

# METHODOLOGY

## ● A - Definitions

**Gender analysis:** The study of the different roles of women and men in order to understand what they do, what resources they have, and what their needs and priorities are (FAO, 2010). This study uses gender analysis to document and interpret how men and women farmers perceive and respond to climate variability to ensure their livelihoods and food security. This report focuses on the gender roles and relations of husbands and wives, the primary decision-makers in the study households, while noting that gender roles are not static and are shaped over time by other differences such as age, class and caste.

**Climate variability and climate change:** Climate variability refers to variations in the mean state of the climate and variations in other statistics (such as the occurrence of extremes) on all temporal and spatial scales beyond that of individual weather events. The average range of temperature for a location, as indicated by minimum, maximum and average temperature values, is an example of a measure of climate variability. This differs from climate change which refers to a long-term change in the state of the climate and which is identified by changes in the means and/or changes in the variability, or changes in the frequencies or intensities of extreme events. This report describes climate variability at different points in time based on climatic data and also based on farmers' descriptions of "average weather" (what farmers call "average weather" is equivalent to climate variability). Farmers' descriptions are given equal footing to scientific measurements because documenting how farmers' frame the conditions they experience is crucial for understanding their responses to said conditions (Roncoli, 2006; Tschakert, 2007). This report refers to changes in climate variability without necessarily concluding that a permanent change has taken place (a state that would be referred to as climate change).

**Coping and adapting:** The study distinguishes between farmers' short-term and long-term responses to climate variability and food insecurity. It defines short-term responses to a decline in food availability and income in abnormal years as coping or coping strategies, and defines longer-term or permanent changes in the ways in which food and income are acquired as adapting or adaptation strategies, after the work of Davies (1993). Although this study does not present a detailed analysis of the components of adaptation that are explored in the climate change adaptation literature, such as "adaptive capacity" and "vulnerability" (e.g. Kelly and Adger, 2000; Smit et al., 2000), the findings are fully applicable to the broader climate change adaptation discourse.

**Farmers:** This is the term used to refer to the participants in the study, although their livelihoods are no longer based solely on farming due to a combination of economic and environmental trends. They are producers but also wage workers when needed. Also, despite the fact that in the study area, women who do not own land are not considered to be “farmers”, here they are referred to as farmers because they engage in many agricultural activities and define themselves as such.

**Food security:** According to FAO, food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2006). There are four components of food security: availability, access, utilization and stability<sup>12</sup>.

## ● B - Research objectives

1. To characterize the local climate conditions and risks, to identify trends in climate variability over the past four decades (according to recorded data); to compare how recorded data corresponds to men and women farmers’ perceptions.
2. To understand how men and women in farm households perceive and experience climatic shifts and how this is linked to food security.
3. To identify the coping strategies that men and women farmers utilize in order to ensure a measure of food security in response to climate variability; to understand the resources and decision-making processes utilized, and to assess the related outcomes for food security.
4. To identify the institutions that support farmer decision-making with regard to climate, agriculture and food security and to assess the extent to which institutional support is available, accessible and usable by men and women.
5. To develop a replicable methodology for examining the gender dimensions of farmer responses to climatic variability and change.

## ● C - Description of the study area

Six villages in two drought-prone districts of Andhra Pradesh were chosen to examine men and women farmers’ responses to climate variability, particularly conditions of drought, to secure their livelihoods and food security. The districts of Mahbubnagar and Anantapur were chosen as they are historically drought-prone, and would thus have a long-term record and farmer memory on which to draw (Figure 1). Both districts rely considerably on rainfed agriculture and face development challenges. Mahbubnagar is known for a

high level of drought-induced migrant labour while Anantapur has both drought mitigation and anti-desertification measures.

In each district, three villages were chosen in consultation with the local project partner, Samatha Gender Resource Centre (a unit of Andhra Pradesh Mahila Samatha Society)<sup>13</sup> which is active in the villages, and local officers of the Department of Agriculture. In each district, two low income villages with limited natural and financial resources, and one receiving more resources and support from government schemes were selected. All of the villages were within 5 to 15 kilometres of the local administrative headquarters. Neither FAO nor other international organisations had had projects there so foreign development interventions do not play a role in the villages, although government interventions are present. The following villages were part of the study: Ankilla, Rampur and Malkapur in Mahbubnagar district and Abbedoddi, Isurallapalli and Jakkalacheruvu in Anantapur district.

**Figure 1.** Map of India showing approximate location of study districts.



Map source: Google Earth



**Mahbubnagar is drought-prone, with single cropping of sorghum, castor and maize**

Farmers in drought-prone Anantapur district are dependent on dryland agriculture for their livelihoods. In the past they cultivated a relatively high number of food crops for household consumption (sorghum, pigeon pea, castor, minor millets, horsegram) as mono crops or mixed cropping with more than two crops at a time in the same field. Farmers in the region have adopted new crops and cropping practices over several decades and now groundnut is the major cash crop grown during the monsoon season mainly with the objective of securing income for household expenditure<sup>14</sup>. Sowing normally takes place at the earliest opportunity from May to June and so the rainfall during the entire period from May to November is utilized. In addition to groundnut, rainfed farmers in the study villages in Anantapur also grow red gram, green gram and sesame, while farmers with borewells for irrigation water also grow rice, chillies, tomatoes and sunflower. The key farming operations (ploughing, sowing, weeding, harvesting) depend on the rainfall pattern and consequent soil moisture content. Anantapur has a highly variable rainfall pattern and groundnut productivity is often negatively impacted by this variability.

Mahbubnagar district is also drought-prone and agriculture there is mainly rainfed, single cropping of sorghum, castor and maize. Farmers in the study villages in

- 14 **Farmers in a changing climate does gender matter?**

Mahbubnagar report growing groundnut, castor, sorghum finger millet, horse gram, red gram, green gram, and sesame, while those with access to irrigation also grow rice. Seasonal rainfall has a significant influence on the yield of the crops. However, technology plays an important role in the yield of sorghum; in the mid and late 1990s, the yield of sorghum exceeded expectations given the amount of rainfall and this was attributed to varietal and technological advancements which facilitated farmers' tasks; the impact of technological improvements needs to be dealt with in a separate discussion as it is outside the scope of this paper.

Borewells were introduced in all of the study villages in the 1980s, along with increased mechanization and a shift toward fertilizer and pesticide use. In recent years the water table has declined significantly so many of the existing borewells are now of little use and even those farmers with a borewell depend on rainfall for irrigation. Women are responsible for collecting water for drinking and other uses, while men are responsible for watering the crops.

#### ● D - Description of the study participants

The results presented here draw on the accounts of over three hundred men and women farmers who participated in this study (201 in the quantitative survey and approximately 100 in the focus group discussions). The participants in the quantitative survey and focus group discussions were drawn from the same portion of the local population according to the following criteria:

##### **Farmers:**

- 1) With land holdings below 5 acres**
- 2) Rely primarily on rainfall**
- 3) Age between 40 and 69 years old**
- 4) Live in a household with at least 10 years engagement in farming**

This population was chosen as the focus as it is particularly vulnerable to climate variability and long-term change because with small land holdings there is limited scope for diversifying crops in the face of climate variability and their highly variable water resources expose them to uncertainty in their on-farm production. Such farmers have little margin of error in their high input cost farming systems, and often need to take loans to cover farming costs, to make up for shortfalls in yields, or to be able to purchase food for their families: a potentially precarious financial situation. A broad age range of respondents and a requirement to have at least 10 years in farming were used to ensure that those with longer memories and substantial experience would contribute their experiences to the study.

Male and female heads of household from 95 households each responded to the quantitative survey<sup>15</sup>, for a total of 190 individual respondents. Views from members of the same household were collected to control for variability between households and to isolate the gender dimension. In addition, 11 female heads of households took part<sup>16</sup>. Almost all of the respondents were from households that owned rainfed land (95 percent), while some respondents, 42 percent, owned some irrigated land in addition to rainfed land. For further details on the participants, see Annex I.

## ● E - Data sources and analytical methods

**Climate analysis:** The first step in the research was to conduct an analysis of climate indicators for the key crops in the region to characterize the climate variability and trends of the past four decades (note that the available climate data allowed for an analysis of the past fifty years of climatological trends, but the farmers' descriptions go back forty or thirty years). Climate data for Anantapur and Mahbubnagar was provided by Acharya N.G. Ranga Agricultural University (ANGRAU), Hyderabad, India. Daily rainfall and temperature data for Anantapur and seasonal rainfall totals for Mahbubnagar were used for this analysis.

**Focus group discussions:** To elicit information on men and women's perceptions of climate variability, the impacts on their livelihoods, and their coping strategies for dealing with food shortages, a series of tools were used in focus group discussions with separate groups of men and women in each of the six villages. See Annex II for a description of the qualitative tools used.

**Key informant interviews:** In order to map the institutional context in which farmers make their decisions and to cross-reference information provided by farmers, key informant interviews were carried out with representatives of institutions in the two districts and at state level.

**Survey of individual farmers:** To quantify the trends described in the focus group discussions, an extensive questionnaire was developed. The questionnaire was administered to a representative, but not random, selection of 201 men and women farmers, about 50 from each of four different villages. For more on the survey, including the questionnaire used, see Annex III.

