

Climate Change Adaptation: Finding the appropriate response

February 2011



ADAPTATION
KNOWLEDGE
PLATFORM

AN APPROACH TO CLIMATE CHANGE ADAPTATION
RESEARCH: EVENTS, STRATEGIES, AND DRIVERS



REGIONAL CLIMATE CHANGE
ADAPTATION KNOWLEDGE PLATFORM for Asia

Acknowledgements

The **AN APPROACH TO CLIMATE CHANGE ADAPTATION RESEARCH: EVENTS, STRATEGIES, AND DRIVERS** was conducted and written in December of 2010.

This research methodology is part of a broader study entitled 'Climate Change: Finding the appropriate response' that draws on a continuation of work in progress related to the Adaptation Knowledge Platform to disseminate and exchange adaptation knowledge with a wider audience. We thank the local stakeholders, institutions, and organizations that have engaged in the participatory research process conducted in Cambodia. Also to be acknowledged is the Learning Institute's research team lead by Robert W. Solar, key advisors - Toby Carson and Marona Srey, and the field-based team consisting of Pech Sithan, Tep Chan Sothea, Loun Phanit, Vonag Van Rith, and Minette Arzadon.

Copyright © AIT-UNEP RRCAP 2011
Bangkok, Thailand
February 2011

How to obtain the digital copy:

The **AN APPROACH TO CLIMATE CHANGE ADAPTATION RESEARCH: EVENTS, STRATEGIES, AND DRIVERS** can be electronically downloaded from the www.asiapacificadapt.net.

This digital publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. The Regional Climate Change Adaptation Knowledge Platform for Asia would appreciate receiving a copy of any publication that uses this report as a source.

Content

	PAGE
DESIGNING A FIELD BASED RESEARCH APPROACH	4
Building a conceptual framework as a basis for a research design	4
Working definitions - #1	5
Focusing the research design: Contextual issues, approach options, scoping questions and research protocol	7
THE APPROACH TAKEN – FROM THE VILLAGE TO LEVELS OF GOVERNANCE	10
Tool #1 – Focused Group Discussion	10
Tool #2 – Natural resource flow and hazard spot map	11
Tool #3 – Ecosystem services change matrix	12
Tool #4 – Extended livelihood profile	13
Tool #5 – Hazard, vulnerability, and action profile	15
Working definitions #2	15
Tool #6 – Risk reduction development service profiles	17
Working definitions #3	17
THE ANALYSIS	21



D Designing a field-based research approach

Climate change¹ adaptation² provides for more tangible responses to foreseen climate related impacts because they are driven by local capacities and meet immediate needs. However, in Cambodia, climate change autonomous adaptations (also known as coping strategies) have proceed unchecked for effectiveness, and planned adaptation responses have tended to be centrally formed and seldom meet local expectations; and at times has led to negative consequences, i.e. mal-adaptation.

Development practitioners and decision-makers are now beginning to ask questions of scale – do we need big or small climate change adaptation projects, is it infrastructure that is needed or focused support at the local level. More importantly they are now asking question of HOW.

- How do we identify mal-adaptation and mitigate this;
- How can we support the movement of good autonomous adaptation strategies towards efficient and effective planned responses; and
- How to bring inclusiveness to climate change adaptation decision-making – informed decision-making from the ground up?

To answer the aforementioned questions, there is a need to first start with identify what is happening respective of climate change adaptation and rural development in context at the village and district level, then upward and outward. Hence, the approach is to develop a better understanding of what drives climate change adaptation responses and to capture practice based knowledge – good or bad - for effective and efficient climate change adaptation support. To do so, the AIT-UNEP and Learning Institute research team explored in context:

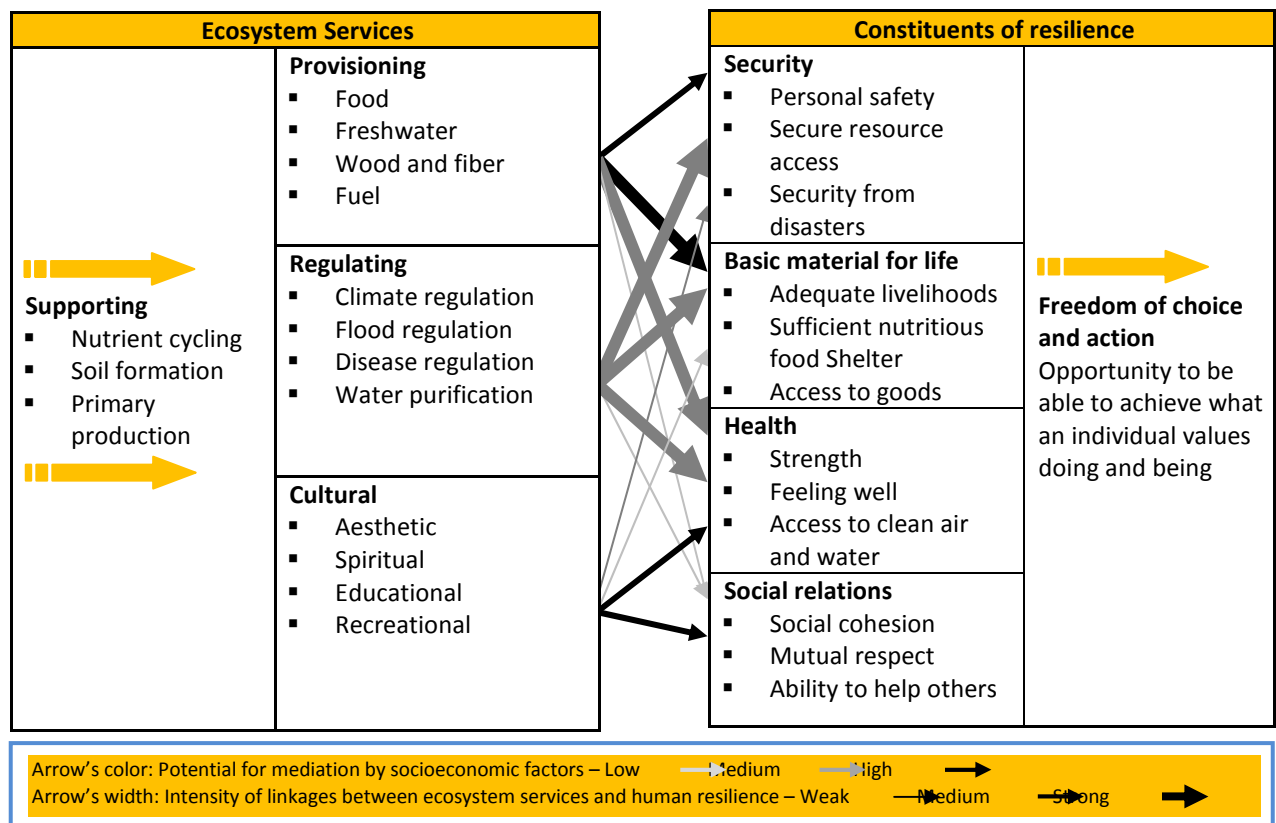
- If adaptation responses have inherent family and societal risks that decrease a ‘community’s resilience to climate change;
- If adaptation responses posed risks to the sustainability of the natural resource base; and
- What drives the development of adaptation responses and the level of climate change resilience obtained from local responses.

Building a conceptual framework as a basis for a research design

To understand climate change resilience in the rural development context, it is important to reflect on why ecosystems are necessary for sustainable living. Facilitating this need, the two boxes below were outlined as a form of conceptual framework that describes the interconnections between the services derived from ecosystems important to sustain the rural poor, and how these services relate to elements of rural resilience under any conditions. Looked at as a ‘framework methodology’, the research design was founded on the principles reflected within. Note the direction of driving forces - from left to right across both boxes.

¹ Climate change: a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole Earth.

² Climate change adaptation: Understood as the things we do, planned or not that result in adjustments to new conditions, stresses, and or hazards; together these adjustments can either enhance people’s resilience to climate change impacts or exacerbate their situation, i.e. mal adaptation.



Working definitions #1

Supporting Services: These services are necessary for the production of all other ecosystem services. For example, the production of biomass, balancing gases in the atmosphere, formation of soil, degradation of waste, nutrient and water cycling, and pollination.

Providing Services: These services cover the natural resources and products obtained from the ecosystems. Goods include food, wood, medicines, fuel and fuelwood, fiber and non-timber forest products. Hence, these services provide the basis for livelihood sectors: Ecosystems, therefore, provide the basis for many industries – **'production services'**: agriculture, livestock, fisheries, lumber, and pharmaceuticals, etc.

Regulating Services: These are services related to benefits obtained from the regulation of ecosystem processes, such as, for example, climate and flood regulation.

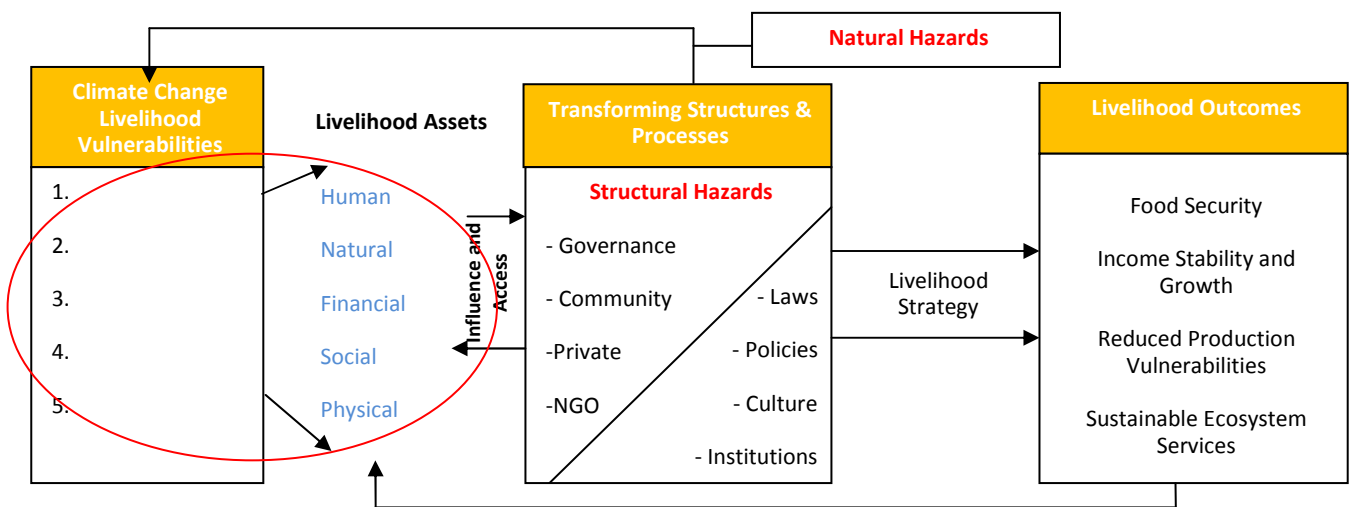
Cultural Services: These are non-material benefits people obtain from ecosystems through spiritual enrichment, development of learning, recreation, and aesthetic experience.

Resilience: The capacity of a system, community or society potentially exposed to hazards and risks to adapt, thus maintaining an acceptable level of function and structure.

Environmental elements are essential components of human resilience because they contribute to human security; providing basic materials for a good life, good health and good social relations – often through economic value. Thus, when considering climate change adaptation strategies respective of rural livelihoods, the research design must consider the fundamentals of livelihood drivers and influences... actual considerations are exemplified in the chart below.

Livelihood platform	Access modified by...	Taken in the context of...	Resulting in	Composed of...	With resulting effects on...
Assets Natural Capital Physical Capital Human Capital Financial Capital Social capital	Social Relations Gender, Class, Age, Ethnicity Institutions Regulations, Policy, Customs, Tenure, Traditional Use Organizations Associations, NGOs, national Agencies, Local Government	Trends Population, Migration, Ecological Changes, Technical Change, Macro-Policy and Market Demands Shocks Natural Disasters, Recruitment Failures, Disease	A Given Set of Livelihood Strategies	Natural Resource/ Asset Based Activities Extraction - Fishing, Cultivation, Forestry, and Livestock Non Natural Resource Based Activities Trade, Services, Manufacturing	Livelihood Security Income level, Income Stability, Seasonality, Level of Risk, Access Environmental Sustainability Water and Soil Quality and Quantity, Fish Stocks, Land Quality, Forest, Biodiversity

Additionally, the research design needed identify where hazards to livelihoods could originate from, thus aiding in identifying climate change livelihood vulnerabilities from those attributed to by other source of hazards and influences. The following schematic was used to not only inform the research design, but very importantly, to help researchers facilitate the investigation process and interpret the results.



Lastly, as one of the main focuses of the research is to understand process of climate change adaptation, as a basis, the following chart reflects the basic criteria used to distinguish between forms of adaptation: Autonomous/ coping strategy, and planned adaptation.

Autonomous Adaptation	Planned Adaptation
<ul style="list-style-type: none"> ■ Short-term and immediate ■ Oriented towards survival ■ Not continuous ■ Motivated by crisis, reactive ■ Often degrades resource base ■ Prompted by a lack of alternatives 	<ul style="list-style-type: none"> ■ Oriented towards longer term security ■ A continuous process ■ Uses resources efficiently and sustainably ■ Involves planning ■ Combines old and new strategies, knowledge, and alternatives

Focusing the research design

The research team was to focus on on-going process of local climate change autonomous and planned adaptations at the village, commune, district, and provincial levels in the context of natural resource use and conservation, and natural resource based livelihoods. This focus intuitively indicated a need to go beyond the surface, and develop climate change adaptation ‘development service profiles’ to gather integrated information that would contribute to understanding the driving forces behind climate change adaptation; supporting or hindering in context. To do so effectively, the research team had to consider **CONTEXTUAL ISSUES, APPROACH OPTIONS, QUESTIONS, AND PROTOCOL** in the research design.



Contextual issues

In designing a ‘research process’, contextual issues come in many forms; from creating a useful methodology that others can use... but may not fit well with all field-based contexts, to creating a design that is only useful to one specific context... again not fitting well to uses in a broader context. For these simple reasons, using Participatory Rural Appraisal (PRA) tools as the backbone to a research design will provide researchers with enough adaptability to context at the field level, and for process knowledge users, the same adaptability to meet their own contexts needs. Hence, PRA tools provide a foundation for investigation to occur – good facilitation will align the context.

Understanding context is paramount to research designs, even when defining the context is the objective of the research – something must be known about ecological, economic, social, and political contexts prior, otherwise the research will lack direction and importantly depth. This also holds true for understanding institutions involved in development work, particularly of those operating directly in a given target area or sector. Working in areas that have had exposure to development organizations might already have preconceived ideas, even agendas that may influence research results – away from the real realities and towards personal agendas. To help with gaining a preliminary understanding of ‘context’, often a review of literature on a given topic, a preliminary visit to the research site, and a scan of the institutional context in the area will suffice for short term/ smaller research efforts.

Notably, a research design also has to be a clear reflection of its own context, for example:

- Based on clear and concrete problem statements and objectives;
- A clear process direction – moving from a general context stance to a deeper, more involved stance; and

- Insurances within the methodology capable of segregating contextual results from one set of factors to another.

The later statement is probably a researcher's greater challenge because results from the field have to be analyzed and synthesized in context to numerous factors – in the case of the following research methodology put forward; serious consideration was given to how to separate factors of poor sustainable development practices, and that of climate change impacts.



Approach options

There are a multitude of approaches to the development of a research design; logical theoretical approaches, quantitative and qualitative, and others related to participation – an exchange between the researcher and a multitude of stakeholders with a 'stake' in the research and its use. In the case of 'development work', the approach to designing a research methodology must connect well to sustainable development principles; gender equality, equitable participation, and empowerment of the marginalized at the least. The following are two key 'approach options' considered in this research design:

- The research design must provide participants with the opportunity to learn and create awareness around their current contexts, as well as provide space to discuss issues and events amongst themselves; and
- The research design must propose the building of a 'description', rather than an extraction of information.

Naturally, 'approach options' cannot only be about design; they must also include ideas as to how the research framework will be delivered. Again, the following are related to considerations taken in this research design:

- Tools and process should not be too complicated for the participants to work with, yet not too simplified that a deeper analysis of the research matter cannot be achieved;
- Tools must be visual, at times interactive to wave off boredom, and as a composite – allow for both quantitative and qualitative data collection, i.e. pinpoint answers and discussions to questions from both the researcher and the participants;
- The process must relate to the lives and or professions of the participants, be it at the village level or national – thus careful consideration was given to individual, group, and sector participation; and
- The approach must be delivered with moments of introspect, candor, and laughter from all.



Scoping questions

Scoping questions are built around the purpose of the research – what needs to be found out. However, most often these forms of questions are exceedingly impossible to ask directly; they need to be broken down into their constituents. Accordingly, this process of breaking down questions directly relates to the tools used in the research itself. The obvious is that questions must be in an answerable form relative to the knowledge and experiences of the participants answering the questions, and that questions should be linked together to form the 'bigger picture' with details along the way.

The more logistical side of developing scoping questions is that they need to be a combination of closed ended questions to set a base line for discussion, and open ended questions to allow for enrichment. At the village level, what, up or down, better or not questions work well, followed by why. However, asking why once is never enough... this is a continual process. Questions should also be set to context – with a relevant example attached to both the question and answer. The latter does have inherent

challenges built around social constructs of society. Hence, a researcher must know who to extend a line of questioning to, and when to end it, i.e. scoping questions should not exacerbate pre-existing conflicts, rather foster constructive thinking in a controlled manner.

When working with differing levels of governance, the development of scoping questions becomes more challenging, i.e. political constraints. Scoping questions should not reflect that the participant/s answering the question, nor the institution they represent have knowledge and or capacity gaps... even if finding these gaps is the purpose of the questioning. It is better to formulate scoping questions around learning about the respondent's capacities, areas of achievement, and priority needs respective of enhancing their current work profile. Asking about priorities can give the researcher a good understanding of an institution's active priorities, rather than a rundown of an ultraistic mandate. This can also elude to identifying capacities gaps, for most institutions tend not to prioritize activities that they have little capacity or interest in dealing with. Lastly, scoping questions should try to avoid issues of power, rather focus on understanding the influence of decision-making; finding the origins of initiatives, funding sources, and the roles and responsibilities of participants through direct examples.



Research protocol

Having a research protocol is essential for methodology orientation and how such will be delivered. However, this protocol should also consider how the research will be conducted by the researchers themselves – principles to adhere to, and how results will be synthesized and used for sharing... in all stages of the process. Importantly, the later should be known to all participants involved in the research process... and agreed upon.

From a point of logistics, the 'written' research protocol should list clearly the rationale, objectives, methods, target stakeholders, time frame, and expected outcomes and uses of the research. This profile should be able to stand on its own and not refer the reader to 'project' documents. Following, is the protocol used in the 'Climate Change Adaptation: Finding the appropriate response' research that has a direct relationship to this document:

Protocol

- Title of the research project;
- Project summary;
- Statement of the research purpose, justification of such, and the use of the results in the form of onward objectives and applicability to greater development contexts;
- Research objectives, both general and specific respective of research components;
- Methodology – including operational definitions, design specifics, data collection processes, and processes to ensure ethical considerations respective of the participants;
- Scope of analysis and use of the results, including feedback of the result to all research participants, form of outputs, their use, and dissemination;
- Bibliographic references to relevant work;
- Timetable and budget; and
- Annexes: An elaboration on methods and procedures to be used, profile of key researchers – including their roles, responsibilities and contact information.



The approach taken – from the village to levels of governance

Overall research objective

To develop a situational and functional understanding of what drives climate change adaptation and to capture practice based knowledge to support effective and efficient adaptation response planning and the delivery of such responses at the village, commune, district, and provincial levels.

Village level investigation

Purpose: To detail on-going process of local climate change autonomous and planned adaptations at the village level in the context of natural resource use and conservation, and natural resource based livelihoods. Information gathered is to include:

- Information around ecosystem services and natural asset based livelihood strategies, and how these are responding to climate change and climate variability;
- Climate related hazards, impacts, and local level adaptation strategies employed, and the assets mobilized in these strategies to reduce climate related risks;
- Dynamics of climate change adaptation responses respective of inherent family and societal risks that decrease a 'village's' resilience to climate change;
- Dynamics of climate change adaptation responses that pose risks to the sustainability of the natural resource base; and to
- Document drivers of climate change adaptation, and the level of resilience obtained from local adaptation responses.

Tool #1 – Focus group discussion

Suggested time frame – 1 hour

A Focus Group Discussion (FGD) is used as a 'warm-up' activity to introduce the topic of climate change, the scope of the research, and to allow participants space to share and discuss their 'climate change' experiences openly; from changes in their surrounding ecosystem to impacts on their natural asset based livelihoods, to family, societal, and development changes resulting from climatic related impacts.



It is not that important to introduce the subject of 'CLIMATE CHANGE' from the onset of research activities; for many local stakeholders this is a very abstract concept – rather, researchers should consider focusing on 'CHANGES'. Changes noted can then be related to 'climate change' concepts in context at the end of the FGD.

Consider

- 1st Ask participants to visualize their village area and surrounding ecosystem/s; then to share openly changes that have occurred over time, e.g. variations of seasons, changes in water resources, soil fertility, the environment, to hazardous incidents such as floods, drought, and or illnesses.
- 2nd Ask participants to think of the aforementioned changes, and describe how these changes have impacted and or change their livelihood strategies.
- 3rd Considering all the changes (ecological, to health and safety, to economic), ask the participants to describe how these 'changes' have impacted their social relationships and their participation in community development activities?
- 4th As an end to the FDG, this is a good time to relate the intent of the research to be conducted to what has been shared by the villages, and to set the agenda for the day's investigation activities.

Tool #2 – Natural resource flow and hazard spot map

Suggested time frame –
1.5 to 2.0 hours

The development of this map will provide the researcher with reference points to ecosystem composition, natural assets, natural resource use and management patterns, to hazardous location for community health and safety. The map is also to be used to reference physically information gathered from other investigative tools, to help facilitate and contextualize discussions, and to help formulate relevant questions to deepen the research.

Must haves

- | | |
|--|---|
| Defined boundaries..... | ▪ Political and or livelihood orientation |
| Ecosystem composition..... | ▪ Grass and agricultural lands, forest type, wet lands, marine system components |
| Key geo-physical elements..... | ▪ Hills, rivers/ streams, mountains, natural embankments, and directions of water flow |
| Natural assets within ecosystems..... | ▪ Fresh water and marine products, NTFP ³ , timber, agroforestry, fodder, agriculture, water |
| Human made infrastructure..... | ▪ Roads, homes/ buildings, dikes, water wells, reservoirs, irrigation, water gates |
| Land use..... | ▪ Agricultural, fisheries, forestry, animal husbandry, waste disposal |
| Land management..... | ▪ Noting key management areas for protection, conservation, exploitation, degradation, conversion, cultural use |
| Hazards..... | ▪ Commonly affected areas – physical/ structural components, commonly affected villages, common areas where livelihoods are affected, water flow during wet season and extreme events, and drought patterns |

Consider – writing notes on the map, e.g. distances and directions, explanations, events, changes, to quantity and quality indicators.

³ NTFP: Non Timber Forest Products

Suggested time frame – 1
to 1.5 hours**Tool #3 – Ecosystem services change matrix**

Through the use of the matrix below, researchers are to facilitate participants in the identification of ‘changes’ noted in their surrounding ecosystems, and in the services these systems provide, e.g. supporting, providing, and regulating services over a period of time. The **purpose** of the exercise is to help the participants focus on ‘change’ in multiple dimensions, and to provide researchers with an idea of **context** and where climate change **impact and adaptation** may be happening. Researchers must ensure that participants consider all components of their surrounding ecosystem – an example is given in the table. Note that significant changes are to be further investigated; asking for more specific ‘**what**’ information, e.g. quality and quantity of the noted change, and questions of ‘**why**’ to bring forth ecosystem use and management systems.

*Ecosystem - What is Provided? -	How do you Benefit?	Has this Benefit Changed Over Time?		Why the Change? (FGD)
		Before	Now	
Marine waters - -		☺: Explain _____ ☹: Explain _____	☹: Explain _____ ☹☹: Explain _____	
Mangrove Forest - -				
Fresh water habitat - -				
Agriculture lands - -				
Inland forest - -				
* Example guides given are in the context of the actual pilot research conducted in Cambodia.				



Most local stakeholders will be focused on their livelihoods as benefits – it is important for facilitators to help participants also think in terms of supporting and regulation ecosystem services, e.g. nutrients from soils, to water flow regulation. Noting these from the onset will help the participants identify a wider range of ‘hazards’ later on in the investigative process.

Encourage the participants to also think in terms of food security, health and safety, household needs and economic production. Each element can be further explained by the participants and noted in the column, i.e. the chart is large.



During the testing of the methodology, five-year (5) intervals were used to set-up a basic trend line covering a fifteen year period. In the three columns faces were used (☺ to ☹) to indicate if the benefit gained was good, ok, or not good. Changes noted would then warrant further investigation in the form of a FGD.

For many stakeholders, trend lines are difficult; either through a lack of memory or the makeup of the participants does not work well with the purpose of the exercise. The following is recommended:

- Ask participants to think back in time to when they thought the benefits were different – they may provide the research with a date.
- Use ‘before’ and ‘now’ columns, then search for a date.
- Always retain the use of faces – this provides participants with visual clues and promotes detailed ‘WHAT’ explanations.



Note that this column focuses on the ‘WHY’, the WHAT is focused on in the previous columns.



After the table matrix is filled in; researchers should review the output, ensuring that noted changes equate realistically - the ‘WHAT’ and ‘WHY’, specifically noting if the change is a result of climate change or some other factor

Tool #4 – Extended livelihood profile

Suggested time frame –
2.0 hours

Through the use of the table matrix series presented, the researcher's aim is to define the village's livelihood profile and look for changes in this resulting from climatic changes. Of keen interest is the range of strategies and assets villagers use, or lack thereof, which enables them to sustain or improve their livelihoods. Understood is that having relevant 'assets' or access to development services most often leads to livelihood and climate change resilience. Thus, in the context of the overall research framework and purpose, understanding climate change impacts, local livelihood strategies and identifying usable assets for adaptation purposes aids in the identification of climate change adaptation drivers.

Consider

- When listing livelihoods this should not be restricted to natural asset based livelihoods; also make clear distinctions between the more traditional livelihoods, e.g. rice cultivation, and of those that have been initiated recently and WHY.
- At the bottom of the 'livelihood seasonal calendar' it is beneficial to place a seasonal calendar that indicates wet and dry season, seasonal storm periods, and intensity trends within.
- When thinking of 'livelihood inputs', these could include 1) products, e.g. fertilizers, 2) development services, e.g. micro-finance to technology training, 3) structural investments, e.g. irrigation, dams, ponds, barriers etc., and 4) enabling policies that give access to resources, or hindering policies that restrict this access.

Suggested FGD questions

- As livelihood strategies have 'changed', have the results caused changes at the level of family and or society? If so, how and why?
- Have changes in other's livelihood strategies influenced and or impacted your livelihood? If so, describe.
- What often hinders positive outcomes in livelihoods, and why? Have there been any new hindrances?
- What livelihood strategies best contributed to building community resilience⁴ to climate change impacts; and why?



FGD Hints

- Write the discussion guide to stages: from introduction, in-depth discussion, verify of conclusions;
- Ensure commonality among members, and avoid dominance; and
- Do not use focus groups when the confidentiality of information sources cannot be maintained.

⁴ Resilience: The capacity of a system, community or society, potentially exposed to hazards and risks to adapt, thus maintaining an acceptable level of function and structure.

Table matrix #1 – Livelihood seasonal calendar

Livelihood	Monthly Calendar											
	1	2	3	4	5	6	7	8	9	10	11	12
Agriculture based - Field cultivation - Backyard growing												
Fisheries - Freshwater - Marine												
Forestry -												
Animal husbandry -												
Labor - In community - Outside of community												
*Climate Pattern	Dry Season				Wet Season				Dry Season			
*Intensity Pattern - rain												

* If possible record recent shifts in climate and intensity patterns... multiple intensity patterns can be used.

Table matrix #2 – Livelihood seasonal calendar

Productivity				
2000-2004	2005-2009	Now	Before	Now
☺ 1 T/hectare	☺	☹	☺: Explain ☹: Explain	☹: Explain ☹: Explain



Productivity can be done in two (2) ways, depending on the preference of the participants. See Tool 3 for the explanation. Note that under each option 'units' can be used and should be explained; under both options; data aligns with the given livelihood in the previous matrix.



After the table matrix is complete, time should be taken to identify significant changes and have participants explain the **CAUSE** of the change and the **IMPACT** of the change.

Table matrix #3 – Livelihood seasonal calendar

Inputs				
2000-2004	2005-2009	Now	Before	Now



The research should maintain the use of the choice of column previously selected by the participants. Inputs can either be products, development services, structural investments, and or policies etc.

Again, after the matrix is complete, in a **FGD** it is important to identify **CHANGE**, the **ORIGIN** of 'inputs', and **HOW** 'inputs' have influenced livelihood strategies. The session should be completed using the 'suggested FGD questions outline.

Tool #5 – Hazard, vulnerability, and action profile

Suggested time frame –
2.0 hours

Through the use of the matrix below, the researcher's aim is to define climate hazards and vulnerabilities to these hazards in the context of the physical environment, and that of society as a whole. Thus, hazards are divided into three (3) categories: 1) those associated with natural events and the environment (flood, drought, fire, weather related storms, pests, to environmental degradation); 2) those associated with culture and societal norms that prevent gender equity and local participation; and 3) that associated with access to natural resources, development services, and participation in decision-making processes.

One of the major objectives of the research is to understand what drives climate change adaptation. With the tools outlined so far, setting the context and segregating events and strategies has been the thrust so as not to confuse drivers to, and strategies of adaptation that may be a result of factors other than climate change. Knowing this, TOOL #5 has a specific and initial focus on natural events and the environment; subsequent categories are to be facilitated in reference to this. The matrix tool is aligned to identify the climate related hazard, the impact of this, how villages react to the impact, and what capacities are used to support the reaction – together the aforementioned outlines the complete range of elements that intuitively drive climate change adaptation. It should also be noted that the outcome of such has a great influence on if the strategy will move from a form of coping/ autonomous adaptation strategy to a planned adaptation strategy.

Working definitions #2

Resilience: The capacity of a system, community or society potentially exposed to hazards and risks to adapt, thus maintaining an acceptable level of function and structure.

Hazard: A potential event that could cause loss of life, or damage to property, environment, livelihood, and or human dignity.

Vulnerability: The degree to which physical structures or natural and economic assets are exposed to loss, injury or damage caused by the impact of a hazard.

Capacities: Refers to individual and collective strength and resources that can be accessed to allow individuals and communities to reduce their vulnerability to the impact of hazards. These capacities can either prevent or mitigate the impact of a given hazard, or prepare the community to respond to the impact better (readiness) – all resulting to improvements in community resilience.

CAPACITIES that effect rural community resilience	Examples of CAPACITIES
<ul style="list-style-type: none"> ▪ Ecosystem integrity, use, and productivity ▪ Ecosystem regulatory governance ▪ Participation levels and the form of local Natural Resource Management and Livelihood planning ▪ Access to natural assets ▪ Access to financial and social assets; ▪ Access to technology and capacity development services 	<ul style="list-style-type: none"> ▪ Human resources, Natural resources ▪ Savings (\$),Micro-finance, Agriculture banks ▪ Storage facilities ▪ Functioning Community Based Organizations, Relief Non Governmental Organizations ▪ Technical and material support ▪ Participation in development processes, decision-making, and governance

Special Note: As mentioned, this research process is to be done using a minimum of two (2) groups; it may be beneficial to the research if the group selected to work with Tool 4 does not work with Tool 5, i.e. promoting variances in thinking.

Table matrix – Hazard, vulnerability, coping, action and support

Hazard	Frequency of the Event	Vulnerability		Actions taken to Reduce the Impact	Capacities that Supported the Action	Result of the Action
		#1 Impact	2# Impact			
Natural events and the environment --						
Culture and societal -						
Access to resources and participation -						



Defining ‘hazards’ may be the most difficult part of the tool for participants to work with. Hazardous events associated with **NATURAL PHYSICAL EVENTS** such as floods, drought, heat, and storms, or geophysical events such as landslides, and earthquakes are common responses; less common are hazards associated with **BIOLOGICAL CHANGES**, e.g. pests or invasive species.

Difficulty for the participants may come when trying to associate the aforementioned with **CULTURAL AND SOCIETAL** hazards. Suggested is to break the section into a mini-chart – asking who is affected more by the identified hazards associated with natural events and the environment – men, women, or children and ask why. From there the research should be able to identify the true ‘hazard’ for analysis.

For ‘**ACCESS TO RESOURCES AND PARTICIPATION**’, try to have the participants relate this to what hazards they could prevent from the natural events and the environment section if they had access to all forms of resources and if they were the ones in power, e.g. if I were in charge, I would prevent this hazard by..... Further discussion should help identify the nature of/ origin of hazards in this section of the column.



The word Vulnerability does not translate well into other languages, nor is it well understood at the village level. When facilitating this column... simply put, just ask the participants what the main results are (impacts) when they experience each of the hazards listed.

Again, poor communities will most often relate impacts to losses in income for this is their main focus. **GOOD FACILITATION** will also help participants think in terms of **ECOSYSTEM FUNCTION AND SUSTAINABILITY, FOOD SECURITY AND NUTRITION, GENDER EQUITY, HUMAN SAFETY, DIGNITY, AND EMPOWERMENT**.



Researchers should note if the action is taken is during the ‘Hazard Impact Period’ or something done before or after the ‘Hazard Impact Period’. This makes a difference when referring to something as an autonomous or planned adaptation strategy.



For each **ACTION TAKEN** response, try to match capacities accordingly. After the matrix is complete, a **FGD** should be conducted.

Suggested FGD questions

- As **ACTIONS TAKEN TO REDUCE THE IMPACT** of hazards, have the **RESULTS** caused changes at the level of family and or society... even environmental changes? If so, how and why?
- What **ACTIONS TAKEN TO REDUCE THE IMPACT** have best contributed to building community resilience; and why?
- What **CAPACITIES** are lacking that could contribute to effective and efficient climate change adaptation planning and response implementation?

Tool #6 – Risk reduction development service profiles

Suggested time frame –
1.5 to 2 hours

Risk reduction development services profiles are built from key climate change impact issues, i.e. dealing with hazards. This is done to provide researchers with a view towards development services villagers (and upward) can access in support of climate change adaptation strategies; as well as identify gaps in development services to support climate change adaptation. These profiles would ultimately include 1) scope of relevant capacity development service provided, and 2) stakeholder relationships between 'community' and relevant development services providers - services perceived to reduce local level risks to climate change impacts. The profile is also to include indications of cooperation between stakeholders. At village level investigations, the service profile must focus on the village at its core, for commune level investigations – villages within the commune are placed at the core of the investigation process... and so on for districts (communes at the core), provincial (districts at the core), and national (sectoral focus at the core) levels.

The research process begins by reflecting on Tool #5's matrix outputs and the FGD associated with this; identifying key issues around hazards and barriers to successful climate change adaptation. Depending on the categories of hazards used; one (1) or (2) general statements that reflect an encompassing view of each category should be developed. Statements are expressed as a NEED to lower RISKS associated with climate change impacts; this process will help focus stakeholder development service profiles in the context of climate change.

Working definitions #3

Natural hazards: Hazards related to extreme weather and or climate, invasive ecological changes, and or geological events, or as a result of poor natural resource management.

Livelihood hazards: Hazards related to events that cause losses in natural resources used in livelihoods, and the productive context of this – these are strongly linked to Natural hazards.

Cultural and societal hazards: Hazards related to how culture and governance is expressed at various levels of society that result in human rights violations.

Process and Structural Hazards: Hazards that result from top-down development/ decision making processes, governance, gaps in development services, and or in the capacity to deliver effective support to ensure community resilience.

Development Service Profile (DSP): What services an institution/ organization offers respective of improving the situation reflected in the Hazard Statement; delivered to the community as a whole or to another relevant stakeholder.



Consider

- Two (2) common participatory Rural Appraisal (PRA) tools are used to complete the RISK REDUCTION DEVELOPMENT SERVICE PROFILE – Stakeholder relationship map, and 2) the Power Pyramid Map. Each has been modified to fit the research needs.
- Clarify the ‘Hazard Statements’ with the participants, then in reference to each STATEMENT, ask for only the key stakeholders that could meet the NEED stated. Allow participants to brainstorm the stakeholders – writing each on a colored circular paper; then encourage them to remove the lesser important stakeholders... begin defining the relationships – quality, frequency of contact, and then direction of communication most often. It also helps to code the colors, e.g. for governance agencies, NGOs, community based organization, and local self help groups etc. Make a duplicate set to be used in the Power Relation Map.
- Add the DSP⁵ information after the relationships have been defined according to the relevant stakeholder.
- For the POWER RELATION MAP; this is also done in relation to each ‘Hazard Statement’. The statement is to be taken as... what stakeholder has the most influence to impact the ‘hazard statement’ in a positive way, i.e. those at the top of the pyramid have the most influence. Suggested follow-on questions can be related to ‘WHY’, and through the use of what CAPACITIES.

*Hazard Statements	Stakeholder Relationship and Development Service Profile	Power Relation Map
Natural events and the environment: <hr/> <hr/> <hr/>	DSP: 	High Influence
Culture and societal: <hr/> <hr/> <hr/>		
Access to resources and participation <hr/> <hr/> <hr/>		
*Example categories given for ‘Hazard Statements’ are those used in the context of the actual pilot research conducted in Cambodia.		

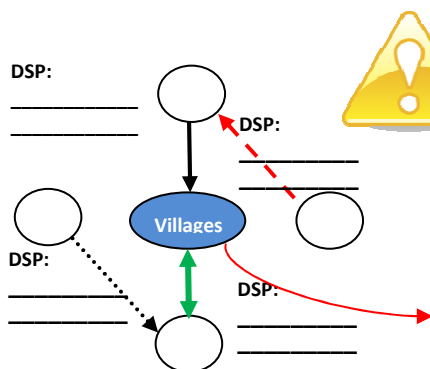
Lines:
 Frequent
 Sometimes
 Seldom

Relationships:
 Good
 OK
 Challenging



Both tools give the researcher insight into where capacities are amongst stakeholder, an idea of organizational mandates, and where capacities and influence can be found. Matching this information gathered to that of other processes, outlines what is working respective of climate change adaptation support, what is not, and where gaps in support are.

Arrow heads can be used to indicate the direction of dialog



Change the core to **VILLAGES** for **COMMUNE** level investigations.

Change the core to **COMMUNE** for **DISTRICT** level investigations.

Change the core to **DISTRICTS** for **PROVINCIAL** level investigations.

Change the core to **SECTOR** for **NATIONAL** level investigations.

For development workers, information gathered helps to design climate change adaptation support initiatives, i.e. what stakeholder capacities and relationships can be harnessed, supported, and if needed - developed to improve village resilience to climate change.

⁵ DSP: Development Service Profile

Village level investigation wrap-up

Suggested time frame –
30 to 45 minutes

- Given the level of activity with village participants, researchers must consider the energy levels of the participants, and their need to attend to ‘family’ needs before moving into another FGD. As an option, researchers can review the days outputs with the participants, and in the process surface one (1) or two (2) questions that would potentially fill in any information gaps. Below are three (3) questions that can be used as guidance. In the process, researchers should think about how answers given would contribute to ecosystem management and livelihood resilience, to stakeholder empowerment and gender equality, and relationship improvements amongst stakeholder groups.

Suggested FGD questions

- From actions taken, e.g. adjustments to Natural Resource Management and livelihood strategies, what have been the cause/ limitation of expectations not being reached? First elicit the expectation, then the cause/ limitation – facilitators are to ensure gender, economic, environmental, and societal balance is achieved amongst responses.
- To support the movement of climate change autonomous strategies towards well planned strategies and supported climate change adaptation strategies, what are your major needs and why?
- What near term actions could be taken to improve your resilience towards climate change impacts?

Commune level investigation

Suggested time frame –
3 hours

The session should start with a dialog and question and answer session on climate change. Depending on the level of understanding, it is good to begin with a simple presentation on climate change, climate change adaptation, and climate change resilience. Following, move to a brief presentation of the village level investigation results. Following, the primary tool for the investigation uses **TOOL #6**, with a minor modification, i.e. the core of the **Stakeholder Relationship and Development Service Profile**, villages is placed. Retain the ‘Hazard Statements’ to ensure a bottom up approach... the **Power Relation Map** is done is the same way.

*Hazard Statements	Stakeholder Relationship and Development Service Profile	Power Relation Map
<p>Natural events and the environment:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Culture and societal:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Access to resources and participation</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>DSP:</p> <p>DSP:</p> <p>DSP:</p> <p>DSP:</p> <p>DSP:</p>	<p>High Influence</p> <p>Low Influence</p>
*Example categories given for ‘Hazard Statements’ are those used in the context of the actual pilot research conducted in Cambodia.		



If multiple villages are investigated within the commune, ‘Hazard Statements’ may have to be modified or additional statements formulated.

Commune level investigation wrap-up

Suggested time frame –
45 to 60 minutes

Wrap-up the aforementioned activity with a FGD respective of changes to development assistance, governance and investment in the commune over time; and in relation to climate change adaptation responses employed, or not, to mitigate climate change impacts. Note that there are specific areas of responsibilities within the commune structure... ensure that each representative has the opportunity to respond during the FGD.

Suggested FGD questions

- When thinking of village resilience, what has change respective of sustainable development assistance since the term 'climate change' has entered the commune, district, and national agenda; and to what level has the commune been involved in consultations respective of supportive responses?
- What steps can/ should be taken in the near future to support local level climate change adaptation - new, enhancements, or in the mitigation of mal-adaptation?
- What capacities are needed respective of: knowledge, systems/ mechanisms, structures, and policies in order to better support commune resilience to climate change impacts?
- Thinking of climate change impacts, what is seen as a priority for the commune to address and why? And, what influences decision-making outcomes?
- Optional – the use of this question depends on the level of climate change adaptation knowledge present: Where are the greater challenges for supporting climate change adaptation processes? And, where are the greater opportunities for supporting climate change adaptation processes?

District to Provincial level investigation

Suggested time frame –
3.5 to 4 hours

As with the commune level investigation, the session should start with dialog on climate change. Depending on the level of understanding, it is good to begin with a simple presentation on climate change adaptation and resilience. Following, move to a brief presentation of village and commune level investigation results. Note that it is beneficial for consistency and stakeholder participation and empowerment purposes to invite key village and commune representatives to the session.

Again, the primary tool for investigation uses **TOOL #6** with a minor modification, i.e. the core of the **Stakeholder Relationship and Development Service Profile**, placed is '**COMMUNES**' and '**DISTRICTS**'.

'**HAZARD STATEMENTS**' can be maintained from the previous levels; however, this should be discussed with the participants and modified as suggested. Often, district and provincial representatives will be focused on systems/ mechanisms, structural, and policy related climate change capacity gaps. It is the researcher's responsibility to ensure connectivity of newly formed 'Hazard Statements' to those developed at the village and commune level.

To wrap-up the aforementioned activity, a FGD can be conducted using similar questions as those proposed for the commune level wrap-up session. However, it may be an advantage to propose the questions in a more open-ended fashion. Again, note that there are specific areas of responsibilities within district and provincial level governance structures... ensure that each representative has the opportunity to respond during the FGD.



The analysis

The aforementioned set of tools have been designed to bring forth linkages between climate change impacts and strategies employed at various levels of society to adapt to these impacts in a way that builds resilience, and those employed that are thought to erode this resilience. The challenge of the analysis is to segregate impacts and issue bases that can be attributed to climate change from those that could be attributed to something else, e.g. poverty, modes of development, and marginalization to name a few. Hence, the analysis cannot begin until the researcher has a significant grasp of development paradigms in the country – the context. Also, understanding contextually the research ‘area’ is paramount; the reason why such emphasis is placed on this – Tools #1 – 4. This understanding will lend to defining the scope of inquiry as it relates to the analysis.

Scope of inquiry

- **Temporal changes:** This forms the root of a situational analysis, noting changes in natural asset based livelihoods, from form and level of productivity, understanding what ecosystem services support livelihood strategies, and the performance of the services, i.e. are they meeting the demand over a given period of time – Tools #1 – 4;
- **Elements of adaptation:** Understanding an identified ‘hazard’, its location of impact (Tool #2), and the form of response to mitigate the impact of the hazard. Linked to mitigation, assets are used and they come in the form of inputs. Through Tool #5, these elements are defined, however, it is also important to note where assets are being derived from – this links in part to Tool #4 and to Tool #6;
- **Driving forces of adaptation:** This can begin from several points of origin, climate hazards, form of chosen livelihoods and the capacities that support or not needed improvements, to a decline in ecosystem services; hence the importance placed on understanding context and how assets are used and managed. Tool #5, through facilitation, focuses the research on the impetuses to climate change adaptation - climate related hazards and impacts, and details the mode of an adaptation strategy taken – influenced by assets and opportunities available to make adjustments to hazards, new conditions, and or stresses;
- **Linkages to adaptation:** Understanding if the adaptation strategy is a result of new conditions and or stressors. This requires the use of temporal knowledge, and an understanding of development priorities and initiatives in the given target area. Focus Group Discussions outlined in the tools will provide this insight, as well as strategic information from comparing the different DSPs developed at differing levels of investigation; and
- **Form of resilience obtained:** Many of the tools strategically chart what is doing better and what is not, the reasons for this, and outcomes of the actions taken to improve a given situation. However, for a complete analysis of resilience obtained, the researcher must also understand linked impacts to actions taken in terms of society, from the point of family and upwards – including levels of governance. This information is derived from a complete understanding of all information derived. Importantly, this composite of information will also help researchers identify the root causes of climate change vulnerability. It is important to note that by defining functional relationships, and the form of development services provided in support of a prioritized need, will help researchers identify existing capacity gaps – from knowledge needs, to the delivery of technology, to multi-stakeholder cooperation in terms of collaboration and decision-making processes.

End.