Biodiversity and Climate Change Project in the El Sira Community Reserve
Perú
2009 - 2012

METHODOLOGY FACT SHEET N° 2

FiMe02-ElSira-GIZ

Vulnerability analysis and strategies for climate change adaptation in the El Sira Community Reserve, Peru

Experiences using the methodology in the El Sira-GIZ project, Peru

Application of the method:

Adaptive Risk and vulnerability Management at Conservation Sites (MARISCO) in the Peruvian Amazon

December 2011

PERÚ Ministerio del Ambiente | Servicio Nacional de Áreas Naturales Protegidas por el Estado

Reserva Comunal El Sira

ecosira

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Por encargo de:
Ministerio Federal de Medio Ambiente, Protección de la Naturaleza y Seguridad Nuclear
de la República Federal de Alemania

Biodiversity and climate change in the El Sira Community Reserve is a project carried out under the International Climate Initiative (ICI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Republic of Germany.

Methodology fact sheet 2 / ***FiMe02-ElSira-GIZ***

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

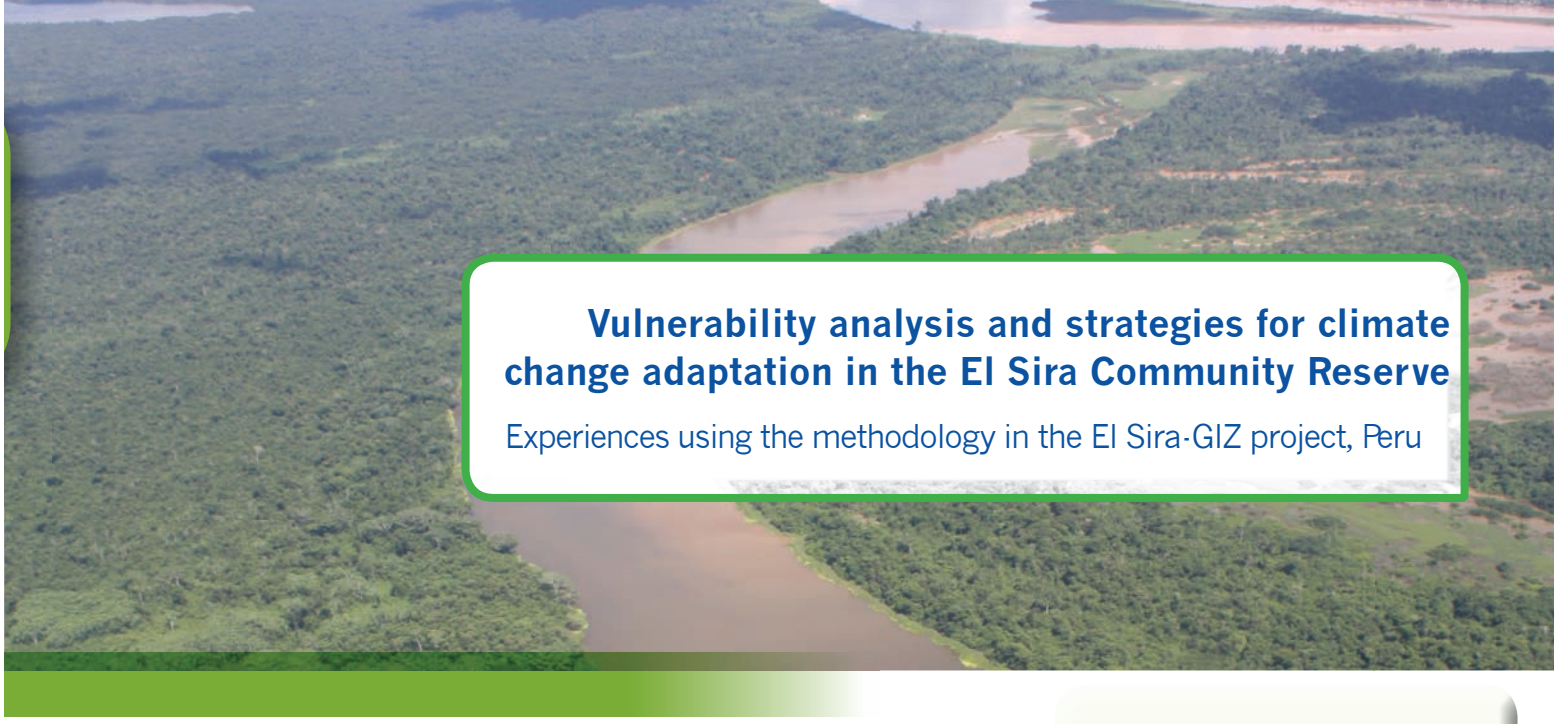
Main advisor: Alois Kohler / alois.kohler@giz.de
Calle Los Manzanos 119, San Isidro, Lima 27, Perú
Text: Pierre Ibisch and Christoph Nowicki
Centre for Econics and Ecosystem Management,
Eberswalde University for Sustainable Development, Germany.
(FH) - Faculty of Forest and Environment
Alfred-Möller-Str. 1
16225 Eberswalde
Germany
www.centreforeconics.org
Email: pierre.ibisch@hnee.de / Telephone: +49 3334 657 178 / Fax +49 3334 657 162

First printed in December 2011

Legal deposit: National Library of Peru, N°: 2011-14981

Design and layout: Gladys Faiffer
Photographs: GIZ archive

Printed by: Industria Gráfica Algraf S.A.C.
Av. Arica 1831, Cercado de Lima. Telephone: 51-1- 717-4515



Vulnerability analysis and strategies for climate change adaptation in the El Sira Community Reserve

Experiences using the methodology in the El Sira-GIZ project, Peru

Introduction

The El Sira Community Reserve, located in the Peruvian Amazon, was established by the Peruvian State to conserve biological diversity for the benefit of the indigenous Ashaninka, Asheninka, Yanesha and Shipibo-Conibo ethnic groups living in the area. ECOSIRA, a local organisation representing all the communities in the area around the reserve, is jointly responsible for managing the area in accordance with an indefinite-term contract for the administration of the reserve under the special regime established for community reserves.

Community reserves are areas established to conserve the flora and fauna for the benefit of neighbouring rural communities, which are given preference in the use of the area's resources, because they employ proven traditional practices. The resources are used and marketed in accordance with management plans approved and supervised by the authorities and implemented by the beneficiaries.

El Sira is known for its spectacular scenery and distinctive geological formations and is home to diverse and unique flora and fauna, including the El Sira curassow, tanager and hummingbird and at least three tree species and four amphibian species unique to these mountains. The area is an isolated range in the eastern chain of the Andes, with rugged terrain consisting of five altitudinal belts from 200 to 2,230 m above sea level. In the southern part of the massif, there are tropical pastures, known locally as pajonales, and dwarf forests with naturally bare rocky areas on the peaks.

El Sira Community Reserve at a glance:

- Reserve area: 616,413 ha
- Buffer area: 1,032,340 ha
- Date established: 22 June 2001
- IUCN category VI
- Location: Huánuco, Pasco and Ucayali departments

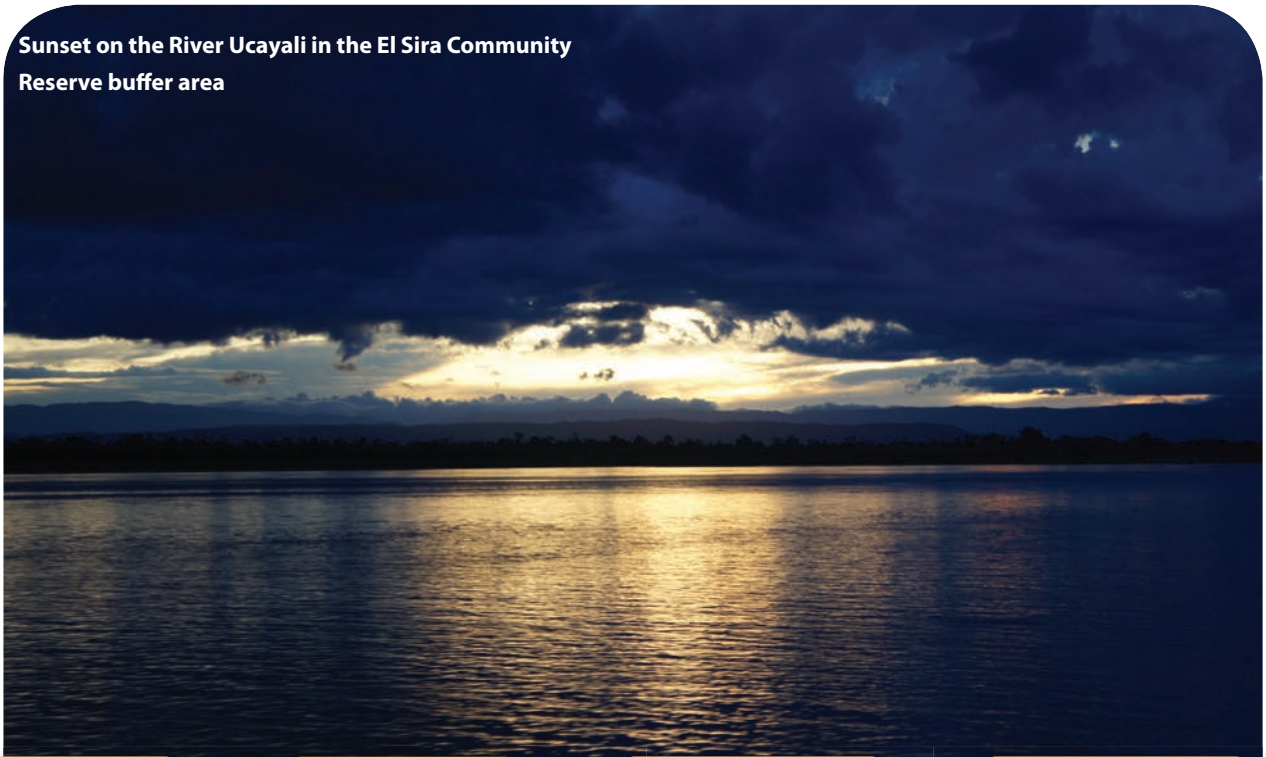
- The Federal Government of Germany has pledged to reduce greenhouse gas emissions by 40% by 2020 (compared with 1990). Revenues from the sale of emission certificates are being employed to achieve this target.
- The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) receives part of these revenues and invests them in projects such as the International Climate Initiative (ICI). The ICI was created in 2008 to support climate protection measures in developing countries.
- The Biodiversity and Climate Change Project in the El Sira Community Reserve is financed from ICI funds (2009-2012).

The Biodiversity and Climate Change Project in the El Sira Community Reserve (short name: El Sira), implemented by the Deutsche Gesellschaft für Internationale

Zusammenarbeit (GIZ) GmbH, supports and provides guidance to the National Service for State-Protected Nature Areas (SERNANP), the Ministry of the Environment (MINAM) and ECOSIRA, an organisation created to promote biodiversity conservation and climate protection in the reserve and its buffer area.

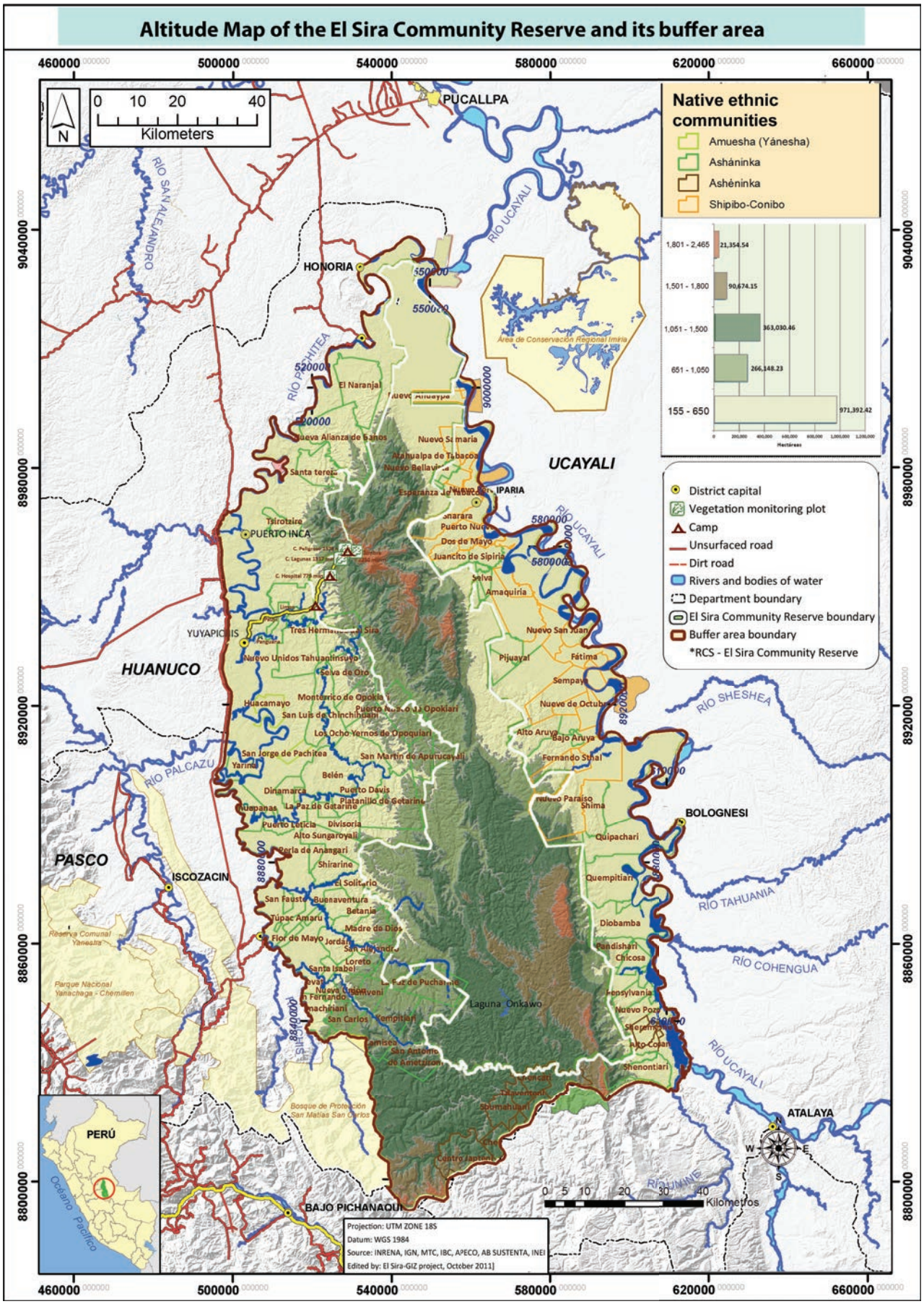
The key goal is to reduce vulnerability to climate change and related risks, with a view to mitigating greenhouse gas emissions through the conservation of forests, which act as a carbon sink, and ensuring the adaptation of ecosystems and communities to the effects of climate change. One of the project's main tasks is therefore to analyse vulnerability, together with the organisations involved, as a step towards identifying climate change mitigation and adaptation strategies.

The vulnerability analysis process, supported by the El Sira project, is described below, with particular emphasis on the methodology and the results obtained.



Sunset on the River Ucayali in the El Sira Community Reserve buffer area

Vulnerability analysis workshops in Pucallpa (April and September 2011) and Atalaya (April 2011)


Altitude Map of the El Sira Community Reserve and its buffer area
Native ethnic communities
Amuesha (Yánesha)
Asháninka
Ashéninka
Shipibo-Conibo
District capital
Vegetation monitoring plot
Camp
Unsurfaced road
Dirt road
Rivers and bodies of water
Department boundary
El Sira Community Reserve boundary
Buffer area boundary
*RCS - El Sira Community Reserve
PUCALLPA
HONORIA
PUERTO INCA
IPARIA
UCAYALI
HUANUCO
PASCO
ISCOZACIN
BOLOGNESI
ATALAYA
BAJO PICHANAQUI
RÍO UCAYALI
RÍO SHESHEA
RÍO TAHUANIA
RÍO COHENGUA
RÍO PALCAZU
RÍO SAN ALEJANDRO
Área de Conservación Regional Imiria
Reserva Comunal Yanesha
Parque Nacional Yanachaga - Chemillen
Bosque de Protección San Matías San Carlos
Laguna Onkawo
PERÚ
Océano Pacífico
Projection: UTM ZONE 18S
Datum: WGS 1984
Source: INRENA, IGN, MTC, IBC, APECO, AB SUSTENTA, INEI
Edited by: El Sira-GIZ project, October 2011]

Climate change in the Peruvian Amazon and the El Sira Community Reserve

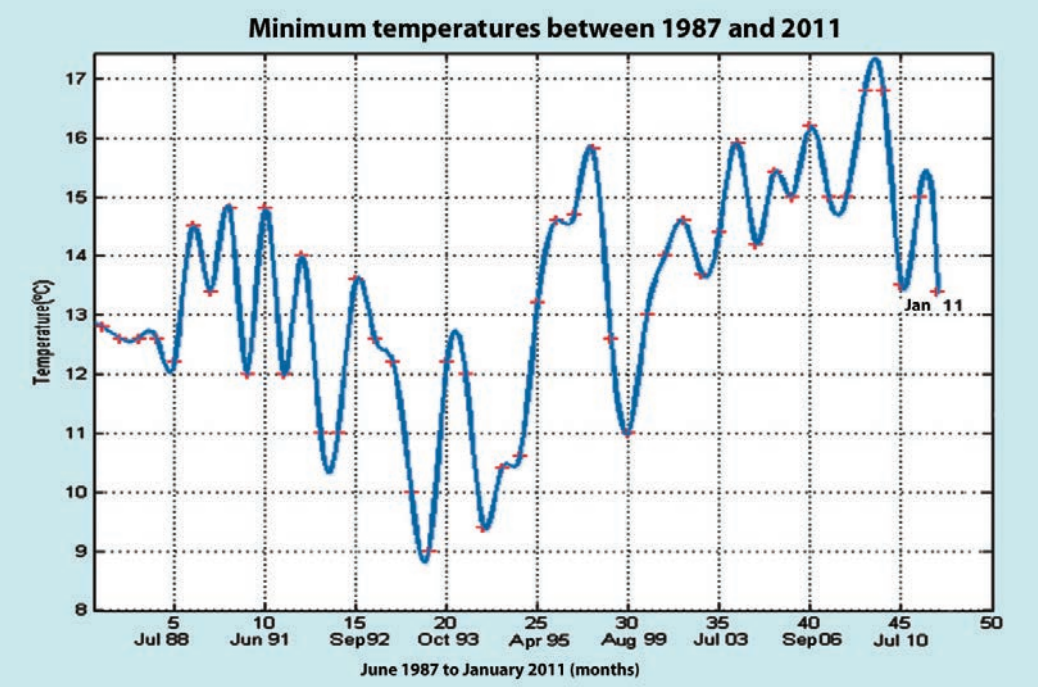
Meteorological and climatological processes are very complex in the Amazon. In addition to global processes, there are also influences produced by the area's topography and vegetation, resulting in local and regional differentiation. Changes caused by phenomena such as 'El Niño' (*El Niño Southern Oscillation*), which are also apparently influenced by global climate change, are also modifying the temporal and spatial patterns of the local and regional climate.

In spite of a lack of reliable data, an analysis of Peru's climate (see, for example, *Climate Wizard*: www.climatewizard.org) shows that there are regions where the annual average temperature has risen over the last three to four decades, accompanied by a reduction in annual average rainfall, while in other areas, the opposite trends have been observed.

Change in minimum temperatures over 25 years

Report analysed using data from the National University of Ucayali weather station

G. Rojas G.



Local meteorological records show an increase in minimum temperatures in the Ucayali region, situated in the Peruvian Amazon, suggesting a reduction in the intensity of cold waves. The local population confirms that extreme weather events, such as flooding, high temperatures and strong winds, occur more frequently.

Testimony of Amelia Coronado, from the Ashaninka indigenous community in Chicosa, Alto Ucayali sector, Raymondi district, Atalaya province.

"There are many changes. Now, it is sometimes so hot that we can only work in the fields very early in the morning. Recently, water levels in the streams have been lower than ever before.

This is a problem, because many fish are dying. But there are also very high flood waters. Everything is changing; now there are flood waters at times of the year when we didn't use to have them.

The flood waters sweep away the crops, and a lot of food is lost. There are also every strong winds, and there have been times when trees have been uprooted by the wind in our communities. This didn't use to happen."

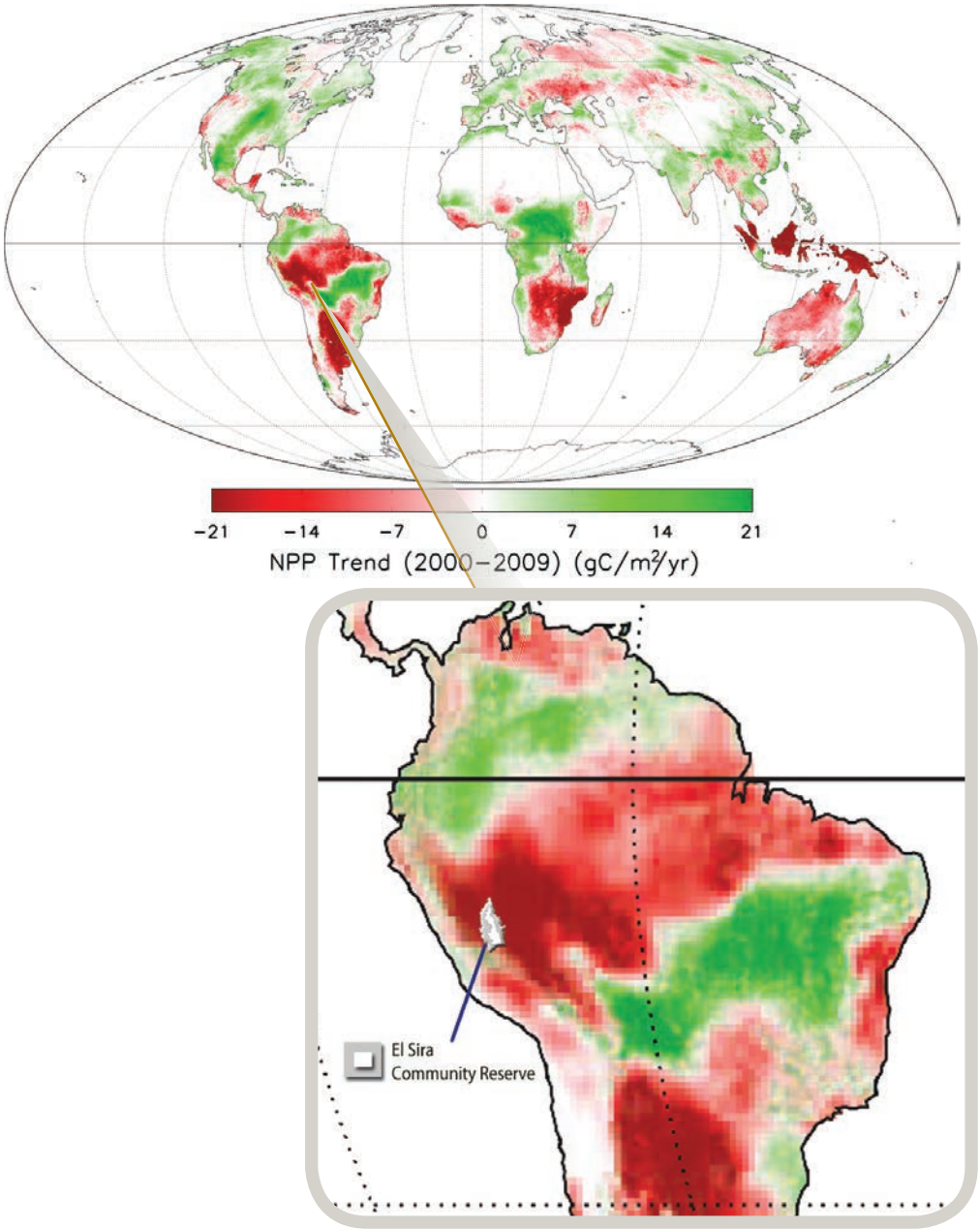
In addition to changes in annual average rainfall and temperatures, which occur over the long term, there are also other trends, which cause ecological effects in the short term, particularly changes in the seasons and their increasing variability.

Extreme weather events, such as droughts, heat waves and extremely heavy, intense rainfall, affect ecosystems, including forests and rivers, resulting in water stress in plants, erosion, landslides and river flooding.

Village in Alto Ucayali

Droughts have a particularly strong impact on Amazon forests. The map below[1] shows the change of net primary production (NPP) between 2000 and 2009, based on a global study using remote sensors. Regions registering a decline in NPP are shown in red and those registering an increase in green. The Peruvian Amazon is among the most seriously affected South American regions, with its forests shown to be highly vulnerable.

Other studies clearly confirm the effects of recent droughts (2010) in the Peruvian Amazon and their negative impact on forest productivity.



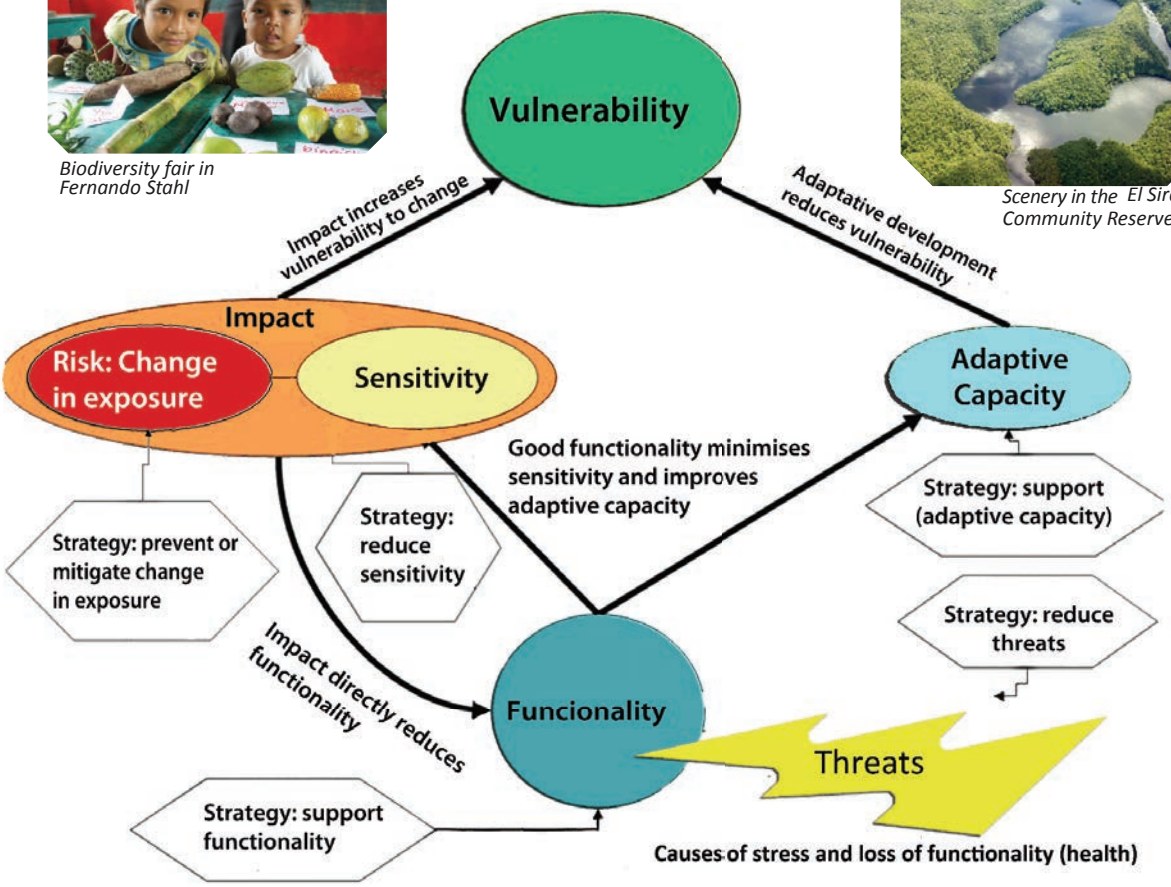
[1] Taken from M. Zhao, S.W. Running (2010), Drought-induced reduction in global terrestrial net primary production from 2000 through 2009, Science 329:940–943.

Significant changes can be expected in the Peruvian Amazon, according to the different scenarios and models used to project future climate change trends. In a worst-case scenario, temperatures could rise by over 2°C by 2050, and there could be a drastic reduction in rainfall, particularly in the winter.[2]

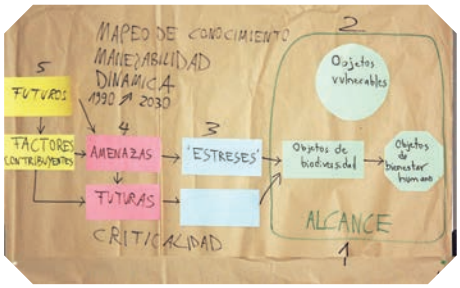
Peru's Amazon forest is at risk of becoming one of the world's most vulnerable ecoregions.

Biodiversity fair in Fernando Stahl

Scenery in the El Sira Community Reserve



Training in native communities



Vulnerability workshop

[2] L.J. Beaumont et al. (2011), Impacts of climate change on the world's most exceptional ecoregions, Proc. Natl. Acad. Sci. U.S.A. 108, 2306–2311

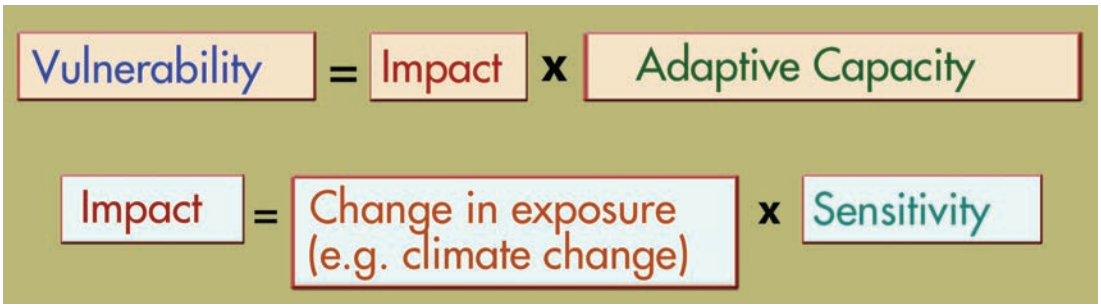
Climate change adaptation and adaptive management in the conservation of biodiversity

The vulnerability of protected areas and their biodiversity (including their conservation objects) to climate change is determined by both impact and adaptive capacity. When changes in maximum temperatures or severe and frequent droughts have an impact on a tree, for example, it will be damaged if it is sensitive (or susceptible) to such changes and if, in general, it has not adapted to withstand such events. In such a case, the tree would be vulnerable.

Vulnerability is also determined by the functionality or health of the system affected. A healthy system can withstand a change in exposure to a certain factor, such as drought. Adaptation is the only option in the face of a strong impact. Sustainable adaptation involves changes that avoid the degradation, collapse or loss of the system's key characteristics and facilitate the continued existence or development of the system.

In the past, it was enough to support the functionality of biodiversity and reduce the threats affecting conservation objects. Now, however, in these times of rapid environmental change, conservation efforts must also facilitate and contribute to a reduction in vulnerability. There are different ways to achieve this, such as reducing sensitivity, improving adaptive capacity and facilitating adaptation.

The strategic development of a management plan (or master plan) should not only seek to control and reactively respond to the threats faced, but also promote preventive and proactive efforts to reduce vulnerability. This requires an analysis of the risks arising from a change in exposure, for example, climate change or a change in land use.



Mapping the vulnerability of protected areas, their conservation objects and strategy options

Analysis of vulnerability is part of any comprehensive analysis of a system's status and should incorporate the dynamics of future non-linear risks, which are difficult to predict. Any attempt to analyse and manage vulnerability involves the management of complex systems.

It is useful, in such an analysis, to identify the cause-and-effect chains wherever possible. However, it is crucially important to be aware that there are complex systemic effects that are difficult to understand. The complex systemic interaction of different threats results in larger scale impacts with synergetic effects. In other words, it is important to take into account that the effects of climate change add to or compound 'conventional' threats.

Furthermore, vulnerability is not solely related to conservation objects, which are elements of biodiversity; the conceptual framework, the design of activities and working conditions are additional sources of vulnerability. Conservation efforts can be rendered more vulnerable by defining objects and objectives that are difficult to achieve in times of rapid change. An inappropriate spatial design can hinder the work, as can institutional weaknesses.

Therefore, the management of vulnerability must:

1. be sufficiently comprehensive and complex, without losing sight of the fact that it is impossible to reflect and model reality in its full complexity, let alone predict future reactions with certainty;

2. take into account all available knowledge and actively evaluated unknown factors. In the evident absence of certainty and sureness, the **precautionary principle** is more important than simplification or making assumptions (principle of evidence);

3. be adaptive, proactive and capable of smoothly integrating 'surprises', that is, new, as yet unknown, factors, synergies and dynamics, into its strategies; it must be based on scenarios and comprise a risk/threat identification and early warning system;

4. be focused on reducing vulnerability with a form of management that is more 'meta-systemic' and less 'object-systemic'; this means that management should be focused more on creating favourable conditions for factors that can reduce vulnerability and less on addressing very specific factors and symptoms.

Adaptive management is a structured, iterative strategy development and implementation process, which also reduces uncertainty by optimising learning through planned and recorded action to improve future management. As it is an adaptive approach, it has the potential to be an effective tool for adaption to uncertain environmental change.

However, adaptive management can be highly reactive, simply responding to changes detected in the system; it should therefore be used in combination with a proactive risk management approach to make it more comprehensive and effective.

Existing adaptive management approaches used in conservation, such as the Open Standards for the Practice of Conservation developed by the *Conservation Measures Partnership*, can be used as a basis for vulnerability analysis and adaptive management. The MARISCO (acronym of the Spanish name for the approach: Manejo Adaptativo de RIesgo y vulnerabilidad en Sitios de COnservación - adaptive risk and vulnerability management at conservation sites) method is based on these Open Standards, with the incorporation of new elements into the iterative analysis and planning process.

MARISCO is a methodological approach used to facilitate the integration of the risk and vulnerability perspective into the management of conservation projects and sites. It is designed to take into account the impact of climate change in the strategic management of protected areas, although it is not confined solely to climate change. It was developed as a result of workshops and projects carried out in Germany, Ukraine, China, Guatemala and Peru.

Application of the MARISCO method in the El Sira Community Reserve

At three workshops held between April and September 2011 in the cities of Pucallpa and Atalaya, some 45 participants conducted a systemic vulnerability analysis of the El Sira Community Reserve and the surrounding area. The participants were representatives from indigenous communities, ECOSIRA, local governments, Ucayali regional government, SERNANP, universities, NGOs and German cooperation (GIZ). The president of ECOSIRA and the SERNANP official responsible for the area took an active part in the workshops.

The participants worked through an iterative process, contributing their knowledge of the status of the reserve and its forests.

The work involved the discussion of technical presentations and analysis in plenary sessions and working groups. The systemic analysis was displayed on coloured cards representing different classes and attributes.

The participants engaged in a collective learning process to improve their knowledge of climate change, vulnerability concepts and risk, taking into account the current situation of the reserve and potential future scenarios, including anticipated climate and socioeconomic changes.

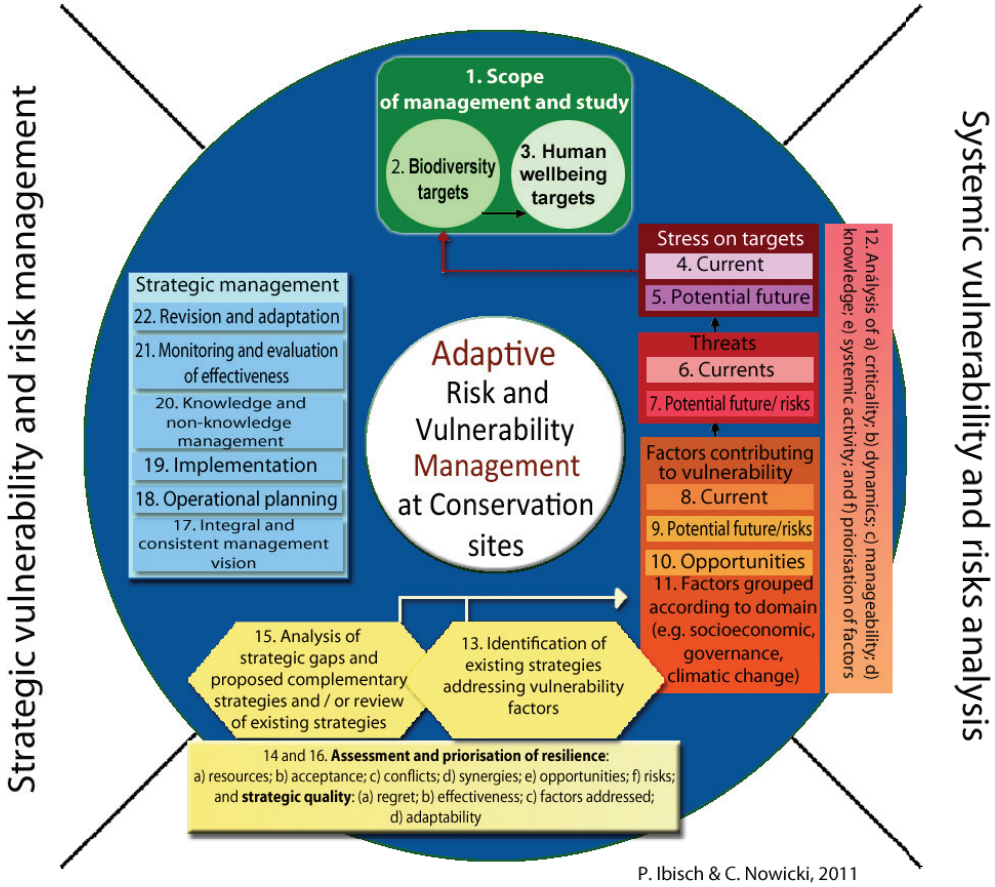
The participants detected potential options for the development of complementary strategies to improve the effectiveness of the reserve's ecosystem functions and, in particular, to reduce vulnerability to the anticipated changes.

Workshop on vulnerability in Pucallpa, April 2011

Working groups at the vulnerability workshop in Pucallpa

MARISCO

Preparation and initial conceptualisation



P. Ibisch & C. Nowicki, 2011

Comprehensive evaluation, priorisation and strategy formulation

Results achieved

As the analysis was concerned with ecosystems, the participants agreed to focus on the most valuable and inclusive conservation object: the area's forests, including highland or montane forests (within the reserve) and lowland forests (mainly outside the reserve). Following an examination of the spatial characteristics of the area, it was agreed that the analysis should cover vulnerability not only in the El Sira Community Reserve, but also in the communities in the buffer area and an even broader area of influence.

The Atalaya and Pucallpa workshops succeeded in making a reasonably comprehensive and complex systemic analysis of the current status of the reserve. The results were displayed, showing the main interrelations among the factors affecting vulnerability in the area.

Both workshops identified climatic factors that put stress on biodiversity and, directly or indirectly, cause suffering and damage in the communities that depend on these resources. The following factors were mentioned:

more severe and frequent flooding, drying up of lagoons and clay licks, reduction in the flow of rivers and streams, very variable water level patterns, very small fish populations in the dry season, landslides in montane forest areas, increase in trees uprooted by the wind and changes in flowering and fruiting times.

The causes of alterations affecting biodiversity associated with agriculture, logging, river pollution, etc. were also analysed. There was discussion of how local population growth and immigration from other parts of the country, facilitated by improved access to the region, have increased demographic pressure on the area and demands on agricultural production.

The main causes mentioned were poor governance, the failure of the authorities to prioritise conservation, and problems relating to culture, local practices and capacities. There was also discussion of external factors affecting the reserve, including coca growing, boosted by growing international demand for cocaine, international demand for land and crops, and rising international gold prices.

Climate change was said to be exacerbating the current situation, by causing mountain dwellers to migrate and a decline in crop productivity, contributing to the expansion of the agricultural frontier.

A very worrying historical and future trend was noted, highlighting the reserve's growing vulnerability. It was observed that many of the factors identified are not well understood or manageable, at least as far as local management of the area is concerned. It is therefore clear that there is an overriding need to adapt to inevitable changes.

A look at how current conservation strategies relate to the threats and risks and how vulnerability is increasing led to the identification of significant strategic gaps. The fact that some of the strategies may themselves be vulnerable and do not always prove effective was also discussed. These observations served as input for the development of new complementary strategies, which were evaluated in a semi-quantitative manner.

Finally, the participants reflected on the management vision for the area, which would guide the implementation of the priority strategies, ensuring a consistent and coherent approach.

The vision

The El Sira Community Reserve is regarded as a pilot area, where new sustainable development models adapted to climate change have been agreed and established. They ensure the effective conservation of functional and adaptable ecosystems and enable the local population to maintain their livelihood by adjusting to the changes. This is achieved through integrated management based on a cross-cutting approach to the environment, which seeks to link the reserve to the surrounding area and other protected zones, promoting external relations and strategic partnerships.

Management of the area is based on:

1. permanent strengthening of the capacities of the main actors in management and conservation, with a territorial focus and taking into account climate change adaptation and risk management;
2. support to enable local indigenous communities and settlers, who are familiar with their culture, to act as conservation managers;
3. establishment of participation and consensus-building mechanisms;
4. jointly managed community protection and monitoring of the ecosystems of the reserve and its buffer area;
5. political advocacy and dissemination of biodiversity values at all relevant levels, including local, regional and national government.

Some of the existing strategies implemented in accordance with the reserve's master plan and classed as top priority were identified as cross-cutting strategies. They include 'developing/promoting participation/ gender equity', 'communication', 'environmental education' and 'developing community capacities'. The existing strategy for 'raising awareness and mobilising public opinion about deforestation' is a more specific strategy that was also prioritised.

The strategies proposed to reduce the area's vulnerability to climate change and other risks and factors do not affect the validity of existing strategies; they merely go beyond general guidelines for action and can be considered complementary strategies. They are described below.

Local advocacy

- Promote cultural activities and the recording of traditional knowledge for future use.
- Provide support to enable communities to adapt to climate change and prepare for extreme weather events (including assistance to improve agricultural production).
- Promote fire control and prevention
- Support local governments in their development planning, including the climate change perspective.

Regional and national advocacy

- Support processes to link protected and forest areas (networks, connectivity) in the region.
- Formulate plans for land use in the proximity of roads (encourage local consultation before the construction of works affecting protected nature areas).
- Promote coherent and concerted planning with the authorities.
- Promote the creation of an association with other community reserves in the Peruvian Amazon.

Conclusions

The planning exercise carried out using the MARISCO method served as a pilot experience to enrich the methodological development process. Overall, the people and institutions involved were satisfied with the work and the results. The advantages noted include the following:

- It is a step-by-step method which guides the discussion and analysis of very complicated and complex issues.
- The exercise is systematic and the way in which the iterative process is recorded and displayed makes it easier to maintain a consistent approach. It also ensures the smooth flow of activities between sessions and workshops.
- It facilitates the active participation of local actors and those with knowledge of the area.
- It raises the awareness of the different participants with varying levels of training in different fields and very varied experience in relation to vulnerability, risk/threat dynamics and contributing factors.
- It promotes a systemic analysis and a better understanding of the complexities involved.
- Adaptive management is applied, even in the permanent planning phase, with a view to achieving adaptive adjustment to the ideas and proposals developed.

In an assessment of the overall results, it can be seen that a complementary vision was developed to supplement the existing management approach:

- The participants acknowledged and affirmed that the management goals for the area should be even more closely focused on maintaining and strengthening the functionality of the reserve and reducing vulnerability.
- In this context, considering future factors (potential threats and risks) is a new angle, resulting in the proposal of proactive and preventive strategies in a conceptual move towards risk management in conservation.
- Climate change and adaptation are recognised as cross-cutting issues which cannot be analysed or addressed in a piecemeal manner.
- There was reflection on priorities and urgent matters, addressing problems and risks as well as solutions.
- It became clear that management of the area must focus on different spatial and institutional levels of intervention and advocacy.

Recomendations

The summary of conclusions and results submitted to Peru's National Service for State-Protected Nature Areas (SERNANP) included the following recommendations:

- promote the introduction of the strategies defined in the climate change analysis as part of the reserve's plan of action;
- use them as input for the revision and adjustment of the master plan;
- take them into account as the basis for the design of any new projects developed for the reserve.

It also identified the potential for using the experience to establish the El Sira Community Reserve as a model to be followed nationwide. The importance of disseminating and discussing the results with other actors (for example, local and regional governments) was highlighted.

Testimony of Mr Rudy Valdivia, head of strategic planning, SERNANP (National Service of Natural Protected Areas).

> *'We value the results of the exercise, particularly in view of the fact that they contribute to developing the capacities of the actors involved in the management of our protected nature areas, so that they can address the challenges they face and future risks in a more strategic way. In this context, it is important for management strategies to incorporate the principles of precaution and prevention, so that we can be more proactive rather than simply responding to acute crises.*
>
> *Risk management in biodiversity conservation contributes to the wellbeing of the people who rely on ecosystem services.'*

Testimony of Mr Luis Saavedra, head of the El Sira Community Reserve

> *'Those of us who are involved in the intense work associated with the management of the El Sira Community Reserve are aware of the complexity of the situation it faces. This analysis exercise, carried out using the MARISCO method, has facilitated a participatory process to familiarise a diverse and heterogeneous group of actors with the risks and factors that contribute to threats affecting biodiversity. I must admit that our demanding day-to-day work to meet urgent needs leaves us with very little time to reflect on the dynamics of the situation and broader, more comprehensive strategies.*
>
> *However, the results of the systematic analysis confirm that while the reserve is still relatively well conserved, the combination of threats and risks identified is certainly a cause for concern. We realise that we need to think and act big and involve all those concerned with its conservation'.*

"It used to be hot, but now the heat is overwhelming. The sun is strong; it is not like it used to be. Now the weather changes quickly, no doubt because the logging companies have cut down so many trees. I am sowing bolaina trees (*Guazuma crinite*) in my fields. I grow them with my cassava, rice and bananas. When the bolaina trees are fully grown, the climate changes and becomes cooler. When there are no trees, the ground gets hot.'

Rosa Shuñaque, 45-year-old Asheninka woman, Nuevo Paraíso community, Tahuanía, Alto Ucayali, Central Amazon, Peru.

"The weather didn't use to be like this. Now it is very hot all day. The rest is the same as it has always been; the winds and rains haven't changed, because there are still forests here. The problem is that there is a lot of deforestation and a lot of cities, factories and cement. We have set up an agroforestry company so that we can look after and live off our forests. We have a bolaina nursery in Nuevo Paraíso, with 2,700 seedlings.'

Roberto Valera Maldonado, 39-year-old Shipibo man, Fernando Stahl community, Tahuania municipality, Alto Ucayali. Central Amazon, Peru".

Area covered by the Biodiversity and Climate Change Project in the El Sira Community Reserve