CHAPTER 1

INTRODUCTION

CHANGING PERSPECTIVES

The relationship between *climate* and *food security* is obviously not a new issue. In Rome in 1974, for example, the United Nations convened a now-famous World Food Conference under the guidance of the UN FAO. It reminded governments of an urgent need to focus on existing and yet-to-emerge food security and related issues. Thirteen years later (1987), the International Rice Research Institute (IRRI) and the American Association for the Advancement of Science (AAAS) convened an international symposium to address concerns about climate, weather and water impacts on agricultural production. The very same issues of concern to policy-makers today were addressed by scientific researchers then:

> *The International Symposium on Climate and Food Security … recognized three critical world problems: that several billion people often lack the most basic human need – food security; that population growth and the need to improve living standards are putting severe pressure on the soil and water resources that sustain all food production; and that unfavorable weather and climate remain the most frequent cause of crop failure – sometimes leading to widespread distress and even famine.*
>
> *It also recognized a new factor: the growing scientific consensus that the buildup of greenhouse gases in the atmosphere is likely to cause a global climate change – an environmental change on a scale unprecedented in human history – with the potential for great impacts, both beneficial and harmful, on food security.*
>
> *The overriding concern was: how can scientists help farmers exploit favorable agro-climate patterns and adapt to or protect against unfavorable climatic trends.*

In the never-ending struggle to provide people everywhere with the assurance of food security, we certainly need to understand more. But the participants also emphasized the need to apply what we already know – by devising and testing better methods of conveying to farmers the timely and practical agro-climatic information they need.

These were the goals and vision of M. S. Swaminathan, Roger Revelle, and S. K. Sinha – the three eminent scientists who made this meeting possible (Burns, 1989)

In the 1970s no attention was paid to mitigation [at that time mitigation meant the softening of the impacts of an event or process], and concerns about adaptation to climate were centered on weather extremes and climate variability from season to season and year to year to address the crucial aspect of food production stability, one of the pillars of food security. By 1996, however, the World Food Summit (WFS) recognized that the resource base for food, agriculture, fisheries and forestry was under stress and threatened by problems such as desertification, deforestation, over fishing, loss of biodiversity, inefficient use of water, and climate change. Mainly under its commitment three, the WFS made a number of explicit references to the dominant role of climate fluctuations in food supply as one of the main factors interfering with sustainable increases in food production.

Hundreds of meetings and thousands of papers, many of which were focused on climate and the search for food security, have already appeared on societal adaptation to climatic, environmental or societal changes. With such an extensive background, the challenge facing those searching for coping strategies to endure climate change (i.e. global warming) may weigh more heavily on deciding which existing adaptive strategies to pursue rather than on developing yet-to-be-identified unique and untested ones.

In reality, the concept of "food security" has been interpreted in many ways. An FAO report noted that there are more than 200 interpretations of the concept (FAO, 2003; [http://www.fao.org/DOCREP/005/Y4671E/y4671e06.htm]). This report defined food security as follows:

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary

needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within the household as the focus of concern (p. 3).

A cursory view of many regions in the world, however, reveals that no matter how one defines the concept of food security, food security as a goal to assure an individual's access to food and nutrition has not yet been realized to any significant extent. This reality has become obvious with the increasing use of and reliance on the term "food insecurity".

Over the decades, the concept of food security has continued to evolve with new twists and turns in its meaning appearing every few years or so. These food security evolutions can be pictured metaphorically as an 'artichoke'. At the heart of the artichoke is the core of the concept of food security, access to adequate nutrition for physical and mental well-being, which always remains the same, but over time different uses of the concept by different users (both individuals and organizations) in pursuit of a wide and varied range of variations on the food security theme to suit their goals and needs add layer upon layer of outer leaves to the center of the artichoke.

Today's concern about climate change has added features to the issue of food security: The acute perception that natural resources are finite (a concept sparked in the late 1960s after the photo was published of planet earth alone in the universe's sea of darkness); that human activities that release greenhouse gases into the atmosphere must be controlled; that adaptation to changing conditions is the most immediate concern for sectors of agricultural production; and that vulnerability to impacts varies greatly from population to population and can even vary in the same location from time to time.

Released in April 2007, the IPCC's 4th Assessment appears to have provided the "tipping point" for governments and many corporations to accept that climate change is a real threat to societies and ecosystems. The global climate has already warmed 0.74 °C since the beginning of the twentieth century. Adaptation concerns are based on the identification of likely impacts of global warming at national, local and household levels and they are increasingly focusing on the development of both proactive and reactive coping mechanisms to soften, if not avoid, those impacts.

The World Bank presents the importance of adaptation in the following way:

> *Developing countries, and particularly the poorest people in these countries, are the most vulnerable to the adverse impacts of climate variability and ongoing and projected climate change. Their economies depend heavily on climate-sensitive sectors such as agriculture, forestry, fisheries, a reliable water supply, and other natural resources. They are generally hindered by limited human capacity and limited access to technology and capital to invest in risk reduction… Thus it is imperative that climate change adaptation is not separated from other priorities but is integrated into development planning, programs and projects (World Bank, 2008).*

Recently, unsustainable development practices for bioenergy production have been recognized as an additional threat and may have an impact on the goal of achieving food security. FAO, in its report on "Food, Energy and Climate: A New Equation" underlined the need to think of food, energy and climate as one interconnected issue.

> *For millennia agriculture supplied three things: food, fodder and fibre, and played a part in shelter too. Now energy has been added to the list, even if wood has always been used for that purpose. With oil prices near all-time high, governments are supporting the production of biofuels such as ethanol and biodiesal from crops previously grown for food, fodder and shelter. This is helping increase the price of food. (FAO, 2008; [ftp://ftp.fao.org/docrep/fao/011/i0330e/i0330e00.pdf])*

THE NEED FOR BASELINE DIAGNOSTICS

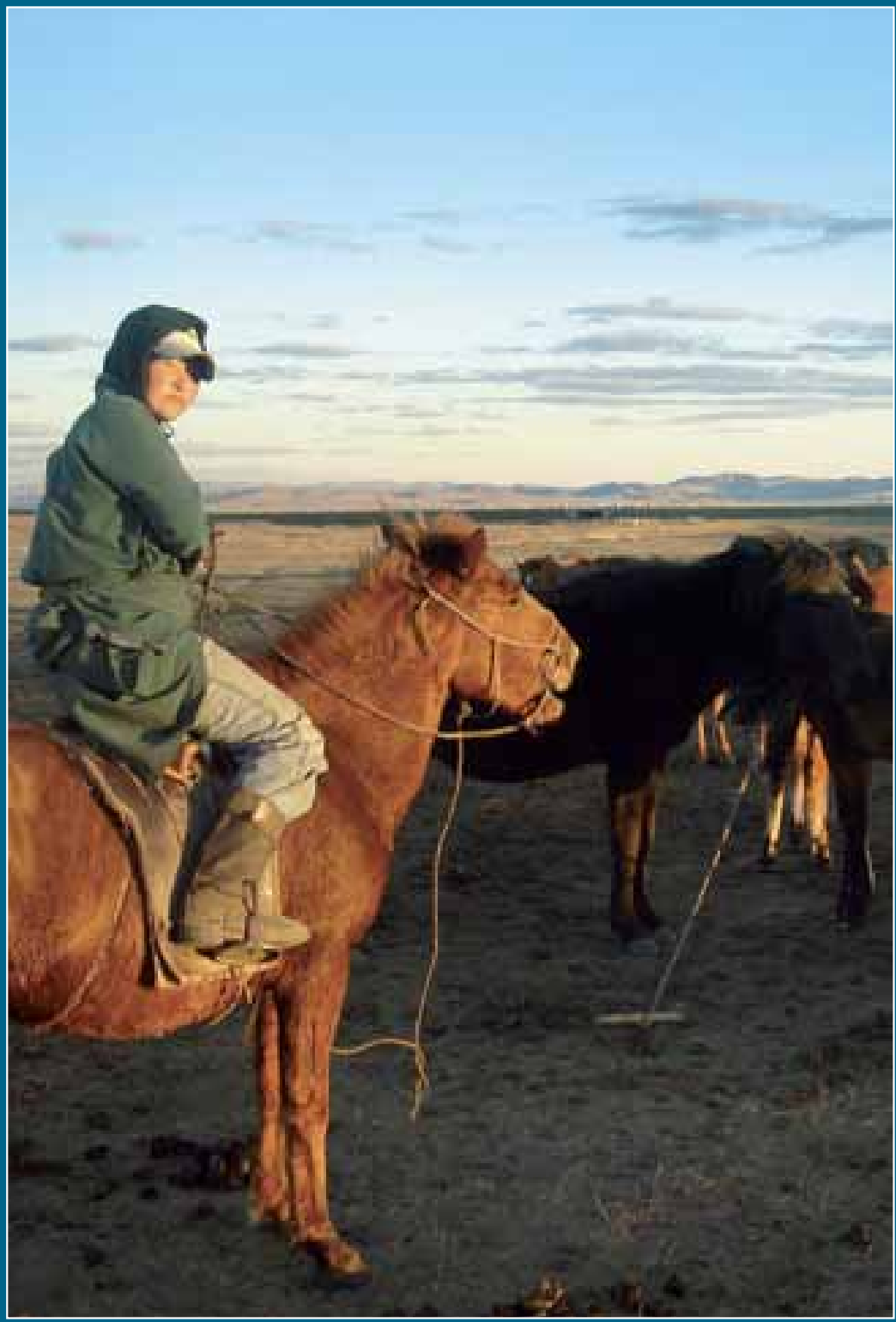
Policy-makers need information in order to make the most informed decisions possible. On a weekly basis, however, policy-makers constantly make decisions under uncertainty; that is, they typically do not have the luxury of having in-hand perfect information on which to base their decisions. With regard to the impacts of climate change on agricultural activities, considerable uncertainty remains about the intensity, duration, magnitude and location of impacts, but this uncertainty must not by itself be used as grounds for inaction.

The fact is that climate change-related uncertainties in decision making and Decision Making Under Uncertainty (DMUU) related to food insecurity will likely always exist. This is true because of limitations in our ability to fully understand and therefore predict climate events. Such limitations may become more pronounced as the climate system warms and its behavior becomes increasingly less predictable.

Baseline data are key to an improved understanding of the agricultural impacts of a changing climate and of the rates of change at which those impacts appear. Slow rates of change, for example, provide time for preparation and response, while faster rates provide less time for such actions. Problems will always exist, however, with data, statistics, lack of carbon-adjusted statistics, difficulties in modeling countries' "mitigation potentials," and the still-not-very-well quantified risks of genetic erosion and loss of crop diversity, especially as they occur on-farm. Filling the gaps in baseline data, therefore, is an important aspect of adaptation and mitigation efforts for agriculture and food security.

To facilitate this undertaking, every government needs to undertake a comprehensive, two-pronged assessment of its country's (1) vulnerabilities and (2) resiliencies (defines in this instance as adaptive capacity). Vulnerabilities seem to be relatively easier to identify than are resiliencies. For example, those mired in poverty – children, pregnant women, the infirm and the elderly – are already known to be most vulnerable to hazards and to food insecurity. The same type of assessment is needed for hazard-prone areas such as unstable hillsides, low-lying coastal areas, bushfire-prone areas, and so forth. Resiliencies can be either tangible (e.g. sea walls, effective state of the art early warning systems, available funds) or intangible (e.g. education, training, skills, awareness of risks, perceptive decision making). Assessments such as these can be extremely useful for identifying not-so-obvious vulnerabilities and resiliencies in a society's socioeconomic sectors. As such, there are no targeted activities completed and/or in progress in preparing "resiliency maps" for the vulnerable sectors.

An important aspect of resiliency mapping is traditional knowledge about food production and the nutrition efforts of the world's farmers and herders. Their tactics and strategies had evolved long before recorded history for coping both with variability as well as extremes and even for coping with abrupt as well as incremental change.



A LIVESTOCK HERDER IN TÖV IMAG, CENTRAL MONGOLIA

The natural disasters, known as dzud and drought, affect Mongolia on regular basis causing deaths of millions of heads of livestock and damage significantly the country's economy.