areas.
 - Assess impacts, identify response measures, develop and implement action plans responding to climate change in the agriculture and rural development sector in the 7 ecological zones.
 - Evaluate potential climate change impacts on livelihoods in areas affected by natural disasters and sea level rise (7 ecological zones) and propose measures to diversify livelihoods, build climate change adaptation and risk reduction capacity.
 - Disseminate and propagate knowledge on climate change mitigation and adaptation to sector officials, employees, staff.
 - Education and training on natural disasters, climate change adaptation for disaster-prone communities.
 - Develop community-based disaster/climate change mitigation models.
 - Develop and organize training programs for scientific research, management on climate change mitigation and adaptation.

- Strengthen steering committees for natural disaster mitigation and climate change adaptation, including improving physical facilities
 - Develop public and private partnerships for dike management, natural disaster mitigation and climate change adaptation.
 - Establish a forum for coordination around natural disaster mitigation and climate change adaptation.
47. For IFAD, the above activities are potentially relevant as they provide an opportunity to integrate concerns for the most vulnerable groups among the rural poor, for the development of pro-poor policies and approaches for climate change adaptation and mitigation; and to establish a bridge between field-level learning and national policy dialogue. All of these elements are still very much incipient within the current Action Plan framework and fit within IFAD's comparative advantages. In addition, they open the potential to promote the "retro-fitting" of existing programs through mainstreaming of climate proofing tools into SEDP planning and implementation processes. In the aggregate they could provide a coherent approach to be systematically applied across the IFAD portfolio of: vulnerability assessment (physical, social, livelihoods); identification of requirements to climate proof current livelihoods and of opportunities for new/alternative sustainable livelihoods in a context of climate change; climate risk and climate change awareness, education and capacity building to enhance local capacity and resilience; community based natural resources management, integrating disaster vulnerability reduction through local land use planning and alternative investments in vulnerable and protection zones; development of knowledge networks among farmers and researchers to identify successful adaptive behaviors and extend them to other groups and communities; support for PPP in the context of climate smart value chains; and knowledge management, to bring "learning for the field" to policy discussions and donor coordination forums.
48. Among the proposed investment projects, there are at least two, possibly four where IFAD might contribute. The first two are stronger candidates, though the last two are also potentially compatible with IFAD's mandate and interests in Viet Nam:
- A program for establishment and restoration of mangroves and coastal protection forests, to be carried out in three coastal regions of Vietnam. The scope of the proposed projects include protection of sea dyke systems; productive and livelihood-enhancing infrastructure along coastal regions; biodiversity and ecosystem restoration; and building capacity to adapt to climate change and improve livelihoods
 - Improvement of livelihood for coastal fishing communities of Vietnam to be carried out in coastal provinces. The scope of the proposed projects is to improve the living standards of local peoples along the coast.
- Among the other six (see Annex IIIa for more details) potential interest areas for IFAD's consideration are:
- Application of effective solutions to reduce greenhouse gas emission and adapt to climate change in key rice production areas in Vietnam. The scope of the project includes: supporting farmers with the application of GAP procedures ("3 increases and 3 decreases", cropping rotation, etc.); development of on-farm hydraulic systems; and supporting the use of safe and environment friendly fertilizers in the farming system. For IFAD, a range of adaptation measures will be required for smallholders and the rural poor and landless. These measures will change along a transect from the coastal zone inland. For example, as SLR opens opportunities for mariculture and aquaculture in currently terrestrial zones, requires shifting to mixed rice-aquaculture systems where now there are rice-only systems, to areas where current cropping continue but require adaptation of cropping calendar, varieties and marketing strategies due to changing rainfall patterns, salinization, etc. Or, where issues of increasing water allocation conflicts requires reducing consumption of irrigation water, leading to opportunities for mitigation through GHG emission reductions (methane) from improved water management in paddy rice or the need to shift out of rice as water resource availability no longer permits farming acid sulfate soils. A project, with smallholders and the rural poor, along such a transect would allow for piloting (and with a long term, 10-15 year commitment, institutionalizing) an entire range of adaptation and mitigation approaches relevant for the rural poor in Viet Nam's most vulnerable area to climate change risk.
 - Development of agriculture research infrastructure to respond to climate change. The project is to support 20 research academies with investment in the upgrading of human resource and other resources for research and training establishment. For IFAD, the opportunity would be in supporting research agendas that are relevant to pro-poor adaptation for climate

change and strengthening research:farmer linkages for more effective, farmer-oriented research and extension of new technologies and learning.

Comments on the RCC-ARD.

49. As a first cut Action Plan for the ARD sector, the RCC-ARD is overall a reasonably good framework in that it clearly sets out to provide a serious response to the concerns and issues that climate change raise for the sector. The vision to 2050 is comprehensive and recognizes the very wide and complex range of interventions that will have to take place in order to support adaptation and enhance the resilience of vulnerable populations throughout the country, not just in the coastal areas and deltas but also inland and among the rural poor in the uplands. Within that longer term vision the Plan does mention many of the types of policy, institutional, investment and technical responses that will be required to achieve the specific goal it lays out of “*Ensuring that organization, individuals, communities and other entities involved benefit equally from the climate change mitigation and adaptation activities*”. Very importantly, the Plan recognizes that “one-size does not fit all” and so the importance of flexibility and locally adapted responses.
50. On the other hand, within the 2011-2015 action framework it is not completely clear how the broader vision to 2050 will translate into locally-adapted (and adoptable and effective) schemes for adaptation. No principles, criteria or priorities are specified for involvement of the diverse stakeholders that must be engaged – from the private sector, local communities and authorities, social organizations and NGOs, Provincial governments, etc – to execute the Action Plan as well as to refine and develop its next phases. MARD (a modern, macro-management Ministry whose primary roles are in policy, regulations, norms and facilitation) has presented a short-term plan whose relevance to a private sector in a globalizing economy or to the rural poor who are already impacted by climate risk that undermines their subsistence and household livelihoods is not clear. The plan is very heavily focused on a limited set of specific hard investments in the coastal areas to combat sea level rise and its effects along with a set of GHG emission reduction (mitigation) investments. While these may be well-justified, there are no clear criteria, indicators or vulnerability factors utilized to transparently explain why these particular investments in these specific areas must be made at this time. Further, with over 90 percent of the funding earmarked for specific hard investments, there appears to be little room for strengthening capacity for local action or other “soft” investments of the type that are important to building capacity and resilience for the long term. Important themes of adaptation for non-irrigated and/or non-rice farmers are largely absent as are investments in strengthening extension and research to support farmer adaptation. Poverty reduction and food security are treated in a limited fashion. Some proposed GHG mitigation investments are the only ones identified for a “pro-poor” climate change response. For food security, important adaptation investments are proposed for rice, however important as that is, the issue of food security among the rural poor – particularly ethnic minorities and other vulnerable populations – is left out of the five year action plan.
51. A final potential concern is the extent to which the proposed, specific investments in levees, dykes and hydraulic infrastructure constitute a “no regret” approach in which the stakes of maladaptive¹³ measures have been correctly understood. As the Action Plan does not articulate a strategy in terms of approaches (e.g., priority given to minimizing future economic costs estimated as a function of future vulnerability versus analysis of current vulnerability and learning from experience), it is unclear if the heavy infrastructure investment is in response to immediate/ongoing threats or to potential, future threats. In the absence of a master plan for protection from SLR (hydraulic works, levees, sea dykes, etc.) it is also difficult to answer the question of risk that an ad hoc heavy infrastructure approach courts of being maladaptive in the delta regions, i.e., by cutting off the rivers from the flood plains, reducing sediment inputs into those areas as well as groundwater recharge, and thus exacerbating subsidence and the rate and impact of SLR.
52. All of this points to the importance of recognizing that the 2011-2015 Action Plan constitutes a learning period. Developing, mainstreaming and implementing a sector-wide approach for mitigation and adaptation to climate change is both extremely complex and suffers from never

¹³ Maladaptation is the implementation of adaptation measures that either turn out to be ineffective once the impacts of climate change materialize (OECD, 2009) or that increases vulnerability to climate change-related hazards through, for example, measures that deliver short-term gains or economic benefits but lead to exacerbated vulnerability in the medium to long-term (UNDP, 2011).

having been done before, either by MARD or by its supporters in the donor community. That a first cut Action Plan will have possible imperfections is to be expected; as it is to be expected that weaknesses are most likely to surface in those areas where historically institutions have struggled to improve performance. Therefore what will be critical is that the “software” portion of the Action Plan is supported in order that key issues be raised and that there be systematic and structured learning to ensure that each planning cycle is better informed and builds upon experience and evidence-generated from the prior and current cycles. IFAD, through support for learning and knowledge management, should help to strengthen both the current plan and as well the planning for the next cycle. An important area upon which IFAD could focus, and for which it has a comparative advantage, is in the systematic inclusion of social vulnerability and sensitivity to climate risk and climate change in policy, planning and investment. This would include, among others, themes of “pro-poor” adaptation responses targeted at the most vulnerable groups and sustainable livelihood systems for the rural poor and poverty reduction in the face of current climate risk and future impacts of climate change.

National Strategy For Natural Disaster Prevention.

53. Vietnam’s National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020, was approved by government in 2007. The main objectives of the Strategy are:

- The integration of disaster risk management into socio-economic development plans at the national and levels with a focus on disaster response;
- Ensuring sustainable disaster recovery which integrates disaster risk management;
- Planning five different regional disaster risk management strategies for the five geographical regions of the country;
- Combining structural and non-structural measures in disaster risk management and dividing implementation responsibilities and timing for risk reduction among a range of ministries.

MARD has estimated that they will require a budget of US\$ 18 billion to implement its portion of the strategy. About US\$ 13 billion would be for structural measures (i.e. building reservoirs, dams and dykes) and US \$5 billion for non-structural measures.

54. Traditionally Vietnam has focused on preparedness and response with a strong emphasis on structural measures such as dykes and seawalls. This current strategy also largely emphasizes water related disasters, placing disaster preparedness and forecasting among its foremost objectives. While mitigation and vulnerability reduction activities have only slowly been entering the development agenda (GFDRR, 2011), the implementation plan for the strategy (CCFSC, 2009) does include a series of actions that offer an opportunity to bring together community-level disaster risk management/vulnerability reduction and climate change response. Of particular interest for IFAD would be those having to do with Community-based Disaster Risk Management (CBDRM). The CBDRM Action Plan¹⁴ contains:

- Capacity building for local government staff at all levels on managing and implementing CBDRM activities, comprising among others, training courses on CBDRM policy, mechanisms and implementation guidance for trainers, agencies, and local staff; training of CBDRM trainers and; capacity building programs on CBDRM for local authorities.
- Capacity building on CBDRM for communities, including: form CBDRM community-selected working groups in communities; developing participatory community-level hazard and vulnerability maps; develop annual community-level plans on disaster prevention, response and management, including climate change concerns; annual updating of hazard and vulnerability maps and community monitoring of annual implementation of activities and; small-scale works for disaster prevention, response and management in the community.

55. MARD is responsible for development and implementation of the training and capacity building programs while the People’s Committees are responsible for the local planning and hazard/vulnerability mapping.

¹⁴ <http://www.ccfsc.gov.vn/resources/users/6D696775656C/Annex%20I%20CBDRM%20action%20plan.pdf>

The National Target Program On New Rural Development.

56. This NTP is to implement the ARD sector's "New Agricultural and Rural Development Strategy" or "Tam Nong". Tam Nong is of particular importance for IFAD. Issued in 2008, the policy calls for structural changes that will widely affect policy, legal frameworks, planning, land use, investment and principal factors of production within the sector and in the rural areas. The intent of the new policy is to speed up industrialization and modernization of the rural sector. MARD is the lead Ministry for the implementation. Among others, the policy calls for:
- Improved natural resource management and climate change adaptation for livelihood security, and building capacity at grassroots level for promoting sustainable uses of natural resources to enhance the livelihoods of the farmers;
 - Decentralization of decision making and resources covering both economic and social issues;
 - The transition of the role of the State in agriculture, from service provider to regulator and facilitator with public resources only being used where private sector would not be expected to invest or provide services;
 - A continued transition to market-oriented agriculture and rural economic development; and
 - Economic growth and competitiveness through the creation of non-farm and off-farm employment opportunities through accelerated market-oriented reforms.
57. The National Target Program for New Rural Development (NTP-NRD) 2010-2020 was approved in 2009. It is to bring under one umbrella all existing programs being implemented in the rural space and re-align them in function of the NTP's objectives¹⁵ and desired outcomes. Operational details for the implementation of the NTP were defined in a 2010 Decision issued by the Office of the Prime Minister¹⁶, which detailed program's eleven components and their institutional and implementation arrangements. While all eleven of components are important for rural development, there are three which are of particular importance in a discussion of climate smart investment and in building resilience for adaptation to climate change:
- General master plan for rural development – including all planning processes for the development of "new rural areas", i.e. planning of land use, basic infrastructure, production of agricultural commodities, agro-industry, craft industry, provision of services, socio-economic and environmental infrastructure, new residential areas and improvements to existing residential areas in communes.
 - Socio-economic infrastructure development – construction of roads, power grids, clinics, schools, irrigation systems, etc. to meet targets for period.
 - Economic restructuring, development and income improvement – including restructuring agricultural production towards production of commodities with "high economic efficiency" and; strengthening extension activities, increasing research outputs on advanced technologies for agro-forestry-aquaculture production.
58. In all of these, it will be critical that concerns about climate risk and long term climate change threats are incorporated in to the planning, prioritization and investment phases. The Commune People's Committees are to carry out planning processes (and implement the approved plans) at the local level, following the guidelines to be provided by the People's Committees at the Provincial and District-levels. Strategic inputs will be required of MARD to assist the Provinces and the DARDs to align and harmonize the NTP-NRD with the NTP-RCC and the RCC-ARD. Specific guidelines (and tools for applying the guidelines) will have to be developed to ensure that the land use, infrastructure and economic planning processes are climate smart and internalize climate/disaster risk management. Among others, ensuring effective implementation of the CBDRM Action Plan in respect of local land use planning would be a good place to start.

¹⁵ To *build* up a new rural area with modern socio-economic infrastructure; proper economic structure and production arrangements with strong connection between agriculture and rapid development of industries, services as well as strong linkage between rural development and planned urban development; to ensure a stable democratic rural society with national cultural richness; *ecological environment is well protected; security is maintained; physical and spiritual life of people is increasingly improved under socialist orientation.*

¹⁶ Decision No. 800/QĐ-TTg, Hanoi, June 04, 2010. Approving The National Target Program On Building A New Countryside During 2010-2020.

Farm Insurance.

59. The Ministry of Finance will be experimenting over a three year period (2011-13) with a farm insurance program. Under the plan, poor farming households will receive a subsidy of up to 100 per cent of the insurance premium. Support to other farming households will be 60 per cent. The percentage for agricultural production organizations will be 50 per cent. According to the draft document, there are three main categories of cover, including cultivated crops (rice), domestic animals (buffalo, cows, pigs and poultry) and aquaculture (tra and basa fish, black tiger shrimp and white-leg shrimp). Under the program, rice insurance will be offered in seven provinces; livestock insurance in nine provinces; fish and shrimp hatchery insurance in five provinces. In the provinces where IFAD works, only one (Ha Tinh) is in the pilot for rice insurance, none are in the pilot provinces for livestock and two (Ben Tre and Tra Vinh) are in the pilot for fishery and aquaculture. Minimum conditions for coverage will be established (e.g., at least 10 dairy cows or 50 beef cattle) that may keep insurance out of the hands of the more vulnerable smallholders (Viet Nam Business, 2011).
60. Previous experiences with farm insurance in Viet Nam have not been widely successful. The majority of the sector are smallholders and high frequency and recurrence rates for natural disaster and epidemic diseases makes the insurance risky. Due to high risks, insurance companies require high premiums that farmers cannot afford. Farmers in their turn find it difficult to make the cost and benefits calculation, which puts them off from spending scarce resources on insurance policies. Demand for agricultural insurance is also likely reduced by VBARD lending policies that provide for a liberal rescheduling of debt when a natural disaster creates problems with repaying loans. This type of policy acts as a form of insurance for the farmer (GlobalAgRisk, 2009).
61. While agricultural insurance could play a significant role in managing climate risk and protecting the rural poor and smallholders, it cannot be treated as an isolated input. For agricultural insurance to be successful, other factors must be in place – financial services, agricultural input supply, markets and market infrastructure, etc. – in order for small farms to have the security and resources to make the investments to increase productivity.
62. Developing agricultural insurance markets will require time. The current pilot project to test insurance products, policies, etc. will likely lead to further testing and development over the medium-term before government would risk rolling out large-scale programs given their substantial risk of being unsustainable (GlobalAgRisk, 2009). For IFAD, there may be options and opportunities to work with government to pilot insurance for smallholders in well-functioning value chains and commodity markets, however, such insurance is probably not a good option during the next COSOP for households in less favored conditions.

Payment For Forest Environmental Services.

63. In December of 2010 the Office of the Prime Minister approved Government Decree 99 establishing the scheme for the implementation of the Policy On Payment For Forest Environment Services (PFES). It still remains to work out the specific criteria, content and measures for implementing the policy, however it is expected that by the end of 2013 that the piloting of the policy would be completed and subject to review for subsequent full roll out.
64. Among the stated objectives of the policy are that the PFES should “*contribute to ensuring harmony and balance of the living environment: to conserve biodiversity; to prevent and limit adverse impacts of natural disasters (flood, drought, soil erosion, desertification, carbon sequestration and retention, air environment pollution; greenhouse gas emissions; climate change, etc.)*.” It also recognizes that to be effective, that the state will have to move forward at a strong pace to allocate forest lands and assign or provides contracts for forest use on a “stable and permanent manner to organizations, households and village communities” in order for the PFES to be of use.
65. Among the stipulations already made are: (i) river basin master plans will serve as the basis for identifying forest areas, liable payers and potential payees of forest environment services payment in each basin; (ii) the general census on forests, being carried out during 2010-2015, will provide the basis for the implementation of the policy; (iii) that hydrologic services (water quality, seasonal flows, other) will be considered and hydropower plants, water supply utilities, industrial water users drawing from natural sources, and aquaculture facilities will be subject to payments

plants, as a basis for the payment for and monitoring of the quality of forest environment services; and (iv) other eligible services will include carbon sequestration; avoidance of deforestation; habitat services, particularly (fishery) spawning grounds, food and natural seeds sources; industrial production establishments using water directly from water sources. Among the main target groups for the PFES payment are the 30 percent of the population that lives in mountainous regions (high percentage ethnic minority).

66. Details of payments and payment levels are still being worked through¹⁷, but in the interim, a payment of 200,000 VND/ha/yr has been set for PFES from hydropower and water utilities (Pham, 2009). Additional GoV programs are also providing payments to households and individuals for forest protection. Notionally, these can also be included as forms of PFES: (i) Project 661 – 100,000 VND/ha/year based on the area of forest contracted to the households by the Forest Management Boards; (ii) Program 135 – 100,000 VND/ha/year, based on the area of forest managed by the Commune People’s Committees and Forest Management Boards; (iii) Program 304 – 100,000 VND/ha/year and 15 Kg of rice/individual/month for forest protection; and (iv) Program 30A - 200,000 VND/ha/year and 15 Kg of rice/individual/month for a maximum of 84 months.
67. There is likely good potential for IFAD to work with, pilot and, potentially, scale-up local approaches to PES as well as participate in the developing PFES program. For the more formal PFES, IFAD is developing experiences and approaches in its “Pro-Poor Partnerships for Agroforestry Development Project” that might be usefully extended to other projects. But, in addition, “payment of environmental services” can have a much more local and less formal expression as well. Many good examples and models exist of locally brokered PES deals and transactions that do not necessarily imply cash payments or transfers. Rather, how benefits and costs are shared is the fundamental basis for PES. Benefits do not have to be in the form of cash and nor do they have to come from new sources or even, in some cases from resources outside the community. For example, if community land use plans identify vulnerable or sensitive areas where additional conservation efforts are required (e.g., protection of a potable water source). The individuals or households upon whom incremental demands would fall for that protection can be benefitted through being given priority access to resources from existing government programs and funds (e.g., P135 funds) to finance livelihood and whatever land management adjustments might be required. In effect, this would be a local decision to re-orient an existing government subsidy to achieving local environmental objectives by providing incremental resources (compensation) to individuals providing an environmental service. Or, in some cases no external resources are required, for example, when it is no more than a group of villagers organizing and providing labor and assistance to fellow villagers in recognition of an environmental service that their land use and land management provides (e.g., pasture management to avoid silting up the village’s pond). Examples of this type abound throughout the world and have been used to successfully resolve conflicts over natural resources within and between communities, to change behaviors and land use, and to reward the good stewardship of individuals and groups that provide a common, local benefit. Experimenting with these types of arrangements may provide an important tool for following up and implementing local land use and disaster vulnerability reduction plans.

ODA/Development Partner Support for CC in ARD.

68. Based on a review of a database compiled by the World Bank¹⁸ on climate change investments in Viet Nam some USD 1.37 billion has been pledged to climate change activities in Vietnam over the twenty-five years from 1992-2017. More than 55 percent of these resources have been in the form of loans. Including Government of Viet Nam’s funds, 51 percent of total resources committed have been destined to climate change adaptation (about ¼ of which is GoV financing for the NTP-RCC), 46 percent directed to mitigation, and 3 percent to capacity building, awareness raising and institutional support. The top five major financiers, accounting for almost

¹⁷ For example, a coefficient based on forest type, origin (natural, plantation), quality, and conservation status will be used to adjust payments, e.g., a well conserved natural forest (1.0) provides greater services than a well-managed production forest (0.75).

¹⁸ The database includes CC analytical studies and investment programs that are completed, on-going, or planned in Vietnam. Some programs of government are included but emphasis is on ODA investments. The database can be located at the World Bank’s Viet Nam country website, under “Climate Change”:
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPREGTOPENVIRONMENT/0,,contentMDK:22422610~pagePK:34004173~piPK:34003707~theSitePK:502886,00.html>

80% of all financing, are: World Bank (43 percent), EU (12 percent), GoV (12 percent), ADB (7 percent), and JICA (5 percent). Denmark and Australia are the other main bi-lateral financiers. GEF and UNDP have also provided major funding.

69. The same database projects IFAD to be a major financier of climate change adaptation under its next COSOP. The database's assumption is that IFAD's entire portfolio (including leveraged GEF/SCCF and GEF/SPA funds) under the new COSOP would be oriented by climate change concerns. Based on this assumption, IFAD would become the second largest financier of climate change actions in Viet Nam (12 percent), following the World Bank (38 percent).
70. Table 8¹⁹ provides an overview of recent funding for climate change. Almost 100 separate programs, project and activities have either just ended or are ongoing. These represent some 60 percent of all of the investments in climate change in the last quarter century. The trend over the period of over half of funds going to adaptation and a bit less than half to mitigation continued in this recent period. As of the time that IFAD's new COSOP comes on line in 2013 only 28 of these activities will still be ongoing.
71. Of relevance for IFAD, very few activities are currently programmed to be ongoing by the time the second year of the COSOP (2014), begins, i.e., at the moment the field is not crowded and potential for undue overlap is low. In the area of adaptation in the ARD sector, the only donors with funds programmed are:
- World Bank: \$150 million "Mekong River Delta Water Management for Rural Development" (2012-17).
 - AusAid and GIZ: US\$28.9 million "Climate Change and Coastal Ecosystems Program (CCCEP)" (2011-16).
 - AusAid: US\$4 million "Climate Change Initiative Framework of the Mekong Delta Commission" (2009-15).
- And for capacity building for climate change adaptation in the agricultural sector and for natural disasters:
- UK/DFID: a technical assistance grant of US\$ 1 million to be executed by the World Bank for enhancing capacity in MONRE, MOIT, MARD, MPI and MOF to formulate and implement climate change policies (2011-2014).
 - Denmark: US\$ 0.45 million to be executed by CARE for mainstreaming climate change adaptation and disaster risk reduction into an ethnic minorities-focused CARE program in five provinces in the northern mountains.
72. Also of note is that World Bank is preparing its Country Partnership Strategy for 2011-16. In the initial consultations for the CPS, the World Bank reports that one of the fine priority areas emerging from national discussions is climate change and natural disaster prevention. It is premature to know what the modality of the support will be, however, it is also reported that "*it was recommended*" that the Bank's support in the area of climate change be through an overall Government program rather than in the form of individual investment operations.

¹⁹ Not all reported activities have their associated budget assigned to them in the database. For purposes of the analysis it is assumed that these activities do not represent major financing that would significantly alter the total amounts or percentages.

Current IFAD Portfolio.

73. In IFAD's prior COSOP (2008-2012) climate change was to be pursued as a crosscutting theme. Specifically, the intention was to promote the development of climate change-resilient agricultural systems oriented towards reducing greenhouse gas emissions, reducing emissions from deforestation and forest degradation, and community-based agroforestry for carbon sequestration in the uplands. Over the course of the COSOP period, in partnership with the Global Mechanism, there was to be an ongoing process to formulate and implement mitigation and adaptation actions. Pilot projects, studies and capacity-building activities were to provide key inputs to the national agenda and policies for climate change. Several preliminary activities were identified during the COSOP formulation for mainstreaming adaptation to climate change interventions and mobilizing supplementary financing through the pursuit of greenhouse gas mitigation measures. A central concept was to assist in developing payment of environmental services (PES) schemes that would translate into rewards for poor communities in upland areas who acted as good stewards of their natural resource base. Key assumptions underlying this strategy were: (i) that there was a need for IFAD to play a catalytic role in promoting Government's engagement in climate change issues; (ii) that the awarding of forest land use rights certificates to individuals would be carried out in an equitable and timely fashion, providing both an incentive and enabling (legal, social, economic) conditions for development of PES, especially carbon payments; and (iii) that international mechanisms for carbon sequestration payments (e.g., REDD, CDM) would come on-line in a timely fashion as would other opportunities (national and international) for PES for biodiversity conservation and provision of hydrologic services.

74. At the time that the COSOP was being developed there were relatively few activities taking place at the national that were directed at climate change. The major ones being investments directed at natural disaster management and mitigation in urban transport. As such, it was reasonable for IFAD to propose a role in bringing greater attention to climate change concerns and policy needs.

Table 8,. Recent CC Funding by ODA and GoV – Activities Ending from 2010-17

Theme or sub-theme	No. Projects/ Activities	US\$
Adaptation-General	5	143,878,788
Adaptation-Agriculture/Forestry/Fisheries	8	6,510,000
Adaptation-Water/Urban	4	1941790
Adaptation-Social/Economic	2	185,000
Adaptation-Natural Disasters	5	108,577,500
Adaptation-Coastal	2	4,700,000
Adaptation-Mekong Delta	4	182,900,000
Current situation/trend in CC	3	-
Nat'l Science & Technological Program	1	-
Capacity Strengthening-General	9	5,970,000
Capacity Strengthening-Agriculture/Fisheries	2	-
Capacity Strengthening-Energy	1	-
Capacity Strengthening-Industry/Urban	2	-
Capacity Strengthening-Natural Disasters	2	450,000
Capacity Strengthening-Community-level	2	6,289,450
Awareness Raising	2	-
Mainstreaming	4	3,650,000
Low Carbon Growth Planning	1	-
Mitigation-General	2	405,000
Mitigation-Agriculture	4	5,348,600
REDD	12	17,032,000
Mitigation-Energy-Power Sector	2	-
Mitigation-Energy-Renewables	2	240,800,000
Mitigation-Energy-EE	10	66,975,000
Mitigation-Industry	1	2,600,000
Mitigation-Urban	1	9,800,000
Mitigation-Transport	2	9,800,000
Financial Mechanisms-General	3	1,500,000
	98	819,313,128

It would not be until the end of 2008 that the National Target Program for Response to Climate Change would be approved and that MARD would approve its Response to Climate Change Action Plan framework. Between 2008 and 2011, over 100 new activities directed at climate change would be initiated and almost USD 740 million of resources committed to those activities. The COSOP assumption on the needed role for IFAD became obsolete early in the COSOP and wisely, IFAD directed its efforts in national policy dialogue towards other areas (e.g., the NTP for New Rural Development).

75. The other two key assumptions also turned out to be somewhat optimistic. The issuance of forest land use right certificates tended to be an activity which lagged in most of the IFAD project provinces as well as nation-wide. Progress was made – roughly 24 percent of Viet Nam’s forest lands are managed by households – but was uneven. Also, lack of readily available and proven technologies (financially and technically) for incorporation of those lands into the diversified production systems of most smallholders impeded progress towards PES. Finally, the international schemes have been very slow to develop, with REDD activities in Viet Nam primarily constituting preparation and feasibility-type activities, with only some few actual REDD project activities on the ground. The CDM is also but slowly developing in Viet Nam.
76. Climate change concerns were, to a greater or lesser extent in all of IFAD’s projects since 2008. For the two projects that were developed under the prior COSOP (2004-08), this required retrofitting. The “Improving Market Participation of the Poor in Ha Tinh and Tra Vinh Provinces” (IMPP), approved in 2006, has perhaps done the most interesting and practical work on climate proofing among projects in the portfolio. Table 9 summarizes the extent to which climate change was integrated at design and the extent to which action was taken during the project implementation. For the two most recently approved projects, it is too early to know how the implementation experience is developing; both have only initiated implementation in 2011.
77. For the next COSOP period, the current portfolio will provide valuable lessons and experiences to build upon. In particular, IFAD’s experiences with developing tools for local, participatory planning and promoting their integration into the SEDP process are extremely useful. This is true irrespective of much of that experience being around value-chain planning and local development. The policy and institutional challenges of integration and institutionalization are the greater of the challenges, the technical content is much more straightforward to develop. Clearly the climate proofing tool for value chains’ planning and investment, developed with GIZ in the IMPP, also constitutes a high value asset to build upon in the next period and through the currently ongoing projects.
78. Regarding PES, looking forward, with the current global economic crisis ongoing and somewhat pessimistic views seeming to be the more common ones on what might be accomplished at COP 17 in Durban, South Africa later this year, it is difficult to predict at this time how much further effort may be merited to capture international funds for GHG reductions. Certainly, exploring more local options for PES would make sense under the next COSOP period, particularly given Decree 99 of 2010 on the Policy for Payment for Forest Environmental Services, which stipulates that certain ecosystem services users (including hydropower, water supply, and tourist companies) must pay ecosystem services providers for valuable forest ecosystem services. Overall, it will make more sense to prioritize climate change adaptation interventions and, in the case that doing so presents the opportunity – at a reasonably low transaction cost – to leverage additional benefits for the rural poor from mitigation, it would make sense to do so. IFAD supervision missions should remain alert to identifying such opportunities over the coming years.

Table 9. IFAD projects under implementation during 2008-2012

Project/Year Approved	Principal CC Relevant Content	
	At Design	Current
Economic Empowerment of Ethnic Minorities in Poor Communes of Dak Nong Province / 2010	<ul style="list-style-type: none"> • Strategic partnership to develop innovative policies on CC mitigation and market access with IFPRI • Interventions to be conceived in context CC & contribution to mitigation & adaptation • Indicators: None 	Project in first year of implementation
Agriculture, Farmers and Rural Areas Support Project in Gia Lai, Ninh Thuan and Tuyen Quang Provinces / 2010	<ul style="list-style-type: none"> • Subcomponent for development & institutionalization of market-oriented socio-economic development planning (MOP-SEDP) & implementation to mainstream “climate proofing” into government’s planning & budgeting mechanism • Indicators: indirect – MOP-SEDP mainstreamed at Provincial-level 	Project in first year of implementation
Pro-Poor Partnerships for Agroforestry Development Project / 2008	<ul style="list-style-type: none"> • Indirect: Payment for environmental services (PES) to provide productive safety net for poor upland farmers. • Indicators: indirect – areas under SLM & SFM; increased income thru PES; sustainable livelihoods thru NTFPs & ecotourism 	<ul style="list-style-type: none"> • Partnership with World Agroforestry Center on developing PES for carbon (REDD, primarily) • Piloting pro-poor RES/PES mechanisms • Studies completed (landscape/livelihoods; carbon stock assessments for major land uses; opportunity costs for REDD+) • CC vulnerability review of project • Incorporating: climate proofing infrastructure; CC into SEDP; improve CC sensitive maize & cattle systems; research on adaptation.
Developing Business with the Rural Poor Program / 2007	None	<ul style="list-style-type: none"> • CC vulnerability review of project • Incorporating: climate proofing infrastructure; CC into SEDP; improve CC sensitive maize & cattle systems; research on adaptation.
Improving Market Participation of the Poor, Ha Tinh & Tra Vinh Provinces / 2006	<ul style="list-style-type: none"> • Indirect: NRM & sustainable livelihoods intentions • Indicators: None 	Substantial: integrating climate proofing planning tools in SEDP & value chains: vulnerability assessments, geo-spatial analysis; climate proofing planning tool developed & tested

Communities and farmers.

79. While there are no systematic studies of the question of how the rural poor are currently coping with climate risk and climate change, there is a growing body of case studies and reports that presents a varied picture. In general, the building evidence seems to show that where the impacts are easily recognized (e.g., changing onset of the rainy season) and the adaptation response is relatively simple, low cost and requires minimum collective action (change planting date), private adaptation is taking place and farmers are coping. Where these factors do not hold, the situation may be more difficult and households are not able to adequately cope.

80. Some of the cases that illustrate this come from:

- OXFAM (2008): Case study of rural poor in Ben Tre and Quang Tri Provinces. Households are already experiencing the consequences of the climate changing, and in many cases are ill-equipped to reduce, or adapt to, the consequences. In many villages women are hit the hardest by natural disasters. They often cannot swim, have fewer assets to turn to for alternative livelihoods when crops are destroyed, and have fewer employment opportunities away from the home. In the case of Ben Tre, the main problems were typhoons, unpredictable weather, and the threat of salt water intrusion from sea level rise and other factors. In Quang Tri, it was more a question of unpredictable and concentrated rainfall causing more flooding than usual or flooding at unusual times of the year. Prawn farming, which had been very lucrative, was becoming too risky (saline intrusion, unpredictable

weather, disease, etc) and the more poorly resourced farmers could not adapt and were left worse off (debts, loss of employment, etc.). Positive examples were found of farmers already changing their crop cycles or planting different crops.

- McElwee (2010): Interviews in Ha Giang Province and the Mekong Delta.
 - Ha Giang. In four districts in the rocky mountain area households are changing their crops grown to lessen the damage caused by water stress. Nearly 30 percent of corn area has been converted to grass plantation in 2009 due to lack of water. The villagers plant “elephant grass imported from Guatemala” as fodder for buffaloes. Villagers said this grass has high resistance to cold spells, can grow on sloping land, and they even said this grass could help prevent soil erosion as well. New buffalo/cow markets have emerged.
 - Ha Giang. Rice and corn are still a major crop but short-term (3–4 month) varieties are replacing local (6-month) varieties. China-made rice varieties are widely used as they have high resistance to drought. Corn varieties (NK 4300 and CP999) are imported from Thailand as they fit in with the shorter rainy season. The villagers widely apply short-term varieties so they can harvest earlier to avoid tornados. If the crop is not successful, they still have time to replace with other crops. For example, in Thai An commune, 3-month rice varieties are used so that the villagers can replace it with soybean or peanut in case the rice dies of drought.
 - Ha Giang. To cover loss and damage caused by hazards, minority people often work for construction projects near their commune (e.g. construction of roads, lakes, small-scale hydro power plants, etc.). Some young men in Tan Trinh have also moved to the south (Ho Chi Minh city) and Quang Ninh province to work for textile companies since 2006.
 - Mekong Delta. Households coped with hotter days by buying fans, and with colder days by wearing more clothes. They also undertook disaster risk reduction measures like preparing houses before storms. The biggest short-term needs after climate events were cash, fuel, a clean water supply, and rebuilding their house. In terms of medium-term measures, most households (more than 75 percent) said they have done nothing. Most respondents have not changed their production system in the last five years, and only a few residents have grown more trees or dug water pools to improve their farming systems. Long-term, residents had no ideas on how to adapt, they said they need more knowledge.
 - Mekong Delta. Before extreme events, collective action primarily took the form of preparedness activities. Residents often exchanged information they heard from early-warning systems, and shared information on things to do such as reinforcing houses. Preparatory activities that entailed raising or spending of funds and additional labor—such as preparing rescue roads, building sandbag dikes, or dredging drainage and canal systems—tended to be less common, and these were usually coordinated by mass organizations. After climate events, collective action emphasized rescue and relief activities. Households collaborated to clean up, mobilize and distribute goods and assistance to affected people, and reinforcing and repairing damaged dwellings and public infrastructure. Collective action was not seen in the form of a long-term adaptation strategy. Overall, most collective actions taken by households at the community level are more time-consuming than financially costly. This may indicate that most collective actions being undertaken are the “easy” actions that entail little sacrifice of time or money. Should more serious actions be needed in the future, these may bring more difficulties in terms of mobilizing participation and reducing conflicts to ensure the collective action provides benefits for all.
- IFPRI (2011). In the Red River Delta planting dates in the winter-spring rice planting area have been continuously shifting in response to changing seasonality. In 1994 about 28 percent of rice was planted in early spring, 34 percent in middle spring and 38 percent in late spring. By 1998, this had changed to 31 percent early, 13 percent middle and 56 percent late spring. In 2004, the pattern was 13 percent early, 2 percent middle, and 85 percent late.

Some additional examples may be found in Annex IIa, Table 1.

IV. Emerging Lessons and Opportunities

Seven Key Lessons.

81. The following are seven key lessons learned both from international experience with management of climate risk and climate change as well as from Viet Nam.
82. **Lesson 1. The major concern is the extent to which climate change will hit poor households in general.** Viet Nam's dynamism and prospects for economic growth driven by industrial development and the growth of services imply that climate change impacts in the long run will be limited. The same will not be true for the rural economy and those who continue to depend on farming and other rural occupations for their employment and incomes should not be neglected. Climate change will hit poor households in general, partly because of the decline in agricultural incomes and partly because of an increase in food prices relative to the general cost of living. The lowest 20 percent of households arranged by household expenditure per person, both in rural and urban areas, will experience larger reductions in real standards of living due to climate change than those in the top 20 percent of households. The effects will also be quite uneven across regions: households living in the Central Highlands region will be the hardest hit because of a decline in agricultural value-added of up to 30 percent. Thus, the driving purpose of policies to adapt to climate change should be to protect the poor, the vulnerable, and those least able to respond to changing climatic stresses; requiring *inter alia* transparent targeting criteria (World Bank, 2010b).
83. **Lesson 2. Adaptation to climate change will primarily be a matter of building on no regrets measures.** Under the intermediate MoNRE climate scenario, a program of agricultural adaptation could actually increase agricultural incomes relative to the baseline, especially in the Central Highlands region. Further, analyses of sensitivity to climate change impacts versus exposure to impacts tends to show an inverse relationship between the two. Areas with the highest exposure to climate change impacts tend to have populations that are less sensitive to the risks those pose. Whereas in regions such as the northern highlands sensitivity to impacts is high, but exposure is relatively low. That is, it is the current levels of poverty, marginalization and social vulnerability that are the main risk factors, not climate change *per se*. Therefore, much of the needed spending to increase resilience and decrease vulnerability to risk should be targeted at enhancing livelihoods, sustainable agriculture and poverty reduction, all investments that would be justified even without climate change. Of particular relevance to IFAD, the key elements of an adaptation strategy, will include: (i) Increased expenditures on research, development, and extension for crop and fodder production, aquaculture, and forestry to develop new crop varieties that are more tolerant to drought, salinity, higher temperatures early in the growing season, etc.; and (ii) make "climate smart" investment in expanding irrigation, efficiency and productivity. Opportunities for irrigation expansion are greatest in the central regions (World Bank, 2010b; IFPRI, 2011).
84. **Lesson 3. Policies and systems that can effectively cope with existing weather variability will be more successful in adapting to future climate change than those that cannot.** Climate change is the long-term face of weather variability. Hence, it is important to enhance the capacities of agricultural and water systems to cope with current weather variability and build resilience into such systems (World Bank, 2010b).
85. **Lesson 4. Well-designed policies and programs, to adapt to climate change, must be flexible.** At the policy-level, the nature of climate change and adaptation is an area of great uncertainty. Studies only give a sense of the range of possible outcomes of climate change. For Viet Nam, the biggest uncertainties concern changes in the level and seasonal pattern of precipitation at a regional level. Well-designed policy to adapt to climate change must therefore be flexible, so that the policies can be modified as more information about the direction of climate change is collected. That is an important reason for making a strong commitment to research, development, and extension activities, since the focus of such efforts can be shifted as more is learned about the extent and impacts of climate change (World Bank, 2010b). Similarly, the bulk of the analysis in Viet Nam on climate risk and climate change threats has pointed out the diversity of risks and threats and contexts in which they play out. Because much of the focus of planned adaptation should be on providing farmers and others with the tools and resources that will enable them to respond to climate change itself and to the new risks that will accompany climate change, this will require that the tools and resources be readily adaptable to local needs, conditions and opportunities. This leads to the conclusion that one-size-fits-all approaches will be largely doomed to failure. Flexibility to learn, experiment and adapt to local and regional

conditions will be essential for climate change response investment programs to be successful. This is both a policy and program design issue.

86. **Lesson 5. Farmers are fully capable of adapting to many important aspects of climate risk.** While clearly there are climate change impacts beyond the farmer's and other producer's abilities and capacity to adapt, there are many other adaptations that farmer can make privately (autonomous adaptation). In Viet Nam, examples of this include changes in sowing dates, switching to drought-tolerant crops, adoption of salinity-tolerant varieties of rice, adoption of new varieties for other crops, switching to rice-fish rotation, switching from maize to livestock, etc. However, lack of credit, too high (relative to economic status) investment costs, risk aversion, lack of information or of timely access to inputs, etc. can create substantial barriers to farmer-led adaptation. Therefore support for long-term adaptation strategies should include greater investment in ARD: development and dissemination of technologies; improved quality and access to inputs (e.g. new varieties), access to output markets, services (credit and extension), and education and training for livelihood diversification within and outside agriculture (World Bank, 2010b; IFPRI, 2011).
87. **Lesson 6. If good development policies and programs are good adaptation policies and programs, then the two must be one.** Viet Nam's experience with rural development and poverty alleviation projects and programs led over time to the realization that top down policy implementation must be generously compensated with bottom-up planning and investment processes. In recent years, this recognition has been leading to the increased fiscal and management decentralization of ARD (and other) programs to the Provinces (e.g., *Tam Nong*) as well as to many pilots and efforts to effectively integrate local and participatory planning processes into the SEDP process. The NTP-RCC recognizes this challenges and would have MPI develop guidelines for mainstreaming climate change issues into the socio-economic development plans (SEDPs) of "localities" and development plans of Ministries/sectors. As the SEDP process drives public investment and development financing, unless "localities" are understood to include "communes and their villages" it will be quite difficult to fully integrate funding for rural development, agriculture, forestry, natural disaster, climate change, etc., etc. into a coherent, "climate smart" development investment program at the local level. The mainstreaming of local, participatory processes into socio-economic development planning, with real fiscal and management decentralization to commune and village levels, will be an essential ingredient for long-term adaptation to climate change.
88. **Lesson 7. There are more good theories on climate change response than facts.** Developing an effective, viable and efficient response to climate change on a national scale has never been done...anywhere, by anyone. For a country of the size and complexity of Viet Nam, to have made the commitment to accomplish just this is highly laudable. The approach being taken – incremental, to be carried out over the next forty years – is sensible and pragmatic in that it takes a (mostly) one-step-at-a-time approach, accompanied by continued research and information gathering. It will be an empirical process and, like as such processes, will be one of trial-and-error. As such, the 2011-2015 period of the MARD Action Plan should be understood as a period of learning. And, as a period of learning, there should be very intentional, very systematic and structured processes and activities built in so as to ensure that learning is captured, shared and fed back into the policy, strategy and decision-making dialogue and process.

Principal Challenges.

89. The primary challenges will be those associated with incorporating these lessons detailed above into a climate risk and climate change response strategy and implementing them within the overall agriculture and rural development context.
90. **Challenge 1. Adapting climate change policy to protect the poor, the vulnerable, and those least able to respond to changing climatic stresses.** While the current policy cannot be said to be explicitly pro-poor, it can be said that it contains the seeds to become so. One of the first challenges will be to develop appropriate targeting strategies in order to direct support for adaptation to those populations and regions most sensitive and most exposed to climate risk (short-term) and climate change impacts (medium to long-term). Much of the subsequent support would have to come through the National Target Program for New Rural Development, creating the associated challenges of both mainstreaming climate risk and climate change concerns into the NTP through SEDP planning and implementation processes as well as working with the Provincial governments and MARD/DARD on policies, strategies, and tools for climate proofing the Provincial NTP implementation.

91. **Challenge 2. Making effective the services to support adaptation by the poor, the vulnerable, and those least able to respond to changing climatic stresses.** The rates of decline in poverty amongst the poorest and most vulnerable communities has been much lower than for the majority population. In 2008, rates of poverty were 9 percent for the majority Kinh/Hoa peoples and 50.3 percent among the other ethnic minorities (Viet Nam Academy Of Social Sciences, 2011). Between 1993 and 2008, a period in which poverty was significantly reduced overall, there was only a modest drop in the percentage of poor households working in agriculture: from 51.3 percent to 47.3 percent (VASS, 2011). This is despite significant investment in the last decades by government to alleviate poverty among these groups and in the region where they reside. Clearly, many of the current approaches for rural poverty reduction in ARD are not as effective as desired. Simply targeting the vulnerable populations will not be effective unless the approaches themselves are refined and improved through better capitalizing upon the successes and lessons learned in recent years among the diverse ARD actors. The principal challenges will be in influencing operational policies, strategies and approaches. This will require a systematic process of analysis, of “learning from the field” and of utilizing evidence-based arguments to justify creation of learning pilots that are linked to the responsible institutions and that have a pre-defined and intentional strategy for identifying, replicating and scaling-up success.
92. **Challenge 3. Making policies and programs flexible.** This is a very significant challenge, but also one where there is positive movement within the ARD sector. MARD has been designated a “modern, macro-management Ministry” whose role is to be one of a policy and regulatory institution that also retains some functions to facilitate policy and program implementation. With the NTP for New Rural Development (*Tam Nong*), the Provinces have been given the central responsibility for implementation; i.e., the program has been devolved to them for implementation. This is a first major step. The Provinces are now faced with the challenge of effectively working with the Districts, the Districts with the Communes and the Communes with the Villages to implement the programs. Those same challenges were there previously, as well, but the nature of the challenge is now somewhat different with ownership having been passed to the Provincial authorities. They are much closer to the problems and, in many Provinces, more keenly aware of the need to adapt to more local conditions and opportunities. Supporting the Provinces to better manage programs like *Tam Nong*, working to close the gaps between the Districts and Communes in the planning and implementation processes, and developing the specific learning about how to better align local needs and capacities with the existing program financing managed by the Provinces would undoubtedly contribute to better outcomes at the program level as well as generating policy relevant learning on how, when and where to build flexibility into both policy and programs.
93. **Challenge 4. Identifying and removing barriers to farmer-led adaptation.** Experience from IFAD’s and other institutions’ rural development programs gives a fairly precise view of what are likely to constitute some of the barriers to farmer-led adaptation amongst those farming households of particular concern. These would include:
- Setting agricultural research and development priorities in function of smallholder adaptation needs and opportunities and making the system more capable and interested in systematically capturing and utilizing farmer developed innovations and traditional knowledge.
 - Adapting extension and technology transfer strategies, methodologies and expenditures to increase coverage of services, make service more responsive to farmer needs, and more effective at reaching and transferring knowledge to women and ethnic minorities.
 - Expanding access to credit, especially short-term credit (purchase of inputs, feed materials, tools, etc.), for the types of small investments associated with changing crops and varieties and whose periodicity is based on the production cycle. Credit of this type is not readily available through the formal credit systems, thus producers must rely heavily on savings and informal credit mechanisms (e.g., from intermediaries/brokers/input suppliers and/or local revolving funds and/or group-based savings and credit schemes). IFAD (and others) have been working with Women’s Savings and Credit Groups (and the Women’s Union) to link them to the formal credit system (VBSP and VBARD) through group lending approaches that provide the economies of scale required for the banks to justify the transaction costs involved with the making and servicing of very large numbers of very small loans. Working banks (on issues of collateral, group lending, standardized products, etc.), with local savings and credit mechanisms and with input suppliers will be required.

- Market access and linkages to markets will include questions of physical access to markets, of tying production (quantities and qualities) to actual market demands, and of increasing access to markets, particularly in those areas where there is no effective competition²⁰. Physical access (road infrastructure) will have to become climate smart and seek to provide for all-weather access with attention to design, lay outs and maintenance of life-line roads when natural disasters strike. For the rest, these are issues that IFAD programs are already engaged with thus the focus should be on the increased urgency of getting these right in order to support long-term adaptation through increased engagement on the policy and strategic planning side at District, Provincial and national-levels.
- Education and training for livelihood diversification within and outside agriculture is crucial. IFAD's experiences with vocational education and supporting educational opportunities for children and youth, particularly indigenous youth, are relevant. However many of the obstacles encountered – for example, linking vocational education to job opportunities with private sector, start-up capital for graduates to establish service-related micro-enterprises in rural areas, adult literacy and bi-lingual education for non-Kinh speakers, support for poor households to send children to distant secondary schools, etc. – are not amenable to resolution through project-based approaches where education and training are only relatively minor (but important) sub-components. To engage on this issue, IFAD would need to consider a stand-alone project targeted at developing, with the appropriate Government agencies, the policies, strategies and investments required. From a climate change perspective, such a project could be justified in areas where the future of natural resource-based livelihoods is already jeopardized by the combination of climate (semi-arid, drought prone areas of the central and south coast), resource degradation, and structural shifts in the local/regional economies are further marginalizing agricultural livelihoods.

94. Challenge 5. Mainstreaming climate smart, participatory local planning and implementation into SEDP processes. IFAD has had a significant role in the development of participatory and market-oriented planning instruments and approaches at the village and commune-levels in a number of Provinces as well as with working with those Province's Departments of Planning and Investment to integrate the plans into the SEDP process. At the same time Government, through programs such as the P135 program, has made significant advances in decentralization and development of modalities for greater commune-level ownership in development processes. Notable examples in this regard include Commune Investment Ownership (CIO), the establishment of O&M funds, the piloting and application of Citizen Report Card surveys, and the development and application of a participatory planning manual. However, much more needs to be done to make local participatory planning effective in order that climate proofing and building of resilience can effectively depart from a community base. This includes:

- Participation is still largely confined to local consultation to select from prescriptive program menus rather than quality, meaningful participation by people in deciding what support best meets their needs. Participation in program management, oversight and implementation also tends to be quite limited. Prioritization of investments is often done by the Districts and Communes, even in the case of those cases (e.g., livelihood and local, small-scale infrastructure) where investment decisions would more usefully made at the Village and Commune-levels. Closing the gaps between supply (of potentially too-limited, one-size-fits all investment offerings)²¹ and demand (and needs at the Village/Commune-levels) through greater adaptation of offerings to local needs and conditions will be challenging. However, the path to climate smart local investment and adaptation will lie through the development of more effective approaches to local planning (technical and investment) such that institutional responses are better tailored to local needs and opportunities.
- While programs (like P-135) and projects (like IFAD's) have helped to make significant advances in participatory local planning and integration of these processes into SEDP planning, overall Government has yet to consolidate these experiences and replicate them

²⁰ i.e., where one or two buyers/suppliers are dominant and follow usurious practices and/or farmers are receiving prices well below market rates, unjustified by transport costs & trading risk and/or farmers have limited access to market information or market networks outside of the commune.

²¹ Standardized packages of investments offerings from government programs is not *a priori* undesirable. Indeed, there are many good reasons (efficiency, responding to broader-scale concerns and priorities, externalities, quality control, etc.) to provide such packages. Allowing for greater flexibility and responsiveness to demand does not mean doing away with menus and standardized packages, rather it means tailoring those menus and packages in a flexible fashion based on knowledge of local conditions and

across its programs and processes. Consolidation, documentation and advocacy around these innovations could form a central strategy for knowledge management and technical assistance to MPI and Provincial Department's of Planning and Investment and MARD and the Provincial DARD's. This would also provide a broader context for advocacy of pro-poor adaptation and sustainable livelihoods within the climate change agenda of Government and the introduction and mainstreaming of climate proofing planning tools at Provincial, District and Commune/Village levels.

- Environmental protection and consideration for natural disaster risk and vulnerability reduction have not been core concerns of Programs such as P-135. This state of affairs has already raised serious concerns about the sustainability of economic growth based on over-exploitation of natural resources (see Box 1) and of failure to integrate disaster risk management into program investments (e.g., each year flooding destroys a lot of P135 investments). If introduction of "climate proofing" planning approaches and instruments is to be successful, it will be forced to deal with the need to mainstream environmental and disaster risk planning as well. Planning instruments for climate proofing ARD investments will need to be put in place (and linked) from the Provincial-level sectoral planning, to the District-level operational (and land use and zoning) planning to Commune/Village-level planning. Local processes will need to be informed by "climate proof" sustainable livelihoods/value-chain and infrastructure planning. At the local levels, natural disaster risk and vulnerability reduction will need to be an integral part of the "climate proof" planning process. Development of participatory land use plans that identify vulnerable areas (drought prone soils, flash flooding, landslides, inundation, water supply, etc) and orient investment will be key as will the linkage of the local land use planning to District land use planning in order that the land use plans are actually utilized as instruments to orient institutional responses and public investment.

95. **Challenge 6. Knowledge management.** The 2011-2015 period is the first step toward implementing a forty year vision. How to achieve that vision still requires the development of quite a bit of learning and knowledge. One area of learning that is widely held to be an area of weakness overall, is that of "learning from the field". Prior work done by the author on needs for coordination in the ARD sector (*ISG 2006 - 2010 Review & Development of ISG 2011 – 2015*) found that all sector stakeholders (government, ODA, NGO, private sector) felt that too little of the learning from implementation was being shared among sector actors and being fed back into the national level policy dialogue. The result of this was that effectiveness and impact of programs was being unnecessarily blunted by failing to capitalize upon experience and learning. If this same issue is not dealt with within the implementation of the MARD Action Plan, then the failure to systematically learn from experience will ensure that the next five year action plan is less well-informed and strategically oriented than would be optimal. IFAD has a comparative advantage in this area, having supported regional and national platforms for systematic learning and knowledge management in the ARD sector. Given the high stakes for Viet Nam from climate change impacts – as one of the top five mostly threatened countries by sea level rise and a "Hotspot of key future climate impacts and vulnerabilities in Asia" (Cruz et al, 2007) – IFAD support is well-justified for a program of knowledge management to capture learning, share it broadly amongst ARD stakeholders, and provide timely and useful information to Provincial and National policy, strategy and decision-making dialogues and processes.

V. Conclusions

Priorities for the ARD Sector.

96. Viet Nam is clearly a country that will be disproportionately impacted by climate change over the coming decades. In clear recognition of this Government has taken a proactive approach, extending back as far as the mid-1990s with the MONRE-IMHEN Vulnerability Assessment of Viet Nam's Coastal Zone. In more recent years, Viet Nam has seen an almost literal explosion in the number of strategic and operational initiatives coming on line to confront climate risk and climate change. Since 2008, when the National Target Program for Response to Climate Change (NTP-RCC) and the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development Sector (RCC-ARD) were approved, there has been tripling of investment in climate change response relative to that of the previous fifteen years. From 2008 until present, at least US\$0.9 billion have been committed for adaptation, mitigation, capacity building, research, and awareness raising investments. While the NTP-RCC is not as yet a an operational

strategy to guide the overall direction and utilization of these resources, nonetheless a mechanism has been established (the SP-RCC) and instruments developed (e.g., policy matrix) to orient both the institutional actors responsible for its implementation as well as their (ODA, NGO, private sector) partners who would contribute to and support its implementation. The SP-RCC, which began operating in 2008, appears to be reasonably successful in this coordination role. MONRE, who is charged with the implementation of the NTP-RCC, is reportedly in the process of developing the overarching strategy for the implementation of the NTP-RCC. In the meantime, the principal challenges would seem more to lie with the various line ministries who themselves are charged, under the NTP-RCC, to develop their own sector's strategy and action plan for climate change response.

97. For the agricultural and rural development sector, MARD developed its national-level framework some three years ago and earlier this year approved the strategy/action plan for its implementation: the *Action Program In Response to Climate Change of the Agriculture and Rural Development Sector During 2011-2015 and Vision to 2050*. While the longer term vision to 2050 provides for a reasonably comprehensive approach, the priority investments in the five year plan are heavily oriented towards "hard"²² investments in dikes, levees, and hydraulic structures. From the rural development, poverty and vulnerable populations targeting perspectives there appears to be little balance in the priority investments between economic goals and social goals. The soft investments (described in the plan as "Duties To Respond To Climate Change") also lack any clear indication that "people" are a focus or that the research and development of subsector and regional plans and priorities will be oriented towards meeting the challenges of developing more locally-driven approaches to adaptation and avoiding "one-size-fits-all" approaches. The inclusion is not clear of such key issues as integration into the SEDP process, poverty reduction, household-level food security among vulnerable populations, support for and facilitation of farmer-led adaptation processes, sustainable natural resources management, or other needs for "soft" adaptation measures of the type required to increase local institutional capacity and social capital for building resilience. Related to that is the fact that the RCC-ARD does not set out to address the mainstreaming of climate change responses into the ARD sectors other programs, especially the poverty reduction and rural development programs that fall under the NTP-NRD umbrella. It is clearly through those programs where MARD and the Provinces have the greater challenge (and opportunity) to work through issues of ensuring that rural development investments are climate smart and support both the building of adaptation capacity as well as the adaptation processes themselves. Other important points for consideration include:

- Transparent targeting criteria currently appear to be lacking. Issues of exposure and sensitivity to climate risk and climate change threats both require attention. The RCC-ARD and related policies would be further strengthened if they explicitly target vulnerable groups and had strong pro-poor and gender emphasis. Among others, this would also be beneficial for orienting support from development partners.
- A very high priority would be to develop the strategy for integrating the National Strategy for Natural Disaster Prevention, Response and Mitigation and the RCC-ARD. It has been widely commented upon that disaster risk mitigation in Viet Nam – which is the responsibility of MARD and the Ministry of Defense to lead – is largely reactive though some initial steps are being taken towards a proactive approach to disaster risk management. Much of what would constitute a proactive approach (vulnerability and risk reduction) would also be essential elements for putting in place "climate smart" approaches for ARD.
- As yet coordination mechanisms for the RCC-ARD are not in place. Only some five months after the approval of the RCC-ARD Action Plan for 2011-2015 was the first meeting held with MONRE, SP-RCC and MARD's development partners to present and begin discussions with them. While the action plan identifies this as a 2011-2015 activity, given the hundreds of millions dollars that are to be leveraged and the large number and diversity of actors, it is crucial that progress be made on setting up a mechanism of similar effectiveness as the SP-RCC.
- It will be critical to develop knowledge management capacity around the implementation of the RCC-ARD in order to ensure the capture of experiences and lessons from the field on

²² In most definitions, "hard" adaptation measures usually imply the use of specific technologies and actions involving capital goods, such as dikes, seawalls, and reinforced buildings, whereas "soft" adaptation measures focus on information, capacity building, policy and strategy development, and institutional arrangements (World Bank 2010c).

climate smart agriculture and rural development. This is a new endeavor for MARD and its development partners. Without a systematic approach for learning and provision of feedback into policy and strategy dialogues, decision-making will be less well-informed than desirable, leading to inefficient use of time and resources. An option to consider is the establishment of a thematic ad hoc group (TAG) for “RCC-ARD knowledge management” and learning from the field. This mechanism was successfully utilized in the past, through ISG, to support MARD and international donors in ODA coordination and policy dialogue, for example for the implementation of the Comprehensive Poverty Reduction and Growth Strategy (CPRGS) in Agriculture and Rural Areas. Ideally the coordination mechanisms would also support forums/workshops at Provincial and national levels to inform policy dialogue and deliberations. Such forums would have broad stakeholder representation and be held for the purpose of reviewing lessons and generating discussion on policies and strategies for climate change response.

- Finally, the question of how to effectively integrate climate risk and climate change threat responses into the Socio-Economic Development Plan for 2011 – 2015 (SEDP) and the Socio-Economic Development Strategy for 2011 – 2020 (SEDS) remains to be answered. One part of the solution will be through inclusion in the SP-RCC financing framework and policy matrix.

98. With the increasing decentralization of fiscal resources and management responsibilities to the Provinces, it will be at that level where the greater challenges are likely to be encountered in the coming years. To respond effectively to climate risk and climate change threats, it will be the Provinces who will bear much of the burden of articulating ARD sector strategies, action plans and programs to ensure that, on the one hand, they support adaptation and, on the other, obtain the inputs and orientations required in order to “climate proof” their investments. While the Provinces will need policy support and guidance from the national-level to allow this to happen, the national role will most usefully be of accompanying the Provinces in order to better understand the challenges, to learn from Provincial experiences, and to adapt national policies and programs to meet the operational needs on the ground. Initial areas for attention in the Provinces are likely to include:

- Harmonizing the various policy, strategy and program instruments into a set of tools that can be used for local (District, Commune, Village) CBDRM/climate smart investment planning;
- Developing appropriate targeting criteria to provide incremental resources and support to those populations most vulnerable and most at risk from climate risk/climate change threats and poverty;
- Ensuring that institutional and organizational arrangements for implementation of the NTP-NRD, the RCC-ARD, the Provincial Disaster Risk Management Action Plans (especially for CBDRM) and other rural programs (P-135, etc.) are rational, sustainable and capable of articulating the various programs at the District, Commune and Village-levels such that capacity building can be effective and implementation possible;
- Working with the Provincial Departments of Planning and Investment to integrate DRM and climate proofing concerns into the SEDP processes²³ and in making the SEDP process responsive to local priorities and ensure needed flexibility;
- Implementing the public awareness and capacity building programs called for in both the Strategy for Natural Disaster Prevention, Response and Mitigation (especially as relates to CBDRM) and in the climate change response plans in order to inject DRM and climate proofing concerns into local development planning (District, Commune, Village);
- Identifying current and emerging priorities for climate risk adaptation and reduction of vulnerability to disasters, on a commune-by-commune basis, in order to identify and adapt best practice responses for further research, piloting or dissemination as appropriate;
- Develop locally tailored strategies for facilitation of adaptation by: (i) identifying the principal adaptation pathways for the ARD sector over the medium-term, on a District-by-District basis (stratified by appropriate agro-ecosystems, socio-economic, cultural and gender factors); (ii) analyzing the current and likely future barriers to adaptation, and (iii) based on these and with

²³ This area will require coordination with and national support from MPI and the Central Committee for Flood and Storm Control (CCFSC). At present, where detailed flood maps exist at the provincial level, they are often not factored into new development plans. No institution, including the CCFSC, has the mandate to ensure risk maps are taken into consideration.

the participation of local stakeholders, develop appropriate targeting and support mechanisms to facilitate long-term adaptation;

- Review and evaluate current agriculture, forestry, livestock and aquaculture policies and priorities to ascertain the extent to which they facilitate adaptation and long term resilience as well as the maintenance of option values at the landscape-scale versus increasing risk and future uncertainty²⁴. The purpose of such analysis would be to initiate, from the Provinces, a national-level dialogue on agricultural policies and priorities and related issues of how to build the needed flexibility into sectoral policies and NTPs in order to support local adaptation over the long term.
- Strengthening and broadening the coverage of the agricultural extension system through systematic development of farmer networks (to share knowledge on successful adaptation); farmer-to-farmer extension approaches (to facilitate technology transfer); continued development of community-based technical services (e.g., para-veterinarians for vaccinations and control of plagues); promotion and utilization of private service delivery and; strengthening functional linkages between researchers and farmer networks to ensure the relevance of the research agendas; and
- Developing knowledge management capacity around the themes of climate smart SEDP planning processes; CBDRM, management of climate risk and farmer adaptation; and successful, pro-poor climate change adaptation (i.e., balancing climate change adaptation with development and poverty reduction imperatives).

99. From a technical perspective, Viet Nam has done a good job of evaluating potential impacts of climate change and identifying approaches, priorities and opportunities for both adaptation and mitigation in smallholder production systems. A good deal of work has been done on alternatives for cropping and aquaculture to confront threats from sea level rise (saline intrusion and inundation), from increasing incidence of drought and extreme rainfall events, etc. Based on analysis of existing smallholder systems, technical recommendations on increasing their resilience and sustainability have also been developed (e.g., soil fertility management, soil and moisture conservation, integration of crops and animals in diversified systems, reduced reliance on external inputs, etc.). While weather forecasting is still somewhat weak (MARD, 2010) it appears that climate indices, particularly as related to the El Niño Southern Oscillation (ENSO), has sufficient basis to develop its application in helping farmers to adjust rice and food crop varieties and planting calendars depending on if it is an El Niño or La Niña year (Nguyen Van Viet et al, 1998). Work has also been done on feasibility of agricultural mitigation, for example, reducing GHG emissions from irrigated rice through water management practices and from animal wastes by manure management (biodigesters, composting, etc.). For the latter (biodigesters and composting) there is ample experience in Viet Nam. This technical offering underpins many of the official Government and development partners publications and strategy documents on climate change response (e.g., IAE, 2011; MARD, 2010; MONRE, 2010; CARE, 2009; ISPONRE, 2009). Areas where relatively less attention has been paid in the official documents and strategies and which may be beneficial to further develop as ARD sector strategic responses to climate change are:

- Livestock and fodder: Livestock are an extremely important source of income, of crop nutrients in a diversified smallholder system, and to household food security. Market demand for livestock products is also increasing at a very rapid pace. There is evidence (McElwee, 2010) that in the northern mountainous regions that some smallholders are shifting into more livestock as drought makes annual cropping (maize) increasingly risky. As an attractive, pro-poor option from both the perspectives of market-based poverty reduction and smallholder adaptation, continued attention to increasing livestock production is called for. Two important ways to facilitate this are by supporting the replication and scaling up of the village and commune-level para-veterinarian systems for animal health and improving animal nutrition through expansion of “climate proof” fodder and feed production.

²⁴ Best practice for climate change adaptation would hold that, in the face of uncertainty over future impacts, it is best to maintain diverse landscapes that will provide a broader set of options for future adaptation. Current policies on large-scale planting of *Acacia mangium* monocultures are one example of a potentially “non-adaptive” policy on land use given that it reduces options and ecosystem resilience and would be vulnerable to increased drought where rainfall is predicted to fall below 100 mm/month during the dry seasons. There are also reports of *A. mangium* planting programs competing with ongoing adaptation processes, for example in Ha Giang where livestock are increasingly seen as an alternative to maize cropping as droughts become more common, expansion of *A. mangium* plantations has reduced available land for fodder production.

- Diversified smallholder systems: Amongst ethnic minorities, especially in the uplands (Northeast, Northwest and Central Highlands), production systems may be extremely diverse with households engaged in numerous, interlinked production activities that revolve around annual cropping of grains and some market crops; animal production; and harvesting of fodders and nutrients, and other NTFPs from forest patches. Scant attention is paid to these systems as the focus tends to be on crops and commodities. For the rural poor, maintaining and improving income generation potential of these diversified systems will both from the adaptation and mitigation perspectives. Such diversified farming at the landscape-scale can also provide multiple environmental services and help to maintain future option values.
- Natural resources management: reducing vulnerability to natural disasters, to climate risk and to the potential threats of climate change will require working at a landscape scale as well as at the household and village-levels. The maintenance of diverse landscapes for conservation of option values, protection of environmental services (e.g., hydrologic services, REDD) and sustainable use of environmentally sensitive areas (e.g., groundwater recharge zones and riparian areas, steep and erosion/landslide prone slopes, areas subject to flash flooding and inundation) will require linking village level planning and application of best practices with Commune-level planning and land use zoning with District level planning, land use zoning and natural resources management policy objectives.
- Conservation of agro-biodiversity: the capacity to adapt to climate change may well depend upon maintaining for future use the diversity of plants traditionally grown and utilized locally. Traditional and open-pollinated varieties, and underutilized crop species have adaptive traits and conserve greater genetic variability than do improved varieties. Both in-situ and ex-situ approaches should be utilized to conserve such germplasm and it should also be brought into testing for adapted varieties²⁵.
- Social systems: much of the official adaptation approach is based on individual household adaptation (of new crop calendars, varieties, cropping systems, etc) or of the introduction of structural/engineered works. The role of groups and communities in adaptation, in building capacity to adapt and in building the resilience of the communities to external shocks from natural disasters and climate risks is, at best, implicit but otherwise not visible in the proposed approaches. Strengthening of groups' (e.g., women's savings and credit groups, farmer-based organizations) and communities' capacity for collective action are also important areas that merit attention. In many cases this will be challenging as very often communities do not know what they are allowed to do and local authorities who have traditionally played a lead role may find it difficult to give communities and groups the space to be proactive or to make their own plans (McElwee, 2010).
- Financial aspects: Access to credit, personal savings, diversified income sources and access to competitive markets to ensure fair prices will all be important elements of successful adaptation.
- Human resources: Education and training for livelihood diversification within and outside agriculture is crucial. In some areas, there may not be many other options for long-term adaptation, particularly where migration is likely to take place due to factors such as sea level rise, or too limited opportunities for natural resources-based livelihoods in degraded or heavily drought stricken areas, etc.

Priorities for IFAD.

100. IFAD has a number of strong comparative advantages upon which it can capitalize to both ensure that its portfolio and investments in Viet Nam are climate smart as well as a platform for engagement with Government and development partners on Government policies, strategies and initiatives for climate change adaptation and mitigation. One principal advantage derives from IFAD's basic mission to enable poor rural people to overcome poverty and its agenda of targeting activities toward enabling the rural poor to improve their food security and nutrition, raise their incomes and strengthen their resilience. This is because increasingly the international community working with Viet Nam is reducing its support for rural development and poverty alleviation. This situation is reflective of a number factors: (i) Viet Nam's overall success in reducing poverty, (ii) its recently achieved Middle-Income Country (MIC) status and

²⁵ Numerous examples exist where traditional varieties have proven to be more productive under actual farming conditions (e.g., rice in East Timor and maize in Mexico) and as such have been incorporated into extension programs with significant yield benefits compared to improved crop varieties.

World Trade Organization Membership that has as some donors (especially, bilateral donors) amending their policies from a 'development cooperation relation' to a 'partnership relation' with non-refundable aid decreasing and the focus shifting more to technical support and trade/business promotion; (iii) an ongoing shift in concessional financing in favor of hard loans from both bi-lateral donors and multi-lateral sources (e.g., Viet Nam is now an IDA-blend country), also a function of achievement in poverty reduction and MIC status; and (iv) shifting government and donor priorities. As it was summarized by one person²⁶ (and paraphrased here): "*IFAD and the World Bank are seemingly the only two major financiers left with strong rural development and poverty alleviation objectives...*". In terms of climate change, IFAD should focus on pro-poor adaptation and mitigation, areas which arguably do not yet receive the attention they merit in the context of current climate change policy and strategy in the agriculture and rural development sector.

101. The other strong comparative advantage that IFAD brings into the next COSOP period is the knowledge, experience and institutional relations and capital that it has developed through its current portfolio. A great deal of what IFAD is currently supporting remains directly relevant to and necessary for developing and implementing a strategy for climate smart investment in Viet Nam: targeting of the most vulnerable populations among the rural poor (ethnic minorities, women, children and youth); participatory local planning processes and integration into the SEDP; improvements in access to and quality of rural services (extension, credit, input supply); market access and pro-poor value chains; sustainable, natural resources-based livelihoods; capacity building at all levels for improving the management of development processes and outcomes; strengthening of social capital through formation and support for local groups and the mass organizations on which they depend; strategic support to local and Provincial-level agencies and authorities to adapt and implement central government rural development policies under those programs that have been decentralized to them for their management. IFAD has also developed good working relationships with the authorities of the Provinces in which it works and that relationship has extended to the national level where IFAD is recognized as an important source of finance, innovation and generation of learning among both the donor community and the concerned Ministries (principally MARD, MPI and MOF. IFAD has the institutional capital and recognition required to engage at all levels, from the field to the national-level, and create a space and opportunity to support, influence and strengthen Government's strategies and initiatives for climate change adaptation and mitigation.
102. IFAD's targeting strategy as regards integrating climate change concerns into its next COSOP should remain substantially the same as its current targeting strategy. Firstly, sensitivity to climate risk and climate change impacts is a direct function of social vulnerability. Therefore, in Viet Nam, it is the rural poor who are the most sensitive and, among the rural poor, it is the ethnic minorities, women and children who are the most vulnerable. Secondly, poverty reduction is one of, if not the best, way to enhance household and community-level capacity for adaptation. And, to increase resilience to climate change impacts, good rural development and natural resources policies and programs will be good adaptation policies and programs. Thus, those factors that drive IFAD's overall prioritization for the 2013-2017 period will be substantially compatible with those factors that would otherwise drive a climate risk-oriented prioritization. Having said that, however, in weighing its geographic priorities for investment under the next COSOP, IFAD should give extra weight and consideration to the following regions as areas where the rural poor are particularly sensitive and exposed to climate risk and climate change threats (see Table 6) and thus merit additional consideration. In order of priority, those regions are:
 - Mekong River Delta – on a poverty head count basis (i.e., not on poverty rate) the Delta has a very large population of rural poor and it is the region in the country that is likely to suffer the greatest impacts from climate change. It will not just be the biophysical impacts, but also the likelihood of a very large number of rural poor suffering from economic displacement as their current livelihood activities are either lost to rising sea level and/or salinization and/or increasingly scarce fresh water resources. Assistance will be needed for adaptation and change of agricultural and aquaculture systems, for shifting to entirely new activities in response to the opportunities created by the new biophysical conditions (e.g., mariculture), as well as becoming prepared to migrate under more favorable conditions (e.g., with an education) as conditions require.

²⁶ S. Jaffee, personal communication, October 1, 2011

- Central Highlands – because of its high rates of poverty, large ethnic minority population and the prevalence of rainfed agriculture for subsistence among the rural poor the Central Highlands are highly sensitive to climate change risk and natural disasters. Here adaptation and poverty reduction imperatives go hand-in-hand. In addition, the Central Highlands is already a zone to which many migrants are coming today, but with the future displacements of populations from the coastal areas and Mekong River Delta, undoubtedly the Central Highlands will see greatly increased in-migration in future decades. Not only is foresight needed to plan for increased in-migration, but also the current population of rural poor could be directly threatened by large-scale in-migration in the absence of support for increased security of land tenure (i.e., through formal allocation of land use right and the forest land allocation process) and income/livelihood improvements. Such support would leave the rural poor and their communities in better conditions to sustain themselves in the face of increasing land and resource access pressures and the structural changes in economic opportunities that the changing demographics will bring.
 - Northern Mountains – the northern mountains are the areas with the highest rates of poverty in the country and the largest ethnic minority populations. It is also probably the area most sensitive to the impacts of climate risk and natural disaster because of those factors. IFAD already has a strong presence in the Northeast, but as yet no presence in the Northwest²⁷.
 - Central Coast, both northern and southern – Poverty rates are similar in the North Coast to those of the Central Highlands (29 percent) and there are areas in both North and South with pockets of ethnic minorities as well as poor rural communities dependant upon fishing or rainfed agriculture. A very high significant percentage of the population in this region is exposed to climate change and natural disaster risk. In the semi-arid south, scarce water resources and drought are severe limitations and risk factors. In many parts of the Central Coast the structure of the economy is rapidly changing to being industrial and service-based. Very limited opportunity (water and natural resources constraints) for greatly enhancing agricultural livelihoods exists over the long term. Among others, adaptation in these areas will require significant support for the rural poor to develop non-agricultural livelihood and employment opportunities.
103. The main imperatives that climate change considerations should add to the next COSOP are those related to the high importance of ensuring that (i) sustainability concerns as regards climate risk and future threats are integrated into investment planning and implementation; (ii) appropriate new tools and instruments are developed and applied to achieve that integration; and (iii) adequate incentives and follow up are included in the investment programs to guarantee that appropriate attention is given to their execution. In terms of additionality to ensure that the COSOP program is climate smart, some of the more important “new” areas should include:
- Disaster risk management and vulnerability reduction – whether seen as a climate change response or disaster risk management is less important than the fact that climate (or weather) risks are not currently being appropriately factored into Government’s ARD programs directed at IFAD’s target groups. Also quite weak are responses for reducing vulnerability to natural disasters, e.g., through application of simple land use planning tools at the community-level and the integration of those into decision-making criteria for rural investment (SEDP process). Large, and avoidable losses are occurring.
 - Policy – on the policy side it is not apparent that the national-level dialogue on climate change in the ARD sector has internalized rural development and poverty reduction objectives or concepts. Increasingly climate change-related initiatives are claiming limited public resources and this trend will only continue in the coming decades. It will be important for IFAD to engage in this dialogue to promote that climate change adaptation and mitigation resources are directed in a “climate smart” fashion towards groups where either (i) persistent, structural poverty makes natural resources-based livelihoods non-viable and provision of alternatives are required (the permanently vulnerable) or (ii) “temporary” poverty becomes persistent poverty due to recurrent losses from drought, flash flooding, and other natural disaster/climate risk-related phenomena.
 - Research and development – there are a number of potential areas where support for development of pro-poor adaptation responses would be well-justified as would policy-

²⁷ The World Bank’s Second Northern Mountains Poverty Reduction Project is located in the Northwest. Approved in 2010, this US\$165 million project supports a substantially similar approach to rural development as do IFAD’s Viet Nam projects.

oriented research in order to promote and support the development of pro-poor approaches in climate change response policy and strategy. Among the former would be R&D for adaptation and climate proofing of production systems that are important for the poor. These may fall into two categories: (i) pro-poor adaptation for systems in which private sector participation is unlikely, for example, adaptation in maize cropping systems and conservation of traditional maize germ or improving resilience through diversified production systems and landscapes for the uplands; and (ii) pro-poor relevant adaptation for which private sector interests exist and therefore PPP approaches are preferable, with some cost-sharing to ensure that smallholders and poor benefit from the outcomes, for example, breeding of saline tolerant catfish. Examples of policy-oriented research of interest includes: **identifying likely adaptation pathways in high poverty areas and analyzing policy and operational needs for removal of barriers to adaptation by the rural poor** and; evaluation of current policies and programs and their effectiveness in assisting **those populations most vulnerable to climate risk (natural disasters) to adapt and reduce vulnerability**.

- Knowledge management – IFAD projects, through their community presence, experience and knowledge, should be capitalized upon for developing systematic and structured learning and knowledge dissemination processes for “pro-poor, climate smart” agriculture and rural development. The goal would be to inform both Provincial-led implementation efforts and to bring “learning-from-the-field” into national policy discussions. For the former, supporting Provincial governments through learning is extremely important given the decentralization of fiscal resources and management responsibilities to them and their needs to learn in near-real time in order to improve practices, methodologies, efficiencies and outcomes. For the latter, at the national level there is significant unmet stakeholder demand for consultation on policy implementation and “learning-from-the-field” in support of high-level policy dialogue (Smyle and Binh, 2009). The agenda for knowledge management would require consultation with key stakeholders, however an example of potentially relevant work would be: The RCC-ARD is very focused on “hard” approaches for planned adaptation²⁸ whereas “soft” approaches and autonomous adaptation are equally important, particularly for diverse smallholder systems. There is, however, only limited and largely ad hoc efforts to systematize learning on soft approaches (e.g., from CBDRM processes) and collect empirical and anecdotal evidence of ongoing smallholder adaptation processes in response to current conditions (natural disasters and climatic variability). ARD climate change adaptation policies need to look beyond structural works to farm and land use management practices and land use shifts. To do so, it would be important to begin by learning from ongoing efforts and experiences.
- A climate smart portfolio – will be the result of the systematic implementation, across the portfolio, of a coherent approach that takes steps such as the following: (i) assesses vulnerabilities (physical, social, livelihoods) to natural disasters and climate risks at agroecoregional, District, Commune and village-levels; (ii) identifies requirements to climate proof current livelihoods and opportunities for new/alternative sustainable livelihoods in the context of climate change; (iii) builds awareness among key stakeholders at all levels on climate risk and climate change; (iv) builds capacity of institutional actors at all levels to enhance adaptation capacity and the resilience of groups and communities; (v) promotes community-based natural resources management, integrating disaster vulnerability reduction through local land use planning and alternative investments in vulnerable and protection zones; (vi) supports “climate smart” development of land use planning/zoning at the Commune-level, watershed-based zoning and land use/water resources planning at the District-level and agroecoregional land use planning, policy, norms, regulations and incentives at the Provincial-level; (vii) development of knowledge networks among farmers and researchers to identify successful adaptive behaviors and extend them to other groups and communities; (viii) development of PPP in the context of climate smart value chains; (ix) and knowledge management, as detailed above; and (x) promotion and support for stakeholder engagement and coordination forums.

²⁸ Planned adaptation is through government actions and spending with the goal of enhancing the capacity of farmers to adapt. This might include construction of dikes and levees, expansion of irrigation, or spending on R&D and extension services to introduce new varieties and raise yields. This is in contrast to farmer-led or autonomous adaptation that is undertaken by farmers, such as changing sowing dates, switching to drought-tolerant crops, adoption of salinity-tolerant varieties of rice, adoption of new varieties for other crops, or switching to rice-fish rotations.

- Mainstreaming climate risk management – will require harmonizing the various policy, strategy and program instruments through a set of planning and operational tools that can be used for local (District, Commune, Village) CBDRM/climate smart investment planning and integration **into the SEDP process.**
- Prioritize climate change adaptation – mitigation financing mechanisms are only very slowly coming on-line and views are somewhat pessimistic as to what might be accomplished at COP 17 in Durban later this year. How much effort is merited – beyond nationally-financed mechanisms – in trying to capture mitigation financing is debatable when achieving pro-poor adaptation is clearly the highest priority. Climate change adaptation interventions should be prioritized in the COSP strategy and, in those cases where adaptation presents the opportunity – at a reasonably low transaction cost – to leverage additional benefits for the rural poor from mitigation²⁹, it would make sense to do so.

VI. Recommendations

104. The current Government strategies and planned responses to climate risk and climate change threats in the agricultural and rural development sector are, for the period 2011-2015, predominantly focused on: (i) for investments – hard, infrastructure investments to protect against flooding and saline intrusion in the coastal zones and deltas; and (ii) for policy and planning – further assessment of climate change and sea level rise impacts on ARD subsectors; integration into sector/subsector/local action plans, policies and planning of climate change concerns; and development of programs and projects for mitigation and adaptation and sector development. There is little explicit content or focus in either the proposed investments or the policy/planning interventions on vulnerable populations, on facilitation of autonomous adaptation by farmers and households and communities, on the need for hard adaptation measures by individuals to protect their assets or on soft interventions to support the building of local capacity for adaptation and to enhance the resilience of vulnerable communities to climate risk. It is in these areas where it is recommended that IFAD primarily focus its strategy for climate smart development. By doing so, the opportunity exists to widen and deepen government's approach to social vulnerability in climate change policy, planning and investment. IFAD's role would be to promote pro-poor climate risk and climate change threat response. It would pursue this role by, among others, supporting (i) holistic approaches that include a balanced concern for poverty reduction, rural development, "soft" capacity building, and facilitation of local, autonomous adaptation responses and; (ii) better coordination and cooperation between sectors and integrated planning for public investments at the local levels; and (iii) better informed decision-making processes within the policy and planning spheres through a systematic knowledge management approach that provides policy relevant information and "learning from the field".

Guiding Principles.

105. The basic principles guiding IFAD's approach to pro-poor, climate smart development should be the following:
- Sustainable development policies and programs will be good adaptation policies and programs
 - Target support to those populations and groups that are most sensitive and vulnerable to climate risk and climate change impacts: the rural poor who are highly dependent upon the natural resources base for their livelihoods. Target programmatic support to those geographic areas regions where these populations reside. For Viet Nam, this equates to targeting the rural poor, especially ethnic minorities, women and children and youth in the Mekong River Delta, Central Highlands, Northern Mountains and Central Coast.
 - In the short to medium-terms, the major opportunities for achieving effective and durable pro-poor responses to climate change lie in synergistically combining concerns for disaster risk management, climate risk and climate change threats, through local planning instruments and processes, into the SEDP process. And, in turn, supporting those policy and institutional reforms required to ensure that Government's rural development (NTP-NRD) and rural poverty reduction programs (e.g., the P-135) internalize climate risk and climate change threat concerns (e.g., climate proofing) and that local-level priorities

²⁹ See Annex V

identified through the SEDP actually translate into budgetary priorities for those same programs.

- The 2011-2015 is a learning period. Promote and support systematic and intentional approaches to learning, dissemination, and provision of focused, policy-relevant inputs for the ARD sector's policy dialogue.
- One-size-fits-all approaches will not work. Flexibility will be required to develop local priorities and plans and to learn and experiment.
- Pro-poor climate change adaptation is the primary objective. Mitigation is pursued as a secondary benefit only when and where opportunities occur to strengthen and compliment adaptation-related interventions. Mitigation opportunities are pursued only if they will provide significant (beneficiaries' perspective) and direct benefits to the target population and transaction costs are known and reasonable.
- A "no-regrets" investment approach will be taken and promoted. IFAD will support "no-regret" investments and, to ensure this, will carry out the required due diligence on any proposed support that has the potential to be maladaptive³⁰. IFAD will also extend assistance to local authorities to evaluate other, potentially maladaptive proposals, where such concerns exist. Of particular concern are investments that might meet the needs of the sector or a particular group but increase the vulnerability of the rural poor, ethnic minorities, women and children or youth.

General Priorities.

106. In terms of priorities, IFAD should:

- Continue with its current approaches and activities that directly contribute to increasing resilience and enhancing adaptation capacity by accelerating support for best practices in the areas of (i) poverty reduction/sustainable livelihoods; (ii) natural and water resources management; (iii) sustainable agriculture; (iv) securing long term access for households to land, forest and water resources; (v) improving access to credit; (vi) improving access to and effectiveness of services, especially agricultural extension and village-level animal health services; (vii) promoting access and linkages to markets and value chains; (viii) securing physical access to markets (e.g., all-weather and life-line roads); (ix) education and vocational training; (x) building capacity and strengthening local institutions for decentralized management of public ARD and poverty reduction programs; and especially (xi), integration into the SEDP of local planning processes.
- Add in a set of new activities, particularly (i) local land use planning with CBDRM hazard mapping for vulnerability reduction, disaster risk management and orientation of public investments; (ii) mainstream tools for climate proofing local investments into the SEDP planning processes; (iii) targeted investments specifically for climate proofing, reducing vulnerability, increasing resilience and capacity for adaptation and/or maintenance of environmental services important to water supply and natural resources-based livelihood, and production systems; (iv) support to adaptation-focused research that is relevant to rural poor; (v) support for developing the knowledge management capacities and approaches required to learn from experience and feed this knowledge back into policy and planning processes; (vi) support at the Provincial-level and in MARD for developing policy relevant information on pro-poor climate change adaptation and adaptation financing, integration through SEDP process, development of local PES schemes, and management/mitigation of climate change, including induced migration; and (vii) strengthen mechanisms for coordination of the RCC-ARD through programmatic frameworks, better stakeholder engagement strategy, knowledge-sharing/learning.

Strategic Objectives.

- There will be three key objectives to achieve in order for the COSOP to deliver climate smart outcomes. First, it will be critical to elevate to the level of the ARD sector's policy dialogue the issues of pro-poor climate change adaptation and mitigation. Secondly, the principal instruments of Government for addressing the needs of the rural poor and vulnerable populations are its programs

³⁰ Of specific concern are those types of interventions that would disproportionately burden vulnerable groups and populations; have high opportunity costs; reduce incentives to adapt; and/or set paths that, given current uncertainty over climate change impacts, prematurely or unnecessarily limit choices available in the future.

for agriculture and rural development, poverty reduction and disaster risk management. While the RCC-ARD is important as well, it is only a partial instrument whose role should be to ensure that these other programs internalize natural disaster and climate change risks and themselves support climate proofing of rural communities and livelihoods and make climate smart investments. Thus there is a fundamental need to align these several programs and ensure that their investments jointly contribute to climate smart rural development and poverty reduction in the communities they operate. Thirdly, it will be at the local level where the various government support programs will require articulation through the SEDP planning process. Therefore instruments and approaches to support local-level “climate smart” investment planning and implementation through the SEDP process are essential. Table 10 proposes a results framework for these three key objectives.

Table 10. Results framework for climate smart COSOP

Strategic Objective	Outcomes for Achievement of Strategic Objectives	Milestones showing progress towards strategic objectives
<p><u>National-level</u> Pro-poor Policies for Agriculture & Rural Development Sector's Response to Climate Change</p>	<ul style="list-style-type: none"> • Transparent targeting criteria on social vulnerability & sensitivity to climate risk. • RCC Action plans with pro-poor strategy • ARD DRM & poverty reduction programs with RCC strategy 	<ul style="list-style-type: none"> • Provincial KM activities (IFAD provinces) & national stakeholder coordination mechanism (MARD) informing ARD sector high-level policy dialogue • Provincial assessments (IFAD provinces) of ARD sector vulnerability to CC by social vulnerability & sensitivity to impacts criteria • Provincial Departments of Planning & Investment (IFAD Provinces) with guidelines for integration of RCC & CBDRM into SEDP planning
<p><u>Provincial-level</u> Institutional & implementation arrangements for NTP-NRD, ARD-RCC, Provincial Disaster Risk Management Action Plans & other relevant rural poverty reduction programs aligned</p>	<ul style="list-style-type: none"> • SEDP process functions to integrate poverty reduction, DRM & climate proofing concerns into ARD public sector investment programs • Pro-poor targeting criteria for RCC applied to ARD public sector investments • ARD public sector investments climate proofed 	<ul style="list-style-type: none"> • Capacity building program (IFAD provinces) for local government staff & communities on implementation of CBDRM/RCC-ARD & integration into SEDP developed & being implemented. • Incentive system for District/Commune integration of CBDRM/RCC/NTP-NRD into SEDP (IFAD supervision, Project indicators, Project-based incentives, e.g., additional funding for success) • Climate proofing tools for (IFAD provinces) District/Commune SEDP planning developed & tested • Principal adaptation pathways identified for agroecoregions, barriers to adaptation analyzed, & institutional response strategies defined (DARD in IFAD Provinces)
<p><u>Operational-level</u> SEDP planning & investment climate smart</p>	<ul style="list-style-type: none"> • Locally tailored strategies for RCC & CC adaptation developed & under implementation at District/ Commune-levels (IFAD Districts) • Community-based disaster/climate risk mitigation models tested (IFAD Provinces) • No. of rural poor households reporting losses from natural disasters/weather-related phenomena declining 	<ul style="list-style-type: none"> • No. of Districts & Communes (IFAD Districts) applying “climate smart” livelihoods planning tools • No. of Districts & Communes (IFAD Districts) with operational CBDRM/CC schemes (steering committees trained; community hazard & vulnerability maps developed/updated; annual community plans on DRM/CC adaptation developed; community monitoring implementation) • Proxy indicators for increased CC resilience (losses from natural disasters/weather-related phenomena) developed, integrated in M&E system, & baseline established (IFAD projects)

IFAD Support to Government.

107. In order to achieve the strategic objectives outlined above, there will be several areas for which IFAD support at the national and provincial levels will be needed. The types of support required may be grouped into four areas, but ultimately the purpose of the four areas of support are to ensure that climate change policies, strategies and programs appropriately consider the needs of the rural poor and that government institutions have the needed tools for their implementation. The support areas are discussed below.

Institutional support.

108. At both the national and provincial-levels assistance is required for enhancing coordination of efforts around climate change in the ARD sector. MARD's efforts, being carried out through ICD, should be strengthened. In particular, from the national perspective there are a large number of stakeholders – national and provincial government, donors, NGOs, mass organizations, academia and private sector – that must be both consulted and organized to effectively participate within the policy-making and strategy development processes and to provide feedback and recommendations on the effectiveness of government programs. This is a challenging effort for which IFAD could provide support directly to MARD and ICD in the form of enhancing its capacity and developing approaches for improving engagement and communications with stakeholders. It is by such means that coordination may be achieved by ensuring broader ownership and commitment by partners to the policies, strategies and programs of government. The specific types of support required were defined through a consultancy, supported by IFAD, to evaluate MARD's ISG program and propose its work program for 2011-2015. This would provide the institutional framework and space for discussion and coordination around climate change responses in the ARD sector as well as the platform for dialogue on inclusion of pro-poor climate change adaptation policies and investments.
109. Knowledge management has also been identified as a critical area for support. The approach to knowledge management should be to provide support at the Provincial-level through IFAD's current and future projects. A general framework for capturing, synthesizing, validating and disseminating knowledge and best practices should be designed in consultation with the participating provinces as it is they who will have to commit to its implementation. The implementation of the framework would be implemented on a province-by-province basis, financed by their IFAD-supported projects. Thematic areas of interest would include: tools for planning of "climate proof/climate smart" investments (including CBDRM tools such as community hazard mapping); mainstreaming of climate proofing tools into SEDP planning and implementation processes; pro-poor climate change response options, including climate resilient value-chains and sustainable livelihoods; on-going adaptation by communities and households, pathways for future adaptation, and obstacles to adaptation; emerging opportunities for complementing adaptation financing with mitigation financing; and progress and learning on scaling up from households lands and production systems to land and natural resources management at watershed and landscape scales. Linkages between the provinces (for exchange of information and learning) could be accomplished through the projects directly, but also through support at the level of MARD, as discussed above, to bridge between the Provincial field-level learning and the national policy dialogue. Dissemination of knowledge within the province (to officials, employees, staff, mass organizations, communes, communities, etc) would require development and/or support for awareness raising activities and linkages to the capacity building activities supported both by IFAD and other projects and programs. The objective of a dissemination strategy would be to avoid creating parallel pathways and feed specific, relevant information to target audiences through existing institutional capacity building pathways.
110. More direct support at the national-level for both generation and management of knowledge should be provided in the form of support for research. One important area for research would be policy-relevant research to be carried out by MARD on areas of social vulnerability to climate change and pro-poor adaptation/mitigation of climate change impacts. The other area of research would be in development, adaptation and validation of pro-poor climate change adaptive technologies and systems and on emerging opportunities and livelihood options created by changing climate. Support could be made in the form of funds available through the proposed MARD coordination mechanism, to carry out research in these areas as agreed and prioritized with its development partners. Additional funding for these types of research would

also be made available directly to the Provinces, but through their specific IFAD-financed projects. To the extent that research is financed on technologies or systems that would benefit private sector investors in addition to the rural poor, partnerships with private sector interests should be sought.

111. Support for the development of strategies for climate change response should be directed to the provinces and through design and implementation of IFAD-financed projects. In all cases, projects should support assessment of overall vulnerability of the ARD sector to climate change with an emphasis on social vulnerability, and the subsequent development and/or updating of climate risk/climate change action plans at provincial and district-levels. At local levels, projects would do essentially the same thing, but with the focus developing locally tailored strategies for facilitation of adaptation. Of particular importance, in each Province, would be to support within the assessments the identification of the principal, likely pathways for adaptation on an agroecoregional basis. Once identified, a review of needs, opportunities and likely obstacles to adaptation should be made in conjunction with an evaluation of current agriculture, forestry, livestock and aquaculture policies to identify any policy obstacles to adaptation. These results would then be linked, as appropriate, to national level discussions with MARD. Finally, to support the development of strategies and plans, it will be necessary to work closely with the institutions responsible (e.g., Departments of Planning and Investment, DARDs. etc) to develop and/or validate (e.g., IFAD/GIZ climate proofing tool for value chains in Tra Vinh) planning tools for climate proofing.
112. **A very critical area for continued institutional support, as well as associated policy dialogue as there are certain policy constraints involved (e.g., government cost ceilings) is through** further broadening the extension system to include farmer-to-farmer transfer of adaption technology as well as promotion of private enterprise service delivery.
113. With Viet Nam's membership in the WTO there is increasing need for producers to adopt new agricultural practices and meet new standards (e.g., GAP). For many producers, especially smallholders and the poor, it will be difficult for them to adopt these. If IFAD should support such production, it will take significant resources and efforts to introduce the new practices. Thus evaluating climate risk to these farmers and production systems should be done upfront, before investing in what might have a very limited future. Where it does make sense to invest in increasing farmer capacity to meet GAP standards and export, given the high investment (by the farmer), some forms of agricultural/climate risk insurance should be introduced at the same time as part of the production and financing package.

Operational Concerns.

114. From an operational perspective, the approach for the COSOP should be to avoid becoming too prescriptive as the types of threats, practices and opportunities will be dependent on the context and content of the future projects. There are, however, important steps that each project should take during design and implementation phases. During design phase, there should be an analysis of current climate risk, potential threats from climate change and social vulnerability to those risks within the project area. This analysis should systematically include the capturing of local knowledge on current trends and adaptation responses being taken by communities and households. Subsequently, there should be preliminary analysis of likely adaptation pathways and option for vulnerable populations as well as a participatory analysis of the likely obstacles to adaptation, such that appropriate design elements and risk management strategies may be incorporated into design. Much the same as an environmental management matrix can be utilized to profile a project's design approach to avoiding or mitigating environmental impacts, the same could be done for projects in terms of their management of climate risk, natural disasters and climate change threats.
115. For project implementation, a great deal of detail has already been provided in this report on the important aspects to incorporate, e.g., support to knowledge management, integration thru the SEDP process, application of climate proofing tools within local-level planning, etc. The policy, institutional and process-related interventions are arguably the most important at this time, given that these will take many years to get right and to see effectively applied in ensuring pro-poor climate smart public and private investments. The scenarios for climate change imply that albeit

tight, there is time to get this right. However, should ten years pass - which is a very short time in terms of re-orienting large bureaucracies and institutions - without very significant advances in getting policies, institutional frameworks and processes right, the consequences are likely to be quite negative. Table 11 (below) provides a summary of some of the other operational considerations that have been mentioned in this report.

116. Institutional partners. IFAD's principal institutional partners for implementation will be:

- Government, National: (i) MARD – for issues of policy, coordination and prioritization of investment project orientation. It is recommended that IFAD support MARD's coordination and policy dialogue functions through ICD and its ISG program. (ii) MPI – for issues of integration of climate change considerations into the SEDP, IFAD should offer support to MPI for them to achieve this commitment, which is a part of the NTR-RCC. (iii) MONRE – for purposes of coordination of IFAD's overall support and contribution to climate change response in the ARD sector. This can be done most effectively through the SP-RCC. (iv) MOLISA – for coordination of questions of integration of climate change concerns into the local SEDP planning process for making the national poverty programs “climate smart” in their investments and implementation.
- Government, Provincial: (i) the People's Committee's at all levels are charged with policy implementation and approvals of plans (SEDPs). They are a focus for awareness, capacity building, local policy discussion, recipients of outputs from knowledge management activities, and for raising “lessons from the field” to central level for policy dialogue; (ii) DPI – the Departments of Planning (from Provincial to District) are charged with implementing the SEDP process; and (iii) DARD – for analysis, planning, research and technology transfer for climate change adaptation in production systems and for implementation of CBDRM.
- Donor partners: as previously mentioned the current pipeline of activities in climate change adaptation and mitigation shows very little planned from 2013 onwards. At present some of the principal opportunities appear to lie with:
 - (i) JICA – which is carrying out a master planning exercise in the Mekong River Delta. An IFAD pro-poor adaptation to climate change program could capitalize upon that plan and put into place planning and livelihood elements for the rural sector and rural poor for master plan implementation;
 - (ii) World Bank is developing a \$150 million “Mekong River Delta Water Management for Rural Development” (2012-17) under which IFAD might find opportunities to partner, particularly around support to the most vulnerable populations. In addition, World Bank has expressed interest in exploring opportunities to collaborate with IFAD on translating seasonal and other weather forecasts (including ENSO patterns) into practical advice for farmers (planting decisions, irrigation, pest and disease measures) as well as early warning systems for financial institutions, input suppliers. This is a proposal under development, in which initial applications would likely be for coffee in the central highlands. Other crops, locations, and types of farmers could be targeted while approaches are proven and refined. Also, a Central Highlands project is in the pipeline for which Bank staff have expressed an interest and willingness to explore collaboration, though at this time no specifics were available. Finally, the World Bank is implementing a grant from the UK/DFID to provide technical assistance for enhancing capacity in MONRE, MOIT, MARD, MPI and MOF to formulate and implement climate change policies. This ends in 2014. Any support for MARD and policy research should be done in close collaboration with the Bank to avoid potential overlap.

Table 11. Operational considerations

Investment Area	Activity
Adaptation, facilitation	<ul style="list-style-type: none"> • Support shifts to livestock thru development of local fodder/feed sources (tied to local land use planning) & support for institutionalization of village animal health workers (para-vets) and establishment of biogas generation units for energy and bio-slurry • Support development & extension of diversified smallholder systems through identification of existing, financially viable systems; key farmers/households applying these systems; farmer-to-farmer promotion/extension of such systems; supply of limited inputs for adoption (germplasm, specialized tools, etc.) • Expand irrigation & increase irrigation efficiency & productivity; soil/moisture conservation, soil fertility management, crop residue management, etc. • Financial aspects: Access to credit, personal savings, diversified income sources & access to competitive markets to ensure fair prices • Education & training for livelihood diversification within & outside agriculture, esp. areas where other options for long-term adaptation lacking, migration likely, natural resources-based livelihoods in degraded or heavily drought stricken areas, etc. • Finance small-scale “hard” adaptation works for community disaster prevention/vulnerability reduction and for protection of household assets (land, crops, animals, etc)
Adaptation, landscape-scale	<ul style="list-style-type: none"> • Support for development, validation & implementation of planning tools & linkages of village level planning & BMPs with Commune-level planning & land use zoning with District-level planning, land use zoning & natural resources management policy objectives. • Support for water resources planning (water balances), where deficits and/or allocation conflicts foreseen
Adaptation, capacity building	<ul style="list-style-type: none"> • Institutional capacity building related to mainstreaming CC into ARD sector & existing rural development & poverty reduction programs (CC awareness, climate proofing planning tools, land use planning & hazard mapping, pro-poor climate smart SEDP, technical & program management capacity; Commune/village steering committees for CC/CBDRM) • Community capacity building for climate smart SEDP planning including CBDRM; community M&E of CC & CBDRM plans & investments; management & operation of small works • Human resources training: Education/training on DRM, CC adaptation • Training programs for scientific research & management if CC adaptation/mitigation in areas relevant for rural poor
Mitigation & adaptation	<ul style="list-style-type: none"> • Support for issuance of land & forest land use right certificates • Support protection/restoration of mangroves/coastal protection forests, • GHG reduction through management of irrigation in rice (see Research & Development) • Management of animal wastes (biogas, composting)

<p>Support for development & piloting of emerging instruments for adaptation & mitigation</p>	<ul style="list-style-type: none"> • Agricultural Insurance: Ha Tinh pilot for rice insurance; explore potential to pilot insurance for smallholders in well functioning value chains & commodity markets • PFES program: Support expansion of through issuance of forest land use right certificates & investments in agroforestry, silvopasture, NTFP, native species reforestation, fire prevention, watershed protection, etc group & community projects • Local PES: Develop & pilot local approaches to PES that link funding from government programs to implementation of community land use plans for protection/maintenance of environmental services from sensitive areas (water sources, hillslope forests, riparian areas, etc.)
<p>Institutional</p>	<ul style="list-style-type: none"> • Develop institutional & organizational arrangements for aligning implementation of the NTP-NRD, the RCC-ARD, the Provincial Disaster Risk Management Action Plans (especially for CBDRM) & other rural programs (P-135, etc.) • Strengthening & broadening of the coverage of the agricultural extension system: farmer-to-farmer, farmer adaptation networks, expansion of private extension • Integrate DRM & climate proofing concerns into the SEDP processes • Climate proofing tools for value chains planning & investment • Identify current & emerging priorities for climate risk adaptation & reduction of vulnerability to disasters on a commune-by-commune basis, identify locally-relevant obstacles to adaptation, develop strategic action plans to respond to thru local investment (SEDP), institutional reforms (Commune, District, Province), or policy reforms (Provincial, National). • Strengthen food security information systems, esp. for crop forecasting, weather early warning, pest surveillance and reporting, & domestic market monitoring • Support extending system (with World Bank) for agricultural forecasts of the ENSO cycles to inform farmers to adjust cropping calendars and varieties
<p>Research & development</p>	<ul style="list-style-type: none"> • Potential project component/sub-component for conservation of agrobiodiversity (traditional germplasm) for current & future adaptation. Could include: collection, cataloguing, testing, validation trials & re-introduction of varieties with high performance under farmer field conditions into extension menu, storage & out-planting schemes, training to famers on seed collection & storage techniques. • Analysis of the role of groups & communities in adaptation, of capacity building needs to adapt & for building resilience to external shocks from natural disasters & climate risks. • Development, testing, validation & dissemination of crop varieties with greater tolerance to drought, salinity, higher temperatures, maturing earlier in growing season, etc. • Thru partnerships (IFPRI) research on GHG emissions reduction through management of rice irrigation systems, (NORAD) saline tolerant catfish • Pro-poor adaptation technologies & systems (incl. support for training researchers in participatory research, institutionalizing researcher - farmer linkages)
<p>Monitoring & Evaluation</p>	<p>Follow up on CC integration into projects: IFAD supervision, Project indicators, Project-based incentives (e.g., additional funding for Districts & Communes that implementing, recognition /awards for those doing well)</p>



Enabling poor rural people
to overcome poverty

VIET NAM

Environmental and Climate Change Assessment

Prepared for IFAD's Country Strategic Opportunities
Programme 2012-2017

Annexes

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Programme Management Department

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Abbreviations and acronyms

ADB	Asian Development Bank
AFD	French Development Agency
AusAID	Australian Agency for International Development
BOD	Biological Oxygen Demand
CCFSC	Central Committee For Flood And Storm Control
CBDRM	Community-based Disaster Risk Management
CIDA	Canadian Development Agency
COSOP	Country Strategic and Opportunities Program
DFID	United Kingdom's Department for International Development
DRM	Disaster Risk Management
DONRE	Division of Natural Resources and Environment
EC	European Commission
GAP	Good Agricultural Practises
GHG	Greenhouse Gas
GSO	General Statistics Office
ICD	International Cooperation Department/MARD
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
JICA	Japan International Cooperation Agency
MARD	Ministry of Agriculture and Rural Development
MIT	Ministry of Industry and Trade
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOLISA	Ministry of Labor, Invalids and Social Affairs
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry Of Science And Technology
MOT	Ministry of Transportation
MPI	Ministry of Planning and Investment
NGO	Non-governmental Organization
NSNDPRM	National Strategy for Natural Disaster Prevention, Response and Mitigation
NTP-RCC	National Target Program to Respond to Climate Change
PES	Payment for Environmental Services
PEt	Potential Evapotranspiration
PPP	Public-Private Partnerships
RCC	Response to Climate Change
RCC-ARD	Action Plan To Respond To Climate Change In The Agriculture And Rural Development Sector During The Period 2011-2015 With A Vision To 2050
SEDP	Socio-Economic Development Plan
UN	United Nations
USAID	United States Agency for International Development
VASS	Vietnam Academy Of Social Sciences

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Annex II. Climate Change: Perceptions, Vulnerabilities, Potential Impacts

Table 1. Climate Risk: Community and farmer perceptions and coping strategies

	Northeastern Vietnam	North Central	South (Mekong River Delta)
Perceived Changes in Climate	<ul style="list-style-type: none"> • Rainy season shorter w/ later onset, dry season longer • Total rainfall less (less before February) • Temperatures increasing (warmer climate crop varieties feasible) • Diurnal temperature fluctuation greater (cooler nights) • Severe & extreme weather events increasing (2008 cold spell, major flooding 2008 & 2009) 	<ul style="list-style-type: none"> • Longer & more severe heavier drought – Higher temperature (hotter) • Unpredictable climate (off-season rain, sudden flash floods, cyclones.) 	<ul style="list-style-type: none"> • Higher temperatures • More storms • Heavier rainfall over a shorter period of time • More droughts, particularly in the zone affected by saline water • Shorter rainy season and a longer dry season • Saline water intrusion in the dry season still appears to be a change of minor importance (but is starting to become more important)
Perceived Climate Impacts	<ul style="list-style-type: none"> • High “limestone” mountains: Water stress (health, fire – loss of houses, crops); Cold spells (human health, buffalo mortality). • High “earth” mountains: flash floods & landslides; drought (crops) • Lowlands: flash floods & inundation (loss of house, crops, animals); tornados (damage to houses) • Droughts limit access to drinking & irrigation water. • Flash floods cause damage to homes, sediments damage ag fields. • Common denominator: vulnerability, primarily related to health risks, e.g., cold spells strongly impact elderly & children (respiratory disease, colds, flu among poor villagers), children miss school, have to sit around fire at home to keep warm • Poverty: damage/loss caused by hazards & drought – non-poor now poor as cannot recover from losses caused by flash floods in 2008 and crop losses (drought) in 2009; “non-poor” slipping into “poor” 	<ul style="list-style-type: none"> • 91% farmers surveyed (n=90) said impacts were “serious” or “very serious” • Loss of arable land areas to drought • Cropping calendar and patterns changing • Water sources are less • Crops’ productivity decreasing • Aquaculture production decreasing 	<ul style="list-style-type: none"> • Rice yields reduced (for some, drought & other storms most serious; other, less important factors also) • Pumping costs increased for irrigation (~ VND 1.8 million/ha autumn-winter) • Lower prices for rice when sow late due to drought (market timing) • Livestock, cattle: serious health problems from scarce water & high temps; drought affects breeding; drought & temperature strongly effect growth (lack of grazing, freshwater) • Livestock, pigs: hot weather causes to eat weakly, grow slowly and be sick; diseases increase when unfavorable weather. • Vegetables: crop losses to high rainfall intensities/flooding, heat & shorter rainy season; production cost increased for replanting, pest control or growth stimulants; more affected in saline water affected zones. • Shrimp: Heavy rain eroding ponds & acidic runoff (acid sulfate soils), storms damage dykes & sluice gate systems, high water temperature causing disease.
Adaptation/Coping Strategies	<ul style="list-style-type: none"> • Heat: grass thatching w/ Imperata; no longer, grassland converted to A. Mangium. • Sedimentation of irrigation: sediment traps; no longer effective, fill too fast. • Cold spells: build livestock shelters, bring in house, special feed (local herbs). • Floods, tornados: build simple houses in protected areas, little furniture. • Water stress: change crops – maize to grass (Guatemala), raise more buffalo; drought tolerant, short-season varieties; alternative short-season crops if main fails • General response: sell labor, youth migrate • Cold spells leading to experiments with feeding different crops to animals; proactively storing seeds & experimenting with new crops (vegetables, peanuts) 	<ul style="list-style-type: none"> • Changing cropping patterns (2 rice to 1 rice/1 cash crop) • Changing to more drought tolerant varieties • Minimizing/optimizing water use (irrigation system improvement; developing new water supply systems for cash crops; building water reservoirs) • Finding new activities (introducing new crops, looking at off-farm opportunities..) • Development of livestock production (cattle, chicken, rabbit) 	<ul style="list-style-type: none"> • Rice: install water pumping system, apply more P & spray more pesticides; propose: i) dredging ditches/canals; ii) constructing water storage ponds; iii) change cropping calendar; iv) establish rice production & rice trading coop to avoid selling at low prices when drought & late sowing. • Cattle: i) lock cattle in shed, ii) give extra water, iii) feed straw & dry grass; propose: grow pasture on vacant/open areas & public lands. • Vegetables: reduce cultivation area, mulch (nylon membranes), supplemental irrigation (groundwater); propose: improving irrigation system, forecasting, greenhouses, new varieties & cultivation techniques. • Shrimp: liming of water, bactericides, etc; propose: mangrove shrimp farming, land use planning, better infrastructure, upgrading delivery systems like shrimp seed, etc. • ~ 75% of farmers surveyed have changed cropping patterns & calendars in recent years. Shrimp–rice model is proving effective.

Sources: IFAD, 2011; Le Duc Ngoan. 2011; Le Ngoc Thach et al, 2010; MARD, 2010; McElwee, P. 2010

Table 2. Assessment of disaster severity in different geographic areas and in the coastal economic zone of Vietnam

Disaster	Geographic Areas and Economic Zones							
	North east and north west	Red River Delta	North central coast	South central coast	Central highlands	North east south	Mekong River Delta	Coastal Economic Zone
Storm	+++	++++	++++	++++	++	+++	+++	++++
Flood	-	++++	++++	+++	+++	+++	++++	++++
Flash flood	+++	-	+++	+++	+++	+++	+	+++
Whirlwind	++	++	++	++	+	++	++	++
Drought	+++	+	++	+++	++	+++	+	+++
Desertification	-	-	+	++	++	++	+	++
Saline intrusion	-	+	++	++	+	++	+++	++
Inundation	-	+++	++	++	-	++	+++	+++
Landslide	++	++	++	++	+	++	+++	++
Storm surge	-	++	++	++	++	++	+++	++
Fire	++	+	++	+++	-	+++	+++	+++

The Table shows the assessment of disaster severity in each zone: Very severe (++++); Severe (+++); Medium (++); Light (+) & None (-).

Source: ADB, 2008.

Table 3a. Potential Climate Change Impacts by Climatic Regions and Subsector (Crops, Livestock, Fisheries)

Region	Crops	Livestock	Fisheries/ Aquaculture
North West, Mountains	<ul style="list-style-type: none"> Area for (subtropical) winter crops reduced; tropical crops adapted to higher altitude; Cropping patterns & calendars adjusted to higher temp. conditions. 	<ul style="list-style-type: none"> Reduced dry season water & feed/fodder availability Increased risk of disease Increase in production costs; productivity loss 	
North East, Mountains	<ul style="list-style-type: none"> Increase in crop pests & disease Increase in production costs; productivity & crop quality loss Increased moisture stress & demand for irrigation. Increase soil loss 		
Red River Delta & Quang Ninh (Coastal Province NE Region)	<ul style="list-style-type: none"> Shift from (subtropical) winter crops In long-term, cropping patterns & calendars adjusted to higher temp. conditions. Increase in production costs; productivity & crop quality loss Salinization of soils/irrigation water. Conversion of ag. land (displacement from SLR) 		<ul style="list-style-type: none"> Decline in productivity & abundance of marine resources (mangrove loss)
North Central Coast	<ul style="list-style-type: none"> In medium-term, cropping patterns & calendars adjusted to higher temp. conditions. 	<ul style="list-style-type: none"> Reduced dry season water & feed/fodder availability Increased risk of disease Increase in production costs; productivity loss 	<ul style="list-style-type: none"> Decline in productivity & abundance of marine resources (mangrove loss)
South Central Coast	<ul style="list-style-type: none"> Increase in production costs from increased volumes & duration of irrigation. Increase in crop pests & disease Increased moisture stress & demand for irrigation 		
Central Highlands	<ul style="list-style-type: none"> Adjust cropping patterns & calendars to higher temp. & increased variability of rainfall Increase in production costs, esp. high value crops (coffee, rubber) Opportunity to increase tropical crops, esp. industrial crops. Increase in crop pests & disease 	<ul style="list-style-type: none"> Increased risk of disease 	
South (Southeast & Mekong River Delta)	<ul style="list-style-type: none"> Increased moisture stress & demand for irrigation esp. in rice Increase in production costs from increased volumes & duration of irrigation SLR: salinization of soils/irrigation water & salt water inundation; long term loss of 20%-50% rice lands Conversion of ag land (displacement from SLR), long term Increased salt water intrusion & potential large area industrial contamination from storm surges. 		<ul style="list-style-type: none"> Decline in productivity & abundance of marine resources (mangrove loss) Loss of freshwater habitat (salinization, salt water intrusion)

Source: ISPONRE, 2009

Table 3b. Potential Climate Change Impacts by Climatic Regions and Subsector(Forestry, Water, Infrastructure)

Region	Forestry	Water	Infrastructure
North West	<ul style="list-style-type: none"> Tropical vegetation moves to higher altitude; area for subtropical reduced 	<ul style="list-style-type: none"> Flash floods in rainy season Dry season low flows decline 	<ul style="list-style-type: none"> Natural disaster risk management (infra. planning, design, construction, maintenance)
North East	<ul style="list-style-type: none"> Temperature increase/humidity decrease increase forest fire risk 	<ul style="list-style-type: none"> Drought frequency will increase w/increased irrigation demand & water allocation conflicts 	
Red River Delta & Quang Ninh (Coastal Province NE Region)	<ul style="list-style-type: none"> SLR reduces area of mangrove forests 	<ul style="list-style-type: none"> Potential for increased flooding in long term Dry season low flows decline Reduction in water supply & increased demand for ag., domestic, & industrial use; allocation conflicts Reduced water quality; sanitation Water allocation Salinization of freshwater resources in Delta. Large-scale inundation (SLR) 	<ul style="list-style-type: none"> Natural disaster risk management (infra. planning, design, construction, maintenance) SLR requires improvements in transportation (roads, bridges, ports); incremental costs construction works, relocation industry/power plants etc. in affected zones
North Central Coast South Central Coast	<ul style="list-style-type: none"> SLR reduces area of mangrove forests, increase coastal erosion 	<ul style="list-style-type: none"> Decrease in annual streamflow w/significant decrease in dry season low flows. Same or slight increase in flood events Decrease available surface water resources, esp. in dry season & in southern extreme of S. Cent. Prov. Drought frequency will increase Increased irrigation demand Water allocation conflicts 	<ul style="list-style-type: none"> Natural disaster risk management (infra. planning, design, construction, maintenance) Increase coastal erosion (mangrove loss) SLR requires improvements in transportation (roads, bridges, ports); incremental costs construction works, relocation industry/power plants etc. in affected zones
Central Highlands	<ul style="list-style-type: none"> Significant loss of subtropical forest & species (pine, cypress, other) Opportunity to increase tropical crops, esp. industrial crops. 	<ul style="list-style-type: none"> Decrease in annual streamflow, primarily from reduced dry season flows. Flash flood risk same, threat in mid-/downstream reaches of river in rainy season. Reduction in water supply & increased demand for ag., domestic, & industrial use, esp. in dry season; allocation conflicts 	<ul style="list-style-type: none"> Natural disaster risk management (infra. planning, design, construction, maintenance)
South (Southeast & Mekong River Delta)	<ul style="list-style-type: none"> Temperature increase/humidity decrease increase forest fire risk SLR: reduced area of mangrove forests, loss of endangered freshwater coastal wetland forests (Melaleuca), salinization of soils 	<ul style="list-style-type: none"> Decrease in Mekong annual streamflow, primarily from reduced dry season flows. Increased rainy season flows and peaks; decreased dry season flows Strong dry season flow decrease possible in years when prior rainy season ends early & next rainy season arrives late. Increased occurrence & severity of drought, incl. possible occurrence during rainy season. Increased moisture stress & irrigation demand Decreased water quality (salinization, industrial contamination from storm surges); sanitation Reduction in freshwater supply & increased demand for ag., domestic, & industrial use; allocation conflicts Large-scale inundation (SLR) 	<ul style="list-style-type: none"> Natural disaster risk management (infra. planning, design, construction, maintenance) SLR: salinity intrusion & salt water inundation

Source: ISPONRE, 2009

Table 3c: Vulnerability to climate change

Climate Change Impact	Vulnerable Areas	Vulnerable Sectors	Vulnerable Communities
Temperature increase	<ul style="list-style-type: none"> Mountainous Areas: Northern East, Western East and North Central Part Northern Part Delta 	<ul style="list-style-type: none"> Agriculture and food security Aquaculture Natural ecology systems and biodiversity Water resources Energy (production and consumption) Community health care 	<ul style="list-style-type: none"> Poor farmers Ethnic minority people, senior citizens, children and women
Sea level rise	<ul style="list-style-type: none"> Coastal Areas, especially deltas and flooded areas (Mekong River Delta, Red River Delta and coastal Central Part) Islands 	<ul style="list-style-type: none"> Agriculture and food security Aquaculture Sea and coastal ecological systems Water resources (surface and ground water) Energy Tourism Residential Space Infrastructure, industrial zones 	<ul style="list-style-type: none"> Coastal communities, especially poor farmers and fishermen Senior citizens, children and women
Floods, flash floods, and land-slide	<ul style="list-style-type: none"> Coastal Areas (including delta areas and flooded areas: Delta and coastal Northern Part, Mekong River Delta and coastal Central Part) Mountainous areas: Northern West, Northern East, North Central Part and Highlands 	<ul style="list-style-type: none"> Agriculture and food security Aquaculture Transportation Water resources Infrastructure Residential Space Health care and life Trade and Tourism 	<ul style="list-style-type: none"> Coastal communities Mountainous communities, especially ethnic minority groups Senior citizens, children and women
Storms and tropical low pressure	<ul style="list-style-type: none"> Coastal Areas: , especially coastal Central Part, Red River delta and Mekong river Islands 	<ul style="list-style-type: none"> Agriculture and food security Aquaculture Transportation Energy Offshore and coastal activities Infrastructure Place of Residence Health care and life Trade and Tourism 	<ul style="list-style-type: none"> Coastal communities, especially fishermen Senior citizens, children and women
Droughts	<ul style="list-style-type: none"> Central Part, especially South Central Part Delta and Northern Part Midland Mekong Delta Highlands 	<ul style="list-style-type: none"> Agriculture and food security Water resources Energy (hydro power) Waterways Health care and life 	<ul style="list-style-type: none"> Poor farmers Mountainous communities, especially ethnic minority groups Ethnic minority people, senior citizens, children and women Coastal communities, especially poor farmers and fishermen <p><i>Note: this cell was left blank in the original document & was filled in here by author.</i></p>

Source: MONRE, 2008

Annex III. Project Concept Note 3: Adaption to Climate Change in the Mekong River Delta Region

BACKGROUND

1. Viet Nam is a country that will be disproportionately impacted by climate change over the coming decades. In more recent years, Viet Nam has seen an almost literal explosion in the number of strategic and operational initiatives coming on line to confront climate risk and climate change. Since 2008, when the National Target Program for Response to Climate Change (NTP-RCC) and the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development Sector were approved, there has been tripling of investment in climate change response relative to that of the previous fifteen years. From 2008 until present, at least US\$0.9 billion have been committed for adaptation, mitigation, capacity building, research, and awareness raising investments. MONRE, who is charged with the implementation of the NTP-RCC, is reportedly in the process of developing the overarching strategy for its implementation. In the meantime, the principal challenges would seem more to lie with the various line ministries who themselves are charged, under the NTP-RCC, to develop their own sector's strategy and action plan for climate change response.
2. For the agricultural and rural development sector, MARD developed its national-level framework some three years ago and earlier this year approved the strategy/action plan for its implementation: the *Action Program In Response to Climate Change of the Agriculture and Rural Development Sector During 2011-2015 and Vision to 2050*. While the longer term vision to 2050 provides for a reasonably comprehensive approach, the priority investments in the five year plan are heavily oriented towards "hard"¹ investments in dikes, levees, and hydraulic structures. The inclusion of such key issues as integration into the SEDP process, poverty reduction, household-level food security among vulnerable populations, support for and facilitation of farmer-led adaptation processes, sustainable natural resources management, or other needs for "soft" adaptation measures of the type required to increase local institutional capacity and social capital for building resilience, is not clear. Moreover, the Action Program does not set out to address the mainstreaming of climate change responses into the ARD sector's other programs, especially the poverty reduction and rural development programs that fall under the NTP-NRD umbrella. It is clearly through those programs where MARD and the Provinces have the greater opportunity to work through issues of ensuring that rural development investments are climate smart and support both the building of adaptation capacity as well as the adaptation processes themselves.
3. There will be three key objectives to achieve in order for the COSOP to deliver climate smart outcomes. First, it will be critical to elevate to the level of the ARD sector's policy dialogue the issues of pro-poor climate change adaptation and mitigation. Secondly, the principal instruments of Government for addressing the needs of the rural poor and vulnerable populations are its programs for agriculture and rural development, poverty reduction and disaster risk management. While the Action Program is important as well, it is only a partial instrument whose role should be to ensure that these other programs internalize natural disaster and climate change risks and themselves support climate proofing of rural communities and livelihoods and make climate smart investments. Thus there is a fundamental need to align these several programs and ensure that their investments jointly contribute to climate smart rural development and poverty reduction in the communities they operate. Thirdly, it will be at the local level where the various government support programs will require articulation through the SEDP planning process. Therefore instruments and approaches to support local-level "climate smart" investment planning and implementation through the SEDP process are essential.

¹ In most definitions, "hard" adaptation measures usually imply the use of specific technologies and actions involving capital goods, such as dikes, seawalls, and reinforced buildings, whereas "soft" adaptation measures focus on information, capacity building, policy and strategy development, and institutional arrangements (World Bank 2010c).

GEOGRAPHIC AREA AND TARGET GROUP

4. Firstly, sensitivity to climate risk and climate change impacts is a direct function of social vulnerability. Therefore, in Viet Nam, it is the rural poor who are the most sensitive and, among the rural poor, it is the ethnic minorities, women and children who are the most vulnerable. Secondly, poverty reduction is one of, if not the best, way to enhance household and community-level capacity for adaptation. Therefore, the targeting strategy of the project would be to target poor rural households, particularly ethnic minorities, women and children.
5. IFAD will give extra weight and consideration to the regions, where the rural poor are particularly sensitive and exposed to climate risk and climate change threats and thus merit additional consideration. In order of priority, the Mekong River Delta Region stands out. On a poverty head count basis (i.e., not on poverty rate), the Delta has a very large population of rural poor and it is the region in the country that is likely to suffer the greatest impacts from climate change. It will not just be the biophysical impacts, but also the likelihood of a very large number of rural poor suffering from economic displacement as their current livelihood activities are either lost to rising sea level and/or salinization and/or increasingly scarce fresh water resources.
6. The project would cover 2-3 provinces in the Mekong, selected based on the following criteria: (i) prevailing poverty rates and poor household numbers in the underlying provinces (strongly weighted by ethnic minorities poverty); (ii) commitment, readiness and absorptive capacity of the province for implementing and mainstreaming innovations particularly related to market orientation and climate change; (iii) past project performance, should there have been a previous IFAD or equivalent bilaterally funded project and potential impact of further IFAD investment; and (iv) Government endorsement of the need for resources for the province, taking into consideration provincial budgets including NTP-RCC, NTP-NRD counterpart financing, private sector contributions and other development partner resources.
7. The project would need to take into account the specific situation and needs of ethnic minority women, men and youth. For ethnic minority youth, in particular, this means providing them with opportunities through which to learn necessary life-skills and vocational skills to ensure their future well-being and to develop their interests. For ethnic minority women, it means enhancing their learning opportunities to regain and assume new leadership and entrepreneurial roles in their communities. For ethnic minority men, it means increasing the opportunities for productive and stable on-farm and off-farm employment. While it will be beyond the scope of this project to cover all these aspects, a gender sensitive approach which clearly differentiates and responds to these needs is warranted.
8. Interventions to maintain the momentum of poverty reduction are to centre around (i) transparent targeting criteria giving priority to ethnic minorities and women; (ii) institutional capacity development, linked to more gender sensitive, climate smart, and market oriented socio-economic development planning at commune level; (iii) increased investment in rural infrastructure and health services, including vocational training, particularly for women; (iv) empowered rural men and women, particularly ethnic minorities, managing community allocated funds; (v) conditional support, including cash transfers and scholarship programmes, especially for ethnic girls; and (vi) increased awareness building for women on improving nutrition for children, particularly in ethnic minority groups.

JUSTIFICATION AND RATIONALE

9. The current Government strategies and planned responses to climate risk and climate change threats in the agricultural and rural development sector are, for the period 2011-2015, predominantly focused on: (i) for investments – hard, infrastructure investments to protect against flooding and saline intrusion in the coastal zones and deltas; and (ii) for policy and planning – further assessment of climate change and sea level rise impacts on ARD subsectors; integration

into sector/subsector/local action plans, policies and planning of climate change concerns; and development of programs and projects for mitigation and adaptation and sector development. There is little explicit content or focus in either the proposed investments or the policy/planning interventions on vulnerable populations, on facilitation of autonomous adaptation by farmers and households and communities, on the need for hard adaptation measures by individuals to protect their assets or on soft interventions to support the building of local capacity for adaptation and to enhance the resilience of vulnerable communities to climate risk.

10. IFAD will primarily focus its strategy for climate smart development. By doing so, the opportunity exists to widen and deepen government's approach to social vulnerability in climate change policy, planning and investment. IFAD's role would be to promote pro-poor climate risk and climate change threat response. It would pursue this role by, among others, supporting (i) holistic approaches that include a balanced concern for poverty reduction, rural development, "soft" capacity building, and facilitation of local, autonomous adaptation responses and; (ii) better coordination and cooperation between sectors and integrated planning for public investments at the local levels; and (iii) better informed decision-making processes within the policy and planning spheres through a systematic knowledge management approach that provides policy relevant information and "learning from the field". It will be important for IFAD to engage in this dialogue to promote that climate change adaptation and mitigation resources are directed in a "climate smart" fashion towards groups where either (i) persistent, structural poverty makes natural resources-based livelihoods non-viable and provision of alternatives are required (the permanently vulnerable) or (ii) "temporary" poverty becomes persistent poverty due to recurrent losses from drought, flash flooding, and other natural disaster/climate risk-related phenomena. While the Provinces will need policy support and guidance from the national-level to allow this to happen, the national role will most usefully be of accompanying the Provinces in order to better understand the challenges, to learn from Provincial experiences, and to adapt national policies and programs to meet the operational needs on the ground.
11. Over the next two to three decades, significant upheaval in local livelihoods will be experienced as a result of sea level rise and ground subsidence with consequent saline water intrusion, increased ambient temperature and hydrological change. Two of the important primary food production sectors in the lower reaches of the Mekong River Delta that are destined to be affected are rice and catfish (*Pangasianodon hypophthalmus*) farming. In 2006, rice farming in the Mekong River Delta accounted for 50 percent of the country's rice production and in excess of 80 percent of the rice exports, while the catfish farming sector accounts for an annual revenue of US\$1.4 billion of export value (De Silva and Soto 2009). With rising sea level, areas impacted by flooding will expand. The Mekong River Delta, which would be most impacted, could see as much as 90% of its total area subjected to flooding. It is anticipated that by 2050 a 30 cm sea level rise will lead to an increase of flood inundation area deeper than 0.5 m of 276 000 ha in the rainy season. In the dry season areas affected by salinity intrusion (>4 g/l) will increase by 420 000 ha. The combined loss of rice production due to inundation and saline intrusion will amount to about 13 percent of the 2007 total rice harvest in the Mekong Delta (IFPRI 2010 a).
12. Interviewed households in the Mekong reported that they coped with hotter days by buying fans, and with colder days by wearing more clothes. They undertook disaster risk reduction measures like preparing houses before storms. The biggest short-term needs after climate events were cash, fuel, a clean water supply, and rebuilding their house. In terms of medium-term measures, most households (more than 75 percent) said they have done nothing. Most respondents have not changed their production system in the last five years, and only a few residents have grown more trees or dug water pools to improve their farming systems. Long-term, residents had no ideas on how to adapt, they said they need more knowledge.
13. IFAD supported investments would focus on enhancing the resilience of poor farmers in light of changing climatic conditions and more frequent natural disasters, targeting "no regret" approaches that enhance livelihoods, sustainable agriculture and poverty reduction. IFAD would address the gap when it comes to implementation of adaptation and mitigation in agriculture at the household level, supporting ongoing farmers' adaptation through appropriate extension and research, developing provincial action plans for addressing climate change risks, ensuring the

incorporation of climate change factors into the SEDP, and feeding back these plans and lessons to the national level for incorporation into investment plans, national targeted programmes and other policies

14. There needs to be a series of profound institutional reforms while developing new strategies, approaches, farming packages to achieve a broad range of newly articulated sector goals within a rapidly shifting context for agriculture and rural development and the increasing impact of climate change. Particularly relevant of the COSOP strategic objectives (SOs) is SO3: Enhance the capacity of poor rural households' to adapt to climate change.

GOAL AND PURPOSE

15. The proposed **goal** of the Project would be to improve the incomes and reduce vulnerability of poor and near poor households in the Mekong Region. The **purpose** of the programme is to demonstrate a rural development model of environmentally sustainable, socially equitable and profitable growth inclusive of rural poor households.
16. The project through its community presence, experience and knowledge, would be capitalized upon for developing systematic and structured learning and knowledge dissemination processes for "pro-poor, climate smart" agriculture and rural development. The goal would be to inform both Provincial-led implementation efforts and to bring "learning-from-the-field" into national policy discussions. For the former, supporting Provincial governments through learning is extremely important given the decentralization of fiscal resources and management responsibilities to them and their needs to learn in near-real time in order to improve practices, methodologies, efficiencies and outcomes. For the latter, at the national level there is significant unmet stakeholder demand for consultation on policy implementation and "learning-from-the-field" in support of high-level policy dialogue (Smyle and Binh, 2009).

PROPOSED COMPONENTS AND ACTIVITIES

17. From an operational perspective, the approach for the COSOP should be to avoid becoming too prescriptive as the types of threats, practices and opportunities will be dependent on the context and content of the future projects. There are, however, important steps that each project should take during design and implementation phases.
18. Assistance will be needed for adaptation and change of agricultural and aquaculture systems, for shifting to entirely new activities in response to the opportunities created by the new biophysical conditions (e.g., mariculture), as well as becoming prepared to migrate under more favourable conditions (e.g., with an education) as conditions require. Mainstreaming climate risk management will require harmonizing the various policy, strategy and program instruments through a set of planning and operational tools that can be used for local (District, Commune, Village) CBDRM/climate smart investment planning and integration into the SEDP process.
19. The proposed project would take a coherent approach that takes steps such as the following:
 - assesses vulnerabilities (physical, social, livelihoods) to natural disasters and climate risks at agroecoregional, District, Commune and village-levels;
 - identifies requirements to climate proof current livelihoods and opportunities for new/alternative sustainable livelihoods in the context of climate change;
 - builds awareness among key stakeholders at all levels on climate risk and climate change to enhance adaptation capacity and the resilience of groups and communities;
 - promotes community-based natural resources management, integrating disaster vulnerability reduction through local land use planning and alternative investments in vulnerable and protection zones;
 - supports "climate smart" development of land use planning/zoning at the Commune-level, watershed-based zoning and land use/water resources planning at the District-level and

- agroecoregional land use planning, policy, norms, regulations and incentives at the Provincial-level;
- development of knowledge networks among farmers and researchers to identify successful adaptive behaviours and extend them to other groups and communities;
 - development of PPP in the context of climate smart value chains;
 - and knowledge management, as detailed above; and promotion and support for stakeholder engagement and coordination forums.
20. **Component 1: Sustainable livelihoods improvement:** This component would entail sustainable agriculture; improving access to and effectiveness of services, especially agricultural extension and village-level animal health services; support to adaptation-focused research that is relevant to rural poor; promoting access and linkages to markets and value chains; education and vocational training; and securing long term access for households to land, forest and water resources; improving access to credit.
21. Activities would be based on locally tailored strategies for facilitation of adaptation by: (i) identifying the principal adaptation pathways for the ARD sector over the medium-term, on a District-by-District basis (stratified by appropriate agro-ecosystems, socio-economic, cultural and gender factors); (ii) analyzing the current and likely future barriers to adaptation, and (iii) based on these and with the participation of local stakeholders, develop appropriate targeting and support mechanisms to facilitate long-term adaptation. The coverage of the agricultural extension system through would be broadened through systematic development of farmer networks (to share knowledge on successful adaptation); farmer-to-farmer extension approaches (to facilitate technology transfer); continued development of community-based technical services (e.g., para-veterinarians for vaccinations and control of plagues); promotion and utilization of private service delivery and; strengthening functional linkages between researchers and farmer networks to ensure the relevance of the research agendas.
22. **Component 2: Climate smart community development:** This component would entail local land use planning with CBDRM hazard mapping for vulnerability reduction, disaster risk management and orientation of public investments; targeted investments specifically for climate proofing, reducing vulnerability, increasing resilience and capacity for adaptation and/or maintenance of environmental services important to water supply and natural resources-based livelihood; securing physical access to markets (e.g., all-weather and life-line roads).
23. Implementing the public awareness and capacity building programs called for in both the Strategy for Natural Disaster Prevention, Response and Mitigation (especially as relates to CBDRM) and in the climate change response plans in order to inject DRM and climate proofing concerns into local development planning (District, Commune, Village) is key. Based on local planning, the current and emerging priorities for climate risk adaptation and reduction of vulnerability to disasters is to be identified, on a commune-by-commune basis, in order to identify and adapt best practice responses for further research, piloting or dissemination as appropriate;
24. **Component 3: Mainstreaming climate change:** This component would mainstream tools for climate proofing local investments into the SEDP planning processes; support for developing the knowledge management capacities and approaches required to learn from experience and feed this knowledge back into policy and planning processes; support at the Provincial-level and in MARD for developing policy relevant information on pro-poor climate change adaptation and adaptation financing, strengthen mechanisms for coordination of the MARD's Action Program through programmatic frameworks, better stakeholder engagement strategy, knowledge-sharing/learning.
25. During design, current agriculture, forestry, livestock and aquaculture policies and priorities would need to be reviewed to ascertain the extent to which they facilitate adaptation and long term resilience as well as the maintenance of option values at the landscape-scale versus increasing risk and future uncertainty. The purpose of such analysis would be to initiate, from the Provinces, a national-level dialogue on agricultural policies and priorities and related issues of how to build the needed flexibility into sectoral policies and NTPs in order to support local

adaptation over the long term. Harmonizing the various policy, strategy and program instruments into a set of tools that can be used for local (District, Commune, Village) CBDRM/climate smart investment planning is crucial. Under this component, appropriate targeting criteria would be developed.

26. At the provincial and national level, knowledge management capacity would be built around the themes of climate smart SEDP planning processes; CBDRM, management of climate risk and farmer adaptation; and successful, pro-poor climate change adaptation (i.e., balancing climate change adaptation with development and poverty reduction imperatives).

ISSUES ON WHICH THE TEAM SEEKS GUIDANCE

27. IFAD seeks guidance on the following:

- Shaping the project development objective and allocation of IFAD resources;
- The selection of districts and communes for inclusion in the project
- The most appropriate location of the provincial PMUs in pulling together the various project activities to minimize overlap and ensure maximum national benefit;
- Possible like-minded-donors who would be interested to co-finance;
- The duration of the project.

COSTS AND FINANCING

28. The project is estimated to cost USD 49 million, including a USD 28 million IFAD loan, USD 12 million from IFAD's Adaptation for Smallholder Agricultural Programme (ASAP) funds, a USD 8.4 million government contribution delivered through the NTP-RCC and USD 0.6 million in beneficiary co-financing. Project costs by component are estimated as follows:

Component	Component Funding (USD million)					Total
	IFAD loan	IFAD grant (SAP)	GoV 30%	Private Sector 20%	Beneficiary Co-financing 15%	
Sustainable livelihoods improvement	12.0	0.0	3.6	2.4	1.8	19.8
Climate smart community development	12.0	6.0	3.6	0.0	1.8	23.4
Mainstreaming climate change	4.0	0.0	1.2	0.0	0.6	5.8
Total	28	6	8.4	2.4	4.2	49.0

29. With regards to cofinancing and partnerships, present some of the principal opportunities appear to lie with:
- JICA – which is carrying out a master planning exercise in the Mekong River Delta. An IFAD pro-poor adaptation to climate change program could capitalize upon that plan and put into place planning and livelihood elements for the rural sector and rural poor for master plan implementation;
 - World Bank is developing a \$150 million “Mekong River Delta Water Management for Rural Development” (2012-17) under which IFAD might find opportunities to partner, particularly around support to the most vulnerable populations. Also, the World Bank is implementing a grant from the UK/DFID to provide technical assistance for enhancing capacity in MONRE, MOIT, MARD, MPI and MOF to formulate and implement climate change policies. This ends in 2014. Any support for MARD and policy research should be done in close collaboration with the Bank to avoid potential overlap.

ORGANIZATION AND MANAGEMENT

30. The institutional and organizational arrangements for implementation of the project would be the People’s Committee’s at all levels as they are a focus for awareness, capacity building, local policy discussion, recipients of outputs from knowledge management activities, and for raising “lessons from the field” to central level for policy dialogue. For implementation the key partners would be provincial DPI – the Departments of Planning and Investment (from Provincial to District) are charged with implementing the SEDP process; and (iii) provincial DARD – Department of Agriculture and Rural Development for analysis, research and technology transfer for climate change adaptation in production systems and for implementation of CBDRM; and (iii) DONRE – Department of Natural Resources and Environment for planning and implementing the climate change response. At the District level, the District Peoples’ Committee (DPC) would implement project activities with particular involvement of the agricultural extension worker, accountant and infrastructure coordinator. At the commune level, the Commune Peoples’ Committee (CPC) would be focal to all project activities, with particular involvement of the agricultural extension worker, accountant and infrastructure coordinator.
31. For component 3, IFAD’s principal institutional partners for implementation will be: (i) MARD – for issues of policy, coordination and prioritization of investment project orientation. It is recommended that IFAD support MARD’s coordination and policy dialogue functions through ICD and its ISG program. (ii) MPI – for issues of integration of climate change considerations into the SEDP, IFAD should offer support to MPI for them to achieve this commitment, which is a part of the NTR-RCC. (iii) MONRE – for purposes of coordination of IFAD’s overall support and contribution to climate change response in the ARD sector. This can be done most effectively through the SP-RCC. (iv) MOLISA – for coordination of questions of integration of climate change concerns into the local SEDP planning process for making the national poverty programs “climate smart” in their investments and implementation.

Summary Of Climate Change Impacts As Detailed In Viet Nam's Second National Communication To The United Nations Framework Convention On Climate Change

B2 “Medium Emission” Scenario Impacts By 2040-2059

For purposes of this Working Paper the summary is only of projections up until 2059, rather than the full set of projections up until 2100. The reasons for this are two. One, MARD’s Action Plan for Climate Change in the ARD sector only projects (a vision) until 2050. Two, there is yet a good deal of uncertainty as to the medium-to-long term impacts of climate change. Projected impacts for 2100 are simply too far out in time to have a significant impact on what is essentially a strategy for the next five years. For the

present, a four decade projection of potential climate change impacts should provide an adequate context.

I. Predicted Impacts of Climate Change

Water resources

- *Annual flows*: Slight increases in annual flows (<2%) for most of the country. Exceptions are the Mekong River, where a greater increase is predicted by 2040 (4%-6%) and in central and southern Vietnam where some rivers may show decreases in annual flow on the order of <2% in central Vietnam and 4%-7% in the far south.
- *Flood flows*: Slight increases (<2%) in the Red River Delta and northern North Central region. South of this region to the northern South Central region the trend is for slight decreases (<2%) and in the Southeast for larger decreases 4-7%). For the Mekong River, an increase of 4%-6% is expected.
- *Low flows*: Projected decreases of 2%-9% countrywide, with the exception of the Mekong River where there are no clear trends in some segments near the Cambodian border
- *Evapotranspiration*: Annual levels in PET projected to increase by 7% to 10%. South Central Coast and Mekong River Delta will see the highest potential increase at 10%-13%.
- *Groundwater*: Post-2020 groundwater table may decrease significantly due to overexploitation and decrease in groundwater recharge during the dry season. In the South, if dry season flows decrease by 15%-20% (extreme scenario), groundwater may drop 11m or more in areas not subjected to tidal influences.

Coastal Zones

- *Sea-level rise*: Flood intensity and duration will increase as will the extent of the flooded areas. Predicted rise is 28-33 cm. A 45 cm rise would increase the annual flooded area to 18,346 km², affecting 44,210 km². A 100 cm rise (high estimate for 2100) would increase this to 40,000 km² and 56,000 km², respectively. The worst affected area would be the Mekong River Delta which would account for 90% of the national flooded area. Rising sea levels would lead to salinization of freshwater rivers and aquifers, causing serious socio-economic damage.
- *Other impacts*: Coupled with increased storm intensity, sea-level rise will increase coastal erosion. Coastal ecosystems, especially coral reef ecosystems in shallow waters, are vulnerable to destruction by rising sea level and strong storm waves, as are seagrass beds. Lagoon environments are highly vulnerable to severe floods and rising sea level water increasing salinity and damaging local aquaculture and fishing activities. Some 36 Conservation Areas – out of 68 major wetlands and 15 marine conservation areas – will be frequently flooded, with 13 of these to be severely inundated if/when sea level rises by 100 cm. Up to almost 16% of mangroves forests (300 km²) would be lost in a 100 cm rise in sea level.
- *Induced impacts*: By reducing productivity and area of cultivable land, pressure will be exerted to convert forest lands to agricultural and aquacultural uses. Population migration to higher altitudes will result in further forest conversion and deforestation.
- *Infrastructure*: Sea-level rise will submerge some embankments and leave others vulnerable to overtopping by storm surges, submerge industrial facilities and threaten sea ports, oil rigs, and dykes, erode infrastructural foundations and increase maintenance costs.

Agriculture

- *Climatic shifts*: A decrease in number of days with average temperatures below 20°C will cause winter cropping patterns in northern regions (Red River Delta, Northwest and Northeast) to change to adapt to new growing conditions and a shift to adapted crop types and varieties. The increase in the number of days above 25°C will benefit tropical crops also requiring changes in crops, cropping patterns, crop calendars and development of suitable crop-rotation systems for heat-tolerant crops.
- *Crop growth rate*: Rising temperatures increase crop growth rates, and shorten growing cycles. A 1°C increase in temperature would shorten rice's cycle by 5-8 days and 3-5 days for potatoes and

soybean. (Note: when adequate nutrients and water are available to support higher plant metabolic rates)

- *Crop water demand:* Water demand for agriculture may double or triple by 2100 (vs. demand in 2000) as risks of severe droughts and water shortage for irrigation increase.
- *Crop pests and diseases:* Potential for significant increases in populations/incidence and geographic ranges of those economically significant pests and diseases favored higher temperatures and changing moisture patterns (e.g., rice-feeding/ear-cutting caterpillars, black cutworms, bark-boring beetles, fungi)
- *Growing seasons:* Spring rice crops in the Red River Delta may be sown 5-20 days earlier on average (medium climate change scenario) and summer rice crops delayed for 20-25 days.
- *Crop geographic distribution:* Tropical crop growing areas will shift to higher elevations and northwards. By 2100, tropical crops may move upwards by 100-550m in elevation and 100-200 km northward. In contrast, subtropical crops' cultivation area would decline. Crops with high moisture requirements may be disproportionately affected by changes in rainfall and rainfall intensity, more frequent floods and droughts, increased evapotranspiration, and water shortages for irrigation.
- *Loss of arable land:* Rising sea level will significantly reduce availability of arable lands along the coasts, impacting rice production. Total annual rice output could be reduced by many millions of tonnes.
- *Rice and maize production:* Climate change impact assessments for rice and maize outputs in Red River Delta, Central region and the South show that: (i) production of both spring and summer crops tends to fall, most noticeably in the Red River Delta; and (ii) countrywide summer crop output may decrease albeit at a lower rate. Predicted declines in production for spring rice – respectively for the Red River Delta, Central region and the South – are for: (i) 2020: -3.7%, -2.4% and -1.1%; and (ii) 2050: -12.5%, -6.8% and -6%. Summer rice show declines in the range of -0.3% to -1.2% in 2020 and -1.7% to -4.3% in 2050. Winter maize output is affected differently by climate change between the Northern, Central and Southern regions. In the Northern region, winter maize output may increase by 7% by 2050. In the Central and Southern regions, by 2050 it declines by -3% to -6%.

Livestock

- *Reduced availability of feedstocks/fodder:* Affecting livestock growth and reproduction.
- *Warmer climate:* Many breeds will have difficulty adapting to new, warmer conditions.
- *Extreme weather events:* The expected increased incidence in extreme weather events – typhoons, floods and flash floods, winds and rainfall – will increase mortality and affect growth and reproduction.
- *Disease:* Warmer temperatures will increase the risk of diseases.

Forestry

- *Shifts in forest ecosystems boundaries:* Deciduous dipterocarp, closed evergreen and closed semi-deciduous forests, all tend to shrink in coverage, a trend clearly visible in 2100 (Tables 3.10 and 3.11). The closed tropical moist semi-deciduous forest ecosystem may be the most vulnerable. In 2000, these forests covered approximately 3.8 million ha, forming 11.4% of the total forest area, and stretching from the North Central Coast to the Southeast. By 2020, 2050 and 2100, this area may decrease to 2.3 million, 1.3 million and 1.2 million ha, respectively, corresponding to coverage of 6.7%, 3.9% and 3.5%. The coverage area will remain mostly concentrated in the Central Highlands and South Central Coast. The geographical distribution of the typical ecosystems of *Churkasia tabularis* or *Pinus merkusii* forests are also affected by climate change with their cover contracting most markedly in 2100. *Churkasia tabularis* forests, which cover about 1.0 million ha of northern mountains, may decrease to 0.7 million ha by 2050 and 0.3 million ha by 2100. *Pinus merkusii* forests, with a current 5.4 million ha cover area in the low coastal hills of the North Central Coast, may be reduced to only 4.2 million ha in 2050 and 2.3 million ha in 2100.
- *Forest Fire:* The Northwest and North Central Coast have rapidly increasing risks of forest fires which peak in 2100. A fire risk index (Nesterov's Fire Hazard) was calculated that predicted: (i) for March in the Northwest fire risk would increase from "elevated" in 2000 to "high" by 2100; (ii)

June values in the North Central Coast exhibit the same trend, increasing from “high” in 2000 to “extremely high” 2100. The risk of forest fires in all regions, particularly during the hot-dry season, will substantially increase.

- *Forest pests and diseases:* In the context of rising temperatures and increasing rainfall, damaging pests such as the Pine Processionary Caterpillar, Beet Armyworm, inchworm, grasshopper, and diseases, such as eucalyptus leaf blight and pine needle brown-spot blight, may thrive, spread and hinder the growth of forest ecosystems.
- *Forest land use conversion, deforestation and degradation:* Loss of agricultural lands to flooding, drought and salinization may increase pressures on forest lands for purposes of conversion for agricultural purposes.

Aquaculture

- *Coral reef ecosystem:* typhoons, floods and sea-level rise will alter the deposition of sediment, speed up erosion rates, affect coastal formations, degrade and destroy shallow-water coral reefs through coral bleaching. In addition, rising temperatures will foster the development of coral diseases and cause widespread damage to reefs and their ecosystem. A recent survey in several coral reef colonies off the coasts of Hai Phong and Quang Ninh reveal an already alarming reduction in coral coverage. In the six areas studied, reduction in coverage from pre-1998 to 2003 ranged from 18% - 26% in the two least impacted areas; 42%-48% in two other areas and; 87%-97% in two more.
- *Seagrass beds:* Increased rainfall and storm intensities will lead to increases in turbidity, slowing the growth and killing many varieties of seagrass. Coupled with the physical impacts of typhoons, seagrass ecosystems may be strongly impacted.
- *Estuarine ecosystem:* Sea-level rise and other predicted changes will reduce the habitat of many estuarine species with far-reaching implications on the estuarine topography and fauna and flora. This in turn will significantly impact aquacultural production. The possible disappearance of mangrove swamps would also result in habitat loss for many species, while saltwater intrusion into estuaries and lagoons would replace freshwater species with marine or estuarine species.
- *Aquaculture:* Rising temperatures will affect the metabolism, growth and seasonal reproduction of aquatic organisms and make them more vulnerable to diseases and toxins. Dissolved oxygen in water will drop rapidly at night, impeding the growth and killing fishes and shrimps. Floods and storms can destroy fish ponds, fish cages, and reduce estuarine water salinity, severely affecting aquacultural production. Increased temperatures and environmental stresses will encourage increased incidence and spread of pests and diseases in aquaculture farms and foster the growth and development of harmful micro-organisms at the expense of the fish stock. Recently, red tides have appeared frequently in July and August in the South Central Coast and caused significant damage to the local aquacultural production.

Energy and Transportation

- *Energy demand:* As temperatures rise, energy consumption in climate-sensitive sectors will increase to meet power demands for electric fans, air conditioners, industrial cooling processes, and agricultural irrigation and drainage pumps. Recent research shows that for every 1°C increase in summer temperatures, total energy demand increases by almost 1% and peak demand by 2.2%.
- *Power Generation:* Extreme weather events and rising sea levels will adversely impact electricity transmission and distribution systems, as well as oil rigs, pipelines, and shipping. Reduced dry season flows and floods will affect hydropower stations and reservoirs. Higher temperatures reduce the efficiency of steam turbine heat cycles resulting in fuel wastage. If cooling water temperature were to rise by 1°C, the annual consumption of coal for a 300 MW generator would increase by 4,500 tonnes/year. For a natural gas power plant, a temperature increase of 1°C in a 250MW gas turbine facility would cause the loss of 7.5 million kWh per year.
- *Power Infrastructure:* Sea-level rise will inundate facilities, stations, and transmission lines in coastal areas. Extreme storm events are capable of eroding and destroying embankments and hydropower

plants, increasing maintenance and repair costs. Existing installations may need to be raised, further increasing costs.

- *Transportation Infrastructure:* Extreme weather events (storms, floods) already cause significant damage. Between 2001 and 2005, extreme weather events cost the transportation sector VND2,571 billion in damages (approx. USD 161 million). If sea level rises by 100 cm, 11,000 km of roads would be submerged. Interruptions in the transportation system affects socio-economic activities and induces economic losses.

Human Health

- *Changing Climate Patterns:* Temperatures may rise by 2 - 3 °C by the end of the 21st century. Seasons will also change, especially in northern regions. This may affect the population's circadian rhythms, health, customs and habits, especially for the elderly and children.
- *Heat Waves:* Extreme and prolonged heat is detrimental to health, particularly for the young and elderly. Heat waves will increase the incidence of outbreaks such as malaria, dengue fever, and diarrhea.
- *Natural Disasters:* Storms, floods, droughts, tornadoes and landslides are predicted to increase in frequency and intensity, causing significant damage to human life and property. Statistics from the Natural Disaster Mitigation Partnership show that between 1989 and 2008, the number of dead and missing during natural weather disasters in Viet Nam reached 13,097; an average of 655 deaths/year or 8.7 per million inhabitants. Total loss of property for the period reached US\$4,858 million, averaging US\$240 million a year. It is worth noticing that the value of losses have increased in recent years.
- *Rising sea level:* Inundation of arable land may affect food security. Saltwater intrusion and inundation will degrade the quality and hygiene of water and food. Consequently, diseases and epidemics may spread more easily.
- *Disease:* Predicted environmental changes imply the increase in pathogenic bacterias and parasites and increased incidence of diseases such as malaria, dengue fever, Japanese encephalitis, and diarrhea. Recent research shows that the number of diarrhea cases in the 1990s stood at about 500 cases/100,000 persons. The medium climate change scenario projects a doubling of this figure by 2020 and an 11.6-fold increase by 2100.

II. Summary of Proposed Adaptation Measures

Sector	Measures	Short term	Long term
Water resources	Formulate plans for sustainable water resources development of all river basins and regions based on the national social and economic development planning.	X	
	Reinforce, upgrade and complete the existing structures and add new water resource exploitation and utilization infrastructure	X	X
	Reinforce and upgrade the existing system of river and sea dykes and build a water-pump and drainage system in low-lying areas and coastal flood-prone areas	X	X
	Promote water use efficiency and conservation		X
	Upgrade and modernize the observation and long-range water resources forecasting network and develop flood warning systems	X	X
	Raise public awareness	X	
Coastal zone	Upgrade 2,700 km of the existing sea and estuarine dykes		X
	Elevate land and residential infrastructure		X
	Pump and dewater	X	X
	Protect coastal environments		X

Sector	Measures	Short term	Long term
	Establish community-based adaptation funds	X	X
	Develop flood maps	X	
Agriculture	Prevent soil erosion, implement soil protection, preserve soil moisture and fertility levels	X	X
	Provide proactive irrigation to crops by constructing water reservoirs and adopt more efficient irrigation methods	X	
	Select crops adaptable to climate change	X	
	Adjust the growing seasons and sowing times as appropriate	X	
	Adopt new, more suitable cultivation practices	X	
	Expand fodder production and enhance storage, processing and utilization of animal feeds	X	X
	Build stables with adequate designs, proper manure and wastewater treatment systems	X	
	Adopt climate change-suited cropping patterns		X
	Crossbreed to create new species more adaptable to the changing climate with increased tolerance for arid conditions, high salinity, flooding and pests	X	X
	Modernize cultivation and stockbreeding techniques	X	X
	Adopt scientific, efficient water management methods	X	X
	Improve land management capacity		X
	Re-plan regional patterns of crop and livestock production	X	X
	Provide additional incentives for agriculture, forestry and aquafarming	X	
	Forecast crop output, develop disaster and pest warning systems in agriculture, and improve information and communication systems	X	X
	Provide crop and livestock insurance	X	X
Develop and implement climate change adaptation mechanisms and policies	X		
Forestry	Strengthen sustainable forest management and development	X	X
	Conduct research to select and diversify plant species resistant to droughts, floods, pests and less prone to causing forest fires. Establish genetic conservation plans and gene banks	X	X
	Develop a forest fire control and management program, and strengthen infrastructure for fire forecasting, warning and control	X	
	Enhance timber-use efficiency, and develop timber and non- timber product processing technologies	X	
	Implement coastal mangrove forest system restoration and development projects, plant protective dune forests	X	X
	Support livelihood and improve living conditions for people living near forests	X	
Aquaculture	Design aquacultural plans for different ecological zones	X	
	Develop plans to preserve marine biodiversity and ecologies	X	
	Introduce heat-tolerant varieties in aquafarming	X	
	Improve capacity in the management of aquafarming infrastructure	X	
	Construct more storm shelters for fishing ships	X	
	Upgrade the existing and develop new aquaculture logistic services sites	X	

VIET NAM
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Sector	Measures	Short term	Long term
	Study and forecast fish school movements, improve the capacity in weather forecast information accessibility for fishermen	X	X
	Establish aquaculture insurance funds	X	X
Energy and transportation	Mainstream climate change issues into energy and transportation development strategies and plans	X	
	Promote efficient energy use and energy conservation	X	X
	Improve energy efficiency	X	X
	Elevate and renovate structures in the energy and transportation sectors in areas vulnerable to sea-level rise and flooding	X	X
	Reinforce transportation infrastructure, power transmission structures in high flood-prone, mountainous and sloping areas	X	
Health	Review construction standards and regulations to take into account meteorological loading and urban sewage	X	
	Strengthen residential planning with respect to natural disasters impacts for vulnerable areas	X	
	Build capacity for rural healthcare institutions in disaster-prone areas	X	X
	Develop disease, epidemic, and air pollution outbreak forecasting capacity. Integrate disease forecasting into the national weather forecast	X	X
	Control vector-borne, water-borne and food-borne diseases	X	
	Promote climate change and epidemics research and information dissemination	X	

Annex III

Section A.

Summary Of National Target Program to Respond to Climate Change 2009-2015

I. General Objectives

Strategic objectives of the NTP are to assess climate change impacts on sectors and regions in specific periods and to develop feasible action plans to effectively respond to climate change in the short-term and long-term to ensure sustainable development of Viet Nam, to take opportunities to develop towards a low-carbon economy, and to join the international community's efforts in mitigating climate change and protecting the climatic system.

II. Specific Objectives

- To identify the extent of climate change in Vietnam due to global climate change and assess climate change impacts on every sector, area and locality;
- To identify measures to respond to climate change;
- To promote scientific and technological activities to establish the scientific and practical basis for climate change response measures;
- To consolidate and enhance the organisational structure, institutional capacity and the development and implementation of policies to respond to climate change;
- To enhance public awareness, responsibility and participation; and develop human resources to respond to climate change;
- To promote international cooperation to obtain external support in response to climate change;
- To mainstream climate change issues into socio-economic, sectoral and local development strategies, plans and planning;
- To develop and implement action plans of all ministries, sectors and localities to respond to climate change; to implement projects, and first of all pilot projects to respond to climate change.

III. Tasks And Solutions

1. Assessment of climate change extent and impacts in Viet Nam
2. Identification of measures to respond to climate change
3. Development of a science and technology program on climate change
4. Strengthening the capacities of organization, institutions and policy on climate change
5. Awareness raising and human resources development
6. Enhancement of International Cooperation
7. Mainstreaming climate change issues into socio-economic, sectoral and local development strategies, plans and planning
8. Development of Action Plans of Ministries, sectors and localities to respond to climate change
9. Develop and implement projects of the Program

IV. Financial Mechanism And Resource Mobilization

- Financial mechanism:
 - The State ensures necessary resources, and mobilizes domestic and international supports;
 - The State provides a legal basis to encourage participation and investment of socio-economic components and domestic and overseas organizations in activities to respond to climate change;
 - Combine with other programs and projects to attract more investments;
 - Projects and investment activities under the NTP will be considered to obtain tax remission in accordance with the legislation.

- Budget: The budget for implementing activities of the NTP in the period of 2009 -2015 (excluding funds for the implementation of the Action Plans of Ministries, sectors, and localities) is estimated at 1,965 billion VND, of which Foreign capital is 50%, and Domestic capital is 50% (central budget: about 30%; Local budget: about 10%; Private sector and other capital contributions: about 10%.)
- Budget planning methodology: Procedures of planning, annual estimated budget development, budget allocation, management, disbursement and auditing follow existing regulations on management and implementation of national target programs.

V. Organization for implementation

- National Steering Committee: Prime Minister, MONRE, MPI, MOF, MARD, and MOFA.
- Executive Board: MONRE, MPI, MOF, MARD, MOFA, MIT, MOLISA, MOT, Construction; Information and Communication; Education and Training; Home Affairs; Health; Science and Technology; Culture, Sport and Tourism; Defense; and Public Security.
- Standing Office of the NTP: Located at MONRE, it is an assisting agency of the Executing Board to co-ordinate activities of the NTP.

VI. Responsibilities

- MONRE: Assist the Executive Board to coordinate activities of Ministries, sectors, provinces in managing and implementing the NTP, focusing in the following main tasks; coordinate program, annual work plan and budget; guide and assist ministries/sectors /provinces in developing and implementing their action plans; monitor, evaluate and draw lessons; coordinate communications and dissemination; annual reporting; To chair, co-ordinate with Ministry of Planning and Investment to develop a monitoring and evaluation mechanism for NTP implementation; develop and implement action plans of the Ministry.
- MPI: Take the lead and co-ordinate with other ministries/sectors/provinces to develop a standard framework procedure and guidelines for mainstreaming climate change issues into socio-economic development strategies, programs, plans and planning; co-ordinate with the Ministry of Natural Resources and Environment in the development of a monitoring and evaluation mechanism for NTP implementation; develops and implements action plans of the Ministry to respond to climate change.
- Ministries, ministerial agencies and other Governmental authorities: Develop and implement their action plans to respond to climate change; carry out tasks assigned by the NTP; proactively participate in common coordinated activities under the direction of the Steering Committee.
- People's Committees of Provinces and central-governed Cities: Develop and implement action plans to respond to climate change in their provinces and cities; organize the implementation of related activities approved in the NTP; ensure the correct and efficient use of funds allocated under the NTP; mobilize additional resources and combine all related activities of other programs within provinces/cities to achieve the objectives of the NTP; comply with the monitoring and evolution principles defined in the NTP; periodically report on the implementing progress of the NTP objectives and tasks at the provincial/ city level.
- Social Organizations, Non-Government Organizations, and Enterprises: Promote political-social organizations, unions, non-government organizations, private sector, and enterprises, according to their functions and roles, to actively participate in climate change response activities, especially in the area of information, education and communication; support and mobilise the communities in active participation, expansion and dissemination of experiences of climate change response models; implement or participate in the NTP and action plans of Ministries, sectors and localities.

VII. Monitoring and Evaluation

Monitoring and evaluation of the NTP implementation is carried out at national, sectoral, and local level:

- District level – DONRE is responsible for information collection, synthesis, management and archiving of information, and prepares regular reports; People’s Committee at district level periodically submits reports to the standing agency of the NTP of provinces and centrally-governed cities.
- Province and City level – DONRE is responsible for management and archiving of relevant information and data; monitoring and instruction of district level units to submit their report timely; People’s Committee of province and centrally-governed city synthesize and submit regular reports to the Executive Board.
- Central level – Ministries and sectors are responsible to regularly report to the Executive Board.
- Executive Board is responsible for management and archiving of information reported by provinces and centrally-governed cities; monitoring and instruction of ministries, sectors, provinces, and centrally-governed cities to submit their report timely; checking sources and reliability of information; development of regular reports and submitting the reports to the Steering Committee to submit to the Prime Minister.

Annex III

Section B.

Summary Of MARD Action Program In Response to Climate Change of the Agriculture and Rural Development Sector During 2011-2015 and Vision to 2050

- I. General objective:** Improvement of climate change response capacity of agriculture and rural development sector during 2011-2015 and vision to 2050, in order to minimize climate change related damages and participate to reduce greenhouse emission to ensure the sustainable development of agriculture fields nationwide; protecting lives of people, prevention and control of climate change and sea level rise related natural disasters; at the same time creating opportunities for sustainable development of different field of agriculture and rural development in climate change context, including the following activities:
- Ensuring the stability and safety of population in cities, regions, especially in Cuu Long (Mekong) Delta, Northern Delta and Central Coasts;
 - Stabilizing agriculture, forestry and salt production to minimize greenhouse gas emission and ensure sustainable development
 - Ensuring food security, stabilizing rice land of 3.8 million ha, including at least 3.2 million ha of two crop rice;
 - Ensuring safety for dyke system, structures of farmers, technical and economic infrastructure, meeting requirements of natural disaster prevention and control;
 - Maintaining the sector growth rate of 20%, reducing poverty incidence by 20% and reducing greenhouse gas emission by 20% during every 10 years.
- II. Specific objectives:**
- Building capacity of studying and research activities, forecasting of climate change effects on agriculture, irrigation, forestry, salt production, aquaculture and rural development to serve as scientific basis for the formulation of policies, strategies and measures for mitigation and adaptation to climate change of the sector.
 - Building a system of policies, integrating climate change contents in different plans of the sector and in specific tasks; improving and enhancing institutional system, defining tasks and responsibilities of related agencies and capitals, management mechanism, tasks of action program to minimize and adapt to climate change of the sector;
 - Proposing solutions and supporting measures to negatively affected regions under climate change to ensure their sustainable production of agriculture related fields;
 - Enhancing international cooperation, linking with international and regional programs, receiving international supports in terms of experience and technology relating to climate change mitigation and adaptation in different agriculture related fields;
 - Development of human resources for different sector activities of climate change mitigation and adaptation;
 - Improving awareness among staff and officials in the sector and different communities relating to climate change mitigation and adaptation in agriculture and rural development;
 - Ensuring that organization, individuals, communities and other entities involved benefit equally from the climate change mitigation and adaptation activities.

III. Key Tasks

1. Evaluation of climate change and sea level rise impacts on each field of agriculture and rural development sector
2. Development of Programs/Projects for each field of the sector compatible with specific regions to respond to (including mitigation and adaptation) climate change and create opportunities for sector development.
3. Enhancing awareness, participation of all levels, sectors, localities and communities
4. Training and development of human resources of the sector, fields and localities to respond to climate change challenges and create development opportunities
5. Integrating climate change and sea level rise issues in action plans, policies, strategies, planning and sector/field/local development plans.
6. Cooperation with International Governments and donors to mobilize resources, knowledge and experience for the implementation of Action Plan to respond to climate change of the sector.
7. Monitoring, inspection and evaluation of the implementation of objectives and tasks of the Action plan.

IV. Solutions For Implementation Of Action Plan

- Mechanism and policies: development of enabling laws, policies and mechanisms for effective implementation; leverage domestic and international resources for implementation; promote intersectoral coordination and participation
- Organization: network building from central to local levels; allocation of responsibilities.
- Finance: increase investment capital for implementation; diversify funding sources (organizations, enterprises, bi- and multilateral)
- Other solutions: high-level training; promotion of study and application of advanced technology and science for mitigation and adaptation; coordination with other actors (government, private, academic, professional societies, local organizations); monitoring and evaluation Action plan.

V. Implementation Arrangements

- Steering committee – to direct related agencies for the implementation.
- Standing Office of the Steering Committee (SOSC) – coordination, annual work plan, orientation of implementation, monitoring and reporting.
- MOST and MONRE – host and coordinate with related agencies for: budget and funding approvals; appraisal of proposals and verification of completion activities.
- ICD – coordinate institutional relations with international cooperation and leveraging of inputs (investment, financial assistance, technical support, capacity building etc) to implement Action Plan; coordination with SOSC for attendance in forums, workshops, negotiations, bilateral and multi-lateral cooperation.
- Departments of Planning and Finance: coordination of planning and budgeting.
- MARD and DARD agencies: development, approval, organization and reporting on detailed agency implementation plans; proposing their annual work plan and budget to MOST and MONRE (Climate Change Steering Committee Standing Office); reporting as required on implementation of the annual work plan.

MARD Investment Matrices: Action Program In Response to Climate Change

**Potential Areas for IFAD Support
Climate Change In Agriculture And Rural Development Sector
Period 2011-2015**

■ - IFAD strong comparative advantage

□ - Aspects of potential interest (targeting rural poor, vulnerable population and/or value chains of interest)

Policy, Strategy & Institutional Investments

No	Duties	Activities/contents	Products	Total budget (million Vietnam Dong)	Timing	Implementing agency
I	Assessing climate change and sea level rise impacts on every subsector of the agriculture and rural development sector			109,000		
1	To assess vulnerability of the agriculture and rural development sector to climate change as basis to develop effective supporting policies and activities for climate change affected areas.	<ul style="list-style-type: none"> - Developing databases and maps of areas vulnerable to climate change - Developing supporting measures to reduce vulnerability and improve climate change response capacity in the 7 regions. 	<ul style="list-style-type: none"> - Developed approaches, criteria and indicators to assess vulnerability to climate change of the agriculture and rural development sector; - Report on vulnerability assessment of the agriculture and rural development sector in the 7 ecological zones for the medium scenario; - Developed policies and activities to reduce vulnerability to climate change of the agriculture and rural development sector for specific regions. 	3,000	2010-2012	Selection
2	To assess impacts, identify response measures, develop and implement action plans responding to climate change in the agriculture and rural development sector in the 7 ecological zones.	<ul style="list-style-type: none"> - Developing approaches and criteria to assess climate change impacts for different aspects; - Assessing climate change impacts and levels of impacts; - Proposing response measures and implementation plans for sustainable agriculture and rural development in adapting to climate change. 	<ul style="list-style-type: none"> - Developed approaches and criteria to assess climate change impacts on agriculture and rural; - Report on climate change impact assessment on agriculture and rural development in the 7 ecological zones of Viet Nam; - Developed response measures and implementation plans for the agriculture and rural development sector; - Proposed projects on agriculture and rural development in climate change conditions. 	13,000	2010-2012	Selection
4	To develop and apply economic models serving economic, social and environment impact assessment of climate change in agricultural production in coastal areas.	<ul style="list-style-type: none"> - Developing mathematical models serving economic, social and environment impact assessment of climate change in agricultural production; - Writing report on economic, social and environment impact assessment of climate change in agricultural production in the Red River Delta with quantitative criteria; - Developing measures to mitigate negative impacts. 	<ul style="list-style-type: none"> - Mathematical models developed serving economic, social and environment impact assessment of climate change in agricultural production; - Report on economic, social and environment impact assessment of climate change in agricultural production in the Red River Delta with quantitative criteria; - Proposed mitigation measures. 	5,000	2011 - 2013	Selection
13	To study on climate change impacts on livelihoods in areas affected by natural disasters and sea level rise (7 ecological zones) and proposal of measures to diversify livelihoods, build climate change adaptation and risk	<ul style="list-style-type: none"> - Writing report on climate change impacts on livelihoods in climate change sensible areas; - Developing measures to diversify livelihoods, build capacity for climate change adaptation and risk reduction for people. 	<ul style="list-style-type: none"> - Report on climate change impacts on livelihoods in climate change sensible areas; - Developed measures to diversify livelihoods, build climate change adaptation and risk reduction capacity. 	10,000	2011 - 2014	Selection

No	Duties	Activities/contents	Products	Total budget (million Vietnam Dong)	Timing	Implementing agency
	reduction capacity.					
15	To develop and apply some pilot models/projects for subsectors in a way to adapt to and reduce emission in climate change conditions.	- Developing solutions; - Piloting some models for subsectors in a way to adapt to and reduce emission in climate change conditions.	Pilot models for subsectors in a way to adapt to and reduce emission in climate change conditions.	10,000	2012-2015	Selection
16	To develop databases on climate change, climate change impacts on agriculture, forestry, water resources, salt production, fishery, and rural development.	Collecting and synthesizing to develop databases on climate change, climate change impacts on agriculture, forestry, water resources, fishery, and rural development.	- Built scientific basis to select parameters for each subsector; - Developed databases on relevant parameters in subsectors; - Software to manage and update the climate change database (impacts and solutions) on agriculture, forestry, water resources, salt production, fishery, and rural development.	5,000	2011-2015	Selection
II	Development of programs/projects for each subsector in specific localities to response to climate change (mitigation and adaptation) and promote the sector development			72,000		
19	To review and adjust agricultural and rural plans for the Red River Delta, Mekong Delta, Southeast Region, North Central Region, and South Central Region in climate change conditions.	- Studying on scientific basis as orientations for planning; - Developing solutions for agricultural and rural plans for the Red River Delta, Mekong Delta, Southeast Region, North Central Region, and South Central Region in climate change conditions.	Reviewed agricultural and rural plans for the Red River Delta, Mekong Delta, Southeast Region, North Central Region, and South Central Region in climate change conditions.	5,000	2011 - 2015	Selection
22	To develop a program to select and experiment new, adaptive plant varieties for areas adversely affected by climate change.	Developing a program to select and experiment new, adaptive plant varieties for areas adversely affected by climate change.	Developed program to select and experiment new, adaptive plant varieties for areas adversely affected by climate change	6,000	2012-2014	Selection
27	To develop programs/ projects on policies, plans and planning for subsectors in climate change conditions for periods 2011-2015.	Preparing programs/ projects on policies, plans and planning for subsectors in climate change conditions for periods 2011-2015.	Developed programs/projects on policies, plans and planning for subsectors in climate change conditions for periods 2011-2015.	10,000	2011-2015	Selection
III	Raising awareness and participation responsibility of sectoral levels, localities and communities			27,000		
28	To disseminate and propagate knowledge on climate change mitigation and adaptation to the sector officials, employees, staff.	Disseminating and propagating policies, views of the Government and sector on activities to mitigate and adapt to climate change to the sector officials, employees, staff and communities.	- Prepared information programs/ materials on natural disasters and climate change adaptation; - Held courses to raise awareness of the sector officials, employees, staff and communities.	10,000	Annually	Selection
29	Education and training on natural disasters, climate change adaptation for disaster-prone communities.	- Developing training programs; - Training of trainers; - Organizing trainings.	Organized education and training on natural disasters, climate change adaptation for disaster-prone communities.	5,000	Annually	Selection
30	To develop community-based disaster/climate change mitigation models	- Developing pilot models of community-based disaster/climate change mitigation - Preparing manuals on sharing experiences and duplicating models to climate change affected areas.	Pilot models of community-based disaster/climate change mitigation; Manuals on sharing experiences and duplicating models to climate change affected areas.	8,000	2011 - 2015	Selection
31	To prepare policies on climate risk insurance for agriculture sector and credit provision for poor communes in	- Developing policies on climate risk insurance for agriculture sector and credit provision for poor communes in climate	Developed policies on climate risk insurance for agriculture sector and credit provision for poor communes in climate change affected areas.	4,000	2011-2013	Selection

No	Duties	Activities/contents	Products	Total budget (million Vietnam Dong)	Timing	Implementing agency
	climate change affected areas.	change affected areas.				
IV	Development of human resources of the sector, subsectors and localities to meet climate change challenges and create development opportunities			43,000		Selection
32	To develop and organize training programs for scientific research, management on climate change mitigation and adaptation.	- Developing training program framework on climate change mitigation and adaptation for the sector staff and communities in specific subsectors such as agriculture, fishery, salt production, forestry, water resources and rural infrastructure; - Preparing contents, plans, and implementation arrangements for the program framework.	- Report analyzing and assessing status of public and sectoral staff awareness; - Report on training needs of the sector staff and communities; - Training program framework and training contents for different target groups.	15,000	2011-2015	Selection
33	To strengthen steering committees for natural disaster mitigation and climate change adaptation, including improving physical facilities	Building and strengthening steering committees for natural disaster mitigation and climate change adaptation.	- Strengthened steering committees for natural disaster mitigation and climate change adaptation. - Improved physical facilities for natural disaster mitigation.	5,000	Annually	Steering Board of CFSPC
34	Public and private partnership in dike management, natural disaster mitigation and climate change adaptation.	Building up public and private partnership in dike management, natural disaster mitigation and climate change adaptation.	Built up public and private partnership in dike management, natural disaster mitigation and climate change adaptation.	3,000	2011-2013	WRD
V	Integrating climate change and sea level rise issues into development action plans, policies, and planning of the sector, subsectors and localities			101,000		
38	To develop supporting policies for cropping pattern change in climate change conditions in agro-ecological zones.	- Studying on scientific and practical basis to develop supporting policies for changing cropping patterns in climate change conditions; - Developing models for cropping pattern change in the 7 ecological zones; - Developing and disseminating policies in cropping pattern change resulted from climate change in agro-ecological zones.	Supporting policies for cropping pattern change in climate change conditions in agro-ecological zones	6,000	2012-2015	Cultivation Department
42	To propose development of technical procedures for cultivation, fertilizer application and land reclamation for key crops in climate change affected areas (including the Red River Delta, Mekong Delta and Central Coastal Plains).	- Developing technical procedures for cultivation, fertilizer application and land reclamation for key crops in order to minimize negative impacts and increase positive impacts in climate change affected areas.	Developed technical procedures for cultivation, fertilizer application and land reclamation for key crops in order to minimize negative impacts and increase positive impacts in climate change affected areas.	6,000	2011-2013	selection
45	To develop policies and mechanisms for livestock development in reducing greenhouse gas emission.	Developing policies and mechanisms for livestock development in reducing greenhouse gas emission.	- Completed policies and mechanisms for sustainable livestock development and minimizing environment pollution impacts; - Completed policies, mechanisms and technical guidelines in animal waste management; Standards and norms on animal waste management; - Policies and mechanisms on private participation in livestock development and environment protection at the same time.	10,000	2011-2015	Livestock Husbandry Department
VI	International cooperation with governments and international organizations in order to mobilize resources such as knowledge, experiences and funds for implementation of the sector climate change response action plans			35,000		

No	Duties	Activities/contents	Products	Total budget (million Vietnam Dong)	Timing	Implementing agency
51	Cooperation forum on natural disaster mitigation and climate change adaptation.	Holding a cooperation forum on natural disaster mitigation and climate change adaptation.	A cooperation forum on natural disaster mitigation and climate change adaptation set up.	5,000	Annually	WRD
52	Cooperation with countries, national, regional & international organizations on nat. dis. Mitig. & climate change adapt.	Cooperation with countries, national, regional and international organizations on natural disaster mitigation and climate change adaptation.	Cooperation with countries, domestic and regional and international organizations on natural disaster mitigation and climate change adaptation built.	5,000	Annually	WRD

■ - IFAD has comparative advantage & within an IFAD Province □ - Aspects of potential interest & within an IFAD Province

Investment Projects

No.	Program/project	Location	Time frame	Task/Activities	Total investment cost estimate (VND billion)
II	FORESTRY				4,000
1	Program "planting and restoration of mangroves and protection forests blocking sand along the coast during 2010 - 2015".	3 projects for 3 coastal regions of Vietnam	6 years	Protection of sea dyke system and production and livelihood infrastructure along coastal regions; enhancing the biodiversity of coastal ecology, building capacity to adapt to climate change and improving livelihood.	3,500
III	AGRICULTURE				5,000
1	Application of effective solutions to reduce greenhouse gas emission and adapt to climate change in key rice production areas in Vietnam.	All provinces	5 years	Supporting farmers with the application of GAP, 3 increases and 3 decreases, cropping rotation...; investment in on-farm hydraulic system; supporting the use of safe and environment friendly fertilizer.	1,500
IV	AQUACULTURE				3,000
5	Infrastructure of concentrated aquaculture area in Nghi Xuân.	Hà Tĩnh	5 years	Investment in the construction of infrastructure serving concentrated shrimp raising in a manner that is sustainable and avoiding inundation.	150
6	Investment in the infrastructure of concentrated aquaculture area in Thanh Phú.	Bến Tre	5 years	Construction of hydraulic system, transport roads and technical infrastructure serving aquaculture development.	150
VI	RELOCATING PEOPLE IN AREAS HIGHLY PRONE TO NATURAL DISASTERS IN 14 PROVINCES	15 projects	5 years	Prevention of natural disasters and ensuring sustainable livelihood	1,000
XII	RURAL INFRASTRUCTURE				5,000
1	Improvement of livelihood for coastal fishery communities of Vietnam.	Coastal provinces	6 years	Improvement of living standards of local people along the coast.	1,200
2	Development of rural infrastructure in Cuu Long Delta Provinces in the context of climate change	Cuu Long Delta	6 years	Construction, improvement and upgrading rural infrastructure structures	1,000
3	Development of agriculture research infrastructure to respond to climate change.	20 research academies	6 years	Investment in the upgrading of human resource and other resources for research and training establishment .	800
4	Development of agriculture infrastructure in Central Highland provinces and in Bình Phước province.	Central Highland provinces and Bình Phước province	6 years	Construction, upgrading and improvement of rural infrastructure.	1,000

**MONRE Investment Matrices: List Of Tasks And Projects For Implementing
The National Target Program To Respond To Climate Change In The Period Of 2009-2015**

Potential Areas for IFAD Collaboration

■ - IFAD strong comparative advantage ■ - Aspects of potential interest (targeting rural poor, vulnerable population and/or value chains of interest)

No	Category, task, project	Leading Agency	Collaborating Agencies	Tentative budget (VND b)	Execution period
II. Develop and implement science and technology programs on climate change					
2	Develop and implement national science and technology programs (medium and long terms) to provide scientific basis for development of institutions, policies and plans to respond to climate change. Main contents are: - Enhance researches on phenomena, scientific nature, and unclear facts of climate change; impacts of climate change on socio-economic activities; analyze and assess socio-economic effective (cost-benefit) of activities to respond to climate change; - Consider mainstreaming climate change issues into environmental protection programs, reasonable use of natural resources programs, natural disaster prevention programs, and marine research programs, etc.; - Promote research on scientific basis to enhance climate and climate change monitoring system; - Develop databases for climate change impacts assessment; - Develop technologies to mitigate green house gases emission and technologies to adapt to climate change - Promote the development of coordination mechanism among research, education/training and technology implementation institutions in the related areas; - Promote international cooperation in scientific and technological activities, effectively apply and transfer climate friendly technologies.	MOST, MONRE	MARD, MPI, other ministries, sectors and localities	350	2009-2015
IV. Awareness enhancement and human resources training					
5	Develop plans and programs to raise awareness of selected groups in the Communist Party, State administration system, social organizations, media and the community.	MONRE	MPS, Central Department of Propaganda and Training, other ministries, sectors, localities and social organizations	60	2009-2015
7	Establish thematic channels on public media (newspaper, radio, television, web, etc) for climate change information exchange.	MIC	MCST, MONRE, MARD, MET and relevant ministries, sectors, localities, and social organizations	60	2009-2015
8	To propagate and raise awareness of public community on climate change.	MONRE (invite Vietnamese Fatherland Front to co-chair)	Vietnam General Federation of Labour, social organizations, ministries, sectors and localities	15	2009-2015

No	Category, task, project	Leading Agency	Collaborating Agencies	Tentative budget (VND b)	Execution period
9	To propagate and promote awareness on the role of women and gender issues in climate change responding activities.	MONRE (invite Vietnam Women's Union to co-chair)	Vietnam General Federation of Labour, MPS, social organizations, ministries, sectors and localities	7	2009-2015
10	Conduct awareness raising programs and contests on climate change.	MONRE (invite Ho Chi Minh Communist Youth Union to co-chair)	Vietnam General Federation of Labour, social organizations, ministries, sectors and localities	80	2009-2015
VI. Develop and implement action plans to respond to climate change					
15	Develop and implement action plan to respond to climate change of the Ministry of Agriculture and Rural Development. - Assess impacts of climate change and sea level rise on sectors administered by the Ministry; - Identify measures to respond to climate change and sea level rise for sectors administered by the Ministry; - Mainstream climate change issues into strategies, programs, plans and planning of the Ministry; - Implement other relevant tasks: develop coastal eco- economic models to respond to climate change; study science bases, realities and propose projects on socio-economic development in regularly dry areas; Propose to integrate climate change issues into development of measures to ensure security of water sources, sea dyke system, reservoir; propose measures to develop protective forests (upstream forests and coastal forests) in accordance with climate change scenarios; study to modify management strategy and planning on protected areas system of Vietnam to respond to climate change; and implement pilot projects.	MARD	MONRE, MPI, and other ministries, sectors and localities	120	2009-2015
16	Develop and implement action plan to respond to climate change of the MPI. - Assess impacts of climate change and sea level rise on sectors administered by the Ministry; - Identify measures to respond to climate change and sea level rise for sectors administered by the Ministry; - Mainstream climate change issues into strategies, programs, plans and planning of the Ministry; - Implement other relevant tasks: collaborate with the MONRE to develop guidelines for mainstreaming climate change issues into socio-economic development plans of localities and development plans of Ministries/sectors; plans to respond to climate change for regions and areas; develop mechanisms and policies to encourage investment into clean development mechanism, emission reduction, and environmental protection; and implement pilot projects.	MPI	MONRE, MARD, and other ministries, sectors and localities	60	2009-2015

No	Category, task, project	Leading Agency	Collaborating Agencies	Tentative budget (VND b)	Execution period
20	<p>Develop and implement action plan to respond to climate change of Ministry of Industry and Trade.</p> <ul style="list-style-type: none"> - Assess impacts of climate change and sea level rise on sectors administered by the Ministry; - Identify measures to respond to climate change and sea level rise for sectors administered by the Ministry; - Mainstream climate change issues into strategies, programs, plans and planning of the Ministry; - Implement other related tasks: energy saving and proper use; study and apply emissions-reduction technologies and energy saving (focus on renewable energies use); study and propose measures ensuring energy security to climate change adaptation; study and propose measures to respond to climate change in trade activities; and implement pilot projects. 	Ministry of Industry and Trade	MONRE, MPI, and other ministries, sectors, localities	80	2009-2015
23	<p>Develop and implement action plan to respond to climate change of Ministry of Labour, Invalids and Social Affair.</p> <ul style="list-style-type: none"> - Assess impacts of climate change and sea level rise on sectors administered by the Ministry; - Identify measures to respond to climate change and sea level rise for sectors administered by the Ministry; - Mainstream climate change issues into strategies, programs, plans and planning of the Ministry; - Implement other related tasks: research and propose measures in term of employment security, poverty reduction for the most vulnerable areas caused by climate change; research and propose solutions and plans on migration, resettlement and life security for residents in the most vulnerable areas caused by climate change and sea level rise; issues on gender, population, livelihood; issues on HIV and other social evils; and implement pilot projects. 	MOLISA	MONRE, MPI, and other ministries, sectors, localities	80	2009-2015
26	<p>Provinces, Central-governed cities:</p> <ul style="list-style-type: none"> - Assess impacts of climate change and sea level rise to their localities; - Develop action plans to respond to climate change and sea level rise. 	People Committees of provinces and Central-governed cities	MONRE, MPI, and other ministries, sectors, localities	150	2009-2010

Support Program to Respond to Climate Change (SP-RCC)
Areas Potential Interest for IFAD Participation and Support in SR-RCC of Policy Matrix

Outcome/Target	1st Cycle CY2008-9 Actions	2nd Cycle CY2009-10 Actions	3rd Cycle CY2010 Actions
Mitigation			
Forest Management			
Develop self-financing mechanism to promote SFM		Implement Payment for Forest Environmental Services (PFES) pilot policy in several provinces. [MARD/DoF/DOL]	Formulate PFES policy and Decree on PES [MARD/DOF]
Agriculture			
Identify and promote sustainable agricultural practices/ecosystems to mitigate climate change and to secure the livelihood of farmers		Collect sustainable agricultural practices (of co-benefit type) which reduce GHG emission [MARD/DCP, Dept. of Livestock Mgmt]	Extend the good practices collected under PA 1.2.1 through extension activities [MARD/NAFEC]
Waste Disposal			
Integrate policies and mechanisms of management for waste in agricultural sector		Develop the comprehensive program including the issues of agricultural waste and household waste in rural area. [MARD]	Develop comprehensive action plan on 3R and implement pilot project on household solid wastes management based on the National Strategy on Integrated Solid Waste Management [MOC/DTI, MONRE/ISPONRE/WPA]
Adaptation			
Integrated Coastal Management			
Ensure Sustainable management of coastal area (livelihoods & ecological system)		Conduct review research on CC impacts on coastal small scale fishery exploitation [MONRE/VASI, MARD/DCFRP, DoA]	Develop coastal eco-economic models to respond to climate change [MONRE/VASI, MARD/DCERD, DCFRP, DOA]
Disaster Risk Management			
Enhance capacity to forecast extreme events with early warnings			Promote weather nowcasting system in the Northern region [MONRE/NHMS]
Strengthen community based disaster risk management (CBDRM)	Issue framework of CBDRM [MAD/CCFSC]	National Program on Enhancement of Public Awareness and Community Based Disaster Risk Management (CBDRM program) is adopted at provincial level [MARD/CCFSC]	
Forestry			
Enhance disaster preparedness (including shore erosion)	Develop Mangrove forest system[MARD/DoF]	Promote implementation of mangrove rehabilitation and development program in provincial level. [MARD/DoF-DOFinanceP]	
Agriculture			
Ensure stable agricultural production and food security		Promote research and assessment for climate change's impacts on crop production in order to form basis for developing active measures against climate change [MARD/DCP]	Promote commercialization of new types of varieties [MARD, MOF]
Cross Cutting Issues			
Mainstreaming CC issues into development planning and Program Management of NTP-RCC and SP-RCC			
Mainstream Climate Change issues into overall planning process		Complete the final draft of SEDP(2011-16) and SEDS(2011-2020) in which Climate Change issues are integrated and mainstreamed [MPI/SENRED]	Prepare Provincial level SEDP and SEDS in which Climate Change issues are integrated and mainstreamed [MPI/SENRED]

Annex IV. Climate Change Finance ODA and GoV

Current and Future Donor Financing in ARD

Regions	Donors	Activities	Duration	Financing (US\$)	Future activities
North West	ADB	Road infrastructure improvement in northern mountainous provinces	2011-2013	350 000 000	Future loan 26,000,000 future grant 2,000,000
		Sustainable Biogas Development			
	CRES- VNU	Economic of adaptation to economic social component (Ha Giang, Da Nang and Kon Tum)	2009-2010	15 000	
	Oxfam in VN	Agr, CCA activities forestation, disaster risk management, early warning farmer groups, etc.	until 2015	annual budget 300,000	continue current activities on climate change adaptation in agr, forestation, DRR, advocacy
North East					
Northern Delta (Red River Delta and Quang Ninh)	ADB	Support for water law and baseline study for RR Delta	2011-2012	5 000 000	
		Irrigation improvement study	2011-2012		
		Investment and modernizing irrigation systems in mid and northern RR delta	approving in 2012	80 000 000	
	CRES- VNU	learning from past adaptation	2009-2010	25 000	
	Not specified	SALPACC project	2011-2014	500 000	EUR

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Northern Central Coast	German Red Cross	Disaster risk reduction (Project 1)	Sep 2010 to Dec 2011	163000	
		Disaster risk reduction (Project 2)	June 2011 to Dec 2011	487000	
	ADB	Coastal cities urban environment and climate change adaptation			
	CRES- VNU	Impacts of climate change to vulnerable communities	2010	23000	
	SRD - Vietnamese NGO	CBDRM & CC project in Huong Tra, TT Hue	2010-2013	300 000	Mr. hop - director 0904649791
		CBDRM & CC project in Ha Tinh	2012-2014	520 000	
	Oxfam in VN	agr adaptation disaster risk management Supporting irrigation into SEDP	long term program	annual budget 300,000	continue current activities
Southern Central Coast	Oxfam in VN	Climate change adaptation for Agr, poor women, economic development DRR forestation	long term program until 2016	annual budget 400,000	Climate change adaptation into agr - DRR
Central Highland	ADB	Biodiversity conservation corridors	2011-2016	30 000 000	
		Forest livelihood in central highland	2005-2012	45 000 000	
		Phuoc Hoa water resources	2003-2012	90 000 000	
	EU	Participation of government and local communities (Kon Tum province)	2011-2014	2 338 579	Implemented by FFI (EUR)
	Oxfam in VN	Agr adaptation - DRR education and knowledge building	until 2016	annual budget 250,000	Climate change adaptation into agr - DRR
South (South East and Mekong River Delta)	German Red Cross				Ongoing coordination for further support for VNRC community based disaster risk management with climate change adaptation
	Ausaid	Kien Giang Biosphere reserves conservation and development	2008-2011	3 208 000	in partnership with GIZ

		Climate change and Coastal Ecosystems Program (CCCEP), in partnership with GIZ	2011-2016	23 000 000	CCCEP will operate in Kien Giang, An Giang and Ca mau provinces	
		Climate change affecting land Use in the Mekong Delta: Adaptation of Rue-based Cropping systems	2011-2014	4 000 000	Funded by ACIAR - Australian Center for International ?Ag research in Partnership with IRRI/Can Tho, etc.	
		Potential Contribution to ADB GMS Flood and Drought mitigation project	2012-2015	5 000 000	Subject to approval	
	ADB		Mekong adaptation study	2010-2012		
			GMS Flood and Drought + risk	2011-2014		
			Support program for NTP	2011-2013	2 500 000	
	EU		Building coastal resilience (kien Giang, Soc Trang, Ben Tre, Can Gio)	2011-2014 (4 years)	2 450 000	Implemented by IUCN
			Support CC adaptation initiatives implemented by MRC (in lower Mekong Region)	2011-1017 (5 years) EUR	5 000 000	Co-financed with Ausaid, DANIDA, Finland, German, SIDA, JICA (total budget 12,000,000(EUR)
	CRES- VNU		Impacts of climate change to vulnerable communities	2010	23000	2 provinces
	Oxfam in VN		Agr adaptation - water and sanitation disaster risk management linking DRR/CCA with SEDP/National CBDRM program (next five years 5M)	until 2016	annual budget 500,000	Agr adaptation DRR, WASH, linking SEDP, national CBDRM in MARD
Budget/national support	WB	Climate change development Policy operation (CC DPO1)	2011	70 000 000		
		CC DPO 2	2012	70 000 000		
		CCDPO 3	2013	70 000 000		

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		Coastal Resources for Sustainable Development	2012	100 000 000	In 7 provinces of northern, central and southern coastal provinces	
		Natural Hazard Management	2012	150 000 000		
		Adaptation study in ARD	2011-2014			
		Capacity building support through DFID funded Climate Change Partnership (VNCLIP) and GFDRR for climate change and disaster management	2011-2014			
	Ausaid		Australian Planned contribution to SP-RCC	2011-2012	8 000 000	Subject to approval
			Climate change community based action grants - competitive grant mechanism for INGOs to undertake community based approaches to adaptation and mitigation	2011-2013	10 000 000	Subject to approval
ADB		Quality and safety enhancement of agricultural products and biogas development		95 000 000		
CIDA		Direct contribution to NTP-RCC		4 450 000 000		
Additional Regional projects	ADB	Core environment program	2012-2015	14 800 000		
		Capacity development for low carbon development	2011-2013	1 500 000		
		Technology transfer for climate change		10 000 000		
		Study on climate change and mitigation	2010-2011			

Projects/Activities Ending From 2010 - 2017

Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
Adaptation-General	Support to NTP (project with both MONRE and MARD and MPI)	UNDP	MONRE-IMHEN	UNDP is developing a proposal for financing under the One-UN Fund (to do analytical work, strategies, coordination, etc.) Perhaps will be about \$2 or \$3 million over 5 years.			2008	2013
Adaptation-General	National Target Program on Climate Change	GoV	MONRE	The strategic objective of the programme is evaluating the degree of impacts of CC on sectors and locals in each period and developing practically action plan to respond effectively to CC both in short and long terms to ensure the country's sustainable development.	\$143,878,788	National	2009	2015
Adaptation-General	Vietnam Assessment Report on Climate Change	UNEP	MONRE	Publication by ISPONRE in 2010.				2010
Adaptation-General	GoV Climate Change Strategy	GoV	MONRE	Intended to be completed by mid-2011. Being prepared by Standing Office on Climate Change			2010	2011
Adaptation-Agriculture	Economics of Adaptation to Climate Change (EACC) - Agriculture and Water sector study in Vietnam	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, under implementation since mid-2009, focuses on the economic impacts of CC on a small number of critically important crops. Being carried out jointly with a number of Vietnamese institutions. Project coordinator David Corderi. Final report expected in early 2010.	\$200,000	National	2009	2010
Adaptation-Agriculture	Helping poor farmers in rice-based systems in the Mekong delta of Vietnam adapt to climate change	Australia/AusAID	ACIAR	Support targeted research and development collaboration between Vietnam agencies, Australian organisations and international agricultural research centres to improve adaptation to climate change for small farmers in the Mekong Delta.	\$1,000,000		2009	2013
Adaptation-Forestry	Economics of Adaptation to Climate Change (EACC) - Forestry sector study in Vietnam	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, underway since late-2009, focuses on the economic impacts of CC on forestry, including mangroves. Project coordinator David Corderi. Expected to be completed by mid-2010.	\$100,000	National	2009	2010
Adaptation-Forestry (mangroves)	Mangrove Management and Reforestation	Australia/Other	CARE	Funded by Australian and Danish Foundations. This project supports 2 Communes to plant 290 ha of new mangroves and develop systems for sustainable management of a total of 350 ha of mangrove as a key to protecting vulnerable communities from physical and economic impacts of disasters such as typhoons and to future climate change impacts. The project is developing and applying participatory methods of community-based mangrove reforestation, protection and management.	\$470,000	Hau Loc, Nga Son, Thanh Hoa Provinces	2006	2010

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Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
Adaptation-Forestry (mangroves)	Sustainable Management of Forest Ecosystems for Coastal Protection in Bac Lieu Province Project	Germany/ODA	Germany/ODA	GTZ. To improve the ecological functionality and resilience of the protective coastal forests. The project advises and supports the provincial Department of Agriculture and Rural Development, the Forest Protection Department, and the People's Provincial Committee of Bac Lieu Province in the development of protective mechanisms for the coastal zone, the management and rehabilitation of the mangrove forests, and the development of implementation mechanisms. A special focus is placed on capacity development. The project is monitoring the resilience of the coastal protection forests. Additional income generating opportunities for the poor coastal population will be created along aquatic value chains.	\$2,240,000	Bac Lieu Province:	2009	2011
Adaptation-Forestry (mangroves)	CONSERVATION AND DEVELOPMENT OF THE KIEN GIANG BIOSPHERE RESERVE PROJECT	Australia/AusAID	GTZ	The overall objective is to develop sustainable natural resource management for Kien Giang Province particularly of the protected areas and coastal mangrove forests.	\$2,400,000	Kien Giang Province	2008	2011
Adaptation-Fisheries	Strengthening Adaptive Capacities to the Impacts of Climate Change in Small-scale Aquaculture	Norway/ODA	NACA	For fuller details on this project see below under Capacity Strengthening (4.03). Inception phase includes considerable work on the impacts of cc on aquaculture.		Regional	2009	2011
Adaptation-Fisheries	Sector review of climate change and aquaculture in Vietnam (EACC)	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, underway since late-2009, focuses on the economic impacts of CC on aquaculture. Project coordinator Benoit Laplante. Expected to be completed by mid-2010.	\$100,000	National	2009	2010
Adaptation-Fisheries	Develop an action plan for aquaculture in line with Program of Adaption to Global Climate Change in Agriculture Sector of Vietnam	Denmark/ODA	MARD	National consultant has 4 months and plans to assess impact and adaptation to CC all along the coast.		National	2010	2010
Adaptation-Water	Impact of Climate Change on water resources and adaptation measures	Denmark/ODA	MONRE-IMHEN	Impacts of climate change on water resources and suggested mitigation measures. Disseminated at a workshop Dec. 2010.	\$800,000		2007	2010
Adaptation-Water	Economics of Adaptation to Climate Change (EACC) - Agriculture and Water sector study in Vietnam	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, under implementation since mid-2009, focuses on the economic impacts of CC on a small number of critically important crops. Being carried out jointly with a number of Vietnamese institutions. Project coordinator David Corderi. Final report expected in early 2010.	\$200,000	National	2009	2010
Adaptation-Water	Developing integrated catchment management strategies for sustainable water use in response to climate change	Australia/AusAID	Universities	Implemented by Monash University, VNU, and MONRE. The project will build multi-disciplinary capacity in integrated catchment management and develop cost-effective adaptation strategies.	\$160,000		2009	2010

Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
Adaptation-Water	Water and Sanitation Sector Responses to Climate Change Impact in Yunnan province of China and Vietnam	Multi-Donor	World Bank	Carried out by Water and Sanitation Program (WSP), a multi-donor funded partnership. Objective is to assist improved approaches by government agencies and service providers to better respond to risks posed by climate change in water supply and sanitation services. These will be initiated and tested by developing adaptation plans for the WSS sector at the study sites of Ben Tre, Vietnam, and Lijiang, Yunnan, China, where poor communities are a significant proportion of the population.			2010	2015
Adaptation-Urban	Asian Cities Climate Change Resilience Network (ACCCRN)	Rockefeller Found.		Assisting with CC resilience of selected cities in Vietnam: Danang, Quy Nhon, Can Tho). Major report published in Nov. 2009.	\$781,790	National	2009	2010
Adaptation-Urban	Megacity Research Project TP. Ho Chi Minh	Germany/ODA	Universities	Financed by Federal Ministry of Education and Research. Intends to derive adaptation options for urban land use planning in HCMC as a response to climate change. Implementation led by Brandenburg University of Technology.		HCMC	2009	2014
Adaptation-Urban	Building Urban Resilience in East Asia	Australia/AusAID	World Bank	Study underway in World Bank in late 2010; could include a city in Vietnam (TBD)		Regional	2010	2011
Adaptation-Social	Economics of Adaptation to Climate Change (EACC) - Social Issues study in Vietnam	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, underway in late 2009, focuses on social issues. Expected to be completed by mid-2010. Project coordinator Robin Mearns	\$100,000	National	2009	2010
Adaptation-Social	Poverty and Social Impacts Assessment (PSIA) associated with Climate Change loan	WB	WB	Will be carried out in 2011 to look at social issues related to Bank's support of SP-RCC	\$85,000		2011	2011
Adaptation-Economic	Economics of Adaptation to Climate Change (EACC)	Multi-donor	WB	The EACC (mostly funded by Great Britain, Netherlands, and Switzerland) will: (i) identify and evaluate the expected impacts of climate change in developing countries under different climate change scenarios; (ii) identify good practice in project, program and policy design and financing; (iii) identify and rank plausible adaptation pathways, assessing their social and economic returns; (iv) integrate adaptation options into sector policies; and (v) inform the development of effective international financial mechanisms for adaptation. The project will have two phases in parallel: (i) determine economic costs at a global level; and (ii) 6 country case studies (which include Viet Nam) plus Brazil. In VN (see also separate entries), studies will cover agriculture and water, CGE model, and coastal infrastructure. Global amount is approximate.	\$6,000,000	Global	2007	2010
Adaptation-Natural Disasters	Natural Disaster Risk Management Project (NDRMP) (P073361)	WB	MARD	The overriding goal of the Program is to reduce human, economic and financial losses from natural disasters and ensure rapid post-disaster recovery of poor communities living in hazard-prone areas. AusAid also has a \$4.5 million TA project associated with this project (2006-2010).	\$86,000,000	National	2006	2010
Adaptation-Natural Disasters	Urgent investment in improving forecast capacity of hydrometeorology station for disaster preparedness, especial		MONRE	Non Structural	\$18,375,000	28 coastal provinces	2006	2010

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Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
	focus on storm forecast							
Adaptation-Natural Disasters	Flash-flood control and adaptation to climate change	Finland/ODA	CSDM	Implementing agency is "CSDM (Centre for Sustainable Development in Mountainous Areas) + Ha Giang PC".	\$202,500	Ha Giang province	2008	2010
Adaptation-Natural Disasters	Disaster Risk Management portfolio:	UNDP	MARD	Strengthening of Emergency response mechanisms, improving institutional setting for complex emergencies. Capacity building for senior officials and humanitarian workers and volunteers. Focus in Cao Bang, Binh Thuan, Can Tho Provinces.	\$4,000,000	National	2009	2012
Adaptation-Natural Disasters	Capacity Building for Mitigation and Adaptation of Geodisasters Related to Environment and Energy Development in Vietnam	Norway/ODA	Universities	Funded by Royal Norwegian Embassy and implemented by VNU. The project carries out overview research on geodisasters in the whole territory of the country and focuses on key pilot studies, including Cua Dat hydropower plant, Thanh Hoa Province, Hanoi City and the coastal districts of the Red River Delta. It includes a special focus on climate change.		National	2008	2011
Adaptation-Coastal (general)	Economics of Adaptation to Climate Change (EACC) - Coastal infrastructure sector study in Vietnam (ports)	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. This sector study, underway since late 2009, will likely focus on the economic impacts of climate change on ports. Final report expected by mid-2010. Project Coordinator Benoit Laplante.	\$200,000	National	2009	2010
Adaptation-Area-specific	Management of Natural Resources in the Coastal Zone of Soc Trang Province	Germany/ODA	Germany/ODA	The coastal wetlands of Soc Trang Province will be protected and sustainably used for the benefit of the local population. Objective 1st phase: Resource users (local population, shrimp farmers) and staff of local authorities carry out co-management of coastal wetlands. Activity areas consist of (i) co-management in mangroves and on mud flats for effective protection and sustainable use of coastal zone; (ii) rehabilitation and effective management of mangrove forest with emphasis on resilience to climate change; (iii) integrated coastal area planning which integrates conservation objectives; (iv) development of participatory environmental impact monitoring system; (v) environmental awareness raising; (vi) income generation for local communities along aquatic value chains; (vii) sustainable financing of ecosystem services provided by coastal wetlands .	\$4,500,000	Soc Trang Province	2007	2012
Adaptation-Mekong Delta	Climate Change Initiative Framework of the Mekong River Commission	Australia/AusAID	MRC	The Climate Change and Adaptation Initiative (CCAI) is a collaborative regional initiative of the Mekong River Commission, funded by AusAid, designed to address the shared climate change adaptation challenges of Lower Mekong Basin countries. The Regional Synthesis Report (RSR) from ICEM has been prepared as part of the initial phase of the CCAI to provide a snapshot of current knowledge and activities related to climate change in the LMB countries. The CCAI Framework Document builds on the RSR (not available on MRC site in Jan. 2010).	\$4,000,000	Mekong Delta	2009	2015

Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
Adaptation-Mekong Delta	Mekong Delta Climate Change Impact and Adaptation Project	Multi-donor	ICEM	Funded by AusAid (\$1.14 million 2008-2010) and ADB. Also implemented by MONRE (IMHEN). Will assess the impact and vulnerability of climate change in the Mekong Delta and propose practical recommendations for adaptation and mitigation and integration into development planning.		Mekong Delta	2008	2011
Adaptation-Mekong Delta	Climate Change and Coastal Ecosystems Program (CCCEP)	Multi-donor	GTZ	Funded by AusAID and by German Govt. The overall objective of the program is to achieve the efficient management and protection of coastal ecosystems for the mitigation and adaptation to environmental hazards related to climate change. The program covers seven subject areas: 1) Support to legal and institutional framework 2) Planning and management of coastal zone ecosystems for climate change adaptation 3) Biodiversity conservation 4) Promotion of sustainable income opportunities 5) Piloting of protection and rehabilitation measures 6) Cooperation between Provinces and National Government 7) Participatory community development The program is in 5 provinces Kien Giang, Ca Mau, An Giang, Soc Trang and Bac Lieu. A sixth component covers policy, capacity and institutional development at national and provincial levels.	\$28,900,000	Mekong Delta Region	2011	2016
Adaptation-Mekong Delta	Mekong Delta Water Management for Rural Development (P113949)	WB	MARD	Project under preparation in 2010. Will be developed through a climate change lens.	\$150,000,000	Mekong Delta Region	2012	2017
Current situation and trend of climate change	Economics of Adaptation to Climate Change (EACC) - Global CC Scenarios	Multi-donor	WB	Under Economic impacts, see the general entry on the EACC. As part of global study, in coordination with MIT and other institutions, the Bank is producing new downscaled CC scenarios, which may be used in the Vietnamese case studies, jointly with NTP scenarios.		Global	2008	2010
Current situation and trend of climate change			USA/Other	Development of Sea Level Rise Scenarios for Climate Change Assessments of the Mekong Delta, Vietnam: Open-file report 2010-1165		Mekong Delta Region		2010
Current situation and trend of climate change	Climate Change Scenarios for Vietnam (2011)	GoV	MONRE-IMHEN	As part of the NTP, MONRE is planning to release improved scenarios by mid-2011 using PRECIS model and better sub-national downscaling of climate models			2010	2011
National Scientific and Technological Program	Linkages of academic and research institutions with Communities on CC	Switzerland/Helvetas		Planned program			2009	2010
Capacity Strengthening-General	Strengthening national capacities to respond to climate change in Vietnam, reducing vulnerability and	UNDP	MONRE-IMHEN	Implementing agencies are "MARD, MONRE". To develop frameworks, mechanisms and capacities in place to inform, guide and coordinate (i) analysis of climate change related risks and formulation of CC adaptation policy responses and investment plans; and (ii) analysis of Green House Gas emissions, and formulation of investment plans and ways to change	\$4,660,000	National	2008	2012

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Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
	controlling GHG emissions			consumer behaviour for low-carbon economic development. Focus in Can Tho, Binh Thuan and Quang Nam Provinces.				
Capacity Strengthening-General	Capacity Building on Climate Change for Civil Society Organisations	Finland/ODA	SRD on behalf of CCWG and VNGO&CC	Implemented by SRD on behalf of CCWG and the network of Vietnamese Non-governmental Organisations (VNGO&CC), funded by Finnish Embassy. Capacity building program for NGO staff across Vietnam through enhanced information access and exchange using CCWG web site and newsletters, training of trainers and short training courses and study tours to ongoing adaptation and mitigation projects. Focus on capacity for adaptation, mitigation and advocacy responding to NGO staff expressed capacity needs.	\$310,000	National	2009	2012
Capacity Strengthening-General	GoV Capacity-building component under WB/DFID partnership (VNCLIP)	UK/DFID	WB	Intended to support GoV with a variety of TA and consulting services to be better able to formulate and implement CC policies. Intended to target MONRE, MOIT, MARD, MPI, and MOF.	\$1,000,000	National	2011	2014
Capacity Strengthening-Agriculture	GoV Capacity-building component under WB/DFID partnership (VNCLIP)	UK/DFID	WB	Intended to support GoV with a variety of TA and consulting services to be better able to formulate and implement CC policies. Intended to target MONRE, MOIT, MARD, MPI, and MOF.		National	2011	2014
Capacity Strengthening-Fisheries	Strengthening Adaptive Capacities to the Impacts of Climate Change in Small-scale Aquaculture	Norway/ODA	NACA	The project Strengthening adaptive capacities to the impacts of climate change in resource-poor small-scale aquaculture and aquatic resources-dependent sectors in the south and south east Asian region also known as "Aqua Climate" aims to strengthen the adaptive capacities of rural farming communities to the impacts of climate change. The project focuses on small-scale aquaculture and related sectors that are comprised largely of poor people who depend on aquatic resources for their livelihoods. The project is working in four countries: Vietnam, Philippines, India and Sri Lanka. It is a three year project funded by the Norwegian Agency for Development Cooperation (NORAD) and coordinated by NACA. The project will map farmers' perceptions and attitudes towards prospective climate change impacts and their adaptive capacities to address these impacts. The project will develop future scenarios based on the current trends, assess the potential adaptive measures for different aquatic farming systems and prioritise better management practices, suggest Codes of Practices and improved methodologies for such systems.		Regional	2009	2011
Capacity Strengthening-Energy	GoV Capacity-building component under WB/DFID partnership (VNCLIP)	UK/DFID	WB	Intended to support GoV with a variety of TA and consulting services to be better able to formulate and implement CC policies. Intended to target MONRE, MOIT, MARD, MPI, and MOF.		National	2011	2014
Capacity Strengthening-Industry	Vietnam Business Council for Sustainable Development: a business-led initiative		Private sector	Funding under negotiation. Supported by VCCI, IUCN and SNV. Purpose is to provide a platform for businesses to share information and experience in relation to low-carbon production and technology, carbon trade, and policy dialogue with Government.			2009	2011
Capacity Strengthening-Urban	Leadership training for VN city officials	WB	WB	Training program of WBI (World Bank Institute); being carried out in Vietnam in late 2009 (Habiba Gitay, TTL); local contact Emanuela Montanari-Stephens			2009	2010

Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
Capacity Strengthening-Natural Disasters	Coping with Disaster and Climate change (CDCC) in Northern Mountains	Denmark/ ODA	CARE	Funded by Danida through CARE Denmark. Builds capacity and facilitates mainstreaming of climate change adaptation and disaster risk reduction into the Program: Civil Action for Socio-economic Inclusion in Sustainable Development for Northern Ethnic Minorities in Vietnam (CASI 3) to ensure sustainable development and enhanced capacity of the ethnic minorities in 5 provinces of Northern Mountains to cope with disasters and climate change. Includes support to NGO capacity building and advocacy in Vietnam through CCWG and other networks. Funding amount is for CC mainstreaming component for three years.	\$450,000	Bac Kan, Lang Son, Thai Nguyen, Yen Bai and Thanh Hoa Provinces	2010	2016
Capacity Strengthening-Natural Disasters	Community Resilience to Natural Disasters in the Mekong Delta	Australia/ AusAID	CARE	The project has built the strengths of communities to identify hazards, assessed their vulnerability and improved their capacity to prepare for and mitigate against natural disasters such as floods, storms, and droughts and helped to optimize their livelihood security during flooding and throughout the year. In three provinces. The funding amount is in A\$5,425,500	\$4,139,660	An Giang, Dong Thap, Long An Provinces	2005	2010
Capacity Strengthening-Community-level	Community based disaster preparedness project	Europe/ODA	VNRC	Funded by EuropeAid and co-funded by the Netherlands Red Cross; implemented by "Vietnam Red Cross, Spanish Red Cross". To reduce negative impact of disasters enhanced by climate change through building adaptation capacity for Red Cross and community. Main components: Awareness, Risk assessment and Disaster risk reduction measures 445,000 Euros Ha Tinh, Quang Binh, Thua Thien Hue, Quang Tri, Ninh Thuan, Binh Thuan	\$1,089,450	Coastal	2007	2010
Capacity Strengthening-Community-level	Building disaster-resilient societies in central Vietnam	Japan/JICA	Japan/JICA	Project activities include (1) Institutional strengthening of DRM agencies, (2) Development of CBDRM manuals and conducting CBDRM in pilot communities, (3) Development of Integrated Flood Management Planning, (4) Development of small-scale, low-cost flood control structures.	\$5,200,000	Hue, Quang Nam, Quang Ngai	2009	2012
Awareness Raising	MediaNet Program	UK/ODA	VNA	Implemented by "VNA, British Council and British Embassy in VietNam". A media project to raise to train journalists on environment issues including CC			2008	2011
Awareness Raising	Integration of contents of climate change response into Education and training curriculum in 2011-2015	UN/Other	MOET	TA from UNESCO. Workshop held on this in July 2010 to present draft plan and project		National	2009	2010
International Cooperation-General Measures	Sector Budget Support to NTP: Adaptation Component	Denmark/ODA	MONRE	The climate change adaptation component will support the implementation of the National Target Program to Respond to Climate Change under the Ministry of Natural Resources and Environment at the national level and specifically in the two climate vulnerable provinces of Ben Tre and Quang Nam. The objective is to enhance Vietnam's capacity and efficiency in response to climate change in order to ensure sustainable development, protect people from its harmful consequences, prevent and reduce risks posed by Climate Change while joining the efforts of the international community's to mitigate its impacts, and protect the global climatic system.	\$40,000,000	National and Quang Nam, Ben Tre	2009	2014

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Mainstreaming	Mainstreaming CC into socio-economic development planing	UNDP	MPI	Support to MPI in mainstreaming CC into socio-economic development planning (national; and provincial). This includes: (i) equip decision-makers and public with knowledge and tools to change behavior on SD and CC/Energy; and (ii) strengthen capacity for sustainable development planning, including CC and develop a more effective coordinated institutional framework for SD and climate change/energy	\$3,600,000		2008	2012
Mainstreaming	Policy measures for investments for GHG emission control	UNDP	MONRE	Implementation by both MONRE and MARD. Design GHG emissions control investment projects in 3 provinces that relate to carbon trade, and build CDM regulations. Pilot projects in three provinces to experiment with specific approaches to GHG mitigation			2008	2012
Mainstreaming	Capacity building on mainstreaming climate change issues into administrative and legislative system in Vietnam	APN	IUCN	A series of policy analysis workshops on climate change in Vietnam, in line with the NTP.	\$50,000		2009	2010
Mainstreaming	GoV Capacity-building component under WB/DFID partnership (VNCLIP)	UK/DFID	WB	Intended to support GoV with a variety of TA and consulting services to be better able to formulate and implement CC policies. Intended to target MONRE, MOIT, MARD, MPI, and MOF.		National	2011	2014
Low Carbon Growth Planning	Scoping study for Low Carbon Growth Strategy for Vietnam	UK/DFID	MPI	Study underway in late 2010 under responsibility of CIEM of MPI. Preparatory to large effort to be financed by DFID/WB Partnership starting in 2011.			2010	2011
Mitigation-General	Vietnam: Second National Communication to the UNFCC	UNEP/GEF	MONRE	To apparently include data from 2000. Was published in late 2010.	\$405,000		2006	2010
Mitigation-General	The Project for Capacity Building for National Greenhouse Gas Inventory in Viet Nam	Japan/JICA	Japan/JICA	Strengthening the capacity to prepare accurate, reliable and periodical national GHG inventories. National inventories for the years 2005 and 2010 will be prepared during the project. In January 2011 was still under preparation but Japanese experts in place in Vietnam.		National	2010	2013
Mitigation-Agriculture	Vietnam National CFC & Halon Phase Out (P083593)	WB	MARD	Part of the Project is to phase out methyl bromide, an agricultural pesticide which causes ozone depletion and is a potent GHG	\$1,500,000	National	2006	2010
Mitigation-Agriculture	Livestock Waste Management in East Asia Project (P079610)	WB/GEF	MARD	Vietnam component addresses the issue of reducing GHG emission by capturing methane. WB, in collaboration with MONRE and many other partners, are planning an international workshop on "Water Pollution Reduction and Climate Change Mitigation" with relationship to the livestock sector in Guangzhou China from September 1 to 3, 2009.	\$1,000,000	Regional	2006	2010
Mitigation-Agriculture	Transfer and Demonstration of Medium to Large Scale Biogas Digesters in Viet Nam (proposed)	ADB/GEF	MARD	Project Objective: The objective of the project is to support pilot testing and market development of energy efficient medium to large-scale biogas plants (MLBGP) in Viet Nam, as a basis for biomass energy development to reduce pollution and greenhouse gas (GHG) emissions through an integrated agricultural waste management approach.	\$2,600,000		2010	2013
Mitigation-Agriculture	Green Future (Generate Rural Employment by Enabling NGOs (and	Ford Foundation	NGO (various)	Project or study Details: 1. Test and develop the local production and use of sources of renewable energy bamboo charcoal bars, hydroelectricity, biogas, energy saving stoves, ...) for local processing chains and farmers; 2.	\$248,600	Thanh Hoa Province	2009	2011

Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
	Enterprises Resources) Fostering Sustainable Technologies Using (bamboo wastes as) Renewable Energy)			Develop eco-friendly products from bamboo by-products (sawdust mushrooms, organic fertilizer...) to improve the supply chain, increase farmers income and reduce the pressure on bamboo plantations and natural forest; 3. To raise community awareness on energy saving / environment protection, 4. To Improve capacities of VNGOs in sustainable development, livelihoods, more effective use of energy to limit pollution and climate change. Also implemented by CRD, a Vietnamese NGO.				
REDD	"Golden Forest" Project	Netherlands/SNV	Netherlands/SNV	Help farmers who have not worked in forestry so far participate in CDM planting on suitable lands provided at HongTrung commune; Collect experiences on requirements of an AR-CDM project that can be applied for the complete AR-CDM project; Publish guidance and lesson learnt documents for use in developing AR-CDM project in Vietnam. A Luoi District	\$57,000	Thua Thien Hue	2006	2010
REDD	REDD Participation Grant	WB	MARD	Agreement has been signed between WB (FCPF) and MARD to provide funding to develop a full REDD proposal for Vietnam. Implementation details under discussion. This initial grant could be followed by a further grant of about \$3.2 million.	\$200,000		2008	2010
REDD	Forest Carbon Estimation Method Study	Japan/ODA		"Study on the development of forest carbon estimation method for the implementation of REDD in tropical countries (Viet Nam)". In Dak Lak, Dak Nong, Dong Na, and Lam Long Provinces.		Southern	2008	2013
REDD	Improved Forest Management: Integrating VCS and FSC	Rainforest Alliance	MARD	Funding from IKEA. Implemented by DARD, SNV, WWF, and RA. Under the VCS a new forest category 'improved forest management' offers potential in the Vietnamese context. This project with WWF and technical support from RA will examine the possibilities and links to FSC and carbon	\$120,000	Quang Tri	2009	2011
REDD	UN-REDD	Multi-donor	UN/Other	Largely financed by Govt. of Norway, a number of activities underway in Vietnam. Implemented by UNDP, FAO, and UNEP. Agreement signed by PM in July 2009.	\$4,300,000	National	2009	2010
REDD	Potential Forests and Land Related to "Climate Change and Forests"	Japan/JICA	Japan/JICA	Identify potential areas for A/R CDM, REDD and other non-UNFCCC carbon sequestration approaches. Project components: 1) develop digital map, 2) model land survey, 3) develop of interim-RELS and cost-benefit analysis, 4) provide information to potential investors.	\$2,000,000	National	2009	2011
REDD	Pro Poor REDD Pilot Project	UK/Other	Netherlands/SNV	Funded by Darwin Foundation. Implemented also by MARD and IIED. Piloting REDD in South Viet Nam in the Cat Tien Landscape; following the VCS methodology and focusing on pro poor aspects.	\$250,000	Cat Tien	2009	2011
REDD	Poverty and sustainable development impacts of REDD architecture	Norway/ODA	Netherlands/SNV	NORAD-funded project; implemented by IIED, UMB (Norwegian University of Life Sciences), etc. but SNV is implementing organization in Vietnam. A research project analysing key determinants of the sustainable development impacts of REDD; initial focus with IIED is on estimating the "economic costs of REDD".	\$220,000	National	2009	2012
REDD	Sustainable Land and Forest Management	UNDP	MARD	Review and formulate policies, policy instruments and procedures for reducing forest degradation through carbon financing. Improve the management of degraded forests to protect and enhance carbon stocks and reduce GHS emissions	\$2,300,000		2010	2013

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Theme or sub-theme	Name of Project	Source of Funds	Implementing Agency	Project or Study Details	Funds allocated	Location	Start	End
REDD	Collecting Information and Analyzing Trends of Forest Resources and Forest Carbon Stock for Establishment of the Interim Baseline Reference Scenarios	Finland/ODA	MARD	Finland provides TA to DOF of MARD to support development of the National REDD Program of Vietnam, particularly on component of Collecting Information and Analyzing Trends of Forest Resources and Forest Carbon Stock for Establishment of the Interim Baseline Reference Scenarios. Analysis of historical trends since 1991.	\$223,000	National	2009	2010
REDD	Development of Management Information Systems for the Forestry Sector (FORMIS)	Finland/ODA	MARD	The overall objective of the project, with Department of Forestry (DOF) of MARD, is to build the modern forest information system from central to local level, in order to provide accurate information for decision making for forest sector at all levels. The project has 5 components, of which a component on Technical Assistance in project M&E, information dissemination and REDD development interventions in MARD and FSSP CO/TFF. This component is to build capacity in planning Climate Change & REDD for MARD.	\$4,300,000	National	2009	2012
REDD	REALU: Reducing Emissions from All Land Uses	Norway/ODA	ICRAF	Funded by NORAD, project is carried out by a number of partners: ICRAF, MONRE (GDLA), SFMI, and NIAPP. Consists of 2 phases: i) desk review and consultation Sept. to Nov. 2009 and ii) case study in Dak Nong Province on land conversion issues, conducted by analysis of remote sensing and stakeholders' workshop.		National and Dak Nong Province	2009	2010
REDD	Developing community carbon pools for Reduced Emissions from Deforestation and Forest Degradation, plus enhancing forest carbon stocks (REDD+) projects in selected ASEAN countries.	Europe/ODA	NGO (various)	In Vietnam in Vietnam (Hoang Lien Mountains and Kon Tum, Central Highlands); Overall objective: To contribute to reduce deforestation and forest degradation through forest improved forest governance and the development of finance/incentive mechanisms that provide benefits to forest-dependent local and indigenous people; Specific objective: To strengthen active participation of local governments and local communities in REDD+ projects in Cambodia, Indonesia, the Philippines and Vietnam.	\$3,062,000	Regional	2011	2014
Mitigation-Energy-Power Sector	Gas Sector Development Framework		World Bank	ESMAP Report 52865-VN. Produced by World Bank and MOIT. ESMAP is the Energy Sector Management Assistance Program.				2010
Mitigation-Energy-Power Sector	Carbon Capture and Storage (CCS) Regional Program	ADB	ADB	In 2011 this regional TA study beginning (Vietnam, Thailand, Philippines, Indonesia) looking at emission sources, storage sites, etc.			2011	2011
Mitigation-Energy-Renewables	Wind Energy	Germany/ODA	Germany/ODA	Project goal: Establishment of a legal framework and improvement of technical capacities for grid-connected wind power development in Vietnam; Activity areas: (i) establishment of legal framework conditions for grid-connected wind power; (ii) Promotion of advanced wind power technologies; and (iii) consulting services for selected wind power projects. GTZ project.	\$1,400,000	Binh Thuan and Ninh Thuan Provinces	2009	2011
Mitigation-Energy-Renewables	Vietnam Renewable Energy (P103238)	WB	MOIT	To increase the supply of least-cost electricity to the national grid from renewable energy sources on a commercially sustainable basis.	\$239,400,000		2009	2014

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Mitigation-Energy-EE	Energy-Efficient Public Lighting	UNDP/GEF	VAST	To build awareness and strengthen capacity of related institutions concerning research and development, design and training, and management development skills for public lighting; assist manufacturers to invest in manufacturing Energy Efficient (EE) equipment which will achieve international standards of quality; complement ongoing activities in setting up national lighting standards on public lighting and lighting products and EE lighting equipment and accessories, and in strengthening the capacity for standard enforcement; establish effective delivery mechanisms to commercialise EE public lighting systems. And in selected provinces. Preparation phase was 2000-2004 with VAST (\$330,000). Particularly in Ha Noi, HCMC, Hai Phong, Quy Nhon.	\$3,000,000	National	2005	2010
Mitigation-Energy-EE	VN-GEF Rural Energy II (P080074)	WB/GEF	MOIT	Financed under GEF CC window to Reduce green house gas emission by improving and sustaining the energy efficiency of LDUs	5,250,000		2004	2011
Mitigation-Energy-EE	Barrier Removal to implement cost effective Energy Efficient Standards and labeling (BRESL)	UNDP	MOIT	Support to improvement/new development of national energy efficient standards for 6 group of electrical appliance Support to compulsory energy efficient labeling schemes Develop capacity of national authority in harmonizing of national standards with regional and international ones.	\$1,000,000	Regional	2008	2012
Mitigation-Energy-EE	Phasing out Incandescent Lamps through Lighting Market Transformation in Vietnam	UNEP/GEF	MONRE	lead INSPONRE (MoNRE), MoIT, MOST; Vietnam based IL/ESL producers; and UNEP/DTIE. Phasing-out of Incandescent Lamps (ILs) production and sale through the transformation of the lighting products market as well as the promotion of high quality Energy Saving Lamps (ESLs) in Vietnam 1. Local Lighting Industry Capacity Enhancement Program 2. Improved QA/QC Framework 3. ESL Market Transformation & Consumer Education & Awareness 4. National Policy & Institutional Support Program towards Phasing-out of ILs & Promotion of ESLs 5. Project Performance & National Impact M&E System	\$10,975,000		2008	2014
Mitigation-Energy-EE	Energy Efficiency Improvement in the Public Building in VN	UNDP/GEF	MOC		\$2,000,000		2010	2014
Mitigation-Energy-EE	Sector Budget Support to NTP: Mitigation Component	Denmark/ODA	MOIT	The climate change mitigation component (of Denmark's overall budget support to NTP) will support climate change mitigation through the Vietnam Energy Efficiency Program under the Ministry of Industry and Trade. The objective is to assist the improvement of energy efficiency in Vietnamese enterprises and contribute to sustainable development and a low carbon economy.		National	2009	2014
Mitigation-Energy-EE	Energy Efficiency and Renewable Energy Promoting Project	Japan/JICA	Japan/JICA	Provides assistance in the form of two-step loan through the Vietnam Development Bank (VDB) to companies that handle such goods as steel, cement and food that consume a large quantity of energy. The project will finance the medium- and long-term investments required to promote the use of energy-saving devices and renewable energy.	\$50,000,000	National	2010	2012
Mitigation-Energy-EE	Vietnam: Expanding Opportunities for Energy Efficiency.		World Bank	Paper by Robert P. Taylor, Jas Singh, Alberto U. Ang So, The World Bank, 2010.				2010

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Mitigation-Energy-EE	Background Paper on Energy Efficiency in Vietnam.	France/ODA	AFD	Report commissioned by Afd, 2010. Includes a matrix of all EE activities in Vietnam over last 10 years				2010
Mitigation-Energy-EE	Energy Efficiency Project		World Bank	Project under development in 2010 for FY2013. With MOIT.			2013	2018
Mitigation-Industry	Waste Heat Recovery for Power Generation (HRPG) in Vietnam's Cement Industry (proposed)	UNDP/GEF	MOST	Project Objective: Increased level of investment in the transfer, deployment and diffusion of the technology on waste heat recovery for power generation in the cement sector in Vietnam. Full-sized GEF project in CC window proposed in August 2009.	\$2,600,000		2009	2015
Mitigation-Urban	Hanoi Urban Transport Project (P085393)	WB/GEF	Local Governments	Implemented by Hanoi PC. Consisting of three components: a BRT system, a road infrastructure and sustainable urban planning, and institutional development. Objective is to ensure environmental sustainability and reduce GHG emissions.	\$9,800,000	Hanoi	2007	2013
Mitigation-Transport	Hanoi Urban Transport Development Project GEF component (P085393)	WB/GEF	Local Governments	Implemented by PC Hanoi. To decrease carbon emission from mobile sources in Hanoi, by (a) developing the public transport system to enable a sustainable modal shift to public transport, (b) helping Hanoi authorities to integrate urban planning with transport needs, and (c) promoting the development of transport demand management based methods.	\$9,800,000	Hanoi	2007	2013
Mitigation-Transport			ADB	Reducing Carbon Emissions from Transport Projects. Reference Number: EKB: REG 2010-16. Published July 2010.		Regional		2010
Financial Mechanisms-General	Small Grants Program of Global Environment Facility (b)	UNDP/GEF	Local Governments	To provide small grants for projects, with the aim of: demonstrating community-level strategies and technologies that could reduce threats to the global environment if replicated over time; drawing lessons from community-level experience, and supporting the spread of successful community-level strategies and innovations among Community Based Organisations (CBO), NGOs, governments, development aid agencies, the GEF, and others working on a larger scale; building partnerships and networks of local stakeholders to support and strengthen community, CBO, and NGO capacity to address environmental problems and promote sustainable development.	\$1,500,000		2003	2010
Financial Mechanisms-General	Vietnam Innovation Day Climate Change Grants for 2010	Multi-donor	WB	With financing from various donors, small grant program to finance innovative ideas to address climate change			2010	2010
Financial Mechanisms-General	GoV Capacity-building component under WB/DFID partnership (VNCLIP)	UK/DFID	WB	Intended to support GoV with a variety of TA and consulting services to be better able to formulate and implement CC policies. Intended to target MONRE, MOIT, MARD, MPI, and MOF.		National	2011	2014

Annex V. GHG Emissions and Mitigation

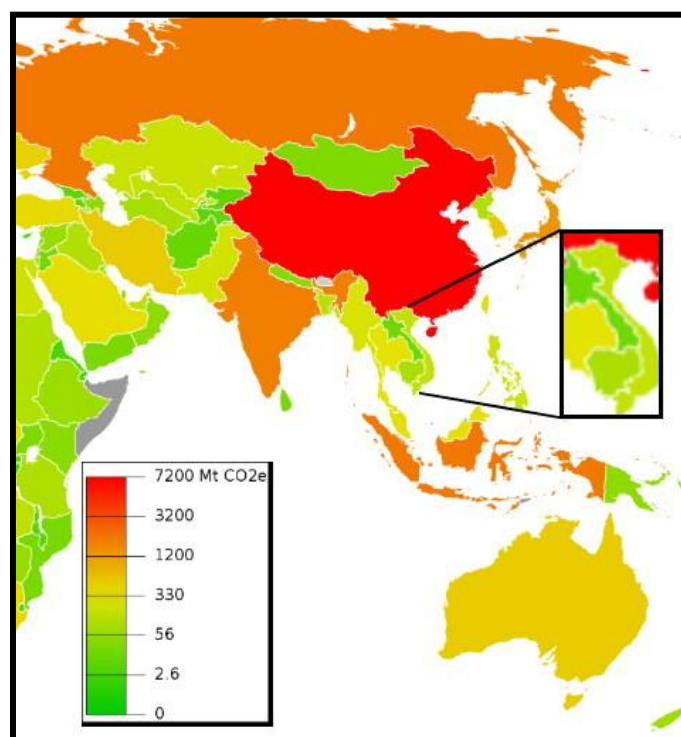
Both Viet Nam's total and per capita GHG emissions are low compared to other developed economies (Figure 1). Agriculture represented the largest share of emissions in the last 15 years, but by 2030 emissions from energy supply is expected to account for 49% of total emissions, as coal is used to fuel the economy's rapid growth. Its contribution to climate change is also expected to increase significantly in the coming years due to it being one of the fastest growing economies in the Asia Pacific. Emissions are expected to growth at over 3% per annum from 2005-2030, reaching 387 Mt in 2030, excluding emissions from LULUCF. The government of Vietnam has made significant progress in adopting legislation for GHG mitigation. In addition to the NTP-RCC, renewable energy and energy efficiency regulations have been pit in place to begin to curb emissions. As its GHG emissions have increased, it has become a preferred target of emission reduction projects and programs financed by multilateral and bilateral agencies and the carbon markets. Despite these efforts, significant abatement potential in Vietnam remains. Based on available data, existing and planned projects are only likely to harvest 12% of available abatement potential in the medium term (2015-2030).

Among the existing opportunities for additional mitigation efforts in the ARD sector are:

- Technical capacity building for emerging REDD+ private sector companies;
- Efficient cook stove programs (including testing of stove types, training of producers and vendors, quality labels and a public awareness initiative);
- Capacity building program on water management in rice cultivation with MARD; and
- CDM Program of Activities linked to agricultural wastes.

(Tatrallyay and Stradelmann, 2011)

Figure 1. GHG emissions by country in 2005, including land-use change



Source: http://en.wikipedia.org/wiki/File:GHG_by_country_2005.png. GHG emission by country in millions of metric tons of CO₂ Equivalent. Data from the [CAIT 8.0 dataset](#). CO₂ equivalent emissions from land use change and emissions of CO₂,CH₄,N₂O,PFC,HFC, and SF₆ are included. Bunker fuel for ships is not.

