CLIMATE CHANGE ADAPTATION SURVEY

QUANG NAM PROVINCE • CENTRAL REGION • VIETNAM

Climate Change Adapation Survey

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The popular term "global warming" is a misnomer. It implies something uniform, gradual, mainly about temperature, and quite possibly benign. What is happening to global climate change is none of those. It is uneven geographically. It is rapid compared to ordinary historic rates of climatic change, as well as rapid compared to the adjustment times of ecosystems and human society. It is affecting a wide array of critically important climatic phenomena besides temperature, including precipitation, humidity, soil moisture, atmospheric circulation patterns, storms, snow and ice cover, and ocean currents and upwelling. And its effects on human well-being are and will undoubtedly remain far more negative than positive. A more accurate, albeit more cumbersome, label than "global warming" is "global climatic disruption."

(Ref: Hot, Flat and Crowded, Thomas L. Friedman, 2008.)

Acronyms

ADB	Asian Development Bank
CBC	Center for Business Entities and Community Development
CCA	Climate Change Adaptation
CPC	Commune People's Committee
DANIDA	Danish International Development Agency
DARD	Department of Agriculture and Rural Development
DMWG	Disaster Management Working Group
DOC	Department of Construction
DOPH	Department of Public Health
DPC	District People's Committee
EMW	East Meets West Foundation
FINNIDA	Finland International Development Agency
GCC	Global Climate Change
GOV	Government of Vietnam
HH	Households
INGO	International Non-Governmental Agency
IPCC	International Panel on Climate Change
MARD	Ministry of Agriculture and Rural Development
MONRE	Ministry of Natural Resources and the Environment
NGO	Non-Governmental Agency
NTP	National Target Program (for Climate Change Adaptation)
VND	Vietnam Dong ($1 USD = VND 16,000, as of February 6, 2009)
PPC	Provincal People's Committee
SPEAR	Subproject Environmental Assessment Report
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

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Quang Nam Province
Location of the Climate Change Adaptation Survey
CHINA
CHINA
LAOS
THAILAND
CAMBODIA
Gulf of Tonkin
South China Sea
Gulf of Thailand
Hanoi
Vientiane
Bangkok
Phnom Penh
Ho Chi Minh City
Hainan Dao
Da Nang
Hue
Quang Ngai
Tam Ky
Vietnam
International boundary
National capital
Railroad
Road
0 50 100 Kilometers
0 50 100 Miles
Lambert Conformal Conic Projection, SP 20:00 N / 12:40 N
Names in Vietnam are shown without diacritical marks.

Part 1
Executive Summary

The **East Meets West Foundation (EMW)**, financed by a $99,000 grant from the **Ford Foundation (Ford)**, has recently completed an extensive field survey of 125 households in 25 communities in Quang Nam Province in the Central Region of Vietnam, and held joint meetings with representatives of those communities and the local government authorities. As stated in the agreement between EMW and Ford, direct consultation with the people who will most likely be affected by **Global Climate Change** (GCC) is a critical aspect of dealing with this issue.

Survey results were then used to develop a model program for helping communities and local government planners and implementing agencies to better deal with global climate change adaptation. Note that this study and the proposed ensuing project do not address climate change mitigation. Mitigation focuses on reducing greenhouse gas emissions to reduce the extent of global warming.

The main outcomes of the **Climate Change Adaptation Survey** are to:

- Assess perceptions of local communities and local government authorities in the Central Region of Vietnam about the impacts of GCC.
- Identify appropriate and cost-effective solutions that local communities can successfully adapt to minimize climate change impacts, meaning "taking the right measures to reduce negative effects of climate change (or exploit the positive ones) by making appropriate adjustments and changes." [1]
- Assess meteorological, hydrological and other related data, develop a program to identify cost-effective strategies for GCC adaptation at the community level in the Central Region of Vietnam, and other areas as funding permits.

The survey results are based on: a) consultations in 25 joint community meetings, each attended by about 30-40 community members, EMW staff, and our local partner, the **Center for Business Entities and Community Development (CBC)** and b) 125 individual household surveys.

We conducted a series of informational discussions about GCC impacts, adaptation strategies and mapping exercises with community members and local government officials. The purposes of these discussions were to:

- Help participating community members and local government officials to better understand the causes and impacts of GCC.
- Develop and refine cost-effective measures to minimize GCC impacts, especially for low-income community members who are most vulnerable to those impacts.

[1] Climate Change: Impacts, Vulnerabilities, and Adaptation in Developing Countries, United Nations Framework Convention on Climate Change (UNFCCC), 2007.

- Expand the capabilities of community members and local government officials to work together to adopt effective strategies that complement their many years of experience in dealing with GCC impacts.

Two workshops will be held in Quang Nam and Hanoi in 2009 to present and discuss the results of these surveys and consultations. The meeting participants will include representatives of the communities surveyed, local government officials, national government officials, and representatives of the international donor community, who are likely to be prospective sources of financing for the implementation of the proposed program that will be developed from the survey analysis and resulting recommendations (see Section 8 of this report).

Part 2
Purpose and Background of the Global Climate Change Survey

The purpose of this survey was to assess the knowledge and perceptions of mainly rural communities in the **Central Region of Vietnam** about the impacts of GCC. The objective is to use this information and analysis to prepare a development program to address the specified concerns of families located within the survey areas, and eventually beyond. The survey was funded with a $99,000 grant from the Ford Foundation to develop a pilot action research program to deal with the effects of climate change for Vietnam's most vulnerable communities.

With the results of this study, EMW will be able to work with participating communities and the local authorities to assess how best to help poor and vulnerable communities in rural Vietnam to develop demand-driven and affordable strategies to minimize the adverse impacts of GCC. As the program implementation progresses, the results will help influence local and national policy by identifying successful climate change adaptation strategies and lessons learned, which will then be disseminated through local and regional workshops focused on community development, community planning and construction.

"With the results of this study, EMW will be able to work with participating communities and the local authorities to assess how best to help poor and vulnerable communities in rural Vietnam to develop demand-driven and affordable strategies to minimize the adverse impacts of global climate change."

According to the **International Panel on Climate Change** (IPCC), projected changes in climate will have both beneficial and adverse effects at the regional level, for example on water resources, agriculture, natural ecosystems and human health. The larger and faster the changes in climate, the more likely it is that adverse effects will dominate. Increasing temperatures are likely to increase the frequency and severity of weather events such as heat waves and heavy rainfall. Increasing temperatures could lead to large-scale effects such as rising sea levels due to melting of large ice sheets, with major impacts on low-lying regions throughout the world.

PHOTO 1
Community Meeting in Quang Nam Province to Discuss Climate Change Impacts

The IPCC estimates that the combined effects of ice melting and seawater expansion from ocean warming will cause the global mean sea level to rise by between 0.1 and 0.9 meters between 1990 and 2100. In Bangladesh alone, a 0.5-meter sea-level rise would place about 6 million people at risk from flooding. The IPCC projects that the average global surface temperatures will continue to increase to between 1.4 centigrade degrees and 5.8 centigrade degrees above 1990 levels, by 2100.[2] While Vietnam is not in quite as difficult a situation as Bangladesh, climate change related impacts are becoming more frequent and intensive, especially in the coastal areas of Vietnam, and in particular in the Central Region, where many EMW programs are being carried out.

2.1. Kinds of Survey Data Collected

CBC survey teams, supplemented by EMW staff, carried out detailed questionnaires at the community and local government levels to collect the following kinds of information:

- General information about the community surveyed. Includes location and demographics (e.g., age, sex, income level).
- Assessment of natural disasters and/or climatic changes. Includes overall impacts thereof, particularly upon poor and vulnerable communities. People interviewed were asked about their perceptions of the changing frequency, intensity and impacts of floods, typhoons, landslides, heavy rainfall causing localized flooding, drought, deforestation, and rising sea level. Although earthquakes are not climate change related, people were also asked about earthquakes.

[2] From a statement by the International Panel on Climate Change (IPCC).

PHOTO 2
Oceanside Community Where Some Surveys Were Conducted

- Specific impacts. Damage to or loss of businesses, homes and property, crops and animals, and injury to or deaths of family members, etc.
- Damage to service infrastructure. Examples include schools, health clinics, water systems, roads, dikes, electrical power, etc.
- Damage to natural resources. Examples include forests and groundwater (e.g., through salinization from saltwater breaking through ocean levees, and then flooding fields and possibly penetrating into the underlying groundwater).
- Government policies and procedures. Policy, training, planning, community information (e.g., communication and warning), material support, designed to respond to the various kinds of impacts listed above. These procedures are designed not only to minimize the adverse impacts of natural disasters, but also to help citizens plan and prepare for (and if necessary, implement) effective measures to deal with a wide range of emergency situations, GCC-related and otherwise.
- Community recommendations on adapting to climate change. Recommendations from communities and individuals on how best to integrate government, community, and family resources to minimize negative climate change impacts, and on what kind(s) of training would be appropriate.

2.2. Public Consultation and Information Dissemination

Community consultation and information dissemination are very important aspects of any rural development program, and GCC adaptation is no exception. When carrying out this survey, EMW and CBC staff worked closely with community members and the local authorities to make certain that the purpose of the survey was clearly understood, and that the results of the survey truly reflected the opinions and perceptions of the household respondents and local authorities.

EMW has already developed a detailed consultation process that has been used (and periodically revised) for more than 20 years. It has been very successful in mobilizing extensive community cash and in-kind labor contributions that demonstrate beneficiary willingness to pay for improved infrastructure services, such as those that are likely to be provided through this proposed GCC adaptation program.

Frequent interaction with the local authorities at the provincial, district, commune and hamlet levels is one important reason for the success of EMW's rural development programs, including community health, education, water supply and sanitation, schools, hospitals, dental clinics, etc. These activities have been a catalyst for developing strong, cooperative relationships with the local authorities at all levels. These working relationships with all program stakeholders (e.g., households, communities, and the local authorities) are a critically important component to help ensure cooperative decision-making in planning, project design, implementation, and long-term sustainability of the proposed GCC adaptation program.

> **"Community consultation and information dissemination are very important aspects of any rural development program, and global climate change adaptation is no exception."**

Part 3
Summary of Environmental Conditions in Quang Nam Province

Nearly 75% of Vietnam consists of low mountains and hilly regions. Regions with elevations less than 1,000 meters above sea level are 85% of the territory. Mountainous regions more than 2,000 meters above sea level are only 1%. The highest mountain ranges are all located in the west and northwest. Nearer to the East Sea the mountain range is lower and ends with a coastal strip of lowland. This area is where the population tends to be more concentrated, and where many of the surveys were conducted **(see Photo 2)**.

Despite abundant groundwater reserves, less than 5% of those reserves are exploited countrywide. In the Central Highlands, groundwater is exploited heavily for irrigation of cash crops, resulting in frequent shortages of water in parts of this region. The North Central and South Central areas (including the project provinces of Quang Nam, Quang Tri, Quang Binh and Thua Thien Hue) have among the least amount of exploitable groundwater compared to other regions.

Communities in Quang Nam Province use groundwater from shallow and deep wells, surface water from rivers and streams, and to a lesser extent rainwater (usually from simple roof catchment systems). Quang Nam is relatively dry. Surface water is often of poor quality due to turbidity, and because of surface runoff that could include agricultural chemicals such as herbicides, pesticides and fertilizers. Climate change impacts, especially increased variability of rainfall to replenish both groundwater and surface water sources (rivers, streams, lakes, etc.) may well adversely impact the quality and quantity of those

local water sources.

The Central Region of Vietnam currently suffers from water shortages and saltwater intrusion during the dry season, flooding in the wet season, and is regularly hit by natural disasters (e.g., typhoons), which besides the community health and social impacts, are a constraint on economic growth. Much of the existing water resources infrastructure in the region is performing below its potential and requires upgrading. The government has placed high priority on development of water resources infrastructure in the region to expand irrigation and flood control systems and to mitigate the effects of natural disasters. Donor agencies (e.g., Asian Development Bank, World Bank, and Finland International Development Agency) have provided fairly limited water and sanitation infrastructure thus far in Quang Nam. However, planned projects will develop new and expand existing infrastructure to provide more reliable water supplies in rural areas, improve flood control and management, and increase agriculture production.[3]

Quang Nam Province has an interlacing river system of about 900 km in length spreading out in all the districts. The two main river systems include the Thu Bon River in the north, and the Tam Ky River in the south, which flows to the East Sea with river mouths at Cua Dai (Hoi An Town) and An Hoa (Nui Thanh District). All the major rivers (including A Vuong, Kon, Cai, Tranh, Vu Gia, Thu Bon, Vinh Dien, Ba Ren, Truong Giang, Ly Ly, and Tam Ky) originate from the western mountainous areas, and run down to the sea. The river water reaches the highest level in early winter, and the lowest level in May and June. There are several large lakes such as Phu Ninh, Khe Tan, Viet An, Thach Ban, Vinh Trinh, Phuoc Ha, Cao Ngan, etc. in Quang Nam. These will be of increasing importance during the drought periods that are anticipated to occur as one of the impacts of climate change.

Part 4
Key Findings and Results

4.1. Selection of Survey Communities

Based on the criteria set out for the selection of local communities to participate in meetings and needs assessments on adapting to increasing natural disasters and climate changes, 25 local communities were selected. The selected local communities are representative of the most vulnerable ones, typically regions that are heavily and regularly affected by severe weather and natural disasters. These regions are also classified according to the characteristics of geographical area, main source(s) of income, culture, ethnicity, etc. The selected communities include poor, average and better-off communities, some of which have previously participated in other projects and programs of East Meets West. Local communities selected for inclusion in the surveys are representative of the three geographical regions of Quang Nam, as described in the following section.

[3] Central Region Water Resources Management Project, Asian Development Bank, Manila, 2003.

TABLE 1
COMMUNITIES GROUPED BY GEOGRAPHIC LOCATION

NO.	COMMUNITY	COMMUNE	DISTRICT	MAIN INCOME SOURCE
COASTAL AREA				
1	Tân An	Bình Minh	Thăng Bình	Ocean Fishing/Aquaculture
2	Bình Trung	Tam Hải	Núi Thành	"
3	Sâm Linh	Tam Quang	Núi Thành	"
4	Hội Sơn	Duy Nghĩa	Duy Xuyên	"
5	Trung Phường	Duy Hải	Duy Xuyên	"
6	Hà Bình	Bình Minh	Thăng Bình	"
7	Trung Thanh	Tam Thanh	TX Tam Kỳ	"
8	Vĩnh Bình	Tam Thăng	TX Tam Kỳ	Aquaculture/Paddy Rice
LOWLAND DELTA				
1	Bằng An Tây	Điện An	Điện Bàn	Paddy Rice Production
2	Trung Vĩnh	Quế Xuân 1	Quế Sơn	"
3	Đông Bình	Duy Vinh	Duy Xuyên	"
4	Thi Lai	Duy Trinh	Duy Xuyên	"
5	Lạc Thành Tây	Điện Hồng	Điện Bàn	"
6	Bình Khương (4)	Bình Giang	Thăng Bình	"
7	Cẩm Phú 1	Điện Phong	Điện Bàn	"
8	Bằng An Đông	Điện An	Điện Bàn	"
9	Phú Bình	Tam Xuân 1	Núi Thành	"
10	Tiến Thành	Tam Tiến	Núi Thành	"
MOUNTAINS				
1	An Xuân	Phú Thọ	Quế Sơn	Paddy Rice / Forestry
2	Châu Lâm	Bình Trị	Thăng Bình	"
3	Thôn 2	Trà Giang	Bắc Trà My	"
4	Thạnh Đại	Đại Hưng	Đại Lộc	"
5	Trấn Dương	TT Trà My	Bắc Trà My	"
6	Hà Tân	Đại Lãnh	Đại Lộc	"
7	Thôn 4	Quế Thuận	Quế Sơn	"

4.2. Coastal Region

Local communities selected as representative of the coastal region are those located in lowland areas with few agriculture activities, and little crop cultivation, or cattle and other livestock raising. Much of the land is sandy, and the groundwater is often salty. The main source of income is the production and processing of seafood, and related products such as fish sauce. Average per capita income ranges from VND 2,400,000 ($150 USD) per person per year (e.g., in Trung Phuong Hamlet, Duy Hai Commune, Duy Xuyen District) to VND 3,600,000 ($225 USD) per person per year (at the hamlets of Sam Linh, Tam Quang, Nui

Thanh). Economic activities such as fish sauce production and other small businesses like agricultural supplies account for a relatively modest portion of the total income (around 10%). Every year this area is affected by typhoons, floods and flood tides that cause considerable damage in terms of loss of human life, damage to fishing equipment (boats, engines, electronic navigation devices, etc.), houses, public buildings, businesses, water systems, roads, and other rural infrastructure and services.

4.3. Lowland Delta Region

Local communities selected as representative of lowland regions are located along the coast stretching from Nui Thanh District to Tam Ky City to Thang Binh, Duy Xuyen, and Dien Ban Districts, and Hoi An Town. Because of the low-lying and generally fertile land, and the general availability of good water resources for irrigation, the main source of household income is agricultural production such as growing rice, maize, beans, and vegetables, and raising livestock such as cattle, dairy cows, pigs, and chickens. Since industrial and service activities account for only a relatively small portion of the economy, per capita income is generally low (VND 3,000,000 or $187 USD per year), at Phu Binh Hamlet, An Xuan 1 Commune, Nui Thanh District, leaving very modest reserves for developing other economic activities.

The EMW / CBC research team further divided the 25 communities selected for study into three groups, based on features such as geography, topography and main source of household income. These groups included communities in the coastal, lowland delta, and mountainous areas, as listed in **Table 1**.

4.4. Mountainous Region

Communities selected as representative of this region are located in the Bac Tra My, Que Son and Dai Loc Districts. Due to immigration, the ethnicity is very diversified. The main ethnic minority groups include the K'Ho, Tay, Nung and Kinh. The main source of family income is agriculture. Service activities are very few and widely distributed. As a result, the average income per capita is relatively low (VND 3.6 million or $225 USD) per year, at Tran Duong Hamlet, Bac Tra My town, Bac Tra My District, for example. Therefore, their capability to successfully adapt to the impacts of natural disasters such as floods and landslides (which occur regularly in the mountainous areas) is typically limited. **Table 1** summarizes the primary income sources for each of the geographic areas studied.

Part Five
Climate Change Impacts

While "weather" refers to all phenomena occurring in the atmosphere at a given time, "climate" refers to atmospheric conditions over long periods of time. Weather can be highly variable over short periods; up until recently, climate has been considered stable over very long periods. In fact, the rate of climate change appears to be increasing, causing weather

changes over both the short and long term. In order to identify types of natural disasters and other weather events as well as their impacts on Quang Nam Province, the survey team applied the following methods:

- Gathering information on natural disasters and severe weather events. Documents were obtained from government organizations working in the fields of natural disaster prevention, reducing hunger and poverty alleviation at provincial and district levels, such as the: Standing Committee for Flood and Typhoon Prevention and Protection; Department of Agriculture and Rural Development; Department of Public Health; Department of Construction; and Quang Nam Center for Hydrometeorology.
- Interviews and meetings with local authorities and staff who are currently working for related organizations in Quang Nam. Collecting information on natural disasters and severe weather events in Quang Nam and direct interviews with representatives of local authorities at the commune, district and city levels, and other relevant local government staff.
- Meetings with members of 25 local communities, including regular citizens and local government representatives. These communities were selected as representative of locations that have been, or are likely to be, heavily affected by natural disasters because of their location or other conditions described later in this report.
- Information obtained from interviews with about 125 households. In order to gather additional information to substantiate the results of community meetings, five households in each of the 25 communities were selected for the interviews as well.

> **“While “weather” refers to all phenomena occurring in the atmosphere at a given time, “climate” refers to atmospheric conditions over long periods of time. Weather can be highly variable over short periods; up until recently, climate has been considered stable over very long periods.”**

5.1. Types of Natural Disasters and Severe Weather Assessed

Natural disasters usually include a wide variety of phenomena such as earthquakes, extreme heat, floods, typhoons (tropical cyclones), tornadoes, tsunamis, landslides and mudslides, volcanic eruptions, wildfires, and severe winter storms that typically have a significant impact on populated areas. “Severe weather” refers to very strong thunderstorms and related phenomena, such as typhoons, high winds, tornadoes, flooding and hail that may or may not have strong adverse impacts. Except for volcanoes, tsunamis (possibly occurring, but very uncommon) and severe winter storms (also uncommon), all of these other natural disasters can and occasionally do occur in Vietnam.

The survey addressed the six main types of natural disasters, including typhoons, lowland and mountainous floods, droughts, landslides, flood tides and lightning. Other extreme weather events include whirlwinds (a tornado killed two people in Thanh Hoa Province in 2007), and unusually cold and hot weather. **Table 2** briefly summarizes information about types of natural disasters and other weather events gathered from interviews and meetings with related organizations in Quang Nam.

TABLE 2
NATURAL DISASTERS, EXTREME WEATHER EVENTS AND AFFECTED LOCATIONS

No.	Location	Types of Natural Disasters and Extreme Weather	Types of Natural Disasters with Significant Impact	Where Natural Disasters Typically Do Not Occur
1.	Coastal Region	Typhoons, floods, drought, lightning, flood tides	Typhoons	
2.	Lowland Region	Typhoons, droughts, lightning, landslides, flood tides	Floods (highest impact on river valleys)	
3.	Mountainous Region	Typhoons, floods, droughts, and lightning	Landslides, mountainous floods	Community members said flood tides have no impact on mountainous communities

The following sections briefly summarize each of the major types of natural disasters or severe weather conditions that typically occur in Quang Nam Province.

TYPHOONS

Because of different geographical conditions, each specific region in the province is affected by certain natural disasters, and not by others. In other words, each type of natural disaster will have major impacts in one specific area and at the same time additional impacts in surrounding areas. For instance, storms can have major effects on coastal areas, but will have only modest impact in mountainous areas, except for example, where heavy rains cause landslides.

However, there are also natural disasters or extreme weather events that can affect one specific area or a very widespread area. Flood tides affect only the lowland coastal areas in the summer, resulting in flooding of rice fields with salt water, whereas lightning can have impacts in almost any area of the country.

Severe storms can be considered a type of natural disaster when they generate significant adverse impacts on local communities in coastal areas such as Tan An and Hoa An Hamlets in Binh Minh Commune, Thang Binh District; Hoi Son Hamlet, Duy Nghia Commune, Trung Phuong Hamlet, Duy Hai Commune, Duy Xuyen District; Binh Trung Hamlet, Tam Quang Commune, Nui Thanh District, etc.

FLOODS

As mentioned above, floods can occur in all regions, particularly the lower basin sections of the Thu Bon and Vu Gia Rivers, which are reported to have recently been at their highest recorded levels. In this area, floods occur most often in November. According to information provided by the local authorities responsible for tracking extreme weather and natural disasters, heavy floods typically occur in areas alongside the Thu Bon and Vu Gia Rivers. Hamlets such as Bang An Dong, Bang An Tay (Dien An Commune), Dien Ban District; Thi Lai (Duy Trinh Commune), Duy Xuyen District; and Phu Binh (Tam Xuan Commune), Nui Thanh District are most frequently affected. Heavy floods also occur in valleys along rivers in mountainous area such as Tra My, Thanh Dai (Dai Hung), Ha Tan (Dai Lanh) Dai Loc District; Hamlet 2 (Tra Giang); Hamlet 8b (Tra Dong), Tran Duong Hamlet (Bac Tra My Town), and Bac Tra My District. Floods also threaten communities in mountainous areas **(see Photo 3)**, where frequent flooding makes it easier to live in boat communities.

PHOTO 3
Rural Poor Living on River

Flooding is exacerbated in urbanized areas **(see Photo 4)**, where poorer people live literally on the river or stream bank, using the drainage ditches as disposal sites for trash, garbage and human waste. Because the dwelling in the photo is located alongside one of the main drainage channels from the town, the location is undesirable—but as a result it is affordable to poor people. During the dry season, the drainage way is used for trash and defecation, which then accumulates and eventually clogs the drainage, which then backs up and causes flooding of the area.

DROUGHTS AND WATER SHORTAGES

Droughts can occur in most districts in the province, but impacts differ. According to experts from Quang Nam's Department for Hydrometeorology Prediction, water often does not reach the low end of irrigation systems, because available irrigation water is insufficient to provide the necessary coverage, due to limited water supply from inadequately maintained irrigation canals and ditches.

LANDSLIDES

Landslides most often occur in riverside areas of communes, in districts located along the Thu Bon and Vu Gia Rivers, and in parts of Tra Dong Commune, Bac Tra My Town, Bac Tra

PHOTO 4
Urban Poor Living
Alongside Drainage Ditch

My District. Landslides occur most seriously in communities along the riversides of Tra Giang and Tra Dong Communes, Bac Tra My Town (Bac Tra My), Dai Lanh, and Dai Hung (Dai Loc).

THUNDERSTORMS

Thunderstorms can happen anywhere in the province, and occur most frequently from April to September. Thunderstorms can bring torrential rains that cause short-term flooding, and lightning that can kill people and livestock, or damage facilities such as electrical power transformers.

FLOOD TIDES

Spring flood tides are an annual occurrence caused by the relative positioning of the moon, and the effect this positioning has on tidal movement. High tides can be as much as 2 meters above normal tide levels. Strong on-shore winds can cause water levels to rise even further. Summer flood tides in coastal areas such as Dien Ban and Duy Xuyen can cause significant damage to hundreds of hectares of rice from seawater.

COOLER THAN NORMAL WEATHER

The annual weather cycle brings cold weather from January to May every year. In 2008, the lowest temperatures in February were 15.5°C in Tam Ky Town and 14.7°C in Tra My District, which is 3.3°C lower than the average annual temperature in previous years. According to Quang Nam's Department for Hydrometeorology Prediction, the number of unusually cold weather events that occurred in 2008 increased by 5 compared to 2007. In February, there was continuously cold weather and heavy rain in the lowlands, coupled with strong winds at levels 6 and 7 on the sea.

TABLE 3 COMMUNITY PERCEPTIONS OF IMPACTS OF NATURAL DISASTERS AND EXTREME WEATHER EVENTS ON DIFFERENT REGIONS

NO.	COMMENTS OF LOCAL COMMUNITIES	TYPHOONS		LOWLAND FLOODS		DROUGHTS		LANDSLIDES		SEA WATER SURGES		THUNDER & LIGHTNING		MOUNTAIN FLOODS	
1.	Number of local communities in COASTAL AREA having comments on impact levels of natural disasters on their location (%)	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%
		S	100	S	50	S	38	S	25	S	0	S	25	S	0
		M	0	M	25	M	0	M	25	M	0	M	0	M	0
		L	0	L	0	L	12.5	L	0	L	13	L	0	L	0
		N	0	N	25	N	50	N	50	N	88	N	75	N	100
2.	Number of local communities in the LOWLAND DELTA area having comments on impact levels of natural disasters on their location (%)	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%
		S	80	S	80	S	50	S	10	S	10	S	20	S	0
		M	20	M	20	M	20	M	0	M	10	M	0	M	0
		L	0	L	0	L	10	L	0	L	0	L	0	L	0
		N	0	N	0	N	20	N	90	N	80	N	80	N	100
3.	Number of local communities in the MOUNTAINOUS AREA having comments on impact levels of natural disasters on their location (%)	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%	LEVEL	%
		S	71	S	57	S	57	S	43	S	0	S	29	S	0
		M	14	M	14	M	29	M	0	M	0	M	14	M	0
		L	0	L	0	L	14	L	0	L	0	L	0	L	0
		N	14	N	29	N	0	N	57	N	100	N	57	N	100

Code of Impact Level

S: Serious

M: Medium

L: Light

N: No reflection

WARMER THAN NORMAL WEATHER

Warm weather typically occurs from the end of March through September. According to meteorological data from the Department for Hydrometeorology Prediction, warm weather typically lasts from May to July. During this period, temperatures rose to 37.8°C in Tam Ky and 36.7°C in the mountainous area (Tra My).

Results of our survey conducted from August 2008 to October 2008 in 25 local communities demonstrate that local people have a good understanding of types of natural disasters and extreme weather events, and the typical impacts thereof on their locality. Comments of local communities are summarized in **Table 3**.

The responses in the table are summarized below, interpreted as follows: if the % of "heavy" – S plus "average" – M is 50% or more, it is an important issue. If the combined total is less than 25-49%, it is a minor concern. Based on that formulation, the following results appear:

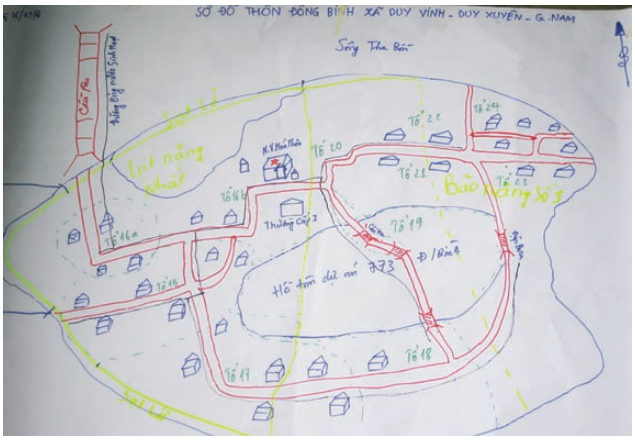


PHOTO 5
Village Mapping Exercise

- <u>For people living in the coastal area:</u> Mountainous floods are not a problem (0%). Storms are a big problem (100%). Lowland floods are a big problem (75%). Droughts are a problem (38%), but not a big problem. Landslides are a problem (50%). Saltwater surges are a negligible problem (12.5 %). Lightning is a small problem (25%).
- <u>For people living in the lowland area:</u> Mountainous floods are not a problem (0%). Storms are a big problem (100%). Lowland floods are a big problem (100%). Droughts are a relatively big problem (70%). Landslides are a small problem (10%). Saltwater surge is a small problem (20%). Thunderstorms are a small problem (20%).
- <u>For people living in the mountainous area:</u> Mountainous floods are not a problem (0%). Storms are a big problem (86%). Lowland floods are a big problem (71%). Droughts are a big problem (86%). Landslides are a medium problem (43%). Saltwater surge is not a problem (0%). Thunderstorms and lightning are a medium problem (43%).

5.2. Current and Future Impacts of Climate Change

Data on the effects of natural disasters and severe weather on poor and vulnerable local communities in Quang Nam Province were gathered from available documents such as the *Report on Preparation for Implementation of Flood and Typhoon Preparedness Plan 2008 from the Provincial Board for Flood and Typhoon Preparedness and Consequence Mitigation*, or *Features of the Meteorology, Hydrogeology and Environment in the Central Region*, produced by the Hydrometeorology Prediction Agency of Quang Nam Province, from direct

PHOTO 6
Fishing and Fish Processing—
The Most Important Sources of
Income for Coastal Families

interviews with local community members and from the results of community meetings carried out during the surveys.

In the community meetings, survey teams discussed with community members and local officials the impacts of natural disasters and extreme weather events using a Participatory Rural Appraisal (PRA) methodology. This included "village mapping." An example of this is illustrated in **Photo 5**, which shows Sam Linh Hamlet, Tam Quang Commune, Nui Thanh District, in Quang Nam Province. The photo depicts the village map, jointly developed by community participants and the survey team members, showing community facilities likely to be affected by a typical typhoon, including homes, small manufacturing facilities, power lines and commune roads. Community members who attended the meetings to analyze disaster causes and impacts, and to discuss prospective solutions drew the map on large-scale paper. A brief summary of the impacts of these natural disasters and incidences of severe weather is given below.

TYPHOONS

Typhoons can damage or destroy roofs, doors and windows of many typical residential houses, as well as public buildings such as schools, health clinics, hospitals and other buildings, cause injuries and deaths of fishermen, and loss or damage of fishing boats and equipment. Not surprisingly, typhoons most seriously affect coastal area provinces. The data in **Table 2** collected from 25 community meetings showed that 100% of coastal communities felt that they were seriously affected by typhoons on a recurrent basis. However, only 80% of total lowland delta communities and 71% of the total communities surveyed in mountainous areas felt the same. In spite of the danger of fishing, it is a very important source of income for many people living along the coast **(see Photo 6)**.

According to a report from the Standing Office of Quang Nam's Flood Protection and Prevention Board, in Flood No. 6 Xangsane in 2006, 14 people died, 550 were injured, and

thousands of houses and public works were destroyed, at an estimated cost of nearly VND 2,000 billion. In the same year, during Storm No. 1 Chanchu, 158 people died and two fishing boats were lost. Another example of typhoon damage was at the community of Tan An, in Binh Minh Commune, Thang Binh District, that was hit by two typhoons in 2006, in which five fishermen were killed, two others seriously injured and 90 homes destroyed. Much of this is due to the relatively poor quality of design and construction, particularly for the homes of low-income families **(see Photos 7 and 8)**.

Typhoons regularly occur along the Central Coastal Region, damaging homes, businesses, schools and other buildings, and can be quite devastating.

FLOODS

Communities surveyed in different areas of Quang Nam Province had different opinions about the level of intensity of flooding. Based on **Table 2**, serious flood impacts were observed by 50% of the total coastal communities surveyed, and by 80% and 57% of total lowland delta communities and mountainous communities surveyed, respectively. These data collected at each community verified that floods affect lowland delta areas more seriously than other areas. In particular, community interviews showed that:

- In coastal communities surveyed, 35% of total interviewees said that flood impacts in their area were serious and 35% said medium.
- In the lowland delta communities surveyed, 15% and 81% of total interviewees recognized that the effect of the floods were serious and medium, respectively.
- In mountainous communities surveyed, 56% and 44% of total interviewees reflected that the effects of floods on their communities were serious and medium, respectively.

Floods cause a wide variety of damage, such as:

- Transportation routes can be blocked or heavily muddied by landslides, particularly alongside rivers.
- Crops are flooded, sometimes by seawater, which can cause both short-term and long-term damage to agricultural production.
- Communes and hamlets can become isolated because of temporarily washed-out roads, interfering with commercial traffic and inhibiting farmers' ability to sell their crops.

Examples of Storm Impact on One Commune

Hundreds of square meters of land are lost every year at a single site of Cua Lo estuary, Tam Hai Commune, Nui Thanh District, Quang Nam Province. The combination of high river flooding and strong sea surge hits directly on the small cape at the estuary, causing the whole village to be evacuated, many houses to be destroyed, and large areas of coconut plantation to be ruined.

The Durian storm that went through Ben Tre unexpectedly in December 2006 destroyed more than 26,000 houses, tore the roofs off of more than 93,000 houses, and killed or injured some 700 people, with a total economic loss of 3182 billion VND (equivalent to nearly $200 million USD).

Ref: Danish Embassy – Climate Change Threatens Livelihoods of the Rural Poor (2008).

PHOTO 7
Low Cost Housing in
Quang Nam Province

PHOTO 8
Another Type of Low Cost
Housing Made of Simple Brick

- Clean water systems are damaged, especially when they are not properly sited and designed to withstand typical flood impacts.
- Water sources (both groundwater and surface water) can become contaminated.
- People lack sufficient stocks of emergency food and medicine, which may often be difficult to find.
- After floods, the local environment can easily become heavily polluted from both human and animal waste, animal carcasses, and contaminated water. Diseases that can cause large-scale death of livestock are easily spread.

According to the *Report on Preparation for Implementation of Flood and Typhoon Preparedness Plan 2008* of the Quang Nam People's Committee, a flood in 2007 killed 47 people and injured 339 others; 1,518 houses collapsed or were swept away; about 200,000 people required emergency housing, food, medicine and medium-term livelihood support; and 70,000 people were evacuated to avoid being affected by floods and landslides. In the community of Tan An, Binh Minh Commune, Thang Binh District, a flood that occurred in 2006 caused the loss at sea of 32 fishing boats. **Photos 9 and 10** show recent flooding in Da Nang and Quang Nam Province. As another example of flooding in Vietnam, Hanoi recently experienced its heaviest rainfall in 35 years, flooding many roads and housing areas.

DROUGHTS

In the survey areas, droughts result in reduced access to adequate amounts of good quality water for daily consumption by people, livestock and agriculture, and small industrial and manufacturing operations. Particularly in lowland coastal areas such as Dien Ban and Duy Xuyen Districts, flood tide surges have exacerbated the impact of drought, because fields saturated with saltwater need to be quickly and thoroughly saturated with fresh water to minimize the damage to rice crops. However, since fresh water pumping stations can be damaged by flood surges as well, they often cannot supersaturate the

rice fields quickly enough to save the crops. In other geographical areas and socioeconomic situations, drought-affected households experience significant depreciation in household incomes. For example, the data in **Table 3** show that 38% of total coastal communities, 50% of total lowland delta communities and 57% of total mountainous communities surveyed felt that droughts had seriously affected their local environment, infrastructure, agricultural production, and household incomes.

LANDSLIDES

25% of coastal community survey respondents, 10% of lowland delta community respondents, and 43% of upland community respondents surveyed said that the effect of landslides in their own communities was serious. Under certain conditions, landslides can cause loss of residential property and/or productive agricultural land, resulting in local people living on or near riverbanks having to rehabilitate or even abandon their homes, abandon their gardens and crops, and/or sometimes even lose their main source(s) of income. Landslides can also damage or destroy public works such as roads, electrical power systems, water system intakes, piping and pumps.

PHOTO 9
Han River Flooding in Da Nang

PHOTO 10
Flooded Roads Near Da Nang

For example, in Lac Thanh Tay Hamlet, Dai Dong Commune, Dai Loc District, a clean water pumping station in the commune periodically breaks down due to landslides. If this is a regular occurrence, then the pump station should be relocated to a more secure location. Of course, not all damage is due to naturally occurring events. Adverse impacts of landslides can be mitigated by selecting home sites away from landslide-prone areas (e.g., steep slopes, along river banks, too near the ocean, etc.). However, people (especially poor people) do not always have the opportunity to locate their homes on stable sites where landslides are unlikely.

FLOOD TIDES AND STORM SURGES

Flood tides and/or storm surges have caused severe damage to rice crops in coastal areas, including Bang An Dong and Bang An Tay Hamlets, in Dien An Commune, Dien Ban District. A storm surge is a high flood of water caused by wind and low pressure, most commonly associated with typhoons. A storm surge is usually the most deadly aspect of a typhoon, and is responsible for 90% of deaths during typhoons. Storm surges are different from tidal surges, which are caused exclusively by the tidal shift in sea level. Storm surges are primarily caused by the extremely high winds that accompany a typhoon. Note the potential vulnerability of the seaside buildings along Da Nang Bay as shown in **Photo 11**.

PHOTO 11
Buildings Close to the Sea with Very Little Protection

THUNDERSTORMS, LIGHTNING AND HIGH WINDS

Thunderstorms, lightning and high winds occur at various times in almost all districts of Quang Nam Province, in lowland and mountainous areas, sometimes threatening people's lives, or causing damage to homes and other infrastructure. According to the Quang Nam Center for Hydrometeorology Prediction, in the first six months of 2008, high winds damaged 40 houses, blew roofs off of seven school buildings, completely destroyed four houses, and seriously damaged two others in Bac Tra My and Phuoc Son Districts. Thunderstorms in Thang Binh District and Tam Ky City seriously damaged the weather monitoring station in Tam Ky, killed three people and seriously injured two others. According to information provided by local communities in Binh Khuong Hamlet, Binh Giang Commune and Thang Binh District, in the first six months of 2008, two people in the commune died after being struck by lightning.

5.3. Frequency of Natural Disasters and Severe Weather

Analysis of information gathered from Provincial Meteorological Agencies, and from community meetings and household interviews, shows that natural disasters in Quang Nam Province tend to be increasing in terms of both intensity and impact. In addition, natural disasters or severe weather events seem to be more complex, and it is more difficult to predict their impact, direction, time and location. Information obtained from the Quang Nam Center for Hydrometeorology Prediction shows that in the last five years typhoons have been frequent and severe (**see Tables 4 and 5** and **Charts 1 and 2**).

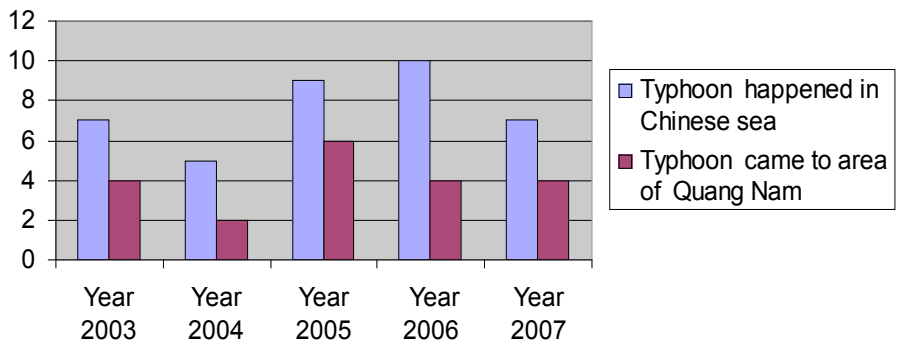
TABLE 4

FREQUENCY OF NATURAL DISASTERS IN THE LAST FIVE YEARS IN QUANG NAM

Types of Natural Disasters and Severe Weather[4]	In the Last Five Years				
	2003	2004	2005	2006	2007
Types of Typhoons					
Typhoons in the Eastern Sea	7	5	9	10	7
Storms in the Province	4	2	6	4	4
Number of Floods	4	2	6	4	9
Total Annual Rainfall (mm.)	2,071	2,009	3,158	2,356	3,440
Cyclones					
# Cyclones in Central Region	6	4	8	5	6
# of Cyclones in Quang Nam	3	3	6	3	1
Highest Tide Level (cm)	83	78	84	80	94
# of Very Hot Weather Days	11	9	13	13	9

CHART 1

NUMBER OF TYPHOONS IN THE LAST FIVE YEARS

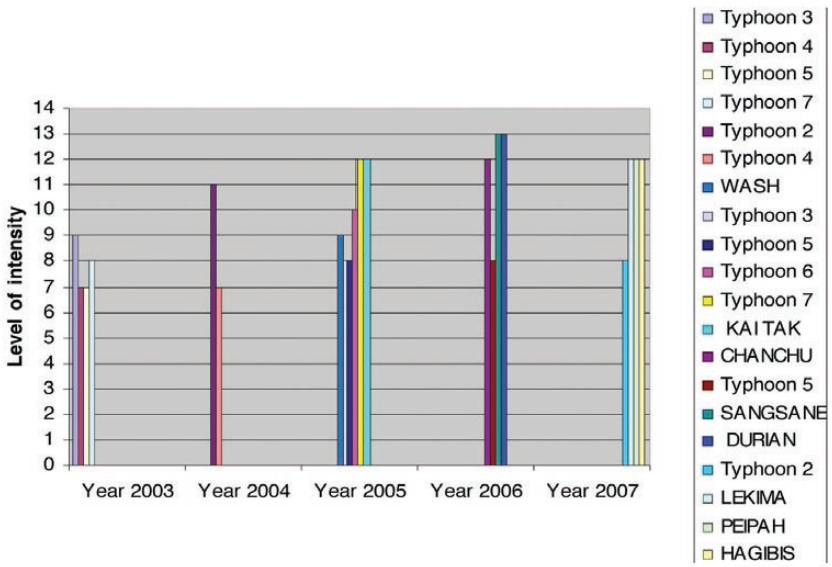


[4] The terms "hurricane" and "typhoon" are regionally specific names for strong "tropical cyclones." A tropical cyclone is the generic term for a non-frontal synoptic scale low-pressure system over tropical or sub-tropical waters with organized convection (i.e. thunderstorm activity) and definite cyclonic surface wind circulation. (Ref: Oceanographic and Meteorological Laboratory, Holland, 1993.)

TABLE 5
INTENSITY OF TYPHOONS IN THE LAST FIVE YEARS IN QUANG NAM

	LEVELS						
Year	**7**	**8**	**9**	**10**	**11**	**12**	**13**
2003	2	1	1	0	0	0	0
2004	1	0	0	0	1	0	0
2005	0	2	1	1	0	2	0
2006	0	1	0	0	0	1	2
2007	0	1	0	0	0	3	0

CHART 2
INTENSITY OF TYPHOONS IN THE LAST FIVE YEARS IN QUANG NAM



Data in Tables 4 and 5 from the Quang Nam Center for Hydrometeorology Prediction

5.4. Conclusions

Information gathered from interviews with organizations involved in weather forecasting, natural disaster warning, protection and prevention, hunger elimination and poverty alleviation and from community meetings and interviews with local households reflects the main types of natural disasters and other weather events in Quang Nam Province. The actual impact level of each type of natural disaster or severe weather event is different in different locations, depending upon the physical and socioeconomic characteristics of that particular site, such as geographic location, main income sources of the local people, level of infrastructure development, success in land-use planning, availability of funding from government and donor agencies (and from beneficiaries themselves), etc. Under the impacts of natural disasters, problems faced by local communities located in different areas will not necessarily be the same. For this reason, site-specific solutions will need to be developed to help people effectively prevent and minimize the effects of climate change.

Part 6
Assessed Needs of Local Communities To Adapt to Climate Change

6.1. Community Constraints to Climate Change Adaptation

Disaster preparedness information has not always been organized to ensure necessary in-time information to communities at risk. Communities face information problems such as: inefficient information dissemination equipment (e.g., loudspeakers to notify the community of important information, such as imminent storm warnings—**see Example 1**). Community members often are unaware of national policies or local government procedures relating to natural disaster preparedness, climate change adaptation, and disaster planning. At community meetings conducted for this assessment, 18 of the 25 communities surveyed noted the problem of insufficient information at the community level, including:

- Problematic information dissemination. At present, information dissemination equipment in use at the commune / community levels are the landline and FM wireless radios. A typical commune has about eight hamlets, but there are usually only three or four loudspeakers, so hamlets located far from commune centers often have difficulty accessing important information. The community level information system typically has only one speaker, one amplifier, a bullhorn (handheld loudspeaker) and the landline telephone. However, in some cases the systems are out of order and waiting to be repaired. This means that communes often get delayed information, or sometimes none at all.

Example 1

Chau Lam (in Binh Tri Commune, Thang Binh District), has two loudspeakers, located at agriculture production brigades No. 19 and No. 22. A. Only the one at brigade No. 19 was working. When emergency information had to be quickly disseminated, community leaders brought the loudspeaker along from brigade to brigade to disseminate information to the community by borrowing equipment such as amplifiers and microphones from nearby households. Sometimes they used handheld speakerphones instead.

TABLE 6 COMMENTS OF LOCAL COMMUNITIES AND HOUSEHOLDS ON TENDENCY OF NATURAL DISASTERS AND OTHER WEATHER EVENTS

NO.	COMMENTS OF LOCAL COMMUNITIES	MOUNTAIN FLOODS		TYPHOONS		LOWLAND FLOODS		DROUGHTS		LANDSLIDES		SEA WATER SURGES		CYCLONES & THUNDER STORMS	
1.	Number of local communities in COASTAL AREA having comments on tendency of natural disasters in their location	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%
		A	0	A	0	A	0	A	0	A	0	A	0	A	0
		B	0	B	100	B	63	B	38	B	50	B	13	B	13
		C	0	C	0	C	0	C	12.5	C	0	C	0	C	12.5
		D	0	D	0	D	12.5	D	0	D	0	D	0	D	0
		N	100	N	0	N	25	N	50	N	50	N	87.5	N	75
2.	Number of local communities in the LOWLAND DELTA area having comments on tendency of natural disasters in their location	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%
		A	0	A	0	A	0	A	0	A	0	A	0	A	0
		B	0	B	90	B	90	B	60	B	10	B	20	B	20
		C	0	C	0	C	0	C	20	C	0	C	0	C	0
		D	0	D	10	D	10	D	0	D	0	D	0	D	0
		N	100	N	0	N	0	N	20	N	90	N	80	N	80
3.	Number of local communities in the MOUNTAINOUS AREA having comments on on tendency of natural disasters in their location	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%	TREND	%
		A	0	A	0	A	0	A	0	A	0	A	0	A	0
		B	0	B	86	B	71	B	0	B	29	B	0	B	29
		C	0	C	0	C	0	C	0	C	0	C	0	C	0
		D	0	D	0	D	0	D	0	D	14	D	0	D	14
		N	100	N	14.3	N	29	N	100	N	57	N	100	N	57

CODE

- A Fewer and Lighter
- B More and Heavier
- C No Significant Change
- D Unstable Change
- N Not Sure

Example 2

At present, in the community of Thanh Dai (Dai Hung Commune, Dai Loc District), there had been no training on natural disaster preparedness or disaster mitigation organized for community members so far. Instead, community members could obtain information on natural disaster preparedness and disaster mitigation in combination with other matters that were discussed by community leaders or the heads of their agriculture production brigades in community meetings. Normally, only community leaders and heads of agriculture production brigades within the community were trained in natural disaster preparedness and disaster consequence mitigation.

- Lack of awareness of disaster awareness procedures. Communities are often unaware of national policies and procedures related to disaster preparedness and planning. Community interviews showed that about 49% of total interviewees were unaware of national policies and procedures, and 72% of interviewees did not know about disaster plans that were made at the community or commune level. In community meetings carried out during this survey, the great majority of participants were aware that there existed policy and implementation procedures for disaster response, but knew very little about implementation details.

LACK OF COMMUNITY AWARENESS ABOUT NATURAL DISASTER PREPAREDNESS AND PLANNING

Interviews showed that most community members were largely unaware of natural disaster preparedness and planning procedures and responsibilities **(see Example 2)**. While community and commune staff had prepared a general natural disaster response procedure, it was insufficiently detailed to be called an implementation plan. In all 25 communities surveyed, there had been no field exercises dealing with natural disaster preparedness. The information collected in the interviews revealed that only 37% of the interviewees were aware of training sessions that had recently been held by the local authorities on disaster preparedness at the commune or community level.

HOUSES IMPROPERLY DESIGNED AND/OR BUILT TO WITHSTAND NATURAL DISASTERS AND/OR SEVERE WEATHER

Through surveys and discussions at the 25 community meetings by the research team, it was apparent that about 90% of the houses in the community were made of bamboo or wood, with no two-story brick homes **(see Example 3)**. Roofs, walls, doors and windows were

Example 3

At the community of Dong Binh (Duy Vinh Commune, Duy Xuyen District), it was estimated that 70% of houses were made largely of wood and bamboo. The remaining 30% were single-story brick houses. Consequently, due to typhoons occurring in 2006, about 50% of farming family homes collapsed, and 50% of the remaining houses lost their roofs due to strong winds. In addition, floods in 2006 caused the loss of five farmer's houses, and virtually all of the other houses were damaged.

not strong enough, and were often not properly designed or assembled to resist regularly occurring storms. As a result, the homes of about 66% of interviewees were regularly damaged by floods or typhoons, largely because of poor location, design or construction.

LACK OF EMERGENCY RESPONSE EQUIPMENT AND TRAINED PERSONNEL

Communities often did not have access to enough proper rescue equipment when natural disasters or severe weather occurred in the community **(see Example 4)**. They were hard pressed to effectively carry out rescues as might have been expected. During the 25 community meetings, participants said they lacked the necessary rescue equipment to effectively respond to floods or typhoons, such as rescue boats, life vests, communications equipment, emergency medical supplies and facilities, and sometimes even food. Besides the above-mentioned emergency equipment and materials, trained personnel such as doctors, health workers and engineers might be required to deal with emergencies such as dike breaching, or to repair damaged community water systems. However, such personnel were often unavailable to assist communities.

DAMAGED OR INCOMPLETE RURAL INFRASTRUCTURE

Rural roads, irrigation systems, clean water systems, electrical power lines and bridges at the 25 communities surveyed were often of poor quality, and were regularly damaged by natural disasters or severe weather occurrences **(see Example 5)**. Basic rural infrastructure—such as commune roads, schools, dikes, dams, health clinics, water systems and sanitary latrines—is not yet fully available in some less-developed communities. At present, data collected at these communities shows that only about 20% of the total planned number of rural roads have been built. Community participants in meetings said that low quality (or non-existent) roads make it very difficult to get their agriculture and other products to the marketplace. Without convenient access to all-weather farm-to-market roads, they were limited to selling their products within the nearby communities, at a much lower price than they could obtain in larger markets in the area, especially urban and peri-urban markets.

Example 4

At Thi Lai Hamlet in Duy Trinh Commune, Duy Xuyen District), a community rescue team was already set up with 10 members, all of whom were young men who volunteered as rescuers during floods or typhoons. They used their own boats and other materials needed for their operation. There was no significant external support for rescue efforts such as boats, life vests, and lifebuoys. Nor were there any operational funds made available by the local government. The lack of necessary rescue equipment for the community rescue team is common throughout the surveyed area.

Example 5

The Community of Ha Tan (Dai Lanh Commune, Dai Loc District) has 325 households with 51 hectares of agriculture land. There was no concrete irrigation system built (in terms of a canal and a dam) except for one water pumping station. As for rural roads, concrete rural roads accounted for only 30% of the total length of existing roads within the community area. A two-room nursery school to be constructed of wood and bamboo was planned, but not yet built.

The irrigation systems were in the same situation. Often only the main canal had been built, but few (or no) small dams or canals had been built, especially in mountainous communities. Statistical data collected from the Quang Nam Provincial Department of Irrigation showed that only about 16% of the total planned irrigation system in the entire province had been built so far. In addition, other public services like schools and health clinics had been damaged by floods or typhoons, and need to be upgraded to meet the community needs. Natural disaster damage data collected from field interviews showed that: 91% said the local rural road system was damage; 45% said the local information system was not fully functional; and 54% said the local irrigation system was not fully functional.

HIGH RISK OF LANDSLIDES/INFRASTRUCTURE DAMAGE IN COASTAL/RIVERSIDE COMMUNITIES

Communities in mountainous areas are at risk of landslides in mountainside and riverbank locations, while lowland delta communities typically suffer from landslides on riverbanks only. Families in those communities periodically have to leave their homes for safer locations. However, not all can easily find land where they can resettle, a problem faced by several households living near the riverbank at Tran Duong Hamlet, Bac Tra My Town, in Bac Tra My District. Given the results of interviews carried out by the survey team, the percent of interviewees adversely impacted by landslides in their communities was as follows: 28% of respondents in coastal areas said that landslides had seriously affected their communities; 17% of respondents in lowland areas said that landslides had seriously affected their communities; and 24% of respondents in mountainous areas said that landslides had seriously affected their communities.

INSUFFICIENT EMPLOYMENT OPPORTUNITIES AND LOW HOUSEHOLD INCOME

Rural communities surveyed have a variety of agriculture difficulties including limited area for planting, infertile cultivation land and inadequate irrigation water **(see Example 6)**. Floods, typhoons and severe weather had often adversely affected their crops. Fishing activity was not stable over the whole year, and it stopped almost completely during the annual typhoon season from October to November. Only a small percentage of skilled laborers in the off-farm economic sector of communities were surveyed. Data collected from community meetings showed that the average skilled labor force in their communities only accounted for about 12% of their community's total work force at the moment. Average per capita income was only VND 3.3 million per year ($206 USD).

Example 6

The main community income source in Dong Binh (Duy Vinh Commune, Duy Xuyen District) is making sedge mats and small-scale fishing. The community has virtually no access to usable agricultural land for food crop cultivation. Average income per capita is 4 million VND per year ($250 USD). The percentage of poor households in this community is 47%.

The community of Lac Thanh Tay (Dien Hong Commune, Dien Ban District) has 210 households. Their main source of income is the cultivation of paddy rice and maize. Average income per capita is 201,000 VND ($12.50 USD) per month. They have no other significant non-farm economic activity.

PHOTO 12
An example of well-designed local infrastructure is the wooden and bamboo bridge. These wooden bridges are relatively well engineered and low-cost, but are often destroyed by storms, and have to be replaced.

INABILITY TO PLAN FOR AND INVEST IN ENVIRONMENTAL PROTECTION

In most disaster preparedness schemes done at the commune level, post natural disaster environmental rehabilitation was addressed, but apparently could not be effectively implemented, most often due to a general lack of needed materials, technical support, or financing from local agencies involved **(see Example 7)**. As a result, post-disaster environmental rehabilitation was often not likely to be sufficiently timely to avoid the possibility of disease and epidemics breaking out. For example, if family latrines are not properly constructed, localized flooding can easily be a disease vector by spreading feces in the floodwater and contaminating the local groundwater.

Example 7

At the community of Trung Vinh (Que Xuan Commune, Que Son District), there was a community plan for disaster preparedness that was prepared only by the community leader.

The community leader said that he and other representatives of community mass organizations had never attended any trainings on planning that may have been held by local authorities or by any development project.

6.2. Community Needs Assessment to Adapt to Climate Change

NEED FOR BETTER AND MORE TIMELY INFORMATION

Local community representatives who participated in community meetings and household interviews admitted that they have insufficient access to information, especially regarding natural disaster planning and mitigation, or severe weather preparedness and planning, to allow them to properly respond. Analysis of the survey data indicates that six local communities (accounting for 24% of the total communities selected for this survey) expressed the need to improve the emergency information system. In fact, 96% of the total households interviewed said that they would support upgrading the information system. Necessary support for local people to effectively

do this includes gaining better awareness of:

- Relevant government policies
- Weather forecasts
- The need for timely notification of pending weather events
- Information about planning and implementing training on natural disaster preparedness, planning and climate change adaptation
- How local people can actively and effectively participate in emergency response activities when natural disasters occur

NEED TO RAISE AWARENESS OF LOCAL COMMUNITIES ON CLIMATE CHANGE

Survey results showed that climate change is still a new concept to most local people. However, people do understand about the impacts of natural disasters. To deal with this problem, before organizing each community meeting for this survey, the topic of climate change was introduced briefly to the local people. Such basic knowledge will help local people to better understand the nature, impact and increasing frequency of natural disasters, and how they are affected by climate change, in particular:

- What is climate change?
- Where and how is climate change occurring?
- What are the effects of climate change?
- What can people do to minimize the adverse impacts of climate change on their families and communities?
- How can local communities modify their behavior to more effectively deal with climate change impacts?

NEED FOR CAPACITY BUILDING

Interviews with 111 households (complete data sets were not available for all 125 HHs initially selected) show that 97% of interviewees felt that on-the-job training for households on topics such as natural disaster preparedness, adaptation, and lessons learned is needed. To enhance the local community's capacity to do this, the following activities were recommended:

- On-the-job training courses for staff at the grassroots level on knowledge, skills in formulating and organizing the implementation of natural disaster preparedness, plan-

PHOTO 13

An example of rural infrastructure that requires, but often does not get, regular maintenance and repair are community schools. These are typically single-story buildings, although the newer ones have two stories to accommodate more students.

ning, and climate change adaptation measures.

- Organizing (and materially supporting) a local rescue team to undertake natural disaster preparedness, planning and climate change adaptation, and providing on-the-job training courses.
- Carrying out exercises to practice tasks that would be required to effectively deal with local natural disasters.
- Organize a series of workshops to share experiences in natural disaster preparedness, planning and climate change adaptation activities. (Note: Two workshops presenting the outcomes of this study are scheduled to take place in Quang Nam and Hanoi.)

NEED TO IMPROVE HOUSES (AND OTHER BUILDINGS) TO WITHSTAND FLOODS AND TYPHOONS

Results of the community consultations show that 90% of people in their communities expressed the need to upgrade their homes. Results of the household interviews indicate that 98% of the interviewees need support in "disaster-proofing" their homes so that they will be reasonably confident that their homes will last through natural disasters and severe weather for a long time. In particular, they want to be able to storm-proof houses by ensuring that:

- Housing structures are made with reinforced concrete.
- Roof-bracing is done using at least D = 6 cm steel bar, with anchor bolts that are attached to the concrete wall to minimize roofing loss.
- The living level (ground floor) of the house is at least 20 cm above the typical flood level.
- House structures are made with steel-reinforced concrete.
- Concrete foundations are built with stone.
- Walls have a thickness of at least 20 cm, and are water-proof.
- With high garret or multi-story housing, the bottom floor should be built well above (at least 20 cm) the typical flood level.
- Every household should have a concrete sanitary latrine (such as a pour-flush latrine with septic tank or tanks) to minimize environmental pollution when flooding occurs, and a properly sealed drinking water tank or reservoir installed on top of the roof to help ensure appropriate water quality and emergency storage.

NEED TO PROTECT PEOPLE AND ASSETS WHEN NATURAL DISASTERS OCCUR

This includes carrying out the following tasks:

- Develop and support rescue teams in each community. These teams will be composed of trained volunteers who are youths and representatives of better-off households in the communities, so that they can readily contribute their time and skills to support their community. In all communities surveyed in this study, emergency rescue teams have already been established. However, these groups typically do not yet operate very effectively because: (a) While some community members participate, many others do not, and (b) Prospective members do not always have the requisite training, equipment and financial support needed to ensure successful implementation.
- Formulate specific working regulations for the rescue teams. Indicate and explain

their rights and responsibilities, providing the necessary equipment and facilities to the rescue team, such as boats, lifebuoys, life vests and adequate budget for operation.

- Provide climate change adaptation-related vocational training for individuals who want to change jobs to help design, build and maintain the new residential areas.
- Provide adequate funding to help poor families in particularly difficult situations to move to new housing areas and build supporting infrastructure (e.g., sanitary latrines) in safer residential areas. However, this would likely be a very expensive undertaking, and the source(s) of funding must be made clear, particularly the level of co-financing by the beneficiary households.
- Develop and implement a broad ranging program to teach ALL school children in Vietnam to swim. All too often, tragedies such as the one in **Example 8** could be prevented if school children were properly taught how to swim.

NEED FOR BUILDING, UPGRADING, FINANCING RURAL INFRASTRUCTURE

Most local communities need to upgrade their rural infrastructure, including roads, irrigation systems, river and sea dykes, clean water systems, temporary safe centers for evacuation, as well as improved kindergartens and schools. Two-story schools can provide a safe haven during flooding, and also provide additional schooling space, the lack of which is a significant problem in many rural areas.

Results of the 25 community meetings showed that:

- 76% of communities supported upgrading rural roads.
- 72% of communities supported upgrading irrigation systems with community inputs.

Example 8

"At least 40 people drowned in a river boat accident in Vietnam on Sunday when a crowded vessel sank while taking people to a market for Lunar New Year shopping," a senior provincial official said. The wooden boat sank amid strong currents and cold winds 20 meters (65 feet) from shore on the Gianh River in central Quang Binh Province when passengers scrambled to get off before it reached the pier, the official said. "More than 80 people were on the boat," provincial Communist Party Chief Luong Ngoc Binh told AFP, adding that, "the boat was licensed to carry just 20."

From the Vietnam News (January 25, 2009)

Identifying financial resources to address these very large-scale problems will not be an easy task. A methodology must be developed that will take into account people's expressed priorities for improving rural infrastructure, with the clear and up front understanding that financing this proposed improved infrastructure will surely strain available resources (financial, human, technical, etc.). Therefore, such a program will require the strong support of the government, and supplemental funding from bilateral and multilateral organizations to provide loans and grants to project beneficiaries. Beneficiaries must be willing to make substantial contributions to co-finance the development of the new and improved infrastructure from which they will benefit.

NEED FOR IMPROVED ENVIRONMENTAL SANITATION

When natural disasters in general—and floods and typhoons in particular—regularly occur, adverse environment impacts caused by animal waste, dead animals and human waste can badly affect communities and households. All of these can result in the contamination of water supplies (groundwater and/or surface water), and of the broader environment. This could result in disease in people and livestock. Potential mitigation activities include the following:

- Provide material and manpower support to properly restore the community to an environmentally clean situation as quickly as possible. Environmental sanitation improvement activities include proper disposal of trash, dead animals and human waste, promotion of proper hygiene behavior such as regular hand washing with soap, recommended vaccinations, and medical epidemic prevention measures.
- Provide support in the form of tools and equipment for decontamination.
- Organize on-the-job training to raise awareness and skills of local communities on sanitation, disease prevention, and environmental protection, etc.

NEED FOR IMPROVING PRODUCTIVITY AND HOUSEHOLD INCOME

The main economic activities in the surveyed communities are agriculture and fisheries. Services and other economic activities (e.g., small-scale manufacturing) account for a very small part of the local economy, so that household income is typically not very high in these areas. As a result, they have few opportunities to invest in infrastructure development, or to increase their capacity to plan and prepare for natural disasters.

Therefore, most local communities need both technical and financial support to improve existing economic activities such as increasing crop productivity, upgrading fishing boats and equipment and to initiate more profitable economic activities.

During the discussions, eco-friendly economic activities were introduced and discussed. Participants in the community meetings paid close attention to proposed economic activities that could improve their household income, and at the same time make substantial contributions to environmental protection, such as forest plantations in combination with short term income generation activities; planting mangrove forests along the sea, beekeeping (for both honey and bees to help ensure pollination of local crops), and eco-friendly fish sauce production (for example, using improved fishing nets so that younger fish can escape and reproduce, thereby helping to sustain the local fish populations).

6.3. Recommendations

The main problems facing communities in adapting to climate change, which were raised during meetings at 25 communities, were identified as the following:

- Access to information
- Community ability to successfully cope with disasters
- Home building for adapting typhoon and flood rescue operation
- Improving rural infrastructure in response to climate change

And, perhaps most important, is the need to identify adequate financing to support the recommendations contained in this report.

Each community's needs were determined in detail by the community through ongoing support from the survey team, following intermediate steps to identify the causes and potential solutions of each problem above. The primary needs of communities include the following:

PHOTO 14
Discussion with Local Officials about Potential Need for Sea Dike

- Improving the information supply system at community and commune level
- Raising awareness in local communities about climate change adaptation
- Strengthening community ability to adapt to climate change
- Improving housing design and construction to make them more resistant to typhoon and flood damage
- Ensuring the safety of people and their property during natural disasters, through improved information, education and communication (IEC)
- Improving rural infrastructure design and location to accommodate climate change impacts
- Improving environmental sanitation (sanitary latrines, and solid waste management) at the community level, before, during and after natural disasters and extreme weather occurrences

Part 7
National Policies and Objectives for Natural Disaster Planning

The objectives of this activity are:

- Develop a good understanding of the government and local policies that are currently applied in the province.
- Get comments on the implementation of these policies from representatives of related local line agencies.
- Collect recommendations for improving current policies and completing future ones, if any.

- Assess the understanding of local communities who are the beneficiaries of the policies and indirectly reflect the implementation of propagation activities on polices of related local line agencies.

7.1. Survey Activities

To achieve the above-mentioned objectives, the research team supported local people to demonstrate their understanding of relevant policies in 25 community meetings, and carried out direct interviews with relevant local line agencies at four levels, as follows.

Community level: In each hamlet, five representatives were selected for the interviews. Those are young, dynamic, knowledgeable people who can propose effective alternatives for natural disaster preparedness at the community level.

Commune level: Interviews were conducted with two people who are Commune representatives. One is a representative of the Commune People's Committee and head or deputy head of the Commune Flood and Storm Control Unit. The other person represents one of the mass organizations in the commune, such as the Women's Union, Farmers Union or Ex-Soldiers Union.

District level: The interviewees are representatives of the District People's Committee, and head or deputy head of the Flood and Storm Control Unit.

Provincial level: The interviewees are representatives of related organizations such as the Department of Agriculture and Rural Development (DARD), Department of Natural Resources and Environment (DONRE); Department of Planning and Investment (DPI); Department of Construction (DOC); Department for Public Health (DPH); and the Floods and Storms Control Board of the province.

A quite recent decision, which is very relevant to this study, has just been ratified by the Government of Vietnam as shown in the **Example: Agreement on Climate Change Adaptation and Relief Approved**.

7.2. Key Survey Findings

Results of the survey conducted at different levels can be grouped into the following levels: community level and local line agency level (commune, district and province level).

Agreement on Climate Change Adaptation and Relief Approved

Nhan Dan. The Prime Minister has ratified the Vietnam – Denmark Agreement on Climate Change Adaptation and Relief in the 2009 – 2013 Period. Climate change is not only an environmental issue, but also a development matter. It has a serious impact on human health and causes epidemics, poverty and hunger, diminished land cultivation, reduced biodiversity and so on.

Vietnam has taken a lot of measures to cope with climate change. The Ministry of Natural Resources and Environment assigned by the Government on December 3, 2007 has coordinated with relevant ministries and branches to work out the national target program on coping with global climate change on the principle of the comprehensive and sustainable, inter-branch and interregion development.

RECOGNITION OF NATIONAL POLICY

National Policy on Natural Disaster Preparedness and Mitigation of Disaster Consequences

At the community level, there was no clear recognition of national policy on natural disaster preparedness and mitigation of disaster consequences. In meetings to assess the need for climate change adaptation, which included commune staff and community members, delegates who participated were not well aware of certain specific national policy details related to natural disaster preparedness and mitigation. Instead, they only described policy implementation that had been done within their own community, after a natural disaster happened. For example, households whose homes collapsed due to severe typhoons or flooding had received a stipend of VND 3 million from the government, while other community members received government support in the form of food. Other households that were displaced due to landslides and therefore had to be resettled, received the same support in terms of financial compensation, etc.

In local level interviews with relevant line agencies, a few national policies were specifically mentioned by interviewees, such as Decision 193/2006/QĐ -TTg, (dated 24/08/2006 and provided to us by the Sub-Department for Rural Development), or Decree No. 67/2007/NĐ-CP (dated 13/4/2007), regulating policies and leadership of supporting groups that are in difficult circumstances and need social subsidies, possibly provided by the Provincial Standing Office of Storm and Flood Control, etc. Others just mentioned their awareness of relevant policies such as the provision of food and medicine, and policies related to providing support to people who were forced to resettle, and how and where they would be resettled, as necessary, etc.

Example 9

In Vinh Binh Hamlet, Tam Thang Commune, Tam Ky City, representatives of local communities proposed as follows:

- Give material support directly to the local people
- Increase support in food and foodstuff when typhoons and floods occur; (previous level of support: 2 packs of instant noodle /household/ time and 1.2 kg of rice/ person/ year)

Advantages, Disadvantages and Recommendations to Improve Climate Change Adaptation Policies

At the community level, representatives of local communities do not always understand the contents of policies, so they cannot give their comments on the advantages or disadvantages of the policies. Most recommendations for improving existing policies referred to material support **(see Example 9)**.

At the local line agency level, people made only a few comments on policies related to migration and resettlement, and policies on sponsoring groups of people affected by natural disasters. At both community and local line agencies levels, understanding of government policies on climate change was often very basic, at best. At all levels, few government policies related to climate change (except the "Commitment of the Government on the Implementation of Kyoto Protocol") appeared to have been well understood by local agencies.

7.3. Detailed Conclusions and Recommendations

Based on the results of the survey on implementation of government policies on natural disaster preparedness and mitigation of natural disaster consequences in the surveyed areas, the following conclusions were reached:

- Government policies on natural disaster preparedness and mitigation of natural disasters are mostly in the form of Decisions or Decrees, etc. In practice, the general level of understanding by communities of the above-mentioned policies and even of many government personnel in relevant line agencies in particular, appeared quite limited. Therefore, workshops to better inform local government agencies about the implications of climate change adaptation would be very helpful to both the local authorities and the communities they serve.
- Local communities do not appear to pay much attention to the above-indicated policies for the following reasons: a) There is seldom any effective means at the community level to quickly disseminate information on natural disasters and severe weather warnings, nor any effective means to mitigate natural disaster consequences. b) Related local line agencies have not paid sufficient attention to disseminating information on natural disaster and severe weather preparedness, and mitigation of natural disasters in general and related policies in particular. c) At related government organizations, on-the-job training courses on natural disaster preparedness and mitigation of natural disasters consequence may have not have been given the necessary attention to be truly effective.
- Therefore, improved provision of the information at the community level is

Example

(Decision No. 193/2006/QĐ -TTg) Dated 24/08/2006 on approving the Resettlement Program for residents in difficult locations that are regularly affected by natural disasters, the border, island, free emigration areas and the critical and very critical areas of protection forests, restricted area of special used forests in period from 2006 to 2010 and strategy to 2015.

Advantages: Support local people in the most vulnerable areas to have stable shelter that will, to the extent reasonably possible, ensure that their lives and assets will not be strongly adversely affected by impact of natural disasters.

Disadvantages: (i) People resettled in the new locations often have problems such as shortage of land for housing and cultivation. (ii) The implementation scale is limited due to high cost for clearing land and building new infrastructure (homes, roads, water systems, schools, etc.) in the new resettlement area while the project and local budget is also restricted (iii) It is difficult for people to find a suitable job in the new resettlement area (e.g. in the case of fishermen who move to mountainous areas). In addition, resettlement can often cause significant problems with regard to environmental, compensation and other issues.

Recommendations for improvement: (i) Encourage local people in the areas that are often affected by natural disasters to simply move, which will help them partly deal with the problems as indicated while the necessary supports for emigrants are ensured. (ii) Create favorable conditions for the emigrants to find a new job such as: organizing vocational training courses, introducing suitable farming and livestock raising models, etc.

necessary to help local communities and government staff in related organizations to better access and implement government policies in the future.

- Recommendations about national policy on disaster preparedness and disaster mitigation focus on the following three objectives: a) Supporting local line agencies at the commune, district and provincial levels to improve awareness of national policy related to disaster preparedness, disaster mitigation, and climate change adaptation among communities; b) Raising awareness of community and staff of local line agencies responsible for climate change and disaster preparedness and disaster consequence mitigation; and c) Strengthening the role of communities in planning and implementation of national policy and procedures related to disaster preparedness and disaster consequence mitigation.

Part 8
Model Programs to Help Communities Adapt to Climate Change

The overall program objectives are as follows:

- Concrete Objective. The concrete objective of the model program is to guide and help selected poor communities in Quang Nam Province to effectively adapt to climate change.
- Development Objective. The development objective of the model program is to create a basic foundation in terms of the information, experience and methodology for EMW and CBC to formulate and implement projects on a large scale to help poor communities effectively adapt to climate change impacts, and at the same time help the related government agencies to improve national policy and develop a national target program for effectively adapting to climate change.

8.1. Model Program Methodology and Beneficiaries

This program includes both direct and indirect beneficiaries. Direct beneficiaries of the model program are the poor communities that have tentatively been selected to participate in the initial model program implementation. The indirect beneficiaries of the model program are: a) Vulnerable communities in Quang Nam Province, b) Local authorities at the levels of province, district and commune, and c) Functional departments at province and district levels.

The model program intervention strategy focuses on helping poor communities adapt to climate change as a new challenge. The model program will help communities and local governments more effectively deal with a range of problems faced by low-income rural communities, as described above. It requires the program to provide a set of solutions for awareness raising, capacity building, specific solutions to deal with increasing consequences of climate change, and solutions for helping the local people effectively develop appropriate economic activities that will provide them with the means not only to address their basic needs, but also to help them adapt to the anticipated impacts of climate change.

The long experience of East Meets West and CBC in other successful rural development projects implemented over the last 20 or more years suggests that the model Climate Change Adaptation Program should include the preparation and delivery of a package of services tailored to meet the needs of selected communities in Quang Nam. The model program should have a number of activity components tailored to address the specific needs of low-income communities, and to strengthen community resilience to climate change impacts.

Active Participation of the Model Program Beneficiaries

Active participation of the model program beneficiaries is a vital factor for the success of the program. PRA and other participatory methods used in the initial research survey will be key tools to motivate and assist the model program beneficiaries to actively participate in the whole process of the model program implementation. In this way, the model program beneficiaries will play a key role in program implementation, while the project implementation team, including short-term and long-term consultants, will be in the position to guide and assist the project beneficiaries.

Simple and Understandable Tools to Deal with Complicated Issues

The results of the field survey just conducted indicate that the knowledge and understanding of climate change impact and adaptation of the people of the selected communities is relatively low. The survey also shows that new and complex issues like climate change impacts and mitigation strategies could be understandable to and supported by the local people, as long as the research team applies the correct approaches and tools to present and discuss the information. The experience of East Meets West and CBC in other similar rural development projects confirms that, to be effective, the tools to help the local people should be as simple, understandable and user-friendly as possible.

Sustainability

The sustainability of the proposed model program approach is a factor that the research team paid very high attention to while doing the research and formulating the model program. The basic factors of the sustainability of the program are awareness raising; capacity building; and helping communities develop appropriate and effective responses to natural disaster and severe weather impacts and their associated adaptation, and finding solutions to help communities develop sustainable economic activities that are in accordance with their lifestyle, aspirations and socioeconomic situations. The survey teams have made it clear that project support requires that community beneficiaries must be willing to co-finance project activities and programs, to supplement the anticipated donor and government financing.

8.2. Proposed Time Frame and Program Components

The scope of the model program depends on its agreed upon objectives, the development strategy of EMW and our development partner CBC, concrete conditions of the selected localities, and of course, the availability of financing from local government, bilateral and multilateral agency donors, and most importantly, from the beneficiaries themselves. Based

on the results of analyzing the above-mentioned conditions, the CBC survey team and the EMW Climate Change consultant proposes the following two alternatives for the model program scope:

- Alternative 1. The model program will work with all the 25 selected communities in only three initial regions of the province.
- Alternative 2. In each specific region of the province, three communities will be selected (among 25 communities surveyed) to participate in the model program. The model program will then work with nine communities in three specific regions of the province.

A draft of the model program is given below for alternative 1.

Model Program Activities

Activity components of the model program are designed based on the following factors:

- Results of the problem analysis
- Identified needs of the people as described below
- Methodology for the model program implementation

The model program consists of the following activity components:

- Component 1. Information and awareness raising on the impacts of GCC.
- Component 2. Capacity building and local policy improvement.
- Component 3. Security of the community members and their assets.
- Component 4. Establishing and upgrading rural infrastructure to more cost-effectively respond to the needs of selected communities to adapt to climate change.
- Component 5. Developing a set of eco-friendly economic activities to improve the living standards of communities selected for inclusion in the proposed Climate Change Adaptation Program.
- Component 6. Disseminating and replicating (formulating new projects based on learning and dissemination of successful techniques within the specific context of the socioeconomic and climate change situation in Central Vietnam).

Component 1
Information and Awareness Raising

JUSTIFICATION

This program component is designed to help communities and local government agencies deal with problems such as the lack of information and low awareness about climate change adaptation, as identified in the problem statement.

RESULTS AND INDICATORS

At least 80% of the residents of the participating community get the basic information needed to increase their awareness about the issues surrounding climate change, and how

to effectively respond to those issues within the constraints of existing technical, financial and cooperative support from the local authorities and participating communities.

ACTIVITIES

Develop a set of materials about climate change adaptation and an associated model program to help poor communities to adapt to climate change, including:

- Develop a basic set of program materials for disseminating key program information and IEC (Information, Education and Communication) on GCC adaptation that are targeted to better inform various audiences (e.g., participating communities, local authorities, policymakers, and potential donors), that will play a wide variety of roles in the successful implementation of the proposed program.
- Prepare and disseminate banners, signs, and radio and television spots to inform and promote the purpose and objectives of the program to rural communities and local government agencies.
- Prepare detailed agenda for, and then carry out, community meetings to explain and discuss GCC adaptation issues, as described in Section 8 of this report, based on the program materials herein, and have quarterly planning and monitoring meetings to ensure that the program proceeds according to the process described herein.
- Develop and introduce an effective dissemination program focused on climate change adaptation, promoted through various media such as provincial TV/Radio, newspapers and schools.

Component 2
Capacity Building and Improving Local Policy on Climate Change Adaptation

JUSTIFICATION

Component 2 is designed to help the selected communities and local government agencies more effectively deal with the problems concerning the capacity of the communities and local government to support the communities to adapt to climate change.

RESULTS AND INDICATORS

The people of the selected communities will be trained in basic knowledge and skills that support their communities to more effectively adapt to anticipated climate change impacts. At least two training courses will be organized in each community with the participation of at least 40 community members.

People in the selected communities will have developed a good understanding of current local government policy in helping communities adapt to climate change, and will make proposals for improving local policy. Three seminars will be organized in the three specific regions of Quang Nam to present, discuss and develop proposals to improve the local policy.

ACTIVITIES

Two training courses will be organized for at least 40 people, with the following criteria:

Participants	Representatives of the households of the community
	Local mass organizations
	Local authorities at district and commune levels
Contents	Basic issues of climate change adaptation
	Supporting community capacity and capability for planning to adapt to climate change
	Planning program implementation

Three seminars will be organized in three regions of the province, with the following criteria:

Participants	Representatives of the households of the community
	Local mass organizations
	Local authorities at district and commune levels
Contents	Current local government policies to assist communities to adapt to climate change
	Efforts of local government to train and support the communities to help people adapt to climate change
	Proposals to improve the policies of the local government to more effectively assist communities to adapt to climate change

Component 3
Help Ensure the Safety of People and Their Community Assets from The Potential Threats of the Increasing Impacts of Climate Change

JUSTIFICATION

This component is designed to assist selected communities to better deal with problems caused by natural disasters and severe weather impacts, and to help them ensure the security and safety of the families and their assets in the participating communities.

RESULTS AND INDICATORS

- Solutions to help ensure the safety of the people, their homes and other community assets will be developed and applied successfully. At least 10 households in each selected village will apply the selected solutions, pending the availability of funding from various sources, including local government, donor agencies, beneficiary communities, and specific families willing to co-finance improvements from which they will directly benefit. At least one suitable solution will be initially developed and applied in one community on an initial test basis, then modified accordingly, and widely replicated.
- Community rescue teams will be selected, trained and financially supported so that they can operate effectively to guarantee the safety of the people and assets of their communities during natural disasters or severe weather situations.

ACTIVITIES

- Experienced program staff will work directly with community leaders and interested participating households to facilitate the development of appropriate solutions for ensuring the safety of family homes, and to better prepare communities to more effectively deal with the effects of climate change.
- Discuss with communities solutions and plans for strengthening family homes to better resist strong weather impacts, and for preserving jointly owned physical assets (schools, health centers, irrigation systems, piped water systems, dikes, etc.) to help ensure their safety by the community.
- Experienced program staff will be sent to participating communities to help communities strengthen their capacity to effectively develop the requisite organizational and operational capability of the community rescue team, develop training exercises for the community rescue team, and identify and consolidate adequate funding sources to support these activities.
- A program to teach school children how to swim will be developed and implemented to help to reduce the unnecessarily large number of easily avoidable drowning deaths among children in Vietnam. Local people can be taught swimming basics by qualified swimming instructors. As their skills increase, they can start teaching classes themselves on the basic skills needed to survive. This would be a very low-cost program, and if properly designed and implemented, could have a very significant positive impact, especially on improving survival rates of children.

Component 4
Upgrade Rural Infrastructure to Meet the Needs Of the Community to Adapt to Climate Change

JUSTIFICATION

- Inadequate and/or poor quality infrastructure in the selected communities is one of the major factors that prevents the successful development of economic activities, by reducing opportunities for increased income generation, and reducing job opportunities for local people living in all the selected communities.
- Roads, piped water systems, health centers, school buildings and other such rural village infrastructure are often in poor or ineffective condition, and may have been already damaged by natural disasters or severe weather events. Irrigation systems in selected communities are often in very poor condition, in part due to a lack of proper operation and maintenance, and/or because of lack of sufficient funding to mitigate such problems.
- For coastal region communities, a lack of effective sea dikes or other protective infrastructure can often cause damage from storm surges or flood tides. This can be a constraint for local people in developing economic activities that will help them improve their lives. However, this kind of larger infrastructure would require significant financing, usually financed with government resources. It is possible that local government financing could be a source of supplemental support for targeted high-impact dikes in certain critical locations that would have significant positive impacts on the local communities.

RESULTS AND INDICATORS

- Main infrastructure of local communities is upgraded so that they can sustain the typical impacts of natural disasters and/or severe weather events to help ensure the safety and productivity of economic assets, and the living requirements of local people.
- The types, quantities and costs of different rural infrastructure options selected for each local community will be based on the results of the needs assessments conducted during consultation meetings with communities, and the availability of required financing from donors, supplemented by co-financing from participating local communities.

ACTIVITIES

- Discuss with local communities their suggestions for "climate-proofing" their local infrastructure by developing appropriate technical financial solutions necessary to support programs for upgrading rural infrastructure.
- Prepare Terms of Reference (TORs) for experts to carry out assessments and feasibility studies to identify potential solutions for upgrading infrastructure, as identified by participating communities.
- Formulate and prioritize plans for upgrading required infrastructure, based on the recommendations of local communities during community meetings and consultations with technical specialists (engineers, environmental assessment specialists, etc.) to develop reasonable estimates of component costs and sources of financing.
- Identify potential funding sources, assess community willingness and ability to provide supplemental co-financing, and reformulate rural infrastructure development plans accordingly.
- Develop feasibility studies and revised cost estimates for selected infrastructure and all required human resources development costs.
- Discuss with proposed beneficiary communities the final list of proposed infrastructure.
- Finalize budget estimates for upgrading or building new infrastructure in the 25 surveyed communities, and make adjustments as feasibility studies are carried out.

Component 5
Development of Economic Activities for Improving People's Lives in Combination with Climate Change Adaptation

JUSTIFICATION

- The typically low income of the surveyed communities is often considered the main reason that they cannot afford to invest a significant portion of their cash reserves in building concrete houses, sanitary latrines, and upgrading other infrastructure (piped water systems, electricity supply, etc.), and improving simple production tools and buying safety equipment. Supporting local people to develop eco-friendly production activities that bring higher economic benefits is a practical way to help local communities take the initiative in adapting to climate change.
- Co-financing of construction costs by project beneficiaries is one of the best ways to

ensure that people do in fact want the proposed infrastructure, and indicates that they are much more willing to carry out and finance the necessary operation, maintenance and repair activities to keep their infrastructure in proper operating condition. Without beneficiary co-financing (and O & M fees), communities are much more likely to expect that the new infrastructure "belongs" to the government, and that all necessary maintenance and repairs are also the responsibility of the government as well. The problem is that local governments almost always have severe constraints on funding, which must be divided among a wide range of infrastructure (water systems, roads, schools, sanitary latrines, dikes, etc.) which also require funding. Willingness to co-finance infrastructure development costs is a strong positive indicator that beneficiaries will be willing to co-finance the necessary O & M as well, so that their investment in community infrastructure provides benefits over the long term.

- The experience of EMW and CBC in supporting low-income families to develop economic activities is that bringing benefits not only to wealthier communities, but also to poor and middle-income communities, is important to help ensure that actively supporting environmental protection (such as building sanitary latrines) will be more broadly accepted in every participating locality.
- During the survey meetings with local communities, the selection of economic activities in this area was discussed at some length.

> "The experience of EMW and CBC in supporting low-income families to develop economic activities is that bringing benefits not only to wealthier communities, but also to poor and middle-income communities, is important to help ensure that actively supporting environmental protection (such as building sanitary latrines) will be more broadly accepted in every participating locality."

PROPOSED RESULTS AND INDICATORS

- At least three eco-friendly economic models will be successfully formulated and implemented in the specific areas that have been surveyed.

ACTIVITIES

- Formulate projects on developing eco-friendly economic activities.
- Engage an expert with experience on developing eco-friendly economic activities (e.g., planting mangrove forests for producing high quality wood for furniture and acting as an erosion barrier for seaside communities, or establishing a chemical-free environment to produce organic honey), and conduct field surveys to select economic activities suitable to each specific location, and to formulate viable subprojects.
- Based on the survey team research results, specialists will assess the feasibility of potential eco-friendly economic activities with regard to the ecological, social and economic conditions of each specific location; availability of suitable technologies; potential markets for proposed products, and the potential impact of these community-level economic activities to support local communities to more effectively adapt to climate change.
- According to the research results of the survey team, local communities in the coastal area can develop eco-friendly seafood processing activities such as eco-friendly fish sauce seafood products, aquaculture and planting trees that offer high economic value

in the coastal area (e.g., mangroves). Local communities in the lowland and mountainous area can plant trees with high economic value in gardens and forest land (trees that offer high value wood, and commercial forests), combining long-term economic returns such as forest plantations, with economic activities that bring good benefits and relatively short returns on income such as keeping bees, producing high-value organic honey, farming ginger, growing medicinal plants, and raising cattle with high economic value (in spite of their relatively high methane production). The main criteria for selecting eco-friendly economic activities are those that:

- Bring high economic benefit (internal rate of return on investment)
- Are suitable to the natural, economic and social conditions of the locality
- Have positive impacts on the environment, and contribute to mitigating the consequences of climate change

While carrying out this survey and formulating the proposed follow-up project, PRA tools are and will in the future be utilized by the project surveyors to better motivate local communities to participate in selecting and designing new subprojects, including (for example):

- Organizing study visits to eco-friendly economic models by representatives of selected local communities.
- Based on projects formulated for developing eco-friendly economic activities, the program will focus on developing models of eco-friendly economic activities that have been successfully developed in some localities near the study visit sites.
- Participant community visits will include representatives of local communities and local authorities (from 10 to 15 people).
- Experience of EMW and CBC during previous years indicates that well organized study visits to nearby successful projects can be very fruitful for encouraging poor communities to invest their limited funds in trying out new income-generation activities, especially in helping them to widen their perspectives about the feasibility of various economic development activities, giving them an incentive to try out new kinds of projects to increase their household income.
- Implementation of selected economic investment models.
- During the project implementation process, the following issues will be particularly given attention: a) Formulation of project implementation and business plans, b) Establishment of an economic organization for local people, c) Supervision and evaluation of local communities' project implementation by knowledgeable experts who can provide suggestions to entrepreneurs on how to better develop and manage various business models.
- The success of other existing models will be assessed.
- Experienced experts will provide support to help local communities evaluate the success of eco-friendly economic models. In each project, workshops will be organized for local community representatives to present the results of their implementation models. Workshop participants will include representatives of local communities and local authorities, and program experts (around 50 participants).

Component 6
Formulating New Projects to Replicate Model Program Results

JUSTIFICATION

As stated in the section on objectives, the model program is to help EMW and CBC develop and refine the information, experience and methodologies to formulate new projects to assist rural communities in Vietnam to be more adaptive in dealing with climate change.

Based on the findings and results of the model program, an expert who has experience in formulating the various development projects will make field visits to evaluate how best to replicate successful program models.

RESULTS AND INDICATORS

New projects for replicating model programs will be formulated before the project ends. The new projects will consolidate results and key findings of the model program(s) and describe the proposed most effective ways to replicate the model program in other localities.

ACTIVITIES

- Send an experienced expert to work with the project team and communities to understand and consolidate the findings and results of the model program.
- Organize a seminar to present key findings and results of the model program to get comments and contributions of the project stakeholders.
- Prepare the material for the dissemination of the model program results.
- Make a draft of the new project for the replication of the model program.
- Organize a seminar to present the draft of the new project to get comments and contributions of the project stakeholders.
- Finalize project design, and do an initial test to implement the model program in two or thee selected communities.

8.3. Proposed Model Program Implementation Arrangements

The model program implementation would be organized as follows:

- Select the model program implementation partner
- Establish the project office in Quang Nam Province
- Establish the project planning and implementation team

Regulation for the model program implementation would include developing guidelines that make clear the procedures for planning, approving and reporting tasks.

EAST MEETS WEST FOUNDATION

The work of the **East Meets West Foundation** is guided by the belief that every person deserves access to clean water, proper medical treatment and a solid education. Without these fundamental elements of life, children cannot thrive and adults cannot be fully productive members of society.

Find out more and get involved at **www.eastmeetswest.org**.

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