

# Climate change

## What challenges for the South?

Scientific editors

Serge Janicot  
Catherine Aubertin  
Martial Bernoux  
Edmond Dounias  
Jean-François Guégan  
Thierry Lebel  
Hubert Mazurek  
Benjamin Sultan

Scientific writing

Magali Reinert

Prefaces by

Youba Sokona  
Thierry Lebel and Jean-Paul Moatti

**IRD Éditions**

INSTITUT DE RECHERCHE  
POUR LE DÉVELOPPEMENT

Marseille, 2015

# The adaptation and resilience of populations in the South



© IRD/J.-L. Maeght

Pulling out rice seedlings for replanting in a rice field (north-east Thailand).

**T**he ability of human civilisation to handle the issues of climate change partly depends on the accuracy of the data concerning this change and the power of forecasting models. The IPCC Fifth Assessment Report is both more precise and more alarming than the previous ones in this respect. It also depends on the determination of decision makers to consult each other to set targets aimed at mitigating the effects of climate change, in particular by a drastic reduction of greenhouse gases, and to strengthen our measures for adapting to an inevitable change, even if there is still disagreement on the scale of the latter. But populations in the South have not waited for the decisions of experts to begin to adjust their subsistence strategies in response to changes that they can perceive and anticipate. These adjustments concern as much the maintaining of their sociocultural integrity as that of the natural ecosystems on which they depend on an everyday basis and with which they maintain progressive interactions. Considering local reactivity is just as important as considering that of the international select few.

## Mitigation, adaptation and resilience

The perception now being confirmed of a break related to climate change has led to a change in the way of qualifying the necessary responses over the past 20 years. Mitigation was the dominant approach used to reduce the effects of warming until the end of the 2000s. Put forward by a community of scientists and experts devoted mainly to risk management and climatic disasters, mitigation consists of reducing the exposure and sensitivity of the system. A central theme of the successive IPCC reports, it is defined there as the human intervention necessary to reduce sources of greenhouse gases or increase carbon sinks, in other words to limit greenhouse gas emissions and store atmospheric carbon. Until recently, researchers and decision makers believed that mitigation would suffice to control the effects of climate change.

Street food vendor  
in Ho Chi Minh City  
(Vietnam).

Migrants include  
a 'floating population'  
of people that work and  
live in the city while making  
frequent trips to the rural  
areas that they came from.



© IRD/P. Gubry

In the face of warming that seems inevitable today, 'adaptation' has become dominant progressively since the end of the 2000s. The taking into consideration of the capacity for systems and populations to adapt has been more the affair of researchers in social sciences. A large amount of literature has been published on the subject in economics, human geography, sociology and anthropology. Numerous studies address the adaptation capacity of rural populations in the South in relation to their environment. Here, pluriactivity and migration clearly show the complexity of the social responses used to handle environmental and social changes (population growth, political crises, rocketing foodstuff prices, drought, etc.).

More recently, the efforts made by climate change specialists have been focused on synergy between mitigation and adaptation. In particular this means examining the 'resilience' of the system with regard to both its biophysical component and that concerning its human population. The popularity of the concept of resilience (defined as the capacity of a system to absorb disturbances or withstand changes without damage to its functions, structure, identity and functioning) thus leads to the perception of risk of failure. But the polysemy that marks this notion still makes operational use difficult. Proof of this is that it is used in very varied disciplines. The word 'resilience' comes from the physics of materials where it defines the quality of a body to conserve or return to its original form after deformation. The concept is also used in psychology to describe the capacity of a person to recover after being badly treated and in ecology to define the reconstitution capacity of an ecosystem after partial destruction by a natural or anthropic catastrophe. The term often has a positive connotation when applied to a society. It is not limited to reconstruction after a crisis but implies a capacity to overcome it and adapt to it.

Applied to public development policies, the notion could begin to provide a response to situations of growing incertitude and vulnerability related to climatic events, economic crises, etc. IRD participates in reflection on the interest of resilience as a new standard to the evaluation of public policies.

## **Sociocultural adaptation, ecological adaptation: entwined developing processes**

The developing adaptation process is clearly revealed by the analytical framework of the 'socio-ecological system' defined by the international network Resilience Alliance as a set of dynamic interactions between biological and social factors, between populations, societies and the environment. These interactions are generic





© IRD/M. Donnat

Survey on the contribution of livestock farming to the resilience of ecosystems and social groups in Djougou, Benin.

and applicable to all types of societies but are fully relevant for populations in the South whose subsistence mode still depends to a considerable extent on the resources provided by the natural environment.

As societies with subsistence economies are fairly self-sufficient, their socio-ecological system can be seen as governed mainly by endogenous dynamics. However, the increasing effect of changes at the scale of the planet—including climate change—is tending to cause the situation to evolve significantly. The attractiveness of markets and consumer goods, public environmental policies, inter-ethnic relations, rural/urban interfaces, external economic stakeholders such as agro-industries, conservation and development agencies and NGOs, etc. are all 'externalities' that are weighing increasingly on locally drafted adaptive strategies. Analysis of the 'box' formed by these socio-ecological systems obviously assumes that increasing account is taken of what is happening 'outside the box'.

## Ecological resilience and social resilience

The resilience of the socio-ecological system of a rural population in the South is only justified if it can ensure the sustainability of resources in parallel with that of the social system mobilised in their management. Figure 32 is a synthesis of the way in which the social and ecological components can interact in the face of climate change, independently of the broad range of subsistence strategies—farming, animal husbandry, hunting, fishing, gathering and so on—that is a feature of societies with subsistence economies. The ecological component is exposed to the effects of climate change and its sensitivity to these effects will damage the environmental services and resources that it provides. The social component developed a degree of vulnerability because of the degradation of the services rendered by the ecosystem (in food supply or water resources for example) and will have to adjust by developing adaptive responses to correct the effects of the change. In this context, the adaptive capacity of the population makes it possible to counterbalance the exposure of the ecosystem or adjust its sensitivity to the effects of climate change. This capacity is measured in a way in the potential of the society in question to maintain or possibly restore the services and resources provided by the ecosystem.

The generally accepted idea about the socio-ecological systems of social groups or communities, especially in the South, whose subsistence and well-being depend mainly on the natural environment, is that ecological resilience and social resilience go together and must be maintained together. However, the work carried out in central Cameroon by IRD for two decades invalidates this idea and shows an interesting case in which forest peoples are obliged to counter-balance the natural dynamics of the **ecotone** to maintain the integrity of their social system (Box 60).

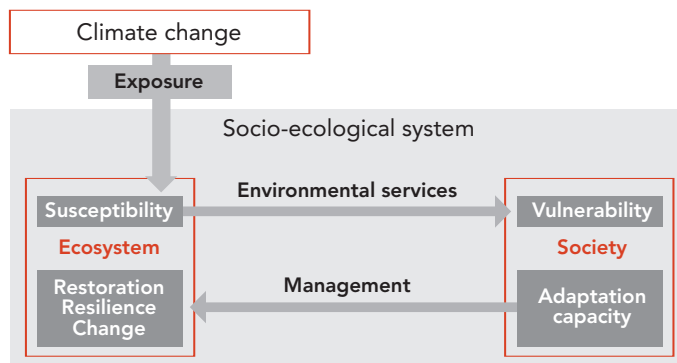


Figure 32.  
Exposure  
of a socio-ecological  
system to the effects  
of climate change.

Source: after DOUNIAS *et al.*,  
2013.

Box 60

### **The forest-savannah ecotone in the centre of Cameroon**

Since the 1990s, IRD and its Cameroonian partners have conducted a vast multidisciplinary human ecology programme at the forest-savannah contact zone to analyse the adaptive responses of the Tikar to the rapid advance of the forest.

The centre of Cameroon is inhabited mainly by the Tikar, cereal growers who moved south from their original savannah area two centuries ago to reach a humid tropical forest about which they knew nothing. The forest/savannah border area forms a particularly dynamic ecosystem that has evolved naturally for nearly 1,000 years, with the forest advancing rapidly into the savannah. This happens at the rate of 1 to 3 metres per year and is at its most spectacular in the inhabited zones where the spread of seeds from young trees on the pioneer front is amplified.

In this very special socio-ecological context, IRD researchers addressed the attitude of a society with regard to the advance of a forest front that might seem contrary to its cereal growing activities. This field of study is all the more propitious for exploration of the notion of the biological and cultural adaptation of a human society as the environment changes very rapidly.

The same applies to climatic events whose incidence can be seen more easily in an ecological transition zone (ecotone) than in humid tropical forest.

#### **A multidisciplinary human ecology programme**

However, the adaptive responses of the Tikar do not operate solely in response to the physical environment. The Tikar organised in ranked chiefdoms, met on their route the local populations of the forest edges and who possessed empirical knowledge of the forest environment. Thanks to a political system that is both malleable and rigorously structured, the Tikar have succeeded in maintaining an improbable balance between the absorption of these local societies and the construction of an ethnic identity.

This work showed first of all that the change in the environment (from savannah to forest)

## **Migration: adaptation or crisis?**

Population migrations are one of the foreseeable consequences of climate change, especially in tropical countries. But migration is not inevitable for these societies. Societies in the North tend to have an opinion of so-called 'developing countries' that is somewhat remote from reality. The populations concerned are far from being over-determined by their environment and frozen in history that they have not understood.

is part of the ecological resilience of the ecotone. It is not because an environment changes that it is not resilient. The research also revealed how the Tikar were able to profit from the arrival of exogenous features—the extension of cacao growing in the 1970s and the arrival of an invasive shrub (*Chromolaena odorata*) in the 1980s—to regulate the unwanted advance of the forest around their dwellings and no longer have to move their villages because of the progression of the forest front. This recent control of forest dynamics is at the expense of ecotone resilience but strengthened the socio-cultural resilience of the Tikar that had been made fragile by the advancing forest. Finally, factors outside the socio-ecological system allowed this control of natural ecological dynamics, highlighting the fact that the taking into account of external factors is essential for understanding its dynamic balance.



© IRD/E. Dounias

Burning off at the edge of a forest before growing maize in the forest-savannah ecotone in central Cameroon.

Migration is one of the responses of human societies to changes in their environment, whether these are brutal changes (natural catastrophe) or gradual (decreased resources). Seasonal or definitive and operating at all latitudes, this facility for mobility demonstrates adaptation capacity in case of changes. Except in cases of serious catastrophe, population displacement is the result of long and complex processes in which climate change is just one parameter among others. Conditions of access to resources (including land), farming systems and population growth are all factors, among other variables, to be taken into account in the interpretation of migrations.



Loading a lorry with migrant workers and goods in Niger.



© IRD/J. Brachet

In addition, studies on regions where climate change has already had an impact on the living conditions of the population show that most migrations are stimulated primarily by socio-economic factors. Finally, migration is often chosen as much as imposed.

### **Mobility is as old as humanity**

Mobility goes with the type of occupation of the environment used by the last hunter-gatherers in the world and that was a feature of humanity as a whole before the advent of farming. The subsistence economy of hunter-gatherers is still closely linked to the natural resources available in the environment and mobility is essential for access to these resources that is continuous in space and time. While mobility is not a fatality for these nomadic peoples, the obligatory settlement that states try to impose on them is as painful as migration for gregarious societies forced to move by dramatic circumstances.

## Climate refugees?

With land flooded by the rise in sea level, natural catastrophes, wars and conflict for access to resources etc., climate change may cause the departure of millions of people from their regions, creating as many 'climate refugees'. The term certainly makes sense when the effects of climate change are sudden and extreme, wiping out all local capacity to adjust to the suddenness and scale of the event. As researchers are cautious with regard to the links between certain extreme phenomena and global warming, the term 'climate refugees' should be used with caution and the use of 'environment refugees' preferred. Then if the areas affected occasionally or definitively by changes may be very varied, it is rare for changes to result in massive, rapid migrations across the frontiers of states. From this point of view, describing these migrants as 'refugees' is inappropriate with regard to international law.

A family displaced by drought in Kenya.

© IRD/M.-A. Pérouse de Montclos



Box 61

### The migratory strategies of the inhabitants of Tuvalu

The population of the atoll state Tuvalu has become a symbol of the climate crisis. However, the migration strategies put forward by the people concerned differ from the dominant 'climate refugees' approach. Researchers are wondering in particular about the risk for the choices of the population concerned formed by this alarmist rhetoric from the international community.

A 1-metre rise in sea level would directly affect one person in ten in the world according to the IPCC. Island populations will be particularly concerned and especially those of the low-elevation Pacific islands.

The climate emigrants of Tuvalu have already received considerable media coverage.

The government of Tuvalu has been trying for several years to negotiate climate refugee immigration facilities for its people with the New Zealand and Australian authorities.

Can one talk in terms of climatic immigration in this case when mention is made of the inhabitants leaving for New Zealand or Fiji?

Surveys of the migration determinants of these islanders threatened by the effects of climate change highlight the contrast between the way in which migrants envisage their migration and how it is generally perceived from elsewhere.

Present migration cannot be understood without associating the history of this migratory people and its migration system, together with the evolution of migration policies. Environmental factors form part of the many determinants of migration because they result in a restriction of access to resources accentuated by population pressure. Migration is also motivated by the attraction of the economic policies of Fiji and New Zealand—serving as a link for reaching Australia—and based on solid family networks.

The question then arises of considering the migratory behaviour of the inhabitants of Tuvalu as family risk reduction strategies rather than climate migration. The alarmist statements by the international community should also be analysed with regard to the risk that speeches about these victims of climate change may weigh on the adaptation capacity of the population.

© IRD/J. Oremüller



A woman in Funafuti (Tuvalu).



## **Vulnerability factors and adaptation strategies**

The climate risk is far from being expressed in a brutal, violent manner everywhere and it would be a mistake to reduce the consequences to environment refugees alone, however difficult the situation may be for the latter. As in the well-known boiling frog allegory—if a frog is placed in a recipient of very hot water it will jump out immediately. But if it is placed in water at room temperature that is then heated, the frog will not react to the progressive rise in temperature, will become drowsy and let itself be boiled to death—it is because climate change in a humid tropical forest environment is slow, progressive and not always very tangible that climate specialists have difficulty in make the general public and decision makers aware that it is urgent for us to get ready.

Much research at IRD consists of analysis of vulnerability factors and the adaptation strategies of populations after serious social or environmental changes. These analyses are of crucial importance as they contribute to the setting up of public policies that can accompany the changes.

Adaptation is thus an essential mechanism for the dynamics of societies. So why should it be a new challenge within the framework of climate change? Doubtless because of the scales involved and especially the speed of global climate change that is unprecedented in human history.