

Livelihoods and Climate Change

Report on Sri Lanka test of CRiSTAL

(Community-based Risk Screening Tool –
Adaptation and Livelihoods)

July 9 – 17, 2006



1. INTRODUCTION.....	3
2. BACKGROUND INFORMATION	3
2.1 Sri Lanka	3
2.2 Climate Change in Sri Lanka	4
2.3 The ‘Conservation of Biodiversity through Collaborative Management in the Rekawa, Ussangoda and Kalametiya (RUK) Coastal Ecosystems’ or RUK Project..	6
3. SUMMARY OF ACTIVITIES	7
3.1 Preparation.....	7
3.2 Field visits, consultations and tests.....	8
3.2.1 Consultation with Fisherman’s Association (Rekawa).....	8
3.2.2 Testing CRiSTAL at IUCN Field Office (Ambalantota).....	9
3.2.3 Testing CRiSTAL with Women’s Group, Kivula Temple (Kalametiya) ..	9
3.2.4 Testing of CRiSTAL with IUCN Staff	10
3.2.5 Debriefing meetings at IUCN Sri Lanka Country Office (Colombo)	10
4. RESULTS OF CRiSTAL TESTING.....	11
4.1 Climate Context	11
4.2 Livelihood Context.....	14
4.2.1 Livelihood responses from Ambaloantote & Ussangoda (Fishermen).....	14
4.2.2 Livelihood response from Ussangoda (Women).....	16
4.3 Project Activity Screening.....	18
4.4 Project Adjustments	21
5. LESSONS-LEARNED.....	21
ANNEX 1: MAP OF SRI LANKA	25
ANNEX 2: TRIP AGENDA	26
ANNEX 3: PARTICIPANTS LISTS	28
ANNEX 4: ADDITIONAL LIVELIHOOD RESPONSE TABLES -- HOW LIVELIHOOD RESOURCES INFLUENCE COPING STRATEGIES	33

1. INTRODUCTION

IUCN, IISD, SEI-B and Intercooperation have developed a tool to help project planners and managers to design activities that foster adaptation to climate change. CRiSTAL (Community-based Risk Screening Tool - Adaptation & Livelihoods) is a decision support tool to help users (a) understand the links between local livelihoods and climate risk, and (b) evaluate how a project affects these links, identifying opportunities to minimize negative impacts and enhance adaptive capacity.

The tool is structured around four framing questions/steps:

- 1) What is the climate context? Identifying the impacts of climate change and current climate stress in the project area, as well as local coping strategies.
- 2) What is the livelihood context? Identifying resources needed to help people conduct their livelihoods, flagging those that are negatively affected by climate stress or essential to coping.
- 3) Screening project activities: Assessing how project activities affect the availability and access to livelihood resources that are negatively affected by climate stress or important to coping.
- 4) Managing climate risk: Adjusting project activities so that opportunities to enhance availability/access to resources important to coping are strengthened.

In order to assess the strengths and limitations of CRiSTAL, the partner organizations conducted a series of field tests on planned, ongoing or completed natural resource management projects in Africa, South Asia, and Central America. In each test, project team members travelled to the project sites to work with local project managers and community members in gathering relevant information and applying CRiSTAL, developing recommendations on how to adjust project activities so that they take into account their impact on local adaptive capacity.

The fifth and final field test took place in Sri Lanka between July 9th and 17th, 2006. Stephen Kelleher (IUCN, Switzerland) and Anne Hammill (IISD, Switzerland) travelled to Sri Lanka to test CRiSTAL on an IUCN field project entitled, 'Conservation of Biodiversity through Integrated Collaborative Management in the Rekawa, Usangoda and Kalametiya Coastal Ecosystems, Sri Lanka.' Several days were spent in the capital city, Colombo, meeting with various IUCN staff and consultants, and 4 days were spent at the project sites meeting with local project staff and community members to gather climate and livelihood information, and a final afternoon was spent applying CRiSTAL. Upon returning from the field sites, Stephen and Anne presented the findings from the field test to IUCN staff and partners in Colombo.

See Annex 1 for map, Annex 2 for trip agenda, Annex 3 for participants list, Annex 4 for complete CRiSTAL testing reports and Annex 5 for list of abbreviations.

2. BACKGROUND INFORMATION

2.1 Sri Lanka

Sri Lanka is tropical island country located about 31 kilometres off the southeast coast of India. It has a land area of about 65,610 square kilometers, and lies between 6° and 10°N latitude and between 80° and 82°E longitude. The island consists of a mountainous area in the south-central parts and a vast coastal plain, which surrounds it. Despite the relatively small size of the

country, there is considerable variation in climate over time and space. The annual average rainfall varies from below 1000mm (39”) over a small region in the arid parts of the north-west and south-east of the island to over 5000mm (197”) in a few places on the south-western slopes of the central hills. There is little seasonal variation of temperature. The mean annual temperature in the coastal areas below 150m in elevation ranges from 26.0o c to 28.0o c while in the hill country above 1500m, it ranges from 15.0o c to 19.0o c.

A former British crown colony known as Ceylon, the country gained independence in 1948. In 1972, a new constitution officially changed the name of the country to Sri Lanka and made Buddhism the state’s primary religion. The country has two main ethnic and religious groups, the Sinhala-Buddhist majority and the Tamil-Hindu minority, who have been in conflict since ancient times (several centuries before Christ). In the last 20 years, the conflict has turned into a violent civil war fought between government forces and the Liberation Tigers of Tamil Eelam (LTTE), who seek an independent Tamil homeland. The war has left an estimated 65,000 people dead, displaced millions of others and damaged to the country’s economy. A cease-fire agreement was signed in late 2001 but hostilities continued, escalating in July 2006.

The social and economic challenges facing Sri Lanka were dramatically compounded in December 2004, when a tsunami battered 80% of the country’s coastline. Over 31,000 people were killed and approximately 100,000 homes were damaged or destroyed. While the ensuing relief effort helped to provide temporary housing, prevent disease outbreaks, and help Sri Lanka’s tourism industry recover quickly, the impacts of the tsunami are still visible along the country’s coastline and continue to shape the lives and perceptions of many of its survivors.

2.2 Climate Change in Sri Lanka

According the Sri Lanka’s 2000 National Communications under the UNFCCC, global warming is expected to lead to a rise in the sea level, higher temperatures, more frequent and prolonged droughts, high intensity rainfall and increased thunder activity. These anticipated changes in the global context represent a significant threat to the coastal areas of Sri Lanka, the different sectors of the national economy and human health. A range of major impacts can be expected from the changes as summarized below:

Sea level rise

- Inundation of low-lying coastal settlements and coastal wetlands
- Coastal erosion
- Flooding and storm Damage
- Saltwater intrusion affecting low-lying agriculture and freshwater intakes
- Fishery industry
- Coastal protection and port structure
- Near shore infrastructure – land-based infrastructure and land reclamation
- Tourism industry

Temperature rise

- Power generation
- Agricultural output
- Human health
- Transportation infrastructure

Drought

- Ground and surface Water Supply

- Power generation
- Forest resources
- Agricultural output
- Human health
- Transport infrastructure

High Intensity Rainfall

- Floods
- Land degradation
- Agricultural output
- Human health
- Transport infrastructure
- Power generation

Increased thunder activity

- Damage to infrastructure
- Human health

Sri Lanka’s response strategy to anticipated climate changes includes the implementation of both mitigation and adaptation measures. The country’s contribution to the emission of greenhouse gases is considered negligible. Even so, every effort has to be made to maximize the country’s potential contribution towards controlling the amount of gases being emitted to the atmosphere. Adaptation measures are required to address the potential impacts of climate change. A few measures have already been adapted in some sectors such as agriculture and energy to promote improved environmental management. The Mitigation Options and Adaptation Measures recommended for the different sectors are summarized in the table below.

Table 1: Sectors relevant to mitigation and adaptation in Sri Lanka

Relevant Sector for Mitigation	Relevant Sectors for Adaptation
<ul style="list-style-type: none"> • Energy Sector • Industrial Sector • Transport Sector • Agricultural Sector 	<ul style="list-style-type: none"> • Transport Sector • Agricultural Sector • Forestry Sector • Water Resource Sector • Coastal Zone • Health Sector • Human Settlement & Public Utilities Sector

General measures that would increase resilience to climate change include - the protection of arable soil, improvement of water management, enhancement of agro-technology, formulation of sustainable land use policies, maintenance of food reserves and provision of emergency disaster relief. Several major policies have been formulated up to date. These are the Agricultural Policy, National Land Use Policy (Draft), Transport Policy, Forestry Policy, and Energy Policy. There is a need for revising these policies taking into account the climate change impacts. When strengthening the policies and preparing new policies it is important to bear in mind the need for (a) building up a database, (b) providing incentives/disincentives, (c) cost-effectiveness, (d) an integrated approach, (e) stakeholder collaboration and (f) increasing awareness of climate change.

The following projects were recommended for inclusion in Sri Lanka's portfolio of projects on climate change:

Table 2: Recommended climate change projects for different sectors in Sri Lanka

Sector	Project activities
<i>Coastal Zone</i>	<ul style="list-style-type: none"> • Studying the influence of increased salt water intrusion in a selected river estuary and undertaking a vulnerability assessment in a selected region along the coast. • Investigating the impacts of sea level rise and temperature rise on coral reef systems around the coastal belt.
<i>Energy Sector</i>	<ul style="list-style-type: none"> • Harnessing the total maximum identified potential of hydropower, based on a study of the economic and environmental impacts • Introducing DSM measures such as luminaires, refrigerators, air-conditioners and motors, etc.
<i>Agricultural Sector</i>	<ul style="list-style-type: none"> • Promoting rainfed farming and water conservation • Developing integrated farming systems in relation to climatic change
<i>Forestry Sector</i>	<ul style="list-style-type: none"> • Preparing a database to achieve a greater understanding of the linkages between climate change and forest eco-systems • Quantifying the role of forests, forest soils and reservoirs, sinks and sources of carbon.
<i>Water Resources Sector</i>	<ul style="list-style-type: none"> • Introducing permit/monitoring systems for groundwater extraction and water quality assessment in vulnerable areas • Assessing extent of land that will be affected by sea level rise.
<i>Health Sector</i>	<ul style="list-style-type: none"> • Establishing work environment standards for local conditions.
<i>Human Settlements</i>	<ul style="list-style-type: none"> • Mapping flood plain and flood hazards • Identifying then prioritizing vulnerable areas for human settlements.

2.3 The 'Conservation of Biodiversity through Collaborative Management in the Rekawa, Ussangoda and Kalametiya (RUK) Coastal Ecosystems' or RUK Project

The RUK area constitutes a section of the southeastern Sri Lankan coastline located in the Hambanthota District about 200 miles from Colombo. The area contains an array of coastal terrestrial and wetland habitats and landscapes. The coastal wetlands in the area include the Rekawa lagoon at 250 ha, the interconnected Kalametiya (606 ha) and Lunama (192 ha) lagoons, the narrowly branched Kahanda lagoon (<100ha) and the Walawe estuary. The Rekawa lagoon lies in the narrow intermediate climatic belt and receives an average annual rainfall that ranges between 1270-1910mm. The average temperature in the area ranges from between 26.6 to 27.2 Celsius. The Kalametiya-Lunama lagoons and the Ussangoda scrubland are located in the dry zone of Sri Lanka and receive annual average rainfall of 1000-1250mm. The RUK area undergoes 2 distinct dry spells, one in February and the other in July-August.¹

¹ *Assessment of Inland and Subtidal Biodiversity in the RUK Area of Southern Sri Lanka*. Final Report. IUCN Sri Lanka Country Office. August 2003.

The objective of the RUK project was to ensure the conservation and sustainable use of the biodiversity of a globally significant set of landscapes through the development of a collaborative management system, actively involving local communities, NGOs and governmental agencies. A number of assessment studies were undertaken during the project implementation related to biodiversity, socio-economics, restocking of coastal lagoons, sea shell exploitation, etc.

The expected outcomes of the project were:

- A coastal environmental profile and a replicable special areas management plan prepared for the RUK area
- Participatory mechanisms for resource management developed and livelihoods of the local community improved through the introduction of nature-based tourism initiatives and other sustainable sources of income
- Conservation programmes for globally-significant biodiversity established at the project site and local biodiversity units established to enhance community awareness
- Efficient policy level coordination and law enforcement established to improve biodiversity conservation
- An effective monitoring system in place to assess development activities and their impact in biodiversity.

The RUK Project ran from 2001-2005 so was not operational during the CRiSTAL test and results especially regarding project adaptation measures were not ideal. Though the project was closed the team was able to visit sites and communities that had been target beneficiaries of the project. The Ministry of Fisheries and Ocean Resources was the executing agency, while the Coast Conservation Department (CCD) functioned as the implementing agency.

The RUK Project was not designed to be a climate change project. However interviews with local communities and stakeholders about their climatic observations and area trends, as well as the CRiSTAL testing, demonstrated a close correlation between many of the potential climate change vulnerability and impact scenarios predicted for these areas by the IPCC and in the Sri Lanka National Communication.

3. SUMMARY OF ACTIVITIES

3.1 Preparation

The CRiSTAL test team for Sri Lanka comprised Anne Hammill of IISD and Stephen Kelleher of IUCN's Forest Conservation Programme, supported by technical and support staff from IUCN's Sri Lanka Country Office. The Team arrived in Sri Lanka on the 9th of July and spent the 9th and the 10th doing final preparations for the field visits including reading background materials from the IUCN Sri Lanka Country Office, the National Communication to the IPCC and additional materials downloaded from the internet.

The 11th of July was spent at the IUCN offices conducting interviews in meetings in further preparation for the field visits. In the morning the team met with members of the IUCN staff who had worked on the RUK project and discussed some of the outcomes and constraints, as well as the possible links to climate change. Attendance included Mr Nishan Perera, Coordinator/Marine and Coastal Programme, Mr Bhatiya Kekulandala - Programme Officer/ Biodiversity Unit, Mr Naalin Perera - Assistant Programme Officer/Biodiversity Unit, Mrs. Kumi Ekarathne, Senior Programme Officer and Mr. Anshuman Saikia, Programme Coordinator.

The afternoon allowed for a follow-on meeting with a number of consultants that had worked on the project as well as representatives from various agencies, including UNDP, the Coast Conservation Department and a university (See Annex 3 for a Participant's List)

It is important to note that all aspects of the visit and the work during the testing was influenced by the impacts of the December 2006 tsunami, which had a serious impact on the areas visited and killed over 30,000 people.

3.2 Field visits, consultations and tests

Over the course of 4 days, a number of consultations were carried out to (a) gather information about local livelihoods and observations about climate conditions, and (b) use this information to test the first two steps of the revised CRiSTAL tool (i.e. Setting the Climate Context and Setting the Livelihood Context).

Following the community consultations, the team sat down with IUCN Sri Lanka staff to review the information entered into the first two steps of CRiSTAL, and the complete the last two steps of CRiSTAL (i.e. Project Activity Screening and Adaptation Management).

3.2.1 Consultation with Fisherman's Association (Rekawa)



The team and IUCN Sri Lanka staff traveled to the field on the morning of 12 July. In the afternoon they had a first meeting with community members and members of a fisherman's association at the NARA Research Station in Rekawa. Given that it was late in the afternoon the intent of this visit was not to conduct a test but to gather information from the group on their perceptions of climatic conditions and trends. The methodology here was one of simple questions and answers around the theme of climate change and if it was perceived to be an issue. The team also visited a mangrove restoration site.

What most struck the team during the meeting/interview was that the observations of the community members correlated with the findings of the National Communication for this area. The observations from the participants include irregular or 'abnormal' rainfall patterns with more incidences of severe events such as drought and flood. Droughts were said to be so severe that even coconuts were effected, which are usually considered to be the most drought resistant. These changes have affected cultivation including increased morbidity in palms and in vegetables. It should be noted that in Sri Lanka there is a tradition of extensive and diverse home gardens that include many family subsistence staples and can include some market produce. These are planted in intensive agroforestry systems around homes and planned to produce something during all the various seasons. Participants have observed a gradual rise in temperature over the last 5 years or so. Also, the wind patterns have shifted so that the previously prevailing winds from the northeast monsoon have shifted to the northwest, exacerbating drought and flood events, which was a finding of the National Communication. Wildfire incidence or change did not seem to have changed.

Participants made a link between the existence of a biogas plant in the area and the increased incidence of drought. Protests by communities against the plant in response to this belief forced the plant to shut down. While it is scientifically unlikely that the biogas plant had any climatic impacts it did demonstrate that communities were making a link between what appeared to be a causal factor, since the biogas plant came on line toward the end of the 1980s around the time that climatic change begin to be evidenced.

There were many observations of change to sea conditions including a reduction or change in currents, different fish stocks being found, reductions in some catches and increases in others. Most of these changes were observed mainly after the December 2004 tsunami so a link to climate change cannot be postulated given a lack of scientific research.

In Rekawa as in other communities the response to a decrease in fishing or agriculture production is a turn toward market based activities, such as brick making, casual or migratory labor, poultry production by women.

3.2.2 Testing CRiSTAL at IUCN Field Office (Ambalantota)

The following morning, the first test of the revised CRiSTAL took place at the IUCN field office. Initially 8 men were in attendance but eventually more men and women arrived to participate. Participants were from the Ambalantota and Ussangoda communities, and many were members of the Biodiversity Task Force that was established by the IUCN RUK project. Most were either beach sand fishermen or recipients of the livelihood revolving loan fund (used for activities like tourism and agricultural production).



The methodology in this test was to first undertake a general discussion on climate change to get a sense if people had heard about the issue at all or not. This was followed by the identification of hazards using colored sheets that were then posted on the wall. These were later grouped to identify the top hazards that were shared among the participants. Upon selecting the top 3 hazards, participants were then asked to list the top 3 impacts for each of the hazards, and the main coping strategies for dealing with each impact. This was also done using colored sheets that were posted on the wall. Each set of answers prompted lengthy discussions, prolonging the exercise. Participants were then asked to identify the main livelihood resources, after which the exercise was brought to a close.

While the methodology used here – starting with an overall discussion of the concept of climate change and then leading into the specifics of CRiSTAL – provided some valuable discussion it blurred the line between the overall discussion and the CRiSTAL window dealing with hazards. This made the test longer than it had to be. However the use of the paper and posting was helpful for visualizing and grouping the various threats.

The full details of the outcomes of the session are available in Section 4, which summarizes the CRiSTAL test results.

3.2.3 Testing CRiSTAL with Women’s Group, Kivula Temple (Kalametiya)

The second structured test of CRiSTAL took place during the afternoon after the Ambalantota test. This test offered an interesting comparison of results, as almost all of the participants were women. As a result their responses differed from those of the largely male audience of the prior test and focused on such issues as feeding the family and keeping it healthy. Almost all of the participants were recipients of the revolving loan fund established by the RUK project.



For this test, the team went directly into the test phase. Like in the prior test colored papers and flip charts on the wall were used, but directly for the identification of hazards. Apart from a short introductory presentation on the purpose of the consultation, and a brief explanation on the causes and impacts of climate change, there was no general discussion on climate change or perceptions of climate change. This helped the test proceed more quickly and smoothly, especially since 'climate change' *per se* is not an issue that people deal with in their daily lives.

3.2.4 Testing of CRiSTAL with IUCN Staff

The following day (Friday, July 14, 2006), the team met with IUCN project manager, Kumi Ekarathne, to complete the remaining steps of CRiSTAL. Because the community CRiSTAL exercises generated long discussions, Team members were not able to complete all of Step 2 (Livelihood Context) during the consultations. They were only able to get as far as listing livelihood resources. As such, the following steps were completed:

- Finish setting the livelihood context: Take the list of livelihood resources provided by the community and analyse (a) the extent to which these resources are affected by current climate hazards, and (b) the importance of these resources to coping strategies.
- Screen project activities: Identify a number of discrete activities under the RUK project and analyse, (a) how these activities impact livelihood resources vulnerable to climate risk, and (b) how these activities impact livelihood resources that are important to coping strategies.
- Adjust project activities for adaptation: Flag those activities that negatively or positively impact resources vulnerable to climate risk / important to coping strategies and adjust them so (a) positive impacts are maximized, or (b) negative impacts are minimized, thereby reducing risk and enhancing coping capacity.

As the project was no longer functioning the results were not as robust as they may have been.

Following the test, the team and IUCN staff members visited two eco-tourism operations in the region that have been supported by IUCN – the new Lunama Lagoon boat ride, and turtle watching at Rekwa beach.

3.2.5 Debriefing meetings at IUCN Sri Lanka Country Office (Colombo)

Upon returning to Colombo, team members spent Monday, July 17th presenting CRiSTAL and the test results to IUCN staff and partners. Two meetings were held at the IUCN office – the first with Sri Lanka government representatives, donors, academics and other IUCN partners; the second with IUCN Colombo staff. Both meetings yielded useful feedback for CRiSTAL and

identified opportunities for using CRiSTAL in other contexts or for other types of projects in Sri Lanka.

4. RESULTS OF CRiSTAL TESTING

As described above, the 3 consultations in the RUK project area yielded different information on the climate and livelihood context. For the purposes of applying CRiSTAL in its entirety, the team decided to use the information generated from the more structured consultations in Ambalantota and Usangoda.

The Sri Lanka test of CiSTAL was unique in that it allowed the Team to apply the tool twice on the same project, but using information from different social groups – (a) sand beach fishermen, and (b) women, the majority of whom were small grant recipients.

In terms of setting the overall project context, the information was as follows:

Table 3: Summary of Sri Lanka CRiSTAL text project

Region	Asia
Country	Sri Lanka
Ecosystem	Coastal
Project name	Conservation of Biodiversity through Integrated Collaborative Management in the Rekawa, Usangoda and Kalametiya Coastal Ecosystems, Sri Lanka
Brief description of Project	Conservation and livelihoods project based on biodiversity, socio-economic and livelihood assessments. Addressed biodiversity threats such as shell mining, coral mining, turtle poaching, mangrove destruction, and worked to provide alternative livelihoods.
Brief description of Project context	Tsunami-affected area (struck by tsunami ¾ through the project); densely populated with high pressure on natural resource base; politically fragmented communities; traditional livelihoods are dependent on threats to biodiversity (shells, corals, turtles); lots of tourism.

4.1 Climate Context

For both social groups, droughts and floods were identified as main hazards in the project area. In identifying the third most important hazard, however, the fishermen noted changing sea conditions, while the women noted increasing temperatures. The impacts and coping strategies identified by the fishermen tended to focus on income-generating activities, while the women’s responses emphasized both income-generating activities and household health issues.

The results for setting the climate context in the RUK project area are provided in the tables below.

Table 4: Climate Context (Ambalantote & Ussangoda communities)

	Hazard	Impact	Coping Strategy
1	Drought	Less drinking water (depend on rain)	Walk far distances for water
		Reduced agricultural productivity (income loss)	Casual labour
		Reduced livestock productivity (food, water)	Take cattle to other areas (state land, wet zone)
2	Floods	Destruction of paddy fields	Change timing of crop planting (no guarantee)
		Destruction of property (infrastructure)	Move to different dwelling temporarily
		Increased threat of water-borne diseases	Boil water
3	changing sea conditions (currents, storm surges)	Declining fish catch	Income diversification (brick making, labour)
		Coastal erosion (coconut plantations, tourism)	Plant green belt (coastal plants - pandanus)
		Saltwater intrusion, affect household water supply	Build sand bags (inland, not along coast)

Participants at the first test agreed that the main hazards affecting their communities were floods, droughts and changing sea conditions (e.g. coastal erosion, rough seas, and changes in currents). Additional hazards identified included changes in soil salinity especially in paddy fields, and increase in invasive species. Hazards such as these, while not in the majority, were noted in the comments section of CRISTAL because they either coincided with the findings of the National Communication or with climate change trends overall.

A summary of coping strategies for drought includes a switch to casual labor during droughts, brick making and illegal seashell (from terrestrial limestone shell beds) and coral mining. To compensate for decreased animal production during drought livestock are often led to distant pastures as far as 100-200 kilometers away. The journey takes approximately two weeks, and adult animals are taken on foot while young animals are transported by vehicles. A summary of the coping strategies for floods includes a change in crop timing, which is considered a gamble, move to a neighbor's house if yours is threatened and boil water to reduce the chance of contracting water borne diseases. Coping strategies for changes in sea conditions are similar to those for drought, a shift toward casual employment, or a move to different fishing areas.

In discussing additional impacts and coping strategies associated with **drought**, the Ambalantote group noted:

- Another coping strategy for dealing with less drinking water is buying water from water vendors or depending on emergency government water services
- Rainwater harvesting systems, using gutters on houses, are too expensive for most
- About 5% of the community have enough money to invest in irrigation systems that bring water from other areas/sources

Regarding additional impacts and coping strategies associated with **floods**, the group noted:

- When families need to move to a different dwelling temporarily, they either move in with neighbours or relatives with houses on higher ground, or construct a tree house.
- Communities will also dredge the mouth of the river to clear sedimentation build-up so that water can flow out
- Some members noted that the community health officer has started a campaign to spray mosquito breeding areas to minimize the spread of diseases during floods.

When discussing the impacts and coping strategies associated with **changing sea conditions**, the group noted:

- Coastal erosion affects turtle nesting areas, which have implications for the tourism industry
- Planting pandanus to prevent coastal erosion has the additional benefit of providing livelihood opportunities, as some people use the leaves to weave mats to sell locally.
- Waves and storm surges lead to saltwater intrusion
- The community wants to build a more permanent wall to protect them from surges (rather than continuing to depend on sand bags)
- Saltwater intrusion has become worse since the 2004 tsunami, as it destroyed the protective mangrove belt

Table 5: Climate Context (Kalametiya community)

	Hazard	Impact	Coping Strategy
1	Drought	Crop damage/loss (coconut; home gardens)	Casual labour (sell fish, shell mining, shops)
		Drinking water shortage	Travelling far distances to get water from wells
		Health (disease, heat stress)	Boil water (protect children)
2	Floods	Damage to crops (rice; home gardens)	Reconstruct irrigation canals, abandon paddies
		Infrastructure damage	Reciprocal assistance with repairs, cleaning wells
		Water-borne diseases (mosquitoes)	Spray engine oil by stagnant water sources
3	Increasing Temperatures	Skin problems (perspiration)	Medicine, both doctor-prescribed and home remedies
		Heat stress	Modify work hours (rest between 10am - 4pm)
		Plant wilting	Let plants die

The three hazards identified by the women were increased drought incidence and intensity, increased flood incidence and intensity and increased temperature. Related to these were more intense wind, and high intensity rainfall. Another perceived change was decreased lagoon harvest of prawns and crabs.

Crop damage or loss was noted as the main impact of droughts and floods. During droughts, they noted that coconut cultivation decreases, pest infestation increases, home gardens suffer and crop substitution is not a viable coping strategy. Instead, they turn to casual labour (selling fish, shell mining and opening roadside shops) to supplement their reduced income, or abandon their crops entirely to conserve water for drinking. When paddy fields and home gardens are damaged due to floods, people will also try to repair or construct irrigation canals.

Water supply and availability is also affected by floods and droughts. To cope with water shortages, the women said they either walked further for water or retrieved it from a public water truck. To cope with reduced quality of water (especially during floods), they boiled water or sprayed engine oil near stagnant water sources to keep away mosquitoes.

In fact, human health impacts were mentioned for all of the hazards. Common colds, prickly heat, diarrhea, and respiratory problems due to increased dust and air pollution were noted (especially during drought). Increasing temperatures are associated with skin problems and heat stress, prompting people to modify their work hours so they are not as exposed to the heat. Some women noted that in April 2005, 2 people died while working in the paddy fields, probably from heat stroke. When home remedies or treatments do not work, they travel 8km to the nearest hospital and see a doctor.

4.2 Livelihood Context

After discussing the climate context of the RUK area, the team went on to discuss local livelihoods. The groups were first asked to identify the natural, physical, financial, human and social resources important to their livelihoods. After identifying these resources, participants were asked to evaluate two types of relationships:

- a) The extent to which these resources are negatively affected by climate hazards
- b) The extent to which these resources are important to coping strategies

Specifically, participants were asked to rate these relationships between 0 and 5, where 0 denoted no relationship and 5 denoted a very strong relationship. Those resources that were given a value of 4 or 5 (highlighted in yellow above) were then flagged for subsequent analysis in CRiSTAL.

The next sections provide a summary of what was discussed in the two RUK consultation groups.

4.2.1 Livelihood responses from Ambaloantote & Ussangoda (Fishermen)

The natural resources considered most important to livelihoods were identified as water, soil and both fresh and saltwater fisheries. The physical resources are irrigation and various types of fishing equipment. When discussing financial resources, participants expressed a need for some type of village fund, ideally financed by donors. Since this fund does not yet exist, they identified revolving loans and liquid assets (especially jewellery) as important to their livelihoods. In terms of social resources, the group noted that biodiversity knowledge and awareness of legal frameworks (particularly penalties and fines) for natural resource extraction was important. The Biodiversity Task Force was recognized as a key social resource, and interestingly, in every consultation conducted in the RUK area, participants mentioned the importance of the Death Society – an organisation whereby members pay a nominal fee for support services (catering, logistics, etc.) rendered during a death in the family.

Table 6: Livelihood Context A – Extent to which climate hazards negatively affect livelihood resources, Ambalantote & Ussangoda (Fishermen)

Hazard:	Drought					Flood					Changing sea conditions							
	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Resource																		
Natural Resources																		
Freshwater						X						X					X	
Soil					X							X					X	
Marine products (fish, shells, coral)		X						X										X
Physical Resources																		
Irrigation infrastructure						X						X			X			
Fishing equipment (harbour, boats, nets)	X									X								X
Financial Resources																		
Village fund (requested for future)	X						X						X					
Revolving loans					X							X					X	
Liquid assets (pawning jewellery)						X						X					X	
Human Resources																		
Biodiversity knowledge	X						X						X					
Awareness of legal frameworks for NR use	X						X						X					
Skills				X					X								X	
Social Resources																		
Biodiversity Task Force	X						X						X					
Federation of 17 community organisations	X						X						X					
Death society	X						X						X					

As demonstrated in Table 6 above, natural, physical, and financial resources were perceived as being most negatively affected by hazards, especially droughts and floods.

In discussing livelihood resources that are important to coping, participants noted:

- The availability of or access to freshwater and irrigation infrastructure was important for offsetting the need to walk distances for drinking water or take cattle to other areas during drought (an unsustainable / undesirable coping strategy)
- Fishing equipment, skills and the federation of community organisations was deemed important to helping people pursue casual labour to cope with reduced agricultural productivity / income.

Table 7 below summarizes the relationship between livelihood resources and coping strategies for drought. Similar evaluations for the other hazards (floods and changing sea conditions) are available in Annex 4.

Table 7: Livelihood Context B – Extent to which livelihood resources influence coping strategies for DROUGHT, Ambalantote & Ussangoda (Fishermen)

HAZARD 1: DROUGHT	Impact:	Less drinking water (depend on rain)					Reduced agriculture productivity					Reduced livestock productivity							
	Coping Strategy:	Walk distances for water					Casual labour					Take cattle to other areas (wet zones)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Freshwater						X				X									X

Soil	X					X						X				
Marine products (fish, shells, coral)	X							X				X				
Physical Resources																
Irrigation infrastructure				X		X									X	
Fishing equipment (harbour, boats, nets)	X								X			X				
Financial Resources																
Village fund (requested for future)	X					X						X				
Revolving loans			X				X					X				
Liquid assets (pawning jewellery)	X					X						X				
Human Resources																
Biodiversity knowledge	X					X						X				
Awareness of legal frameworks for NR use	X					X								X		
Skills	X									X			X			
Social Resources																
Biodiversity Task Force	X					X						X				
Federation of 17 community organisations			X							X				X		
Death society	X					X						X				

When evaluating the importance of the livelihood resources for coping strategies associated with the other identified hazards, there were few resources that scored highly with floods (i.e. only freshwater and skills were deemed important for coping), while there was a mix of resources (physical, financial, human) that were needed for coping with changing sea conditions.

4.2.2 Livelihood response from Ussangoda (Women)

Table 8: Livelihood Context A – Extent to which climate hazards negatively affect livelihood resources, Kalametiya (Women’s Group)

Resource	0	1	2	3	Drought		Flood					Increased Temperatures					
					4	5	0	1	2	3	4	5	0	1	2	3	4
Natural Resources																	
Paddy fields						X						X				X	
Seashell deposits	X							X						X			
Freshwater					X						X					X	
Physical Resources																	
Roads	X										X			X			
Vehicles	X								X						X		
Agricultural implements	X								X						X		
Financial Resources																	
Loans					X						X			X			
Liquid assets (jewellery)					X						X			X			
Human Resources																	
Agricultural skills/training (paddy cultivation)	X						X								X		
Brick making skills	X						X								X		
Sewing skills	X						X								X		
Social Resources																	
Agromart (agriculture society)			X						X					X			
Coastal management society	X							X						X			
Death society	X						X							X			

For the women, drought and floods had the most negative influence on livelihood resources. Those resources most affected included natural resources (paddy fields and freshwater), physical resources (roads), and financial resources (loans and liquid assets). Increased temperatures had an impact on livelihood resources, but to a lesser degree than droughts and floods (Table 8).

In terms of livelihood resources that are important to coping (Table 9), the women noted:

- Seashell deposits were important for supporting casual labour to cope with crop damage/loss during droughts.
- The availability of or access to freshwater and irrigation infrastructure was important for offsetting the need to walk distances for drinking water or boil water to protect household health during a drought (both seen as unsustainable / undesirable coping strategies)
- Roads are important for supporting casual labour and allowing people to fetch water from other sources during a drought
- Loans are important for supporting casual labour, particularly the establishment of roadside shops

Table 9: Livelihood Context B – Extent to which livelihood resources influence coping strategies for DROUGHT, Kalametiya (Women’s Group)

HAZARD 1: DROUGHT	Impact:	Crop damage / loss					Drinking water shortage					Health (diseases, heat stress)							
	Coping Strategy:	Casual labour					Walk distances for water					Boil water (mostly to protect children)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Paddy fields		X						X						X					
Seashell deposits						X		X						X					
Freshwater		X										X							X
Physical Resources																			
Roads						X						X		X					
Vehicles			X									X		X					
Agricultural implements				X				X						X					
Financial Resources																			
Loans						X		X						X					
Liquid assets (jewellery)					X			X						X					
Human Resources																			
Agricultural skills/training (paddy cultivation)					X			X						X					
Brick making skills						X		X						X					
Sewing skills						X		X						X					
Social Resources																			
Agromart (agriculture society)					X			X						X					
Coastal management society					X			X						X					
Death society		X						X						X					

Table 10 below provides a summary of the Livelihood-Climate analysis for both consultation groups.

Table 10: Summary of Livelihood-Climate Analysis for both CRiSTAL consultation groups

Ambalantote & Ussangoda (Mostly men, beach sand fishermen)	Kalametiya (Women, revolving loan recipients)
<p><i>Livelihood resources negatively affected by climate:</i></p> <p>Freshwater Soil Marine products (fish, shells, coral) Irrigation infrastructure Fishing equipment (harbours, boats, nets) Revolving loans Liquid assets (pawning jewellery)</p> <p><i>Livelihood resources important to coping:</i></p> <p>Freshwater Soil Irrigation infrastructure Fishing equipment (harbours, boats, nets) Revolving loans Biodiversity knowledge Skills Federation of 17 community organisations</p>	<p><i>Livelihood resources negatively affected by climate:</i></p> <p>Paddy fields Freshwater Roads Loans Liquid assets (jewellery)</p> <p><i>Livelihood resources important to coping:</i></p> <p>Seashell deposits Freshwater Roads Vehicles Loans Liquid assets (jewellery) Agricultural skills / training</p>

4.3 Project Activity Screening

After flagging livelihood resources that are important for adaptation (i.e. either vulnerable to current climate stress or important to coping strategies), the team ‘screened’ six RUK project activities to evaluate their impact on the flagged resources. The six activities were:

1. Conducting biodiversity and socio-economic assessments
2. Preparing an eco-tourism process for the project area
3. Establishing a revolving loan fund for alternative livelihoods
4. Re-stocking the lagoon with fish
5. Establishing a project monitoring system
6. In-situ conservation of sea turtles

Table 10 below summarizes the screening results. During the screening exercise, the team encountered a programming problem with CRiSTAL. The programme did not automatically flag those livelihood resources that were most negatively affected by hazards. As such and in the interest of time, the team was unable to examine how the selected project activities affected the availability of and access to these resources. The exercise ended up focusing on how project activities affect livelihood resources that are important to coping strategies.

Table 11: Project activity screening, Ambalatote & Ussangoda (Fishermen)

Project activities	Impact of activity on resources most negatively affected by hazards				Impact of activity on resources most important to coping			
	Resources	Pos	Neg	NA	Resources	Pos	Neg	NA
Activity 1								
Biodiversity and socio-economic assessments	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment			X
	Fishing equipment				Revolving loans			X
	Revolving loans				Biodiversity knowledge	X		
	Liquid assets				Skills			X
				Federation of 17 org			X	
Activity 2								
Eco-tourism process for project area	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment			X
	Fishing equipment				Revolving loans	X		
	Revolving loans				Biodiversity knowledge	X		
	Liquid assets				Skills	X		
				Federation of 17 org			X	
Activity 3								
Revolving loan fund for alternative livelihoods	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment	X		
	Fishing equipment				Revolving loans			X
	Revolving loans				Biodiversity knowledge			X
	Liquid assets				Skills	X		
				Federation of 17 org			X	
Activity 4								
Re-stocking lagoon with fish	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment			X
	Fishing equipment				Revolving loans			X
	Revolving loans				Biodiversity knowledge	X		
	Liquid assets				Skills	X		
				Federation of 17 org	X			
Activity 5								
Project monitoring system	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment			X
	Fishing equipment				Revolving loans			X
	Revolving loans				Biodiversity knowledge			X
	Liquid assets				Skills			X
				Federation of 17 org			X	
Activity 6								
In-situ conservation of sea turtles	Freshwater				Freshwater			X
	Soil				Soil			X
	Marine products				Irrigation infrastructure			X
	Irrigation infrastructure				Fishing equipment			X
	Fishing equipment				Revolving loans	X		
	Revolving loans				Biodiversity knowledge	X		
	Liquid assets				Skills	X		
				Federation of 17 org			X	

The resources highlighted in the table above are coping resources that are positively affected by project activities, signifying an opportunity to expand and strengthen these activities to further support adaptation. Skills and biodiversity knowledge seemed to be most enhanced by RUK project activities.

Table 12: Project activity screening, Kalametiya (Women)

Project activities	Impact of activity on resources most negatively affected by hazards				Impact of activity on resources most important to coping			
	Resources	Pos	Neg	NA	Resources	Pos	Neg	NA
Activity 1								
Biodiversity and socio-economic assessments	Paddy fields				Seashell deposits			X
	Freshwater				Freshwater			X
	Roads				Roads			X
	Loans				Vehicles			X
	Liquid assets				Loans			X
					Liquid assets			X
				Agricultural skills			X	
Activity 2								
Eco-tourism process for project area	Paddy fields				Seashell deposits	X		
	Freshwater				Freshwater			X
	Roads				Roads			X
	Loans				Vehicles			X
	Liquid assets				Loans	X		
					Liquid assets			X
				Agricultural skills			X	
Activity 3								
Revolving loan fund for alternative livelihoods	Paddy fields				Seashell deposits	X		
	Freshwater				Freshwater			
	Roads				Roads			
	Loans				Vehicles			
	Liquid assets				Loans	X		
					Liquid assets			
				Agricultural skills	X			
Activity 4								
Re-stocking lagoon with fish	Paddy fields				Seashell deposits			X
	Freshwater				Freshwater			X
	Roads				Roads			X
	Loans				Vehicles			X
	Liquid assets				Loans			X
					Liquid assets			X
				Agricultural skills			X	
Activity 5								
Project monitoring system	Paddy fields				Seashell deposits			X
	Freshwater				Freshwater			X
	Roads				Roads			X
	Loans				Vehicles			X
	Liquid assets				Loans			X
					Liquid assets			X
				Agricultural skills			X	
Activity 6								
In-situ conservation of sea turtles	Paddy fields				Seashell deposits	X		
	Freshwater				Freshwater			X
	Roads				Roads			X
	Loans				Vehicles			X
	Liquid assets				Loans			X
					Liquid assets			X
				Agricultural skills			X	

For the women’s group, RUK project activities were seen as decreasing reliance on seashell deposits, diversifying the resource base for coping and protecting the local natural resource base.

Overall, the research team and IUCN staff were unable to identify instances where RUK project activities may have had a negative impact on resources important to coping with climate stress. There was some discussion, however, on how climate change, vulnerability and coping could have been incorporated into activities that had no ostensible impact on resources. For example, when conducting the biodiversity and livelihood assessments, climate stress could have been

incorporated into the analysis. Thus, the project screening step provided a useful framework for discussing the links between climate change and field projects more generally.

4.4 Project Adjustments

After thinking about how project activities affect livelihood resources that are important for adaptation, the discussion turned to concrete project adjustments. These resulted both from the organization and presentation of data using the CRiSTAL programme, as well as discussions during the CRiSTAL process.

Using the information from the **Ambalatote & Ussangoda** consultations, the team came up with the following project adjustments:

- Activity: Restocking of lagoon
Effect: **Positive** impact on biodiversity knowledge, local skills, and the sustainability of the federation of 17 community organizations – all of which are important to helping local people cope with climate stress. Want to adjust the activity so that it is even more effective and sustainable.
Adjustment: Develop lagoon management and monitoring plan with community participation and buy-in. Require community financial contribution as incentive for sustainable management
- Activity: Establish of a project monitoring system
Effect: **N/A** -- the monitoring system did not appear to have any direct positive or negative impact on livelihood resources important for coping. However, after further discussion, it was felt that improving the project monitoring system could dissuade people from relying on seashell deposits to cope with climatic stress and encourage them to pursue alternative income generating activities.
Adjustment: Provide technical and financial support to Biodiversity Task Force members to become rotating monitors

Using the information from the **Kalametiya** consultations, the team devised the following project adjustment:

- Activity: Biodiversity and socio-economic assessments
Effect: **N/A** – the assessments did not have any observable impact on livelihood resources important for coping with climate stress. The team did feel, however, that the process of conducting the assessments could have been improved so that RUK project activities could have gotten underway sooner (and therefore given more time to achieve effectiveness), and contributed to an applied research agenda.
Adjustment: Do targeted studies in parallel with field activities – do not wait, build on what's there and conduct applied research

5. LESSONS-LEARNED

The Sri Lanka test demonstrated that overall CRiSTAL is good tool for project design whether the project is intended to focus on adaptation or not. It allows project managers and developers a chance to sit with communities and solicit their input so that climatic change can be taken into account in project design and implementation. CRiSTAL helps to mainstream adaptation and vulnerability aspects into project design, implementation, and management and thus can be very valuable for setting baselines and for monitoring. CRiSTAL does have relevance in terms of

adapting existing projects, and it should also be encouraged and mainstreamed during project development phase. CRiSTAL provides space and prompts to encourage people to think explicitly about the environments, to step back and look at changes, to make linkages that may not have been clear.

More specifically, the final field test of CRiSTAL yielded the following lessons / insights:

- Local observations of climate/environmental change support National Communications findings: Throughout the consultations in the RUK project area, it was evident that local observations of climate change were consistent with what has been reported in Sri Lanka's National Communications. Observations of increasing temperatures, more droughts and floods, increasing wave height, shift in wind patterns and the emergence of invasive species have all been cited as impacts of climate change for countries such as Sri Lanka.
- Project staff / CRiSTAL users must be aware of the impact other socio-political or environmental issues can have on community's perceptions on livelihoods and climate: The community consultations revealed how the 2004 tsunami really affected peoples' livelihoods and their perceptions of the environment. People spoke of their lives as though they were divided into two distinct phases – life before the tsunami, and life after the tsunami. Changes in wind direction, wave height, fish stocks, and coastal conditions were all noted after the tsunami. Several women spoke of being afraid of the ocean and no longer swimming out of fear of the sea. Research team members were very conscious of the opportunity and risk of using the tsunami as an entry-point for discussing climate change. They noted that while climate change may, over a much longer period of time, lead to similar impacts (salinisation of inland water, coastal erosion, etc), it would not lead to another tsunami.

When discussing the challenges of implementing and sustaining community development projects in Sri Lanka, several IUCN staff members noted that the ongoing conflict between the government and the LTTE have resulted in politically fragmented communities and post-conflict fatigue, whereby people have gotten used to a certain level of death and destruction. Land rights were also flagged as an ongoing issue that affects sustainable resource management (and therefore, by extension, vulnerability and coping with climate stress). With unclear or insecurity land rights, communities have to incentive to manage their natural resources sustainably, as there is no assurance that the neighbouring community will not come and extract them at will.

- Project managers or field staff do not necessarily have livelihood information, making community consultations essential to the application of CRiSTAL: One of the overriding assumptions in designing CRiSTAL was that the target users – i.e. project designers and managers – would have intimate knowledge and understanding of the local livelihood context. The users would then be able to enter this information into the tool and begin the process of systematically understanding how livelihoods are linked to climate change, and how their projects can best contribute to adaptation. As such, community consultations were believed to be a nice complement – even a luxury – to the CRiSTAL process, but not essential.

However, while most community-level projects are designed and managed with some measure of local community participation, this does not always result in project staff having a solid understanding of the local livelihood context. This can be attributed to a number of reasons – staff turnover, the use of external consultants in pre-project assessments or design, limited capacity (time, resources) of project staff to regularly engage with communities, etc. As such, these staff (i.e. CRiSTAL's target users) cannot begin using CRiSTAL without first

conducting community consultations to gather information on local livelihoods and perceptions of climate risk. CRiSTAL provides a nice framework for structuring such consultations.

- There is value in consulting with different social groups when gathering livelihood and climate information: Communities are complex, dynamic and heterogeneous. As such, when conducting consultations for CRiSTAL, it makes sense to consult with a number of different social groups to get a more complete picture of how people perceive climate stress or change, and how they cope. In Sri Lanka, during mixed consultations (i.e. attended by both men and women), men tended to dominate the discussion. It was therefore useful to conduct a separate consultation with women, who emphasized issues such as household health.
- CRiSTAL provides a framework and series of prompts for understanding the links between local livelihoods, climate change and development projects: While the programming steps in CRiSTAL are designed to lead the user to a series of concrete project adjustments, the process can become lengthy and confusing, depending on the time and level of knowledge of the user. However, the discussions generated by working through each of the steps are useful in pushing the analysis and producing useful recommendations.
- CRiSTAL is essentially a tool with two modules, each serving different purposes and requiring different types of information and analysis:
 - **Module 1: Synthesising information on climate and livelihoods**. This module would consist of the first two steps of CRiSTAL, with the specific goal of helping users to collect and organise information on the climate and livelihood context in the project area. Users would gather information for this module through participatory workshops, consultations, site visits, document review, Internet research, and interviews.
 - **Module 2: Planning and managing projects for climate adaptation**. This module would consist of the last two steps of CRiSTAL, with the specific goal of helping users to analyse the links between planned or ongoing projects and the climate-livelihood context. Users would carry out the analysis individually or through small project meetings, but could also rely on stakeholder inputs to assist with the analysis. At a minimum, users are encouraged to share proposed project adjustments with community stakeholders for their feedback.
- The second module, which focuses on linking climate and livelihood information to concrete project adjustments, needs more thinking: Much of the energy and resources in developing and testing CRiSTAL have gone towards the first two steps of the tool. The final two steps have been more difficult to test and fine-tune due to both logistical, technical and time-related issues, but there is a need to think more about how to potentially simplify the process.
- Might want to consider some additions to the conceptual framework and distribution of CRiSTAL: During discussions with IUCN staff and partners in Colombo, a number of suggestions were made on how to improve / adjust / adapt CRiSTAL. These included:
 - Explicitly integrating Policies, Institutions and Processes (PIPs) into resource screens and livelihoods contexts
 - Introducing project activities earlier in the screening process (so user's always have a reference point for the process)

- Devising a simplified version of the tool for local communities and NGOs who are just becoming aware of climate change adaptation as an issue
- Introducing an option for the valuation of project adjustments
- Strengthening the conceptual framework
- Allowing users (through additional resources, steps) to identify the most vulnerable communities

ANNEX 1: MAP OF SRI LANKA



ANNEX 2: TRIP AGENDA

Sunday, 9 July 2006:

- Arrival in Colombo
- Preparation for meetings with IUCN staff

Monday, 10 July 2006 (public holiday)

- Continued preparation for meetings with IUCN staff

Tuesday, 11 July 2006:

- Meeting with IUCN staff in Colombo

Wednesday, 12 July 2006:

- Travel to RUK project area (coastal route; observation of tsunami-affected areas)
- Community consultation at NARA Research Station (Rekawa)
- Visit to Rekawa lagoon (mangrove replanting area in RUK region)
- Visit to Kalametiya Hide (eco-tourism initiative in RUK project area)
- Visit to Kalametiya Campsite (eco-tourism initiative in RUK project area)

Thursday, 13 July 2006:

- Community consultation at IUCN Field Office (Ambalantota)
- Community consultation at Kivula Temple (Kalametiya)
- Visit to Ussangoda Plateau

Friday, 14 July 2006:

- Working meeting at IUCN Field Office to finish CRiSTAL test (Ambalantota)
- Lagoon trip
- Turtle viewing

Saturday, 15 July 2006:

- Synthesis of field results

Sunday, 16 July 2006:

- Preparation of presentation on field results to share with IUCN staff and partners

Monday, 17 July 2006:

- Presentation of CRiSTAL Sri Lanka test results with IUCN partners and consultants

- Presentation of CRiSTAL Sri Lanka test results with IUCN staff

Tuesday, 18 July 2006:

- Departure from Sri Lanka

ANNEX 3: PARTICIPANTS LISTS

1. Meeting with RUK Consultants and Partners

Date: 11th July, 2006

Time: 1400 – 1650

Venue: IUCN SL Country Office

Name	Institute
Mr Susith Jayasekera	TEAMS
Prof K N J Katupotha	University of Sri Jayewardenapura
Ms Darshani de Silva	UNDP
Mr Renton de Alwis	Sustainable Development Consultants (Pvt) Ltd
Mr B H J Premathilake	Coast Conservation Department
Mr Bhujang Rao	IUCN
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN Sri Lanka Country Office
Mr Udula Bandara	IUCN Sri Lanka Country Office

2. Community Meeting

Date: 12th July, 2006

Time: 1400 – 1650

Venue: NARA Regional Research Centre, Rekawa

Name	Institute
Mr Ruchira Amaraweera	NARA Regional Research Centre, Rekawa
Mr E.K.A. Sumith Kumara	Bata Atha South Fisheries Cooperative Society
Ms G. Jayasundera	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms A P Hemalatha	Biodiversity Conservation Society (Recipient of RUK RLF)
Mr J P Amerasena	Biodiversity Task Force

Name	Institute
Ms Pushpa Jayasuriya	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms W. P. Gunawathie	Biodiversity Conservation Society (Recipient of RUK RLF)
Mr E.M.A. Patisinghe	Lagoon Fishery Management Authority
Mr S. P. Sugathapala	Lagoon Fishery Management Authority
Mr S.P. Ariyadasa	Lagoon Fishery Management Authority
Mr K. B. Lionel	Lagoon Fishery Management Authority
Mr G.W. Dayaratne	Lagoon Fishery Management Authority
Mr T.H. Chaminda Kumara	Lagoon Fishery Management Authority
Mr W. Karunasena	Lagoon Fishery Management Authority
Mr W.G. Sarath Kumara	Lagoon Fishery Management Authority
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN Sri Lanka Country Office
Mr Udula Bandara	IUCN Sri Lanka Country Office

3. Participatory Workshop 1

Date: 13th July, 2006

Time: 0945 – 1300

Venue: IUCN Southern Field Office

Name	Institute
Mr I. G. Samarasena	Biodiversity Conservation Society
Mr E. A. Sirisoma	Swarnapura Prajamula Sanwardena Society
Mr Sudath Ansaraweera	Ruk Diya Eco Holidays Community Group
Mr U.H. Senaka	Ruk Diya Eco Holidays Community Group

Name	Institute
Mr R. P. Sarath	The Kalametiya Campsite (owner)
Mr E. K. A. Sumith	Bata Atha South Fisheries Cooperative Society
Mr G. H. Nandasiri	Biodiversity Task Force
Mr R.P. Wilson	Biodiversity Task Force
Mr W. S. Premadasa	Biodiversity Task Force
Mr K.L. Ariyasena	Biodiversity Task Force
Ms K. L. D. Shyamalie	Does not represent an organization, but has undergone handicraft training through RUK project. Also not a recipient of the RLF.
Ms R. P. Achini	Biodiversity Task Force
Mr Charles Liyanapatabendi	Biodiversity Task Force
Mr Nihal Paranamana	Biodiversity Task Force
Mr A.P. Karunadasa	Biodiversity Task Force
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN Sri Lanka Country Office
Mr Udula Bandara	IUCN Sri Lanka Country Office

4. Participatory Workshop 2

Date: 13th July, 2006

Time: 1500 - 1700

Venue: Kivula Buddhist Temple

Name	Institute
Ms M. M. Lakshmi Ajantha	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms L. Weeraratne	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms Kalyani Tennekoon	Biodiversity Conservation Society (Recipient of RUK RLF)

Name	Institute
Ms Manel Abeysuriya	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms W. Muthumala	Biodiversity Conservation Society (Recipient of RUK RLF)
Ms A. P. Ranjani	Biodiversity Task Force
Mr R. P. Sarath	The Kalametiya Campsite (owner)
Mr E. K. A. Sumith	Bata Atha South Fisheries Cooperative Society
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN Sri Lanka Country Office
Mr Udula Bandara	IUCN Sri Lanka Country Office

5. CRiSTAL Tool Testing Session

Date: 14th July, 2006

Time: 0900 - 1630

Venue: IUCN Southern Field Office

Name	Institute
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN SL Country Office
Mr Udula Bandara	IUCN SL Country Office
Mr E. K. A. Sumith	Bata Atha South Fisheries Cooperative Society
Ms A. P. Ranjani	Biodiversity Task Force

6. De-briefing Meeting

Date: 17th July 2006

Time: 0900 – 1145

Venue: IUCN Sri Lank Country Office

Name	Institute
Dr Nihal Atapattu	CIDA
Dr R A D B Samranayake	Coast Conservation Department
Prof C. M. Madduma Bandara	University of Peradeniya
Mr Lionel Weeraratne	Sewa Lanka
Mr W. R. M. S. Wickramasinghe	Ministry of Environment
Ms Nishanthi Perera	Ministry of Environment
Dr Anura Jaya tilleke	Ministry of Environment
Ms Anusha Amerasinghe	National Science Foundation
Ms Shireen Samarasinghe	UNDP
Mr Bhujang Rao	IUCN
Mr Stephen Kelleher	IUCN FCP
Ms Anne Hammill	IISD
Ms Kumi Ekaratne	IUCN Sri Lanka Country Office
Mr Udula Bandara	IUCN Sri Lanka Country Office

ANNEX 4: ADDITIONAL LIVELIHOOD RESPONSE TABLES -- HOW LIVELIHOOD RESOURCES INFLUENCE COPING STRATEGIES

Table 13: Livelihood Context B – Extent to which livelihood resources influence coping strategies for FLOODS, Ambalantote & Ussangoda (Fishermen)

HAZARD 1: FLOODS	Impact:	Less drinking water (depend on rain)					Reduced agriculture productivity					Reduced livestock productivity							
	Coping Strategy:	Walk distances for water					Casual labour					Take cattle to other areas (wet zones)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Freshwater						X		X								X			
Soil					X			X						X					
Marine products (fish, shells, coral)		X						X						X					
Physical Resources																			
Irrigation infrastructure					X			X								X			
Fishing equipment (harbour, boats, nets)		X						X						X					
Financial Resources																			
Village fund (requested for future)		X						X						X					
Revolving loans		X						X						X					
Liquid assets (pawning jewellery)		X						X						X					
Human Resources																			
Biodiversity knowledge					X			X						X					
Awareness of legal frameworks for NR use		X						X						X					
Skills						X				X				X					
Social Resources																			
Biodiversity Task Force			X					X						X					
Federation of 17 community organisations				X							X			X					
Death society		X						X						X					

Table 14: Livelihood Context B – Extent to which livelihood resources influence coping strategies for CHANGING SEA CONDITIONS, Ambalantote & Ussangoda (Fishermen)

HAZARD 1: CHANGING SEAS	Impact:	Less drinking water (depend on rain)					Reduced agriculture productivity					Reduced livestock productivity							
	Coping Strategy:	Walk distances for water					Casual labour					Take cattle to other areas (wet zones)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Freshwater						X						X		X					
Soil							X					X		X					
Marine products (fish, shells, coral)					X			X						X					
Physical Resources																			
Irrigation infrastructure				X				X						X					
Fishing equipment (harbour, boats, nets)					X			X						X					
Financial Resources																			
Village fund (requested for future)		X						X						X					
Revolving loans						X		X						X					
Liquid assets (pawning jewellery)					X			X						X					
Human Resources																			
Biodiversity knowledge					X							X		X					

Awareness of legal frameworks for NR use				X					X			X					
Skills						X					X		X				
Social Resources																	
Biodiversity Task Force		X							X			X					
Federation of 17 community organisations				X				X							X		
Death society	X						X					X					

Table 15: Livelihood Context B – Extent to which livelihood resources influence coping strategies for FLOODS, Kalametiya (Women’s Group)

HAZARD 1: FLOODS	Impact:	Crop damage / loss					Drinking water shortage					Health (diseases, heat stress)							
	Coping Strategy:	Casual labour					Walk distances for water					Boil water (mostly to protect children)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Paddy fields							X	X						X					
Seashell deposits	X							X						X					
Freshwater							X	X						X					
Physical Resources																			
Roads						X				X				X					
Vehicles						X			X					X					
Agricultural implements					X			X							X				
Financial Resources																			
Loans				X				X						X					
Liquid assets (jewellery)	X							X						X					
Human Resources																			
Agricultural skills/training (paddy cultivation)			X					X						X					
Brick making skills	X							X						X					
Sewing skills	X							X						X					
Social Resources																			
Agromart (agriculture society)				X				X						X					
Coastal management society	X							X						X					
Death society	X							X						X					

Table 16: Livelihood Context B – Extent to which livelihood resources influence coping strategies for INCREASING TEMPERATURES, Kalametiya (Women’s Group)

HAZARD 1: INCREASING TEMPERATURES	Impact:	Crop damage / loss					Drinking water shortage					Health (diseases, heat stress)							
	Coping Strategy:	Casual labour					Walk distances for water					Boil water (mostly to protect children)							
Resource:		0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
Natural Resources																			
Paddy fields	X									X				X					
Seashell deposits	X									X				X					
Freshwater				X				X						X					
Physical Resources																			
Roads					X			X						X					
Vehicles					X			X						X					
Agricultural implements			X					X						X					
Financial Resources																			
Loans					X			X						X					

Liquid assets (jewellery)				X		X						X					
Human Resources																	
Agricultural skills/training (paddy cultivation)			X			X											X
Brick making skills	X					X						X					
Sewing skills	X					X						X					
Social Resources																	
Agromart (agriculture society)	X											X					
Coastal management society	X											X					
Death society	X											X					