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Farmer Literacy Practices: A Comparative Study of Farmers in Kurnool District of Andhra Pradesh, India

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Farmer Literacy Practices:

A Comparative Study of Farmers in Kurnool District of
Andhra Pradesh, India



Master's Project

by

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DEDICATION

To David W. Kahler. David, I vividly remember the summer of 2003 when we did the first training for the APWELL Project staff at Muthyalapadu.

The Farmer Water Schools is an outcome of that effort.

The time and energy you spent training colleagues in the field across several countries is laudable. I am a beneficiary of that generous gesture.

May God bless you. Wish you a speedy recovery.

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A special thank you to all those whose support and friendship helped me to stay focused on the Master's program and provided me with the encouragement to pursue my study.

ABSTRACT

The goal of the study was to understand farmer literacy practices, and how farmer participants perceive the usefulness of Farmer Water School (FWS) training. Studying the farmer literacy practices was to help identify farmer friendly methods, and design effective messages for dissemination on crop choices, decisions, and sustainable groundwater management. To understand the usefulness of FWS training to farmers, a comparative study of FWS participants and non-FWS participants' perceptions on crop-water management, crop choices, and agriculture practices was undertaken. The study focused on the farmers of Kurnool district of Andhra Pradesh, India.

The research questions driving this study included:

1. How do farmers use literacy for crop-water management and crop choices?
2. How do farmers, completing the Farmer Water School training view the usefulness of information they learned about groundwater management?
3. How have farmers adapted the information in their daily lives that they learned in the Farmer Water School training?

In Chapter One, I discuss the rationale of the research. I briefly present my experiences of working in two different settings. One, designing and implementing literacy programs for illiterate rural women and second, providing assistance in the implementation of Farmer Water Schools – a participatory approach to groundwater management. I also, discuss my assumptions about literacy and the rationale for undertaking this research.

In Chapter Two, I discuss the research context. First, I discuss the literacy scenario in India and the literacy statistics at the national, state and the district level. I also discuss the

Indian agriculture scenario, farmers' increasing dependence on groundwater, changing rainfall patterns, and the need for sustainable management of groundwater. Later on, I present the APFAMGS projects ongoing efforts to enhance the ability of farmers, water user groups, and communities to manage their groundwater resources in a judicious and sustainable manner.

In Chapter Three, I discuss the use of case study research, data collection methods, field experiences in doing the research, and my location in the research.

In Chapter Four, I use the findings to discuss the research questions. Chapter Five focuses on conclusions and implications. The findings can be summarized as follows:

- Farmers use various means to record the transactions. Most of them calculate orally or mentally and can recollect transactions of the entire crop-season. Illiterate farmers seek the help of other literate members in their community to cope with the day-to-day needs.
- Use of small learning groups in Farmer Water Schools (FWS) appears to have been an effective learning strategy to cope with the varied literacy levels of the farmer participants.
- Farmer Water School (FWS) participants reported that they monitor water levels in their borewells and collect rainfall data to forecast water availability. They use this to make informed decisions about crop choices.

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1. INTRODUCTION

Literacy and Farmers

Over the years, I have used nonformal education to design curricula and develop materials, for adults, adolescents, and out of school children. I coordinated the implementation of the Women's Empowerment through Literacy and Livelihood (WELLD) Project in the state of Andhra Pradesh, India. I also provided assistance on similar initiatives in other states of India. Interacting with adult illiterate women, I became aware that lack of literacy skills undermined their abilities to optimally utilize opportunities for growth. Illiterate men/women often must depend on others to manage their transactions. I have heard of several instances in the past that moneylenders and landlords exploited or cheated people's inability to read and write.

From my experience working with new literacy learners in India, I have learned that one of the immediate learner outcomes from participation in adult literacy programs is application of the learning to day-to-day life. Within a few weeks into the literacy program, participants proudly shared that they were using the newly acquired skills to write a shopping list, read newspapers and other printed material. Also, they were using numeracy skills to check the price labels, weights and measures, and to confront the local retailer for charging excess prices or using wrong weights. I also recollect a group of participants (daily wage earners) from the WELLD project in Andhra Pradesh, India, sharing that they were able to cross check the contractors' tabulation of their daily wage and point out the mistakes. The ability to read and write helps one become better organized as one can record or keep a journal and also keep track of time (days and months) and events. Participants usually use their newly-acquired literacy and numeracy skills to record market and business transactions

as well. This is critical for livelihood improvement. Bown (1990) aptly summarizes this by stating that the time span for behavior change can be much shorter among adult learners (as compared to children who attend schools), since adult participants are already fulfilling adult roles in the society and, hence, the application/transfer of the learning to their day-to-day life happens immediately (Lauglo, 2001, p. 19).

WELLD participants also shared that, realizing the importance of literacy, they took keen interest in enrolling their children in school, especially their girl children. This suggests that adult literacy programs complement efforts to ensure universal primary education -- both access to and retention in schooling (Lauglo, 2001, p. 16). Further, they gained confidence to express/ articulate their opinions and worked to address their issues and concerns. They participated more actively in local government body elections. Some of the participants ran for and were elected to local bodies -- Village Heads (Sarpanchs), Education Committees, Mother's Committee, etc. Literacy skills are fundamental to informed decision making, personal empowerment, and both active and passive participation in the local and global social community (Stromquist, 2005, p. 144).

I have always held that, in a world that is progressively becoming literate, the illiterate population can neither effectively contribute nor actively participate in the development process. Reading, writing, and numeracy skills are critical to make a reasonable living, participate in the economic and political process, and contribute to societal development.

At the same time, over the past four years, I have been coordinating World Education's efforts to assist the Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project to provide assistance in the implementation of Farmer Water Schools

(FWS). The APFAMGS Project covers about 650 villages in seven drought prone districts of Andhra Pradesh, India, and aims to enhance the ability of farmers, water user groups, and communities to manage their groundwater resources in a judicious and sustainable manner. The Project engages all water users in a given Hydrological Unit¹ (HU) in judicious use of groundwater. To reach a large number of farmers, tap their existing knowledge and skills, and create a discovery and experiential learning environment, the APFAGMS Project adopted the Farmer Water School (FWS) approach. FWS is an adaptation of the Farmer Field School (FFS), described below.

Farmer Field School (FFS) is a participatory approach to agriculture development initiated in the late 1980's by the Food and Agriculture Organization (FAO) of the United Nations. Its over-arching purpose is to enable small scale farmers to make a choice in methods of production through discovery learning. In FFS, a group of farmers with common interests get together on a regular basis to study the “how and why” of a particular factor affecting crop production (Gallagher, 2003).



A



B

FWS Participants observing & discussing (A) plant parameters, & (B) HU Map

¹ The area drained by a river system.

In a Farmer Water School (FWS), a group of men and women farmers belonging to one Hydrological Unit (HU) come together to explore and discuss the various factors influencing groundwater availability. They conduct field based experiments on crop-water management. The discovery learning process enhances their understanding of the HU and enables them to make informed decisions about crop-choices and crop water management practices. FWS participants observe and analyze groundwater availability and crop-water requirements, discuss the situation with co-farmers, and make collective decisions. Farmer Water School uses the hydrological cycle as its basis. Farmers meet once every 15 days, from June through May, to discuss groundwater management concepts – namely, availability of water resources, their impact on crop growth, role of institutions in sustainability, and gender equity.

Estimation of groundwater recharge, draft, and balance requires complex calculations. Recharge is the process by which groundwater is replenished. Recharge happens because of rain, surface water reservoirs, and sub-surface movement of water. The rate of recharge of a given place is dependent on the soil profile, rock structures, and its area. Groundwater draft is the amount of groundwater extracted for irrigation or other consumption purposes. Groundwater draft of a given place is dependent on its area, number of borewells², borewell yield, and hours of pumping. Groundwater balance is calculated by deducting the groundwater draft from the recharge. This estimation helps farmers make informed decisions on the crops to be sown. I have always been amazed by the keen interest and sense of ownership of farmer participants in the Farmer Water Schools (FWS). However, I wonder how some of the semi-literate and illiterate participants are able to grasp

² Tube wells.

these concepts and cope with the calculations. My discussions with project staff and the brief interactions with farmers always gave positive feedback about the impact of the work.



FWS Participants measuring: (A) water levels in borewell, (B) discharge rate, & (C) rainfall data

Currently, the APFAMGS Project (i.e., the partner NGOs) is making efforts to build capacities of farmer institutions (GMCs and HUNs³) to coordinate and manage ongoing FWS activities for sustainable groundwater management. The project also intends to work with farmers to build their capacities to cope with the consequences of climate change. Further, farmer facilitators have expressed a need for further simplification of farmer training materials on groundwater concepts. This would enable them to disseminate key messages on sustainable crop-water management to a larger audience. To further demystify the concepts, I believe we need to gain a better understanding of farmer literacy practices. This effort, apart from addressing current farmer training needs on groundwater management, will also help address farmer information needs on climate change.

³ Groundwater Management Committees (GMCs) are village level institutions of farmers – men and women. GMCs monitor and disseminate information on groundwater levels, rainfall, and discharge in their communities. GMCs deliberate on all critical issues related to water and agriculture during their regular monthly meetings. Several GMC's within a given hydrological boundary join together to form a Hydrological Unit Network (HUN).

The Study

The goal of the study was to understand farmer literacy practices, and how farmer participants perceive the usefulness of Farmer Water School training. Studying the farmer literacy practices was to help identify farmer friendly methods, and design effective messages for dissemination on crop choices, decisions, and sustainable groundwater management. To understand the usefulness of FWS training to farmers, I undertook a comparative study of FWS participants and non-FWS participants' perceptions on crop-water management, crop choices, and agriculture practices. The study focused on the farmers of Kurnool district of Andhra Pradesh, India. The study involved interviewing and observing:

- FWS farmer participants belonging to the Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project; and
- Farmers (non-FWS participants) from adjoining mandals⁴ with similar groundwater situation.

The research questions driving this study included:

1. How do farmers use literacy for crop-water management and crop choices?
2. How do farmers completing the Farmer Water School training view the usefulness of information they learned about groundwater management?
3. How have farmers adapted the information in their daily lives that they learned in the Farmer Water School training?

⁴ Administrative unit in a district.

More specifically, the inquiry focused on:

- How do farmers go about their daily lives? How do they handle literacy in the various tasks that they do? For example, how do farmers document the various purchases they make to grow crops; tabulate the various expenses incurred towards agriculture; estimate expenses incurred towards hiring laborers; record yield and income/ profits earned; document loans raised from various sources; and perceive measurements – land area, depth of water, rainfall, quantity of water required for a crop?
- Does lack of literacy skills, as we define them, handicap farmers' ability to manage their daily lives? If so, what are their coping mechanisms or strategies?
- How did FWS participants 'take hold of' the knowledge and skills gained from participation in FWS and adapt it to their daily lives? What do they like about the current training or implementation strategies and to build on them?
- How do FWS participants and non-FWS participants go about crop choices, crop-water practices, water conservation practices, and agriculture inputs?

The goal has been to learn from the farmers. Understanding the 'knowledge-in-use' will likely contribute to "informed practice" (Street, 2001, p. 2). By doing so, I choose to start from where the farmers are rather than where I wanted them to be. This stance will inform my ideas and actions for future next steps in the process of training farmers. Further, the results of this investigation/ study may well contribute to improved educational interventions and training about climate change and water resource management for farmers in India.

2. RESEARCH CONTEXT

Literacy in India

India has the dubious distinction of having the largest number of illiterates in the world (UNESCO, 2006). Despite significant economic development and major strides in information technology, a sizeable population – over 35% – remains illiterate (UIS, 2005). According to the census (2001), the literacy rate is 64.84%. The distribution of literacy rates amongst men and women are 75.26% and 53.67% respectively. The literacy rates in Andhra Pradesh are below the national average. They stand at 60.47% for the general population and are 70.32% for men and 50.43% for women. In Kurnool district, the literacy rates are 54.43% for the general population, and 67.36% and 41.07% for men and women. The literacy scenario in rural areas compares adversely to urban centers.

Reducing illiteracy has been one of the major national concerns of the Government of India since independence. The ‘National Policy on Education’, drafted in 1986, aimed at achieving total literacy through a two-pronged approach of universalization of elementary education and universal adult literacy. The National Literacy Mission (NLM) was set up in 1988 to impart a new sense of urgency and seriousness to adult education.

The NLM launched a massive Total Literacy Campaign in the late 1980s which still continues. The program covers all the states in the country. In the initial years, it was able to generate much enthusiasm. Various art and cultural forms (kalajathas) were used to mobilize support for the programs. However, poor quality of materials, short duration of instruction, lack of proper planning, and bureaucratic delays undermined the program (Karlekar, 2004, p 149 & 171). In spite of various initiatives, adult literacy has not made much headway.

Indian Agriculture Scenario

Agriculture plays a significant role in the Indian economy. It provides employment to approximately 52% of the Indian population (Economic Survey, 2007-08, p. 155). The economic growth of the country is dependent on the performance of this sector. An increased growth in this sector will push the Gross Domestic Product (GDP) upwards and also make the growth more inclusive. Increasing farm incomes is also necessary for an equitable growth. Apart from that, high agricultural production is critical for domestic price stability and food security of the developing economy and burgeoning population. The onus of addressing the growing demand for food grains lies on the farmer. However, the majority of Indian farmers are small and marginal land holders with farming plots of less than two hectares. The ability of these farmers to absorb the shocks of crop failures is minimal.

The Planning Commission Expert Group report on Groundwater Management and Ownership (2007) observed that more than 55% of all irrigation water needs are met from groundwater, and more than 80% of all rural water supplies are groundwater dependent. Additionally, all the rural cottage and small-scale industries are dependent on groundwater (Parikh, 2007). This has forced more farmers and rural water supply agencies to invest huge sums on dependable irrigation sources in the form of drilling of tube wells. It is estimated that currently there are over 26 million borewells (tube wells) in the country (Mukherji & Shah, 2005, p. 54). More than 15% of these structures have been abandoned due to lowering of groundwater water levels or deterioration in groundwater quality. Another 15% of the wells are functional only for 3-6 months in a year. Over-exploitation of groundwater is thus a matter of great concern.

The sustainable management of water resources is an issue of increasing importance, especially in drought-prone areas of various Indian states, such as Andhra Pradesh (AP). In recent years, the emphasis has been on sustainable management of groundwater by various stakeholders. A dwindling resource base and escalating population growth are the primary reasons for increased demand for groundwater. Augmenting the supply through improved recharge (supply-side management), and judicious use of available water (demand-side management) are two ways of addressing the current situation.

An issue that is of increasing concern to the farmers is the changing rainfall patterns. Changes in rainfall patterns can have a detrimental effect on the agricultural sector. Scientists predict that the present fickle weather conditions can become more unpredictable due to climate change. Agriculture will not only be affected by an increase or decrease in rainfall, but also by a shift in the timing of rainfall.

The Intergovernmental Panel on Climate Change (IPCC) predicts a temperature rise of 1 to 2.5° C by 2030. Consequently, rainfall patterns will change, contributing to severe water shortages or flooding (FAO, 2008). Changing rainfall and temperature patterns will also result in increased land degradation and soil erosion, changes in water availability, biodiversity loss, more frequent and more intense pest and disease outbreaks, as well as disasters. Apart from that, rising temperatures and changing rainfall patterns will cause shifts in crop growing seasons. Food production could fluctuate rapidly because of changes in suitability or availability of arable land and water, and inability of crops and animals to adjust to climatic changes. Small scale rain-fed farming systems could be particularly vulnerable to climate change. Since small and marginal farmers constitute close to 80% of

the farmers in India, their inability to cope with consequences of climate change could adversely affect the stability of food supply and access to food in the country.

Adaptation, which involves either moderating the harm or exploiting the beneficial opportunities of climate change, is the immediate concern, and it needs to be local and location specific. Effective adaptation strategies should tap the body of knowledge within local communities on coping with climatic variability and extreme weather events (FAO, 2008). This indigenous knowledge and local coping mechanisms could be used as a baseline and starting point for adaptation planning. Further, adaptation planning should take into consideration that climate change impacts will change over time.

Efforts to Assist Indian Farmers

The Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project is a Nationally Executed (NEX) Project of the Food and Agricultural Organization (FAO) of the United Nations implemented in the southern state of Andhra Pradesh, India. The project is being implemented by a federation of nine NGOs. Bharathi Integrated Rural Development Society (BIRDS) acts as the thematic and administrative leader of the coalition.



The project covers about 650 villages in seven drought-prone districts of Andhra Pradesh

(South India): Anantapur, Chittoor, Kadapa, Kurnool, Mahabubnagar, Nalgonda, and Prakasam.

The APFAMGS project aims to address the issue of groundwater depletion using the demand-side approach to management of groundwater. The Project is working to enhance the ability of farmers, water user groups, and communities to manage their groundwater resources in a judicious and sustainable manner. Towards this end, the project uses an integrated multi-disciplinary approach, addressing hydrological, agro-technical, institutional, and social aspects of village life and livelihoods.

To increase farmer ownership of the process and enable effective collection and management of crop-water data by the farmers, the APFAMGS project adapted the Farmer Field School methodology to groundwater management. The Farmer Water Schools (FWS) use a discovery and experiential learning process, tap into the existing knowledge and skills of the farmers, increase farmer ownership of the process, and reach all the farmers in a given Hydrological Unit. FWS participants are involved in the identification of appropriate content for local needs. They are also involved in the identification of methods, design, and development of materials and models to demystify groundwater concepts. The composition of participants in a Farmer Water School (FWS) is a mixed group of literates, semi-literates, and illiterates. The challenge is how to cater to the needs of the participants with varied literacy levels.

The study developed an understanding of farmer literacy practices. Farmers use varied methods and skills (literacy practices) to estimate, record, and analyze information in their daily life. They use these skills to make decisions on crops by forecasting yields, profitability, and estimating groundwater availability. Knowledge of these farmer literacy

practices will be helpful to identify farmer-friendly education and training methods, and to design effective messages for dissemination on crop choices, decisions, and sustainable groundwater management.



A handbill preserved for future reference.



Farmers reading news and discussing politics



Pictures from the weekly market

3. METHODOLOGY

CASE STUDY RESEARCH

For the research, I conducted case studies of eight farmers to learn and understand their literacy practices. The purpose and scope of the study falls within the domain of case study research. Yin defines case study research as an “empirical inquiry to understand contemporary social phenomena within its real-life context” (1994, p. 13). In-depth study of particular cases helps understand larger social phenomenon (Rossman & Rallis, 2003, p. 104). Apart from giving the researcher the “flexibility” to study the “case” and the context as they unfold, it also enables the researcher to “retain the holistic and meaningful characteristics of real-life events” (Yin, 1994, p. 3).

Definitions of case study research differ. Stoecker (1991) and Yin describe case study as a “comprehensive research strategy” that includes design, techniques of data collection, and data analysis (1994, p. 13). On the other hand, Stake (2000) describes case studies as an “overall strategy rather than a genre of research” (cited in Rossman & Rallis, 2003, p. 104). According to Stake (2000), it is a choice of what to study rather than a methodological choice (cited in Rossman & Rallis, 2003, p. 105). Despite these differences, some generally agreed-upon common characteristics of case study research include in-depth research on a bounded system, use of multiple data collection techniques, and the significance of the context in the research (Yin, 1994). Apart from that, the depth of information collected, use of multiple sources, and the “thickness” of description provide the reader an opportunity to decide the relevance of the lessons drawn from the case to another setting (Rossman & Rallis, 2003, p. 105). For the purposes of this study, I refer to case study as a method or a form of inquiry.

DATA COLLECTION METHODS

I used multiple interactive and humanistic methods – in-depth interviews, discussions, observations, document analysis, and farmer training events – to collect data for the study (Rossman, & Rallis, 2003, p.9).

I used the aid of the Bharathi Integrated Rural Development Society (BIRDS) staff to identify the research participants and get the necessary introductions. I conducted in-depth interviews with eight farmers – four women and four men. Of these eight farmers, four were FWS participants (APFAMGS Project participants) and four were non-FWS participants from habitations with similar groundwater conditions. Also, I observed them in varied rural settings. Further, I observed and made note of the varied literacy practices of these farmers. Apart from that, I accessed different documents that the farmers keep, newspapers – national and local language dailies, relevant documents of the APFAMGS Project, materials on climate change, food security, and literacy practices.

The study involved ‘meeting’ these farmers face to face over an extended period; listening to them, taking in what they do as well as what they say. The process I adopted was to simply take a case and ask ‘what does this case teach me?’, ‘what is it a case of?’ However, it is not that there is no structure for the study. My interest lay in developing a deeper understanding of farmer literacy practices. This will then help design future interventions and training which take cognizance of farmer abilities.

My stance as a researcher was to be open to learning and developing deeper understanding. For this, I had several conversations and observed the farmers in various settings. I was mindful of letting the research participants lead the conversations and let

them talk about what was important according to them, rather than what was important for me, as the researcher. My role was more of one who sought to understand and learn. Simple questions like – what, why, where, and how lead my inquiry.



Farmers sowing seeds – Traditional ways



Modern farm equipment

DOING THE STUDY

Here, I discuss the general ethical issues that I encountered in the study, based on the main questions raised by Rossman and Rallis (2003, p.73): gaining participation through clarifying consent and the voluntary nature of the study, ensuring the privacy and confidentiality of the research participants, and building trust through collaboratively deciding on the time and location of the interviews.

Research Colleagues

Two other colleagues, Y. Sudhakar and G. Nagaraju, working on the APFAMGS Project assisted me in identifying research participants, establishing contacts, and traveling with me to meet with the research participants. Y. Sudhakar is an employee of World Education AP, and G. Nagaraju is an employee of BIRDS, a partner of the APFAMGS Project. One of the two always accompanied me to meet with the farmer participants. We engaged ourselves in discussions about the participants while driving to a village to conduct an interview or observation. On our drive back, we reflected about our observations and experiences in the field. I maintained a scrap book to jot down observations and reflections. They also assisted me in reviewing the field notes that I maintained. Also, engaging in reflective writing at different points of the study helped document the experiences, challenges, and organize the information collected using different methods. Apart from giving more insights into the topic, this exercise helped me to be more engaged and immersed in the study (Richardson, 1994, p. 516). These colleagues and I created a “community of practice” for discussing issues in the study. They shared with me that it helped them develop a better understanding of how research is conducted. Both of them requested that I disclose their identities. They believe it would bring them recognition for the

role they played in the research. Revealing their names is my way of acknowledging their contribution.

On most days, we started off early and got back late in the evenings. The travel to the villages and back consumed a lot of time. I was tired by the evening as it was an intense amount of time spent in discussions, observations, and reflections. Despite being persistent, it was difficult to keep field notes regularly. However, keeping the scrap book was very helpful. “Learn to trust the process” and “learning by doing” are the two principles that guided me through the data collection process in the field (Rossman & Rallis, 2003, p. 25).

In addition to these two colleagues, one farmer, a project participant, was curious about the research. He hopped into the vehicle and decided to join the team. He became an important resource in identifying research participants, helping me understand the socio-cultural nuances, and literacy practices. He gave me a tour of the weekly market. In spite of me being a local person, interacting with the farmer was a good learning experience. He was a very useful resource.

Selection of Participants

I had a meeting with the Bharathi Integrated Rural Development Society (BIRDS) staff to share the purpose of my visit and the focus of the study. I had already contacted them by phone and shared the outline of the visit and purpose of the research. They had prepared a list of *project farmers* to be interviewed. We first discussed the characteristics of the research participants. I stressed the importance of doing case studies of farmer participants of lower socio-economic strata and with minimal literacy levels. We then revisited the list to identify farmers who suited the criteria we had laid down. As we progressed in the study, we identified additional farmers based on the identified criteria.

To identify non-FWS farmer participants for the study, we identified villages in the same district with similar groundwater situations. We then identified village contacts. They were either old acquaintances or referred to by friends. We contacted them and shared with them the purpose of the research. After they agreed to cooperate, we discussed a mutually convenient time to visit the village. We also discussed the characteristics of interviewees. The village contacts agreed to identify a few prospective interviewees based on our discussions. We visited the villages at a mutually agreed time. The village contacts were mostly present when we reached the village. This was an acknowledgement of their support to our work.

I interacted with more farmers than required for the study. This helped me develop a better perspective on the broad themes emerging from the interviews and observations of individual case studies. For the purposes of the study, I used case studies of eight participants – four women, and four men farmers. Three of the four women farmers whom I interviewed for the research are illiterate. The fourth woman was literate in Urdu. Of the four men farmers, two are literate, and one is a semi-literate. Considering that these farmers were chosen randomly, it reflects the prevailing gender dynamics in literacy in rural AP.

Interview Locations

We conducted the interviews either at or near the homes of the interviewees or in their fields. At their homes, we sought their permission to take photographs of them and their family members. We also requested them to show us around their homes and share any kind of written materials / documents that they kept as records. This helped us develop a better understanding of their literacy practices. Thus, we were present in their (research participants) “natural settings” and had the opportunity to triangulate the information using

multiple sources (Rossman, & Rallis, 2003, p. 69). I did have some hesitancy in asking farmers to show their homes, especially when I had to request interviewees whose religion was Islam. I know them to be conservative and not open to letting strangers observe their homes. But, I decided to go ahead and ask them even if that meant getting a 'no' for an answer. However, except for one farmer participant, everyone else invited us to their homes. They introduced their family members and showed us their homes. The one farmer, whose home we didn't visit, said that there was nothing to observe and that only he and his wife stayed there and they had no children. I empathized with him. I imagined the socio-cultural pressure he and his wife must be facing in their daily lives. But, he was very open in showing his farm and discussing crop patterns, crop-water management, marketing issues, and literacy practices.

We asked the farmer participants to let us know a convenient time to visit their farms/ fields to observe the crops. In the month of July, research participants remarked that there were no standing crops because of the delayed monsoon. I revisited these participants in the third week of August. In most fields, the seeds had just sprouted. However, the research participants were very eager to show their fields and discuss issues around crop-water management.

In one instance, the local leader suggested that we conduct the interview in his presence. The interviewee was standing with his hands folded while we were seated in comfortable couches – a typical scene in a “high power distance” culture (Hofstede, & Hofstede, 2005). I gently told the local leader that I needed to visit and observe the farmer's field and that observing the field and home of the farmer would bring up more questions in my mind. He indicated that he wanted me to be comfortable. I wonder if this leader

imagined that a city-bred and an international student like me would find it difficult to walk in the fields and sit down on the ground to converse with the farmers.

Interview Issues

It was relatively easier to identify and interview FWS participants than non-FWS participants. My colleagues have regular interactions with the FWS participants. They were understandably more cooperative and forthcoming in sharing their experiences, since they had participated in a year-long Farmer Water School. In such situations I only had to ask a few key questions to the interviewees and the stories unfolded on their own (Riessman, 1991, p. 234). This natural unfolding of the stories did not happen with the non-FWS participants. The first challenge was to break the ice and overcome the non-project participant's defensiveness. While interviewing them, I often received very brief or monosyllable responses to the questions. As Kellehear points out, I wondered if this was a polite interrogation (Guillemin & Gillam, 2004, p. 271). As it was an open ended interview, I had to constantly 'think on my feet'. It was a challenging experience. As I listened to those difficult scenarios on the tapes, to transcribe the interviews and draft the case studies, I could sense the muscles in my body tightening. It is a fascinating experience. Gould rightly states interviewing as "a gutsy human enterprise, not the work of robots programmed to collect information" (Riessman, 1991, p. 233).

The FWS participants were also more buoyant and appreciative of the impact of the project. They could be exaggerating some of the successes. For example, here is an excerpt of one of the Farmer Water School participant's interview.

I have complete faith in this practice and am confident that I can grow paddy even in four or five acres. I am confident. Think whatever you want, but I believe this practice is even more

useful considering the power cuts. I am confident of growing the crop even if the bore well pumps water only for one hour in the night. I believe in this.

– *Karim, male farmer, FWS participant*

On the other hand, non-FWS participants sounded more pessimistic. They could have perceived the study as a needs assessment exercise of a forthcoming initiative.

Presenting a bleak picture could be a strategy to attract the future initiative to their habitations. Here is an excerpt from a non-FWS participant:

We made good profits by growing banana, turmeric, sunflower etc. So far things have gone well. From now on, I don't see things going well. In spite of all the precautions we take, we are incurring losses in growing turmeric, banana, or paddy. The expenses are increasing and the investments are going up. We are slowly getting into debts. In the past two years, new strains of crop diseases (or pests) are appearing.

– *Abdul, male farmer, non-FWS participant*

I could not finish all the interviews before I left India. I was falling short of one lady farmer from the non-project area. I have shared earlier the challenges in interviewing lady farmers. My colleague, Sudhakar, graciously agreed to conduct the interview. He had been present with me throughout the study and had taken the lead in conducting a couple of interviews when I was having a sore throat. We discussed the questions and process over Skype. He followed the protocol and informed the participant of the purpose of the study, that participation in the study was voluntary, and used the informed consent before the conduct of the interviews and observations.

Informed Consent

I started each interview sharing the purpose of the study and elaborating the voluntary aspect of participation in the study. I enquired if they needed any clarifications (Guillemin & Gillam, 2004, p. 272). I then shared with them the informed consent. If they were illiterate, I either read aloud or encouraged their friends or relatives to read aloud the informed consent. I also shared with the research participants the norms of confidentiality

and that I would assign them pseudonyms. But, I would be using excerpts from their interviews to support my conclusions or findings. Accordingly, I have assigned them pseudonyms to mask their identities. After this, I asked them if they were willing to sign the informed consent.

Despite sharing that participation is voluntary and that they are free to withdraw at any point of time, once recruited, research participants might sometimes feel obliged to participate in the study. To address this “potential power imbalance between the researcher and the participants” (Etherington, 2007, p. 614), I reiterated the ‘voluntary’ aspect to the research participants in various interactions and during the progress of an interview. Also, I discussed their level of comfort before doing an observation. I had to abandon a few interviews as I sensed that the research participants were not comfortable. For example:

Field Notes 28th July 2008

After the farmers gathered and were seated comfortably, Sudhakar volunteered to lead the discussions. He introduced Nagaraju and me and shared the purpose of the visit to the farmers.

We shared with the farmers that participation in the study and the interview was voluntary. Farmers shared that they were willing to share their experiences. We said that we intended to interview prospective research participants individually as we wanted to learn from their individual experiences. We also showed the informed consent and Sudhakar read it out aloud. After reading it out aloud, we asked one of the farmers if he was willing to participate in the study and be interviewed. The first farmer said that he would speak after the others and suggested that I interview the farmer seated next to him. I shared with them that participation was voluntary. I also shared with them that I interview select participants based on their socio-economic. If they were not willing to participate, I would meet with other farmers with similar socio-economic situation and interview them. However, participation of any farmer in the study is voluntary and there is no element of coercion. At this point, one of the farmers volunteered to be interviewed.

The interview progressed smoothly. Later, he was open to us visiting his home and interacting with his family members. He even demonstrated his reading and writing abilities. He shared that he barely knows how to read. However, he cannot write other than his name. He learnt how to read by attending literacy center run in his village in the 70s.

I believe the hesitation of the earlier participant was in recording his interview and signing on informed consent.

Observer comments

I wonder how come farmers hesitated to sign on the informed consent when they sign on documents with cotton seed companies. These agreements are more elaborate and involve financial commitment.

This was the first time we had visited this village. The village head was related to an acquaintance of mine. He helped identify prospective interviewees. So, we wondered if farmers were wary of the political influence wielded by this local leader. We were very confused by the farmers' attitude. This was the first time we encountered a situation wherein, farmers refused to be interviewed after all the introductions and agreeing to participate in the study.

Collectively reflecting on the incident, we wondered if it would be helpful to access farmers through academicians or college students rather than through village leaders. But, how do we establish contact with local college students. How would we win their trust?

Field Notes 19th August 2008

As we reached the village, I requested Sudhakar to take lead in interviewing as I was suffering from sore throat and cold. I shared with Sudhakar that I would jump in wherever necessary.

After the farmers gathered and were seated comfortably, Sudhakar introduced me and shared the purpose of the visit to the farmers. He later shared with the farmers that participation in the study was voluntary. Farmers shared that they were open to sharing their experiences. He said that we intended to do individual interviews as we wanted to learn from their individual experiences. We showed the informed consent and Sudhakar read it out aloud.

We asked them if they needed any clarifications. Then, Sudhakar asked one of the farmers if he was willing to participate in the study and be interviewed. The first farmer said that he would speak after the others and suggested that we interview other farmers first.

At this point, I stopped the process and informed the farmer that participation was voluntary. I also shared with him that participants for the study are selected based on their socio-economic conditions. If he was not willing to participate, I will meet other farmers with similar socio-economic situation and seek their participation. I stressed participation in the study is voluntary and there is no element of coercion.

Observer comments

I wonder if I need to make repeated visits to each village and spend more time to develop trust and confidence of the farmers. I was encountering this problem for the second time. In both the instances, the villages and the farmers were not associated with the APFAMGS Project.

Women Farmers

Creating an environment wherein non-project women farmers felt comfortable and at ease was a challenge throughout the study. I requested a lady colleague or my wife to accompany me when interviewing non-FWS women participants. Despite this, it was difficult to make them comfortable and feel at ease. A probable reason could be lack of adequate privacy during the interview. Usually, other village folk were curious to know what was happening. This probably made the women participants all the more self-conscious and intimidated to speak with a group of onlookers watching them.

Field Notes 22nd August 2008

Aparna (my wife) traveled with me to assist during the interview. We believed that it would make the lady comfortable. We reached the village in the evening. On reaching the village, we went to the farmer's home. They asked us to be seated in the backyard of the house. The husband brought the lady for the interview.

At the outset, we introduced ourselves and shared the purpose of the visit. I then asked the lady if she was comfortable doing the interview. She answered in the affirmative. I read out the informed consent for her. I told her that I intend to record the interview as I would have difficulty remembering all the conversation. I told her that my wife would be holding the recorder. She nodded her head. As we started the interview, I sensed her discomfort. So, I reassured her that at any point of time she could ask the interview to be stopped or she could choose not to answer a particular question, if she found uncomfortable answering it. I again asked her if we could proceed with the interview. She nodded her head. I assumed that she was indicating for me to proceed with the interview.

While I was interviewing her, her husband and some of his acquaintances were present in the background and watching the process and the discussion. A few more ladies gathered as well. After a few questions, I realized that it was being difficult for her to continue with the interview. While answering a question, her eyes would move towards the women and then the husband, and she was very withdrawn in her speech. I stopped the process and enquired if she was comfortable. She nodded her head indicating it was ok. But, her discomfort was obvious. I paused for a moment and then one of the older ladies in the background started to respond to my question. At this point, the lady said that she would be back and left. After the older woman finished speaking, we waited for the younger lady to come back.

After a couple of minutes, her husband went to fetch her. They came back. It was obvious to us that she was not comfortable doing this. So, when the husband and wife returned, I said to the lady that I believe she is uncomfortable doing this and so we should not proceed. She nodded her head again. I decided to stop. I thanked her and said that I understand that she was not comfortable with the setting and so we should not proceed.

Observer comments

Her guarded response and her frequently shifting gaze seem to indicate that she was seeing if her husband and others approved of what she was sharing. It was obvious that she was unsure of what and how much she could speak with the stranger without involving the displeasure of her husband, family, and the community.

While interviewing one lady farmer in a non-project village, her husband constantly intervened to share additional information. After a few times, I requested him not to do so.

Field Notes 21st August 2008

నేను మీతో ఆమెతో మాట్లాడిన తరువాత మీతో మాట్లాడతాను. ఆమె చెప్పలేంది ఏదైనా ఉంటే మీరు సుళ్ళి చెప్పరు.... ఇద్దరు ఒక్కసారి మాట్లాడితే సుళ్ళి అది విని రాసేటప్పుడు అది రెండు మాటలొస్తాయి విని రాయడం కుదరదన్నమాట. అందుకనే ఒక సునిషి మాట్లాడితే మీలు. మీరేమైనా చెప్పలేదనుకుంటే తరువాత మీరు చెప్పరు అన్నీ చెప్పరు.

I will talk to you after I finish talking to her. If she misses sharing any information, you could always tell later. ... If both of you talk at the same time, two voices will be recorded in the recorder. It will be difficult to comprehend when transcribing. So, it will be helpful if only one speaks at a time. You could always share later, if you believe she has missed sharing (useful/ important) information.

We didn't experience these hurdles in the project-run villages. Probably they were used to the project staff, and some of them had already met with me and seen me in various meetings or events. Or probably, these women had grown in confidence over time to speak. The two FWS women participants did share that initially they were naïve, and that they have grown in confidence attending meetings over time.

Respondent One:

(8.23) నేను చేసే ఏ స్టడీ ఎట్లా అంటే ఫర్స్ట్ మీరు దింట్లో పాల్గొనడానికి సుముఖంగా ఉన్నారా లేదా అనీది కూడా, మీరు నాకిష్టంలేదు నాకు కుదరదు అంటే కుదరదన్నట్లు అది కూడా ఉంది అనమాట. అట్లా ఏం లేదు. (8.37)మీకు సుముఖతే కదా. సుముఖతే.

Interviewer: Your participation in this study is voluntary. Are you willing to participate? You could say: 'no, I am not willing to', if you are not interested. It is that way.

Respondent: I have no problem.

Interviewer: Are you willing to participate?

Respondent: I am willing to.

Respondent Two:

(3.16) అంటే ఇంటర్వ్యూ చెయ్యటానికి మీరు సుముఖంగానే ఉన్నారా? నేను తెలిసినట్టివి చెప్తాను సార్. నేనన్నీ ఏవి చేస్తున్నా బడ్డ్యు సంస్థ వాళ్ళు ఏది ఏవిధంగా నాకు చెప్పినారు, నేను మీటింగులకు పోయి ఏమి ఇన్నా, నాళ్ళు ఏదెప్పితే నేను నలగురకూ వచ్చి ఏం చెప్పున్నా అవి చెప్పగలుతాసార్. అది చెప్పటానికి మీకెటువంటి ఏమి అభ్యంతరమేమి లేదు? అభ్యంతరంలేదు.

Interviewer: Are you willing to participate in the interview?

Respondent: I will tell you all that I know. I will tell you all that I have learnt, the meetings I have participated in, how I shared my learning with others.

Interviewer: Do you have objections?

Respondent: No, I have no objection.

Field Notes 16th July 2008

Rashid offered us soft drinks. While we were sipping the soft drinks, Fatima Bi arrived. I was introduced to Fatima Bi. She sat on the chair next to me. Considering that she was a Muslim, I was impressed that she took a seat right next to me, while her husband was still standing in the doorway. During the interview/conversation I learnt that she was a leader to reckon with in the village. She was a leader of the women's cooperative savings and credit groups, member or chair person of the village education committee, and so on.

Duration of the Study

The study was conducted during the summer of 2008 and was conducted over eight weeks. The arrival of the monsoon was delayed by over four weeks. So, most of the farmers had just started their agriculture operations. Because of the late arrival of the monsoon, some of the farmers were planning to forego the crop-season and begin sowing operations in October. As a result, there were no standing crops to observe the crop-water management

practices firsthand. I had to accept whatever the farmers shared as facts. I did not have the opportunity to cross-check the information through observations in the field. Ideally the study should have been spread over at least one full cropping season.

Other Sources of Information

I accessed information from varied sources. I met with the officials of the Department of Agriculture in Kurnool District to hear their perspective about farmer concerns on crop management and crop-water management. I also met with Dr. Arivudai Nambi, Director, Climate Change at the MS Swaminathan Research Foundation, Chennai, to learn more about their initiative ‘Vulnerability Assessment and Enhancing Adaptive Capacity to Climate Change in Semi-Arid Regions of India’. I also met with Dr. KV Rao at the Central Research Institute for Dryland Agriculture, Hyderabad to know more about their work. Apart from that, I collected news items related to farmer concerns and rainfall patterns from various regional dailies. Engaging in discussions and drawing ideas from different people was very helpful. All data has not been used to write the analysis, but it definitely enhanced my perspective on the topic.

Transcribing and Translation

Transcribing is a tedious process, requiring lots of patience and commitment. As the researcher, transcribing the tape provided me an opportunity to listen closely to the recorded conversation. This process gave me more insights into what the interviewee had shared (Lapadat, & Lindsay, 1999, p. 82). Also, it enabled me the opportunity to catch the nuances of the local dialect.

Translating the interviews into English was challenging. The structure of Telugu language is different from that of English. Another issue was that respondents sometimes

left a sentence incomplete during the conversation. While translating, I had to make conscious efforts to check myself from inserting the unspoken words. Apart from that, I was often caught in a dilemma as to which particular word best suited the context of the discussion. It was a tussle of choosing the appropriate word or translating the literal meaning of the word. I decided to do the literal translation and incorporated the word, appropriate to the context, in parenthesis. For example, during the interviews and conversations, all the research participants used the term '*medicine*' (మందులు) for 'chemical fertilizers and pesticides'. At times, they would differentiate between the two by calling chemical pesticides as '*water medicines*' (నీళ్ళ మందులు) and 'chemical fertilizers' as '*bags*' (స్తూటలు). I guess they do this because most chemical pesticides are in liquid form and chemical fertilizers are usually granular and are packaged in large plastic bags. They used the word '*decoction*' (కషాయాలు) for organic pesticides which usually are plant and leaf extracts. The common term used for plant diseases or pest infestation is '*diseases*' (బాధలు).



Discussions with participants

MY LOCATION IN THE RESEARCH

I coordinate the World Education-AP Team that trains the Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project staff on usage of nonformal education methods. We introduced the project staff to systematic approaches in training farmers and usage of experiential learning process in farmer trainings. We also assist the partner NGO staff in demystifying technical information and design and develop various materials, models, etc., for usage in the Farmer Water Schools (FWS).

The APFAMGS Project Management and FAO were supportive of the study. I shared the outline of the study with the FAO (UN) National Program Coordinator – Land and Water Division, and the APFAMGS Project Leader. They have been very forthcoming in their support for the work and believe that the study would add value to the ongoing work on the project and help in designing future interventions. Senior colleagues at World Education were involved in the design of the study. Also, World Education staff working on the APFAMGS Project provided me ample support.

The experience gained over the years of implementing various projects makes me believe that true participation is when all the stakeholders in a given situation feel comfortable, are treated equally, voice their opinions/views freely, and show mutual respect. However, ensuring true participation is a challenge in large power-distance cultures which are characterized by a hierarchical system that creates an inequality based on one's social status (Hofstede & Hofstede, 2005, p. 55). Considering my role on the project and the "high power distance" that is typical of the country's culture, farmers see me as a senior staff person. This has implications on the interactions. To create a 'level playing field', I shared

the purpose and scope of the study to both the BIRDS staff and the research participants. I also explained to all the stakeholders that:

- Objective of the study is to learn from the farmers.
- Learning from the study may pave way for better informed strategies and messages. And
- Study does not aim to evaluate or assess either staff efforts in training farmers, or farmer skills and abilities.

I made conscious efforts to win their confidence by being transparent, discussing principles of participation, trust, and keeping things simple and plain (Rossman & Rallis, 2003). I clarified their questions and discussed issues openly and strived to create a non-threatening environment. In the past, I had maintained a friendly disposition towards colleagues and farmers. This aided my interactions with the staff and the farmers.

On the other hand, farmers were more open to sharing their knowledge and skills with me as they viewed me as an 'insider' who works for their causes. Further, Telugu is my mother tongue and I am fairly conversant with the language. This aided my interactions with the farmers. But, I am not a farmer. As discussed earlier, I did experience elements of defensiveness from non-project farmers. I tried to resolve the concerns of those farmers by stressing that participation in the study was voluntary and shared the purpose of informed consent. Cantaffa rightly points out that: "One's position along the insider-outsider continuum is dependent on context and on who is posing the question of one's status" (2008, p. 141). Further, I tried to be mindful of the local dialect and did not hesitate to ask farmers to elaborate words or phrases.

I tried to be conscious of the influence of my background in literacy while seeking information on literacy practices. Traditionally, literacy is associated with reading, writing, and numeracy skills. While researching, I tried to be cognizant of my “worldview” of what counts as literacy (Rossman, & Rallis, 2003, p. 36). However, the researchers’ subjectivity is natural. It is like a second skin that cannot be removed (Peshkin, 1988, p. 17). I tried to address this by being consciously “reflexive” and pose myself questions like: what am I doing? Is this the right thing to do? Is this the right way to be doing it? Can I get evidence for my statements? What assumptions am I making and is there real evidence for them (Guillemin & Gillam, 2004, p. 274)? Thus, I tried to be attentive of how my feelings, perspective, past experience, theoretical and methodological orientations could be influencing my views on the study (Rossman, & Rallis, 2003, p. 49). And thereby, make a conscious effort to develop an understanding of the subject through the eyes of the farmers.

I am passionate about working with rural populace. The study gave me yet another opportunity to learn more about the rural scenario.

4. FINDINGS FROM CROSS CASE ANALYSIS

The goal of the study was to understand farmer literacy practices, and how farmer participants perceive the usefulness of Farmer Water School training. Studying the farmer literacy practices was to help identify farmer friendly methods, and design effective messages for dissemination on crop choices, decisions, and sustainable groundwater management. A comparative study of FWS participants and non-FWS participants' perceptions on crop-water management, crop choices, and agriculture practices was undertaken to determine the usefulness of FWS training to farmers. The study focused on the farmers of Kurnool district of Andhra Pradesh, India. In this section, I used the findings of the study to discuss the research questions.

LITERACY PRACTICES

Research Question One: How do farmers use literacy for crop-water management and crop choices?

Current Farmer Literacy Practices

The major agricultural transactions the farmers engage in are:

- Purchase of seed, fertilizers, and pesticides,
- Payments to laborers, and
- Sale of agricultural produce.

Seeds, fertilizers, and pesticides are purchased from vendors in adjoining towns. Because farmers do not have adequate cash on hand they usually pay these vendors at the end of the cropping season. Otherwise, they raise loans from the rich landlord or the

moneylender to make the purchases. Payments to laborers are made once a week. Most of the agriculture produce is sold in the market.

Farmers use various means to record the transactions. Shopkeepers give receipts. Some also ask them to enter the amounts in their books. Moneylenders lend money after drafting the legal documents. Farmers value these documents and keep them in a safe place. While repaying the amounts due to the shopkeeper or to the moneylender, farmers take the documents as proof. An element of trust seems to govern the transactions with pesticide/fertilizer shop keepers. Here are excerpts from farmers:

When we take a loan, the person lending the money would write. They write the bond (legal document) and then give the money. After we sign on the bond, they lend us money. After we get the yield, we look into our expenses and repay the principal amount. Else, we tell the moneylender that yield was poor; we only pay the interest and assure him that we would repay the principal amount the next time.

– Abdul, male farmer, non-FWS participant

I studied only up to 3rd class. I do not know how to read. ... We remember the transactions. We note down the numbers or figures when needed. If it is not necessary, we don't. When we purchase fertilizers in the shop, they write the amounts. We take books. They write the loan amount. We bring them back. Again when we are repaying, we take the books. There will be someone who is educated. They will calculate and let us know. It is not important that we do our own calculations. Others can do as well. They will calculate and we will pay.

– Iswaraiah, male farmer, non-FWS participant

One woman participant shared that she crosschecks the tabulation of the petty shopkeepers. Here is an excerpt from a woman farmer:

Usually when we make purchases, we enquire the prices of each item purchased for a kilogram, calculate and make the payments. Even if they calculate, we review the list, ask how they arrived at each of them, and ask for the money that they need to return.

– Balamma, woman farmer, non-FWS participant

My observations in the weekly market didn't reveal any handicap in the transactions. Things seemed to progress smoothly, and I didn't witness any arguments about the calculations.

Field Notes 24th July 2008

The prices of the commodities are not fixed. The purchasers bargain for the best price. The vendors offer a better bargain as the day progresses. Also, the margin for bargain varies from produce to produce. The margin is minimal for vegetables and provisions. It is quite large for pots, metal vessels, clothes, and other fancy items.

Most transactions were based on oral calculations. Vendors selling provisions and spices gave a written receipt which included list of purchases, their quantity and price.

Some of the farmers, I interviewed, currently take the assistance of their literate children to do the calculations and maintain records.

That fellow (my son) knows how to do the calculations and he has gained experience in making payments to laborers.

– *Rashida Bi, woman farmer, non-FWS participant*

All of them stated that they calculate orally or mentally. Also, they said they can remember and recollect transactions made during the crop-season. I wonder if this reliance on memory is a feature of cultures with oral traditions.

I am not educated. I do oral calculations. If we have to make payments, we do make mental calculations. We don't use any signs or materials to record, everything is oral. I can remember all of them. I calculate and make payments to the laborers. We get the necessary change and then make payments by telling that this amount is for this work and so on. Everything is based on oral calculations. We do not record anything. How can we write down when we are illiterate? I don't need to record them as I can remember the amounts that need to be paid for that week. Also, I can remember how many laborers worked on Friday, how many on Saturday, and how many on Sunday. We make payments based on that. I have never experienced difficulty because I don't know how to read and write.

– *Balamma, woman farmer, non-FWS participant*

I did not study. No, no, not at all. I can keep track of things. I do oral calculations. How is it possible for us to record anything?

– *Abdul, male farmer, non-FWS participant*

I studied only till 5th Standard, that too not seriously. About keeping track of day to day expenses, I jot down. Sometimes when I lose the bills, I am confident that they would be available in the shop. I can recollect from my memory. On such and such date, we gave so many bags. I can remember. That much (capacity) I have. On a certain date, I brought two liters of medicine (pesticide). I can remember that on a certain date, I brought these many packets, I brought so many bags of ammonia, and urea. Immediately after selling the bags (harvest), we take the money and go. The people in the shop tally. It will all be correct. There has been no difference, so far. Normally we pay to the shop keeper after six months

from the time of delivery of the pesticide i.e. before March. I can remember all the transactions till then.

– *Karim, male farmer, FWS participant*

None of the research participants shared experiences of being exploited because of the inability to read and write. Most of these are small and marginal farmers with access to land. They are probably not vulnerable to exploitation because of their better socio-economic status. There could be other people (landless and daily wage laborers) who might share different experiences. I didn't have the opportunity to learn from their experiences.

One woman farmer did share an experience of being cheated. But, it didn't seem to have registered on her mind that she was exploited. Fortunately, the government wrote off the loan. However, this incident happened recently and her sons are educated. So, we cannot attribute it to illiteracy. It could be a simple case of cheating by a relative or friend you trust.

Recently, a farmer took our land documents and raised a loan of rupees five thousand. We would have been in debt and would have had to repay it. The government has waived all (farmer) loans. So, we don't need to worry. Else, repayment of that money would have been our responsibility.

– *Balamma, woman farmer, non-FWS participant*

One of the farmers shared his experience of traveling to neighboring states to do business. The language and the scripts used in these states are different from those used in Andhra Pradesh.

The prices in the market keep changing. We keep track of them by phone. We find out over phone. What's the big deal? We telephone them and find out the price and how is the market doing. For example, if you are a trader, I will telephone you and enquire about the market position. I enquire with two or three others. We go to a place where we get a good deal.

I did business in chillies. I used to go to Chennai, Bangalore, and Anantapur. In Chennai they speak Tamil. But, there will be people who speak our language. The shop keepers are all from our state. We experience some difficulty the first time. After making the first visit, the second time around we speak a lot. What's there in it? After the first time, we lose fear.

– *Iswaraiyah, male farmer, non-FWS participant*

The farmers use various strategies to cope with the day-to-day needs. They seem to seek help from other educated members in their community. These educated persons could be husbands, relatives, friends, or responsible elders. The “collectivist” nature of the society could be another reason for people being open to seek others help and finding it without much difficulty (Hofstede & Hofstede, 2005).

I am illiterate. But, it takes intelligence to get work done. Many people have reposed their trust in me and given their money. I need to be responsible. It is not very easy to be the leader of the S&C cooperative. I get all transactions recorded and keep them safely. I use the services of an educated person as a book keeper. I ask him to record all the transactions by month, date, and year. Suppose people like you ask me how come you manage all the accounts? I show all the record books. All the transactions are recorded in those books. They are the supporting evidence of the various transactions.

The book keeper could also make mistakes while jotting down the entries. A lot of money is at stake. I am accountable for the money of so many people. I don't rely on one person alone. After I get the records crosschecked, I show them to my husband in the night. He checks if the transactions have been recorded correctly. After his approval, I keep the records/ papers in a safe.

– *Fatima Bi, woman farmer, FWS participant*

I use marks/ symbols. I use one's. I draw lines. From this field I got fifteen hundred. I denote half this way. This way I used to keep marks (lines). For example, I draw five lines on the ground to denote five thousands and then I draw one line and half a line that makes one thousand five hundred.

...I don't always use vertical lines. I also drop pebbles in a box to record the number of laborers I employed for the day. Suppose I engage 10 laborers, I put 10 pebbles into the box. By counting these pebbles I will know how many laborers I have hired. I then confirm this with the laborers.

Normally, I can't calculate quickly. I need to sit down quietly, take a chalk and draw lines and add them up. ... I cannot be sure if these calculations are correct. I go to someone educated and request him/her to do the calculation. When his/her calculation tallies with mine, I remain silent. When there is a difference, I request him/her to explain the calculation. By doing so, we come to know where we went wrong in our calculation or if there is any error in their calculation.

– *Sarakka, woman farmer, FWS participant*

However, they do acknowledge that it is helpful to be a literate. Upon probing, some farmers did share feelings of being handicapped or vulnerable to exploitation.

Look, we might go to a place. I will tell you that I will come for the meeting. You will ask me to come to a certain place. I will not be able to distinguish if the venue is an office, or some other. If I know the alphabet, I will be able to tell that this path leads to the office.

– *Sarakka, woman farmer, FWS participant*

When we repay loans, we have to pay whatever the moneylender has written in the document. We do not know what is written. Well there are people who get cheated that way. We didn't. There are some who get cheated that way. Who knows, we might as well.

– *Abdul, male farmer, non-FWS participant*

Lack of opportunity seems to be a main reason for being illiterate.

Then our situation was not good. That is why my parents couldn't educate me. Not many studied in those days. Who used to think of studying and getting a job? Now everyone thinks so....

We do experience difficulty because we are illiterate. Why won't we experience difficulty? If someone next to us is reading, we will have to keep looking at them. Isn't it so? If we are in the midst of people and we get to see the newspaper, we can only look at the pictures and keep it down. Otherwise, we have to ask someone and know about it. We ask them to read aloud if there is any interesting matter. If we have someone whom we know, we will ask him to read. It will be difficult if you don't know anyone around. We have to listen like sheep. That is it. Who knows if the fellow is telling you the truth?

– *Iswaraiah, male farmer, non-FWS participant*

One research participant did share that initially it was frustrating to sit in the Farmer Water School (FWS) sessions. However, use of small learning groups in FWS appears to have been an effective learning strategy. Farmer participants form into small learning groups in the first FWS session and continue to be in the same learning groups throughout the year. These learning groups are a mix of literate and illiterate farmers. The literate farmers in these small groups seem to take upon themselves the responsibility to further demystify the concepts to illiterate farmers.

I did experience some difficulty. It sometimes gave me a headache. It was frustrating and upsetting. But, now that we have learnt and can manage things on our own, we don't even need the services of BIRDS staff. BIRDS staff has taught us all that they had learnt. There are always literate/educated farmer participants in the FWS sessions. We learn in small groups. So, these farmers take the extra effort to help us understand the concepts and calculations. They simplify things for us. They tell us: "because we are literate, we write things down. You are not literate, so you need to learn it this way." They make things clear for us. They are very patient with people who are not literate. Even the staff is patient when they explain concepts to us.

– *Fatima Bi, woman farmer, FWS participant*

Three of the four women I interviewed, for the research, are illiterate. Rashida Bi is literate in Urdu. She acknowledges that it serves a religious need and is not relevant for daily life.

I studied Urdu. I got them (my children) educated in Telugu as they will need to do calculations, business, or even travel. Knowledge of Urdu doesn't help in these things. That is why I got them educated.

– *Rashida Bi, woman farmer, non-FWS participant*

Of the four men, two are literate and one is a semi-literate. Considering that these farmers were chosen randomly, it reflects the prevailing gender dynamics in literacy in rural Andhra Pradesh.

Children's education

All the research participants shared that they wanted basic education for their children. It would enable them to cope with day-to-day needs.

Unlike us, our children should at least be able to read a letter, a legal document, and when they travel make out where they are. Keeping this in mind, I have provided education to my children till grade 10 as that is what I could afford. As my means are limited, I am now using their services on the farm. I believe their education will enable them to read a legal document, identify the bus they need to take, record and calculate the weighing of crop yields like paddy, cotton, maize etc. Unlike me they don't need to depend on others for calculation. I did not aspire for them to get jobs with their education.

– *Sarakka, woman farmer, FWS participant*

Nowadays every one wants to educate their children even though they might not have enough food to eat. People get their children educated at least till 10th standard. They say, "Our lives are ruined, at least let our children benefit from education." In the past, even the government didn't care that much.

– *Abdul, male farmer, non-FWS participant*

Parents seem to prefer to educate boys over girl children. This reflects the poor enrolment of girl children in rural Andhra Pradesh. This could be a reflection of Indian patriarchal society.

We let only the boy study till intermediate (grade 12) as our situation was not that good. The daughters are married. I got them educated in Telugu as they will need to do calculations, business, or even travel.

– *Rashida Bi, woman farmer, non-FWS participant*

One son studied up to seventh class and dropped out. Other son studied up to tenth, failed to clear the exam and dropped out. The girl children did not read much. One of them studied up to second class and dropped out. They wanted to continue their studies. We didn't have the strength to support their studies. They stopped studying because we didn't have the capacity. They were caring for the younger siblings. Considering that things were not going well for us, we thought that they should care for their younger siblings and assist at home. We let the sons study as we thought it would be good to have some education.

– *Balamma, woman farmer, non-FWS participant*

One of the farmers mentioned that it might help their children to get job opportunities or better bridal prospects.

Somehow or the other we need to get our children educated. Isn't it so? We get them educated as we don't want them to struggle like us. If we are lucky they might get jobs or might not. If they have some intelligence, they can survive. They can survive. They could work in private companies. If our daughters are educated, we could find a bridegroom who is employed. Sometimes employed people look for educated spouses. If we have the ability, then we could get our daughters married to them. Who is marrying uneducated people nowadays?

– *Iswariah, male farmer, non-FWS participant*

CROP-WATER MANAGEMENT

Research Question Two: How do farmers completing the Farmer Water School training view the usefulness of information they learned about groundwater management?

Crop Failures

Water availability is a major concern. Farmers depend on groundwater (borewell) for an assured source of water during a crop-season. However, their inability to estimate groundwater availability, eagerness to expand farming operations to enhance returns, and poor forecasting of their irrigation needs seem to result in falling short of water at critical crop stages. Further, drilling seems to be the coping mechanism that most farmers adopt. This means increased farm investment and stretching their limited financial resources. Failure to access additional water requirements at critical crop stages results in crop failures or reduced crop yields. The ability of small and marginal farmers to withstand financial shocks is minimal. Further, this has implications for the state or country's food security.

Three of the four non-project farmers that I interviewed for the study reported crop failures because of inadequate water availability during critical crop stages.

There were times when we grew paddy in 2 or 3 acres of land. But, the water was not enough. Now we are growing it only in one acre of land. We are always wary about the water availability. We tend to worry about water. But, we sow the crop and leave it to God's grace. That is how it has been (we don't have any other option).

I do not know the depth of the bore well. He knows about it. Initially we drilled up to 250 feet. It failed. We drilled further down to go more than 400 or 450 feet (husband said). If the crop is growing, won't it need water? We can't delay irrigating the field. Wanting to save the crop, we drill with the hope that we would get water. We drill another 20 feet or another 100 feet. If there is no standing crop then we don't think of drilling further, fitting pipes, etc. for more water. We look for another point and drill later on.

We have four acres of land under bore well irrigation. Greed makes us take another few acres of land for lease and grow crop on it. The water supply is not adequate (to irrigate the additional plot as well). That way a part of the crop gets affected. Man is greedy, isn't he? We assume that a good rain would take care of things. But, rain doesn't come at the

appropriate time. If it doesn't rain the crop gets affected. In such situations, we raise a loan and drill further. That's how it has to be. Else, we will lose the crop. We can raise crops only when we have water. If we don't have water, how can we grow crops? We act thinking that way.

We did think of drip irrigation. We need to make a deposit for it and where do we have the money for all these? That is why we didn't proceed. They (Jain Drip Agency) too came and organized a meeting. Our kids were still studying then. How is it possible to pay ahead of time for everything?

– *Rashida Bi, woman farmer, non-FWS participant*

.... There is no water in the borewell. We did drill (the land) two or three times. We could not strike water for the borewell. If the rains had come on time, we would have sown paddy on half acre. The rains didn't come on time, so we have sown red gram. We are hoping to purchase water from the neighboring borewells.

We drilled a borewell two years ago. The borewell is presently 180 feet deep. We got a yield of 1 ½ inch of water. It was the dry season. They said that the water yield will improve with the rains. We lowered the pipes into the borewell over a period of time. We needed to lower two more pipes. Each of them cost us a thousand rupees. When we tried to lower them, they wouldn't go down. There is water but, the pipes are not going down as there seems to be some obstruction. As a result, the crop withered away. Even the last year's crop almost withered away. The water flow is very minimal. So, we are depending on rains to grow crops. We plan to consult a geologist to see what needs to be done for the borewell.

We hoped that the borewell will give a good yield. We could then grow crops well, grow vegetables, and grains. Not sure, why our luck is so! We got very little water.

– *Balanma, woman farmer, non-FWS participant*

Sometimes borewells go dry. Then we have a crop loss, why not. If there is a green chilli crop growing in the field, it will wither away. There have been times when the entire crop withers away. That fellow drilled four bore wells to save his green chilli crop. He spent two lakhs of rupees on borewells. Now he is still struggling to repay the loan. What to do, the crop was growing, it was withering away? We get less rainfall. Rain has an impact on bore wells. If there are good rains, water levels in the bore well don't go down. If the rains are not good, the water levels go down.

Farmers who have bore well grow green chilli on one to three acres (of land) and cotton on two acres. We can't afford to raise crops on seven or ten acres of land. We have (only) seven hours of electricity. How much land can you irrigate in seven hours? Even if we have lots of water, we do not have uninterrupted power supply for the seven hours. We have three hours of power supply at one time and then four hours. Look, the electricity supply is not there now. It was supposed to come at 1 pm, it came now and again it is not there. It hasn't come back. Who knows when it will come and what would I irrigate? I mean that we do not have enough time to water the crop. That is why; we have to grow only rain fed (dry) crops.

Sometimes, even if the water levels in the borewell are receding, we sow crops in the hope that it will rain in the next two or three months. Even if it rains in two or three months, the water levels in the borewells go up. What to do otherwise? We think that way and sow. If the rain doesn't come, we let the crop wither away. Otherwise if a good rain comes at least once in August or so, we would get a yield of two to four bags (per acre).

– *Iswaraiyah, male farmer, non-FWS participant*

The FWS farmer participants reported that they had similar experiences before the project intervention.

Earlier we were not very planned. We used to incur losses. Now we know how much inputs we need to invest in the crop. Also, we used to use lot of chemical fertilizers. We used to grow paddy on all the four acres. Just when the crop has grown well we used to run out of water. Bore wells used to go dry. We used to incur huge losses.

– *Fatima Bi, woman farmer, FWS participant*

We continued with our previous agricultural practices. I started to incur heavy losses in agriculture. I reached the limits of my endurance. I was running out of time and things were to come to a stop by the end of the year. I was in deep debt. We were raising crops without adequate knowledge.

– *Karim, male farmer, FWS participant*

Earlier when we used to grow groundnut we used to divide one acre of field into two or three sections and used to leave the water flood that entire section. As the particular section is being irrigated, if there is electric power shut down, we used to again start from the beginning. It used to take, four to five days to irrigate one acre of land. We used to use that process for sunflower, Bengal gram, and groundnut.

– *Nagi Reddy, male farmer, FWS participant*

Following their participation in the Farmer Water Schools (FWS), these farmers reported that they check water levels in their borewells, collect rainfall data, forecast water availability, and make crop choices based on the estimation of water balance.

We check the water levels in the bore wells. How do we check the water levels? Now we have measuring devices. We know how much water we have. While making decisions on crops, we forecast to see if this crop would grow even if the water levels recede. Apart from that, whenever we approach the (farmers) society, they provide us with information on water levels, amount of rainfall, and water availability. Based on the water availability, they also advice us on the selection of crops. Previously we used to listen to the radios to get agriculture related information. But now, televisions are available. Further, the people in the village also tell us.

Today, we know how much of water is required to grow an acre of paddy or groundnut. Also, we know how much water is required to grow green gram, ridge gourd etc and the extant of the plot that needs to be irrigated at one go. Earlier, we used to sow paddy in two or three acres, run short of water, successfully irrigate only half the sown area, and let the rest go dry.

– *Sarakka, woman farmer, FWS participant*

... in the past people used to say that it is ideal to sow seeds when the depression in the grind stone overflows with rain water. We no longer go about doing things this way. We measure the amount of rainfall every day. Based on that, we decide if it is ideal to sow seeds and also

make decisions on what kinds of crops we should sow; what would be the yield for different crops? We sow crops based on water availability. Earlier, I had no knowledge of crop-water plan. Now, we definitely know about it. We organize meetings.

We also measure water levels in our bore wells. We check what the water level is before switching on the bore well motor and what is the water level after the borewell motor runs for sometime? Presently, even the womenfolk have knowledge of these facts. Earlier men used to take on responsibility of watering the crops. Women used to say “we will cook and bring food for you, you go ahead and water the fields.” Now, that is not how things are. My husband leaves home by 5 am for collecting milk from different vendors. I go to the fields before dawn, when it is still dark, to water the crops.

There is an observation well in my uncle’s plot which is adjacent to my plot. I use the water level indicator to measure the water level. When the probe touches the water, there is a beep sound. I mark the measuring tape with a pencil at that point. Another farmer in the village checks the pencil mark and will tell me the depth and then enter the data in the record book.

– *Fatima Bi, woman farmer, FWS participant*

ADAPTATION & DISSEMINATION

Research Question Three: How have farmers adapted the information in their daily lives that they learned in the Farmer Water School training?

Adaptation

FWS farmer participants shared that they use various water saving methods. Some of the farmers were excited about the innovations they made to their farming practices based on the ideas learnt from FWS.

After our organization started working on water saving practices, we have learnt alternate ways of irrigation like, using smaller sections, and alternate furrow method. With this method, it takes only half hour to irrigate one acre of land. There has been no loss in the yield. Now, we can water three acres of land for the time required to irrigate one acre. We are also able to convince our co-farmers that it is helpful to use these alternate methods and they are adopting them.

Another thing, we earlier thought that paddy grows only if water is available in plenty. Now we believe that paddy can be grown with less water. There are stages in crop growth. If we provide adequate water at critical crop growth stages, paddy would grow. Earlier we used to believe that we need to have two feet of water continuously in paddy (field). Only then will paddy grow. We used to keep the (borewell) motor running 24 hours. All the water in the borewell was used for growing one acre of paddy, leaving no water for other crops. Now we realize that it doesn’t need that much water. When we were implementing our learning, other farmers looked at it with interest. They imagined that we were doing something foolish. With the success of the method, a lot of farmers recognize it and have expressed interest to

attend meetings (FWS sessions) and learn these methods. Many farmers have shared that they have got better yields by following this method.

– *Nagi Reddy, male farmer, FWS participant*

While attending the Farmer Water School sessions, an idea struck me. I thought of experimenting with the water saving practices in paddy. I started the experiment two years back. ... After transplanting the paddy, I watered the plot continuously for a month. I was afraid that otherwise there would be excessive weed growth. From then on, even the women in the house started to express anguish that I was keeping the plot dry and not flood it with water. They were worried that this would increase weed growth, reduce the yield and we would die of starvation. I pacified them saying that there was enough moisture in the soil and I continued to see to it that there was enough moisture retention in the soil. This considerably reduced my expenses and hardship.

Previously, whenever the water flow was less, we wondered if it was because of the voltage drop in power supply. Water flow used to drop slowly as the motor continue to run. (We) didn't know. With the introduction of these methods we now understand. Oho, the bore well yield is low because of reduced water levels. Now we understand that it is because of low rainfall. Now I understand that we need to choose crops in accordance with the water availability.

– *Karim, male farmer, FWS participant*

FWS participants also shared how they alter their crop plans to cope with rainfall variability.

Last year we had plenty of rains in June – the streams and tanks were full. Where did it rain this year? If there is no rain in the immediate future, we would change our plans and sow groundnut crop in five acres instead of ten acres. We will grow Jowar. We will make changes based on the emerging situation. When the rainfall is scanty, we measure the water levels, estimate how many acres of land the bore well can irrigate, and accordingly reduce the crop sown area and sow jowar. We grow Jowar because just by irrigating once, we would be able to harvest the grain. Also, it requires less labor.

– *Sarakka, woman farmer, FWS participant*

The rain God has not been kind this year. No rains yet. We still did not sow anything so far. We are planning to grow red gram. The time is running out. We still have one more week's time to sow red gram. Last year we sowed by 25th of this month (July). We sowed by 25th July. We make crop choices based on the timing of the year. If not, I will grow sunflower. The rainfall has been less. I have also prepared the seedbed for paddy. Now, I am having second thoughts. Probably, I need to reduce it. But, I like growing paddy because I am habituated to do so.

– *Karim, male farmer, FWS participant*

Farm Investments

All the non-project farmers shared that they use a lot of pesticides and fertilizers. They compete with each other in the usage of fertilizers and pesticides with the hope of getting good yields. Some farmers shared stories of the detrimental impact on their health. Apart from that, a major concern seems to be the prevalence of spurious varieties. In general, they seem to convey that their problems are manifold and life is a struggle.

Earlier, we used to use castor cake and neem cake for green chilli plants to prevent root blight. Now we spray pesticide. Earlier agriculture didn't involve large investments. Now we use medicines (pesticides) and the duplicate/ spurious ones do not control the pest adequately. We are taking more loans. We keep hoping that may be this will be effective, or may be that will be effective. Well, that is how things were then and this is how things are now. Investment is increasing. We might get a good yield or we might not get at all. Fertilizer usage is high. And we are not sure if they are giving us spurious ones' or good quality ones. They keep telling us use this, use that and we follow. As we use, sometimes it (the pest) is controlled and sometimes not.

Usually our crop choices are based on what other farmers in the village grow. That is how we make decisions on crops. Usually the rich farmer decides to grow a particular crop because it fetches more money. The other poor farmers follow the rich farmer because they worry that otherwise they would incur losses. We end up taking loans to invest in the crop believing that others crops would not grow well. The rich farmer doesn't incur any (losses). But, the poorer farmer incurs losses.

– *Rashida Bi, woman farmer, non-FWS participant*

We usually consult other farmers on what to use for the crops. Based on their advice, we bring them with the hope of getting a good crop. Thinking on those lines we use. Sometimes the pest is controlled and sometimes not. What returns do we get after paying for the medicines (fertilizers and pesticides) and laborers? If we sow more, we need to hire laborers. We need to pay them.

– *Balamma, woman farmer, non-FWS participant*

We use a lot of pesticides and fertilizers. We are struggling between life and death. We use DAP, Potash, and urea as fertilizers. We use the costlier pesticides like Confidor, and Monocrotophos. For cotton, we usually spray once every ten days for four rounds. After that we mount a sprayer on to the tractor and spray the pesticide. We have to spray the pesticide even if it means taking a loan. We have to take a loan and then payback after the yield. If we spray any other thing, the crop won't grow. That is how the lives of small farmers are. It is a struggle. Survival is at question. We are trapped. What to do? We take loans, grow crops, and then repay it to them. That is how things are. What can we do? There is nothing left. There is nothing left for the farmer! Farmer problems are manifold. Farmers have a lot to agonize about. We keep hoping that this year it will happen (good rains and good yield), this year it will happen, this year it will happen, that year has never come!

– *Iswaraiah, male farmer, non-FWS participant*

In our efforts to get better yields, we compete with each other in the usage of the medicines (fertilizers and pesticides). Some people's eyes have been affected. Spraying pesticide has many harmful effects on the body. My brother's son developed joint pains because of this. My children too say that even if we are finished, no problem. But, we need to get a good yield.

We don't get good yields, if we don't use medicines (pesticides and fertilizers). We are incurring losses. The poor who cannot invest gets the crop later and loses money. The person who gets the yield first makes profits. Initially, the price for a bunch of bananas goes up to even a hundred, hundred and thirty, hundred and fifty (rupees). In January, February, and March when the poorer farmer brings his yield into the market the price of a bunch of bananas falls to rupees ten or five.

– *Abdul, male farmer, non-FWS participant*

On the other hand, FWS participants shared that they have learnt the use of organic pesticides and fertilizers. This has reduced their dependence on chemical pesticides and fertilizers. As a result, the cost of agriculture inputs has reduced without any reduction in yields. Farmers also shared the various types of leaf and plant extracts they use as organic pesticides and the benefits of their use.

After attending Farmer Field School, we have become aware of many practices like, how to grow dry land crops? How do we use organic fertilizers? How to cut down the usage of chemical fertilizers? How to identify friendly insects (predators)? What is an enemy insect (pest)? We became aware of some of these practices. By using garlic, green chili decoction, neem decoction I am able to reduce the usage of pesticides, and save some money. Whatever they suggest has helped us save money, and did not increase expenditure. Earlier, when the rich used to purchase the pesticide the poor man's soul used to weep, as they didn't have the money to pay for the pesticide cans. By easing these problems, they have exposed us to the idea of how to light the lamps when the light in the lamp goes out!

-- *Sarakka, woman farmer, FWS participant*

I have reduced the use of urea. I use cattle manure. I also use 30 packets of vermicompost. I grow paddy on 1 ½ acre. We were able to get 43 bags of paddy per acre last year when the average yield was 25 to 30 bags per acre. I also use organic pesticides – leaf extracts, garlic, neem, castor cake. We used three bags of neem and castor cake at the beginning. Because of the use of these organic manures and pesticides, the cost of inputs was only Rupees. 6,000. Earlier it used to be Rupees. 10,000. With lower input costs, I was able to get a yield of 43 bags of paddy per acre. I also got a good price for the paddy. I was offered Rupees. 200 more than the market price.

– *Fatima Bi, woman farmer, FWS participant*

We realized that if we spray pesticides, both beneficial and harmful insects will die. But, if we spray our decoctions (organic) we can protect the beneficial insects. It is good for the environment. It is good for the food we eat. We didn't know about this, at first. We used to spray (pesticide) because we didn't know. If we spray these decoctions, we can see the birds in our fields. They also eat some (of the insects). The ants in the ground will eat the eggs of

the insects. We have around 10 kinds of beneficial insects and only two types of harmful insects. Also, even if the insects eat part of the leaf nothing will happen to the crop.

-- Nagi Reddy, male farmer, FWS participant

I made a calculation of the expenses. I was saving four thousand rupees of investment per acre of paddy. Then I compared my earlier practices with the current ones, including pesticide usage. Usually we sow in August and start spraying pesticides from September. Only a month's gap. We start spraying in September and go on till December. Previously, I used to spray pesticide 12 times during this period. I mean we used to spray 12 times in my area. That means an expenditure of rupees six thousand per acre on pesticides alone. Now I spray pesticide twice, and use the insecticide powder once. In all, I use pesticide three times. Compared to the previous practices, the yield is excellent. My labor also has come down. Aha! This is a new practice.

-- Karim, male farmer, FWS participant

In the past, these farmers also were high users of pesticide and fertilizer. The change in practices happened over time and now they are eager to innovate, experiment and share their learning with other farmers.

I was incurring losses in agriculture. I was in debt. Gradually, the water levels in the borewells started to go down. Rainfall became scanty. The borewell yield was decreasing. The crop yield was not good. Investment was increasing but the yields were not good. One day, two years ago, I was sitting at the Bus station, feeling depressed. I met with Narayana. We exchanged greetings. He told me about the Farmer Water School (FWS) activities being conducted by Bharathi Integrated Rural Development Society (BIRDS). I had not heard of BIRDS, nor was I aware of the programs conducted by them. One day, a FWS session was organized at the rice mill. I attended it. They were talking about water saving practices and other things. I did not pay much attention to it. I wondered when I am not able to get a good yield even after irrigating the field for 24 hours; these folks are talking about water saving practices. Initially I didn't give much thought to these. However, Narayana took me along for two or three sessions.

While attending the Farmer Water School sessions, an idea struck me. I thought of experimenting with the water saving practices in paddy. I started the experiment two years back.

-- Karim, male farmer, FWS participant

One day, Paul sir and Yarasree madam came to our village. They sat near the temple and enquired who in the village uses the highest amount of pesticide. The villagers said that Rami Reddy and Nagi Reddy use more than anyone else in the village. Yarasree madam was concerned and asked me, what would happen to your field tomorrow, if you were to continue this usage (of pesticide and fertilizer)? What kind of future are you going to give to your children, if you continue this usage (of pesticide and fertilizer)? I responded by saying that, "it's enough if this lasts till I am there, I don't care if nothing is left for my children. I didn't listen to them. I retorted: "When people (marketing representatives) from different (pesticide) companies come and tell us to spray pesticide, you are telling us not to spray? How will crops grow, if we do the way as you suggest? Grow them and show us."

They continued to pursue me. They came to my farm, if I was there. They persuaded me to change.... They said that they will show us (how to grow crops) without using pesticides, and conducted an Farmer Field School (FFS) on green chilli. I was a keen participant. I didn't trust their words, but wanted to see if their words were true or false. I continued to use my practices to grow cotton on two acres, and green chilli on one acre. And on half acre I decided to grow green chilli to experiment with the practices being taught to us. I didn't tell them (about it). Will this be beneficial or harmful! I had a strong conviction that the crop would definitely grow, if I use chemical fertilizers and pesticides. I did not know that it had so many negative repercussions. From the FFS, I know that it is not necessary to use the medicines (fertilizers or pesticides). Now we are able to tell other farmers as well. I got a good yield in the green chilli crop during the FFS. I started to use the same practices across the whole field. It costs less!

– *Nagi Reddy, male farmer, FWS participant*

Dissemination and Outreach

The APFAMGS Project farmers also shared that other farmers in their village and neighboring villages turned from bemused observers to being open to adopt some of the innovative practices.

Around 10% to 20% of us started to change. Those lagging behind started to observe that this person's life is improving; she is making a few more rupees. Noticing the improvement in our lives, those women folk sought our assistance. We continue to offer advice to those who approach us.

– *Sarakka, woman farmer, FWS participant*

My neighboring farmers, I mean farmers adjacent to my land enquired why I was not watering the paddy crop adequately every day. I told them, look for yourselves. I too used to think on the same lines. See, am I incurring any loss? It is right in front of you. There is no water in the field. But, is there any change in the crop? You folks are watering (your crop) daily. Look at your crop. They said; yes, there is no difference. My neighboring farmers have started to adopt my practices. Two-three farmers have grown (accordingly).

– *Karim, male farmer, FWS participant*

Initially some of the farmers wondered if I was mad to be spraying these decoctions (plant extracts) and were concerned that I will lose everything. Those that made fun of me for using the leaf decoctions are now enquiring about them. Now, farmers in around 10 villages consult me. I have set an example. I now am able to live on my own and also share my knowledge with ten other farmers. All of this I learnt from FWS. Earlier, along with me these farmers also lost a lot. They used to compete with me in use of fertilizers (and pesticides). I was in debt and they too were in debt. All this change is because of the support of my wife and my father.

– *Nagi Reddy, male farmer, FWS participant*

ACCESS TO CREDIT

Even though it wasn't a research question, access to credit came out strongly as an issue affecting all farmers. Farmers from the APFAMGS Project shared that it would be helpful to strengthen the existing farmer institutions (i.e. Hydrological Unit Networks – HUNs) by making them inclusive to address issues such as, access to credit and markets.

We are facing lot of problems. Right now I need ten thousand rupees. Eighty percent of the farmers take loans. After harvesting the crop, we go and deposit the grain in (their) homes. Marketing the yield is a major issue. We take loans from the moneylenders to invest in paddy. That is the only way. The rate is fixed then at five hundred and fifty rupees, and the rate of interest is two rupees. Finally, we have to deposit the grain in their homes. We have to pay for everything including the loading and unloading charges at the moneylender's house. We are the losers at the end. These pesticides and repayment of the loans consume a major portion of the yield. Out of 80 bags of paddy I harvested, we could keep only 10 bags for our consumption. The rest was used to repay the loan.

– *Karim, male farmer, FWS participant*

We have to take a loan and then payback after the yield. If we spray any other thing, the crop won't grow. That is how the lives of small farmers are. It is a struggle. Survival is at question. We are trapped. What to do? We take loans, grow crops, and then repay it to them. That is how things are. What can we do? There is nothing left. There is nothing left for the farmer! Farmer problems are manifold. Farmers have a lot to agonize about. We keep hoping that this year it will happen (good rains and good yield), this year it will happen, this year it will happen, that year has never come!

– *Iswaraiah, male farmer, non-FWS participant*

The HUN (Hydrological Unit Network) should become a hub of activities. Else, farmers won't gather regularly. Farmer will definitely gather if the issue involves money. Each would say, I have a stake in this. Also, people would feel more responsible. They will come to inquire how their money is being spent. If there is nothing at stake, a farmer will not develop a sense of responsibility. So, he will not see the use of attending GMC or HUN meetings. Otherwise, it will involve only a few and they would gather for the sake of gathering. Look at the savings groups. Even if meetings are organized at 7 pm, all women will keep their work aside and come to attend the meeting. Why? "Because, I have paid Rs. 500 or Rs. 1,000. I want to raise a loan of Rs. 10,000 to purchase buffaloes." That is why those groups run well. If we want GMCs and HUNs to function well, we need to engage in such activities. Access to credit is a major issue among farmers. Farmers would easily gather if issues around credit are discussed at the HUNs.

– *Nagi Reddy's male farmer, FWS participant*

5. CONCLUSIONS & IMPLICATIONS

Conclusions

Farmers use various means to record the transactions. Shopkeepers' receipts, moneylenders' legal documents, farmers' jottings of the amounts, etc. serve as record. An underlying element of trust seems to govern all transactions. Most of them calculate orally or mentally and can recollect transactions of the entire crop-season. I hypothesize this reliance on memory is a feature of cultures with oral traditions.

Considering the low literacy levels, illiterate farmers seek the help of other literate members in their community to cope with the day-to-day needs. The "collectivist" nature of the society could be a reason for people being open to seek others' help and finding it without much difficulty (Hofstede & Hofstede, 2005). None of the research participants shared experiences of being exploited because of their inability to read and write. However, the study did not involve more vulnerable sections dependent on agriculture such as, the landless and daily wage laborers. Discussions with them could have provided more insights into whether the 'collectivist' sense of trust transcends the 'hierarchical' structures of the society; or whether illiteracy contributes to economic and social deprivation.

Farmers, in general, acknowledge that it is helpful to be literate and state that lack of educational opportunities in their childhood as the primary reason for being illiterate. They send their children to school, because they believe that basic education is critical to cope with day-to-day needs. However, the preference is to educate boys when hard pressed for resources. This gender disparity is reflected in the literacy levels of the general populace. Of the four men farmers, I interviewed, only one was illiterate. But, three of the four women

farmers I interviewed are illiterate. Rashida Bi who is literate in Urdu acknowledges that it serves a religious need and is not relevant for daily life.

Use of small learning groups in Farmer Water Schools (FWS) appears to have been an effective learning strategy to cope with the varied literacy levels of the farmer participants. Formation of these small learning groups and continuing them through the FWS cycle promotes camaraderie and enhance opportunities for mutual learning.

Farmer Water School (FWS) participants reported that they monitor water levels in their borewells and collect rainfall data to forecast water availability. They use this to make informed decisions about crop choices. They also use various water saving methods to conserve water and are making innovations in crop-water management. Further, use of organic pesticides and fertilizers has reduced costs of agriculture inputs without any reduction in yields. This seems to catch the attention of other farmers.

Implications

Farmers' ability to cope with climate change will depend on their knowledge and skills of crop-water management, pest management, and effective crop planning (FAO, 2008). The FWS participants are demonstrating a growing ability and confidence to cope with these issues. Further, strengthening their knowledge and skills to conduct realistic field experiments, innovate, and adapt will build a body of knowledge within the local communities to cope with climatic variability and extreme weather events.

The continued building and strengthening of this body of farmer knowledge and skills will depend partly on the abilities of NGO and farmer technicians, including farmer trainers to present information and skills development in a manner that is open, transparent

and respectful of farmer learning styles and abilities. While the Farmer Water School is based on experiential learning approaches and techniques, it will be necessary to continue to refresh NGO staff and farmer trainer training capacities, as well as to bring new farmer trainers into the core group providing ongoing support to farmer participants in the FWS.

Access to credit appears to be an issue affecting all farmers. Efforts may be made to strengthen existing farmer institutions to address issues of access to credit and markets, as long as these inputs are supportive of the current focus of the Farmer Water Schools and their efforts to promote self-determination and decrease dependency. There are a number of programs in India that have developed strong credit education linked to literacy. Since all the farmers shared that they value literacy, the Farmer Water School providers may well want to further research these programs and the efforts each has made to make credit education and credit more accessible to farmers with low levels of literacy skills while further developing literacy and numeracy skills.

ANNEXURE: CASE STUDIES

Farmer Water School Participants

1. SARAKKA

My name is Sarakka. Initially, I used to be an ignorant person! To tell you the truth, in the past we were naïve. The men folk of the house used to provide for us. We used to be under the impression why bother, when they are there to take care of us? We used to not give much of a thought. Well, the father-in-law is bringing, providing, and we are eating. We did not know if we were getting into debt. We did not know if there was enough wealth/property. We did not have any knowledge of the property documents. Well there are those who provide, let us who eat, eat. Well, the person shouldering the weight knows it, not the ones who aren't lifting it! We used to live that way.

These Netherlands people (APWELL Project staff) invited us to a meeting. They promised to drill borewells and lay pipelines in our fields. We attended the meetings as they urged that women should be in the forefront in all matters. Participating in the meetings gradually improved our awareness levels. It was ok to go to these meetings. She went. I went. Similarly everyone attended the meetings. Simply attending the meetings exposed us to more information. Instead of staying at home and whiling away time in gossip, we come to know about each and every issue when we attend the meetings.

After attending Farmer Field School, we have become aware of many practices like, how to grow dry land crops? How do we use organic fertilizers? How to cut down the usage of chemical fertilizers? How to identify friendly insects (predators)? What is an enemy insect (pest)? We became aware of some of these practices. By using garlic, green

chilli decoction, neem decoction I am able to reduce the usage of pesticides, and save some money. Whatever they suggest has helped us save money, and did not increase expenditure. Earlier, when the rich used to purchase the pesticide the poor man's soul used to weep, as they didn't have the money to pay for the pesticide cans. By easing these problems, they have exposed us to the idea of how to light the lamps when the light in the lamp goes out! Thinking on these lines, around 10% to 20% of us started to change. Those lagging behind started to observe that this person's life is improving; she is making a few more rupees. Noticing the improvement in our lives, those women folk sought our assistance. We continue to offer advice to those who approach us. We have realized that we need to do our work and become self reliant. At present, we do not have any problems.

We check the water levels in the borewells. How do we check the water levels? Now we have measuring devices. We know how much water we have. While making decisions on crops, we forecast to see if this crop would grow even if the water levels recede. Apart from that, whenever we approach the (farmers) society, they provide us with information on water levels, amount of rainfall, and water availability. Based on the water availability, they also advice us on the selection of crops. Previously we used to listen to the radios to get agriculture related information. But now, televisions are available. Further, the people in the village also tell us.

Today, we know how much of water is required to grow an acre of paddy or groundnut. Also, we know how much water is required to grow green gram, ridge gourd etc and the extent of the plot that needs to be irrigated at one go. Earlier, we used to sow paddy in two or three acres, run short of water, successfully irrigate only half the sown area, and let the rest go dry.

Last year we had plenty of rains in June – the streams and tanks were full. Where did it rain this year? If there is no rain in the immediate future, we would change our plans and sow groundnut crop in five acres instead of ten acres. We will grow Jowar. We will make changes based on the emerging situation. When the rainfall is scanty, we measure the water levels, estimate how many acres of land the borewell can irrigate, and accordingly reduce the crop sown area and sow jowar. We grow Jowar because just by irrigating once, we would be able to harvest the grain. Also, it requires less labor.

Look, we might go to a place. I will tell you that I will come for the meeting. You will ask me to come to a certain place. I will not be able to distinguish if the venue is an office, or some other. If I know the alphabet, I will be able to tell that this path leads to the office. Unlike us, our children should at least be able to read a letter, a legal document, and when they travel make out where they are. Keeping this in mind, I have provided education to my children till grade 10 as that is what I could afford. As my means are limited, I am now using their services on the farm. I believe their education will enable them to read a legal document, identify the bus they need to take, record and calculate the weighing of crop yields like paddy, cotton, maize etc. Unlike me they don't need to depend on others for calculation. I did not aspire for them to get jobs with their education.

I use various kinds of marks/symbols (vertical lines) to record. For example, when I sold the produce from this field, I got Rs.2300. From that field I got Rs.1500. I have got this much from this field and that much from that one. Normally, I can't calculate quickly. I need to sit down quietly, take a chalk and draw lines and add them up. How much does two thousand and two thousand add up to? I use marks/ symbols. I use one's (1's). I draw lines. From this field, I got fifteen hundred. I denote half this way (use of half line).

This way I used to keep marks (lines). For example, I draw five lines on the ground to denote five thousands and then I draw one line and half a line that makes one thousand five hundred. When these two are added up, they become six thousand five hundred. I cannot be sure if these calculations are correct. I go to someone educated and request him/her to do the calculation. When his calculation tallies with mine, I remain silent. When there is a difference, I request him/her to explain the calculation. By doing so, we come to know where we went wrong in our calculation or if there is any error in their calculation. That is how I used to keep marks.

I don't always use vertical lines. I also drop pebbles in a box to record the number of laborers I employed for the day. Suppose I engage 10 laborers, I put 10 pebbles into the box. By counting these pebbles I will know how many laborers I have hired. I then confirm this with the laborers. I know simple multiplication and division. I use them to calculate. But, I primarily rely on symbols/marks.

2. FATIMA BI

To start with. I was a daily wage laborer. I was not used to attending any village meetings. I had no idea of how Xxxxxx (a nearby town) looked. Today I have enough money to even lend rupees five lakhs to someone. I am stretched for time. I have to attend so many meetings. I also have a farm of five acres. God has given me plenty. Without God's help I could not have achieved all this. But, my husband is greater than God.

My husband is a good man. He believes that one becomes knowledgeable only by interacting with others. Not only men, women also should know things. He says "My wife is illiterate. Even though she is illiterate all these people have chosen her to be their leader. There is nothing wrong in this." He has no objection. I attend all meetings regularly. Many people listen to me.

I am **currently the leader** of the village savings and credit (S&C) cooperative which has around 54 savings and credit groups. I have been in this role for the past five years. Before that, I was the chairman of the village education committee. The leaders of the savings and credit groups chose me to be the leader of their cooperative because they believed that I would not cheat them. As a leader of S&C cooperative, I regularly visit Xxxxxx to draw money on behalf of the village savings and credit groups and disburse loans to group members.

I am not educated. I know how to sign my name. But, I cannot recognize my name if you write it down because, you write it neatly in Telugu or in English." I cannot read. I cannot even identify alphabets. I am illiterate. But, it takes intelligence to get work done. Many people have reposed their trust in me and given their money. I need to be responsible.

It is not very easy to be the leader of the S&C cooperative. I get all transactions recorded and keep them safely. I use the services of an educated person as a book keeper. I ask him to record all the transactions by month, date, and year. Suppose people like you ask me how come you manage all the accounts? I show all the record books. All the transactions are recorded in those books. They are the supporting evidence of the various transactions.

For example, in the last month I drew eleven lakhs (1,100,000) of rupees under the Indira Awaas Yojana⁵ Housing scheme and disbursed the amount to deserving families. This month I drew 16 lakhs (Rupees 1,600,000) and disbursed the amount. I take either thumb impressions or signatures of those who have received the money. I later ask an educated person in the village to verify the records, make photo copies and keep copy of all these transactions.

I do not use the services of relatives. I have lots of enemies. Many envy my success. I get the records cross checked. I am not educated. The book keeper could also make mistakes while jotting down the entries. A lot of money is at stake. I am accountable for the money of so many people. I don't rely on one person alone. After I get the records crosschecked, I show them to my husband in the night. He checks if the transactions have been recorded correctly. After his approval, I keep the records/ papers in a safe. When others come, I show them the records.

When BIRDS **staff** encouraged me to participate in meetings to discuss issues around **groundwater management**. I used to say I have no interest to know/learn about these issues. One of the male farmers encouraged me to participate in the meetings. He told the

⁵ Rural housing program, Government of Andhra Pradesh

BIRDS staff that she is an illiterate woman but, a very confident lady. She should be nominated as the secretary to the Groundwater Management Committee.

Even big/large and rich farmers in the village attend the meetings when we request them to do so. Most of the Farmer Water School (FWS) participants are older and mature farmers. I had no knowledge about what do you mean by an adequate rain to sow the seeds. I hear that in the past, people used to say that it is ideal to sow seeds when the depression in the grind stone overflows with rain water. We no longer go about doing things this way. We measure the amount of rainfall every day. Based on that, we decide if it is ideal to sow seeds and also make decisions on what kinds of crops we should sow? What would be the yield for different crops? We sow crops based on water availability. Earlier, I had no knowledge of crop-water plan. Now, we definitely know about it. We organize meetings.

We also measure water levels in our borewells. We check what is the water level before switching on the borewell motor and what is the water level after the borewell motor runs for sometime? Presently, even the womenfolk have knowledge of these facts. Earlier men used to take on responsibility of watering the crops. Women used to say “we will cook and bring food for you, you go ahead and water the fields.” Now, that is not how things are. My husband leaves home by 5 am for collecting milk from different vendors. I go to the fields before dawn, when it is still dark, to water the crops. There is a power cut at 10 am. I go to Xxxxxx around that time. Electricity supply is back from 1 pm onwards. So, I make it a point to return home by 12 noon. If I know that power is going to be back by 1 pm, I will be in the field to water the crops. I come home at 5 pm after watering the crops.

There is an observation well in my uncle’s plot which is adjacent to my plot. I use the water level indicator to measure the water level. When the probe touches the water, there

is a beep sound. I mark the measuring tape with a pencil at that point. Another farmer in the village checks the pencil mark and will tell me the depth and then enter the data in the record book.

Does being an illiterate, handicap your participation in the FWS sessions – especially when estimating the area of the Hydrological Unit, calculating recharge, draft, etc.?

I did experience some difficulty. It sometimes gave me a headache. It was frustrating and upsetting. But, now that we have learnt and can manage things on our own, we don't even need the services of BIRDS staff. BIRDS staff has taught us all that they had learnt. There are always literate/educated farmer participants in the FWS sessions. We learn in small groups. So, these farmers take the extra effort to help us understand the concepts and calculations. They simplify things for us. They tell us: "because we are literate we write things down. You are not literate, so you need to learn it this way." They make things clear for us. They are very patient with people who are not literate. Even the staff is patient when they explain concepts to us.

Did you make any changes to your crop patterns?

I have reduced the use of urea. I use cattle manure. I also use 30 packets of vermicompost. I grow paddy on 1 ½ acre. We were able to get 43 bags of paddy per acre last year when the average yield was 25 to 30 bags per acre. I also use organic pesticides – leaf extracts, garlic, neem, castor cake. We used three bags of neem and castor cake at the beginning. Because of the use of these organic manures and pesticides, the cost of inputs was only Rupees. 6,000. Earlier it used to be Rupees. 10,000. With lower input costs, I was able to get a yield of 43 bags of paddy per acre. I also got a good price for the paddy. I was

offered rupees two hundred more than the market price. In November, I sowed groundnut and later during the summer we grew sunflower. This year too, I plan to do the same.

What changes have you made to your crop plans compared to previous years?

Earlier we were not very planned. We used to incur losses. Now we know how much inputs we need to invest in the crop. Also, we used to use lot of chemical fertilizers. We used to grow paddy on all the four acres. Just when the crop has grown well we used to run out of water. Borewells used to go dry. We used to incur huge losses.

3. KARIM

I am Karim. I come from Yyyyyyy in Zzzzzzz Mandal. It is irrigated by waters of KC canal⁶. We never had to face water scarcity. We don't know what borewells are. Don't know anything about motor pump sets and borewells. We migrated to Xxxxxx village. Over there, the rents on the leased lands increased. Hike in rent on land and higher incidence of pests increased our expenditure. Our investments increased but, the returns decreased.

It is eight years since we came here. After coming to Xxxxxx, we have taken for lease ten acres of land irrigated with borewell water. We continued with our previous agricultural practices. I started to incur heavy losses in agriculture. I reached the limits of my endurance. I was running out of time and things were to come to a stop by the end of the year. I was in deep debt. We were raising crops without adequate knowledge. My debt increased to rupees two lakhs. I don't have a house or land. I used to raise debt on goodwill and was repaying it. But, I was incurring losses. If I was investing rupees ten thousand, I was incurring a loss of rupees twenty thousand. Unaware, I would switch on the pump set, go and relax in the village. When we came here, there was continuous power supply for all the twenty four hours. We could irrigate the entire field.

I was incurring losses in agriculture. I was in debt. Gradually, the water levels in the borewells started to go down. Rainfall became scanty. The borewell yield was decreasing. The crop yield was not good. Investment was increasing but the yields were not good. One day, two years ago, I was sitting at the Bus station, feeling depressed. I met with Narayana. We exchanged greetings. He told me about the Farmer Water School (FWS) activities being conducted by BIRDS. I had not heard of BIRDS, nor was I aware of the programs conducted

⁶ Kurnool-Cuddapah Canal: Major irrigation source for Kurnool and Cuddapah districts

by them. One day, a FWS session was organized at the rice mill. I attended it. They were talking about water saving practices and other things. I did not pay much attention to it. I wondered when I am not able to get a good yield even after irrigating the field for 24 hours; these folks are talking about water saving practices. Initially I didn't give much thought to these. However, Narayana took me along for two or three sessions.

While attending the Farmer Water School sessions, an idea struck me. I thought of experimenting with the water saving practices in paddy. I started the experiment two years back. I mean, this is the second year. I started this last year. After transplanting the paddy, I watered the plot continuously for a month. I was afraid that otherwise there would be excessive weed growth. From then on, even the women in the house started to express anguish that I was keeping the plot dry and not flood it with water. They were worried that this would increase weed growth, reduce the yield and we would die of starvation. I pacified them saying that there was enough moisture in the soil and I continued to see to it that there was enough moisture retention in the soil. This considerably reduced my expenses and hardship. That year, I had a yield of 75 bags for 2 acres of land. Encouraged by this, in the last kharif season, I sowed paddy again and extended the paddy cultivated land by another 3/4th acre. I continued with the practice (of irrigating the field at critical crop growth stages). (I) had a yield of 83 bags. Then, I made a calculation of the expenses. I was saving four thousand rupees of investment per acre of paddy. Then I compared my earlier practices with the current ones, including pesticide usage. Usually we sow in August and start spraying pesticides from September. Only a month's gap. We start spraying in September and go on till December. Previously, I used to spray pesticide 12 times during this period. I mean we used to spray 12 times in my area. That means an expenditure of rupees six thousand per acre on pesticides alone. Now I spray pesticide twice, and use the insecticide powder once.

In all, I use pesticide three times. Compared to the previous practices, the yield is excellent. My labor also has come down. Aha! This is a new practice.

My neighboring farmers. I mean farmers adjacent to my land enquired why I was not watering the paddy crop adequately every day. I told them, look for yourselves. I too used to think on the same lines. See, am I incurring any loss? It is right in front of you. There is no water in the field. But, is there any change in the crop? You folks are watering (your crop) daily. Look at your crop. They said; yes, there is no difference. My neighboring farmers have started to adopt my practices. Two-three farmers have grown (accordingly).

I like to grow paddy. The reason being, I am habituated (to growing paddy). I now know a new and better practice. I have complete faith in this practice and am confident that I can grow paddy even in four or five acres. I am confident. Think whatever you want, but I believe this practice is even more useful considering the power cuts. I am confident of growing the crop even if the borewell pumps water only for one hour in the night. I believe in this.

Previously, **whenever the water flow was less**, we wondered if it was because of the voltage drop in power supply. Water flow used to drop slowly as the motor continued to run. (We) didn't know. With the introduction of these methods we now understand. Oho! The borewell yield is low because of reduced water levels. Now we understand that it is because of low rainfall. Now I understand that we need to choose crops in accordance with the water availability. That means we weren't giving much thought to this before. In the last two years, we have been changing our crop plans keeping in mind the water levels in the borewells. As a result things have improved. What is the water level in the borewell? Now we are confident with the introduction of these devices.

Practicing farming based/depending on the situation:

The rain God has not been kind this year. No rains yet. We still did not sow anything so far. We are planning to grow red gram. The time is running out. We still have one more week's time to sow red gram. Last year we sowed by 25th of this month (July). We sowed by 25th July. We make crop choices based on the timing of the year and the rainfall received. If not, I will grow sunflower. The rainfall has been less. I have also prepared the seedbed for paddy. Now, I am having second thoughts. Probably, I need to reduce it. But, I like growing paddy because I am habituated to do so.

A problem we face is the sale of poor quality seeds in the market. Look at this sapling, how thin it is. Look how robust the saplings in those two square plots are. We are facing some difficulties because of that.

We are facing lot of problems. Right now I need ten thousand rupees. Eighty percent of the farmers take loans. After harvesting the crop, we go and deposit the grain in (their) homes. Marketing the yield is a major issue. We take loans from the moneylenders to invest in paddy. That is the only way. The rate is fixed then at five hundred and fifty rupees, and the rate of interest is two rupees. Finally, we have to deposit the grain in their homes. We have to pay for everything including the loading and unloading charges at the moneylender's house. We are the losers at the end. These pesticides and repayment of the loans consume a major portion of the yield. Out of 80 bags of paddy I harvested, we could keep only 10 bags for our consumption. The rest was used to repay the loan.

I studied only till 5th Standard, that too not seriously. About keeping track of day to day expenses, I jot down how many liters of medicine (pesticide) did I bring for this field.

How many liters of medicine (pesticide) did I bring? Those people in the shops give (bills). Isn't it? I take them and jot down in a note book. How many bags of medicine (fertilizer) did I bring? Today how many bags did I bring? How many laborers worked today? I write it down. That much I can do. I have taken this much money from so and so, I note them down that day including the dates. I can remember the water medicine (pesticide) I purchased from the shops and I also note down. Sometimes when I lose the bills, I am confident that they would be available in the shop. I can recollect from my memory. On such and such date, we gave so many bags. I can remember. That much (capacity) I have. On a certain date, I brought two liters of medicine (pesticide). I can remember that on a certain date, I brought these many packets, I brought so many bags of ammonia, and urea. Immediately after selling the bags (harvest), we take the money and go. The people in the shop tally. It will all be correct. There has been no difference, so far. Normally we pay to the shop keeper after six months from the time of delivery of the pesticide i.e. before March. I can remember all the transactions till then.

4. NAGI REDDY

One day, Paul sir and Yarasree madam came to our village. They sat near the temple and enquired who in the village uses the highest amount of pesticide. The villagers said that Rami Reddy and Nagi Reddy use more than anyone else in the village. Yarasree madam was concerned and asked me, what would happen to your field tomorrow, if you were to continue this usage (of pesticide and fertilizer)? What kind of future are you going to give to your children, if you continue this usage (of pesticide and fertilizer)? I responded by saying that, "it's enough if this lasts till I am there, I don't care if nothing is left for my children. I didn't listen to them. I retorted: "When people (marketing representatives) from different (pesticide) companies come and tell us to spray pesticide, you are telling us not to spray? How will crops grow, if we do the way as you suggest? Grow them and show us."

They continued to pursue me. They came to my farm, if I was there. They persuaded me to change. My father (who was against my practices of using chemical pesticide and fertilizers), who was alive then, told her, "at least you tell him (to change). We did farming that way (without using chemical pesticide and fertilizers) and have earned so far. This fellow is losing everything, he will make us paupers. I don't know how you will change him, but change him. If need be, I will hire someone to work on the farm. Take him along with you and change him."

They said that they will show us (how to grow crops) without using pesticides, and conducted an Farmer Field School (FFS) on green chilli. I was a keen participant. I didn't trust their words, but wanted to see if their words were true or false. I continued to use my practices to grow cotton on two acres, and green chilli on one acre. And on half acre I decided to grow green chilli to experiment with the practices being taught to us. I didn't tell

them (about it). Will this be beneficial or harmful! I had a strong conviction that the crop would definitely grow, if I use chemical fertilizers and pesticides. I did not know that it had so many negative repercussions. From the FFS, I know that it is not necessary to use the medicines (fertilizers or pesticides). Now we are able to tell other farmers as well. I got a good yield in the green chilli crop during the FFS. I started to use the same practices across the whole field. It costs less!

Later on, the government department made me the president of their FFS program at the mandal level. I went and trained other farmers as well at the mandal level in big meetings. I learnt all that from here. We experimented with the FFS practices in okra and groundnut. I always come to the FFS meetings ahead of others and mobilize other farmers. Other farmers saw that I was benefiting from my participation and came to attend FFS out of curiosity.

We realized that if we spray pesticides, both beneficial and harmful insects will die. But, if we spray our decoctions (organic) we can protect the beneficial insects. It is good for the environment. It is good for the food we eat. We didn't know about this, at first. We used to spray (pesticide) because we didn't know. If we spray these decoctions, we can see the birds in our fields. They also eat some (of the insects). The ants in the ground will eat the eggs of the insects. We have around 10 kinds of beneficial insects and only two types of harmful insects. Also, even if the insects eat part of the leaf nothing will happen to the crop. Initially some of the farmers wondered if I was mad to be spraying these decoctions and were concerned that I will lose everything. Those that made fun of me for using the leaf decoctions are now enquiring about them. Now, farmers in around 10 villages consult me. I have set an example. I now am able to live on my own and also share my knowledge with

ten other farmers. All of this I learnt from BIRDS. Earlier, along with me these farmers also lost a lot. They used to compete with me in use of fertilizers (and pesticides). I was in debt and they too were in debt. All this change is because of the support of my wife and my father.

Regarding water usage, earlier when we used to grow groundnut we used to divide one acre of field into two or three sections and used to leave the water flood that entire section. As the particular section is being irrigated, if there is electric power shut down, we used to again start from the beginning. It used to take four to five days to irrigate one acre of land. We used to use that process for sunflower, Bengal gram, and groundnut. After our organization started working on water saving practices, we have learnt alternate ways of irrigation like, using smaller sections, and alternate furrow method. With this method, it takes only half hour to irrigate one acre of land. There has been no loss in the yield. Now, we can water three acres of land for the time required to irrigate one acre. We are also able to convince our co-farmers that it is helpful to use these alternate methods and they are adopting them.

Another thing, we earlier thought that paddy grows only if water is available in plenty. Now, we believe that paddy can be grown with less water. There are stages in crop growth. If we provide adequate water at critical crop growth stages, paddy would grow. Earlier, we used to believe that we need to have two feet of water continuously in paddy (field). Only then will paddy grow. We used to keep the (borewell) motor running 24 hours. All the water in the borewell was used for growing one acre of paddy, leaving no water for other crops. Now we realize that it doesn't need that much water. When we were implementing our learning, other farmers looked at it with interest. They imagined that we

were doing something foolish. With the success of the method, a lot of farmers recognize it and have expressed interest to attend meetings (FWS sessions) and learn these methods. Many farmers have shared that they have got better yields by following this method.

Participants find it difficult to understand when you say cubic meters. Instead, use pots or overhead tanks (water). Our village overhead tank has a capacity of 16,000 litres. It is easier to understand, if you were to say that it takes one overhead tank of water to irrigate an acre of paddy, once. So, these many tanks of water are required to grow paddy. Then they would be able to visualize the amount of water required to irrigate paddy. We can also explain to them how we reached the figure by stating that it takes 7 seconds to fill a 100 litre drum. So, what is the yield of the borewell per minute and per hour? How many hours of power do we have in a day? And how many days does one irrigation require? We explain by calculating that way.

I believe *Farmer Water School should be organized at the hydrological unit level.*

As a result, farmers – men and women -- from different villages gather to discuss issues concerning different villages in the FWS. When participants engage in small group discussion, usually participants from different villages are represented in each group. As a result, farmers from different villages get to know each other. This gives farmers an opportunity to discuss about crops in different villages, stages of crop growth, pest infestation, usage of various practices, etc. Farmer issues at the hydrological unit level can be resolved here. On the other hand, if FWS were to be organized at the village level, farmers get to know issues concerning only that village. They will not be able to know what is happening in the neighbouring villages.

Weather is the creation of God. We can do nothing about it. Rains may come on time and may not come time. It is not in our hands.

The HUN (Hydrological Unit Network) should become a hub of activities. Else, farmers won't gather regularly. Farmer will definitely gather if the issue involves money. Each would say, I have a stake in this. Also, people would feel more responsible. They will come to inquire how their money is being spent. If there is nothing at stake, a farmer will not develop a sense of responsibility. So, he will not see the use of attending GMC or HUN meetings. Otherwise, it will involve only a few and they would gather for the sake of gathering. Look at the savings groups. Even if meetings are organized at 7 pm, all women will keep their work aside and come to attend the meeting. Why? "Because, I have paid Rs. 500 or Rs. 1,000. I want to raise a loan of Rs. 10,000 to purchase buffaloes." That is why those groups run well. If we want GMCs and HUNs to function well, we need to engage in such activities. Access to credit is a major issue among farmers. Farmers would easily gather if issues around credit are discussed at the HUNs.

Non-Farmer Water School Participants

5. RASHIDA BI

My name is Rashida Bi. We came to Abced 20 years back. We have only four acres of land. The four acres are irrigated by a borewell. This year we have a banana plantation on two acres of land and have sown paddy in one acre. In November, we will sow sunflower and groundnut. During this time of the year (kharif – June thru September) it rains. So, apart from banana plantation, we usually grow some paddy based on water availability. We keep the rest of the land vacant. There were times when we grew paddy in 2 or 3 acres of land. But, the water was not enough. Now, we are growing it only in one acre of land. We are always wary about the water availability. We tend to worry about water. But, we sow the crop and leave it to God's grace. That is how it has been (we don't have any other option).

The wild boar menace is increasing. We can grow only one crop in rainy season. It is difficult to keep watch (and protect the crop). We do make all the investments but, half the crop is destroyed by the wild boars. Because of this, we get into debts. The land is fertile and the crop yield is good. But, we incur huge losses because of the boars.

Since the drilling of borewells, everyone grows sunflower, groundnut, and sugarcane. Usually, our crop choices are based on what other farmers in the village grow. That is how we make decisions on crops. Usually, the rich farmer decides to grow a particular crop because it fetches more money. The other poor farmers follow the rich farmer because they worry that otherwise they would incur losses. We end up taking loans to invest in the crop believing that others crops would not grow well. The rich farmer doesn't incur any (losses). But, the poorer farmer incurs losses.

In the past, we used to cultivate red gram, cotton, jowar (millet), and sajja (spiked millet). There were no borewells then. We used to grow rain fed crops. We used to get some yield and the rest would go waste. If the rains were good, the crop yield was good. If the rainfall was scanty, we used to incur losses. That's how things were. Then we used to grow crops only once in a year. Only once!

Earlier, we used to use castor cake and neem cake for green chilli plants to prevent root blight. Now we spray pesticide. Earlier agriculture didn't involve large investments. The yield used to be so-so. We didn't have these kinds of expenditure. So, things were adequate. It used to suffice even if we got one fourth ($\frac{1}{4}$) of expected crop yield. Now we use medicines (pesticides) and the duplicate/ spurious ones do not control the pest adequately. We are taking more loans. We keep hoping that may be this will be effective, or may be that will be effective. Well, that is how things were then and this is how things are now. Investment is increasing. We might get a good yield or we might not get at all. Fertilizer usage is high. And we are not sure if they are giving us spurious ones' or good quality ones. They keep telling us use this, use that and we follow. As we use, sometimes it (the pest) is controlled and sometimes not.

I do not know the depth of the borewell. He knows about it. Initially we drilled up to 250 feet. It failed. We drilled further down to go more than 400 or 450 feet (husband said). If the crop is growing, won't it need water? We can't delay irrigating the field. Wanting to save the crop, we drill with the hope that we would get water. We drill another 20 feet or another 100 feet. If there is no standing crop then we don't think of drilling further, fitting pipes, etc. for more water. We look for another point and drill later on.

We have four acres of land under borewell irrigation. Greed makes us take another few acres of land for lease and grow crop on it. The water supply is not adequate (to irrigate the additional plot as well). That way a part of the crop gets affected. Man is greedy, isn't he? We assume that a good rain would take care of things. But, rain doesn't come at the appropriate time. If it doesn't rain, the crop gets affected. In such situations, we raise a loan and drill further. That's how it has to be. Else, we will lose the crop. We can raise crops only when we have water. If we don't have water, how can we grow crops? We act thinking that way.

We make the plant beds based on water availability. It takes one to one and half hour to water each plant bed. We did think of drip irrigation. We need to make a deposit for it and where do we have the money for all these? That is why we didn't proceed. They too came and organized a meeting. Our kids were still studying then. How is it possible to pay ahead of time for everything? We get money only once a year. We have to make other payments and need to keep our word. What other sources do we have? We are poor and can't afford it. Some people have gone for it.

I go to the field daily. I go at nine in the morning. I complete the work at home, feed the buffaloes and go by nine. If there are weeds, we remove them. We attend to whatever work that needs to be done – removing weeds, collecting twigs, spraying pesticide, or putting fertilizer. I come home by four, do the work at home, tie the buffaloes, water them, cook food and so on.

I studied Urdu. My children, two daughters and one son studied up to seventh class. We let only the boy study till intermediate (grade 12) as our situation was not that good. The daughters are married. I got them educated in Telugu as they will need to do calculations,

business. or even travel. Knowledge of Urdu doesn't help in these things. That is why I got them educated.

That fellow (my son) knows how to do the calculations and he has gained experience in making payments to laborers. We have been doing the same work, since our old people died. We have gained experience. Currently, payments to laborers are either in fifties or hundreds. It is easy to calculate. That is how we do. If it is more complicated those two (father and son) will look into it. It becomes difficult if it is smaller amounts and more numbers. We have to make payments to the laborers on every Tuesday. We make necessary preparations for that.

6. BALAMMA

I was married at eighteen years and came to live here. From the day I came, my life has been a struggle. I learnt how to use the handloom, and had to struggle to make a living because of irregular crop yields. When the kids were small, we had to earn our daily wages to have food to eat. At times it was difficult to even feed the children. That is how things were then. The hardships continue, I continue to struggle. We did not have even a cent⁷ of land and had to make a living with the labor of our hands.

After the children grew up, a few years ago, we were able to have our own land and with a pair of bullocks we were able to cultivate it. We grew bajra, red gram, cotton, groundnut, and sesame. The crops used to grow if we had rains, otherwise no. We used to harvest the yield and make a living. That is how we lived. The children used to go to the hill to work in a quarry.

(At present, we) have four acres of land. We are growing jowar on one acre, groundnut on two acres, and red gram on half acre. We have put two bags of fertilizer for the groundnut. For Jowar as usual, we have put one bag of fertilizer. We are waiting for the rains to come. There is no water in the borewell. We did drill (the land) two or three times. We could not strike water for the borewell. If the rains had come on time, we would have sown paddy on half acre. The rains didn't come on time, so we have sown red gram. We are hoping to purchase water from the neighboring borewells.

We drilled a borewell two years ago. The borewell is presently 180 feet deep. We got a yield of 1 ½ inch of water. It was the dry season. They said that the water yield will

⁷ Unit of land measurement

improve with the rains. We lowered the pipes into the borewell over a period of time. We needed to lower two more pipes. Each of them cost us a thousand rupees. When we tried to lower them, they wouldn't go down. There is water but, the pipes are not going down as there seems to be some obstruction. As a result, the crop withered away. Even the last year's crop almost withered away. The water flow is very minimal. So, we are depending on rains to grow crops. We plan to consult a geologist to see what needs to be done for the borewell.

We hoped that the borewell will give a good yield. We could then grow crops well, grow vegetables, and grains. Not sure, why our luck is so! We got very little water.

Usually we use urea, sulphate, and compost. We usually consult other farmers on what to use for the crops. Based on their advice, we bring them with the hope of getting a good crop. Thinking on those lines, we use. Sometimes the pest is controlled and sometimes not. What returns do we get after paying for the medicines (fertilizers and pesticides) and laborers? If we sow more, we need to hire laborers. We need to pay them. On one day, they would charge thirty rupees and on others fifty or sixty rupees. After paying the laborers, what we will be left for us? Not much will be left! We eat if something is left, or we need to explore other ways of earning to make a living.

When I am on the field, I usually cut grass and pluck weeds. We do sow seeds if the men folk are not available. Also, we water the crops if need be.

One son studied up to seventh class and dropped out. Other son studied up to tenth, failed to clear the exam and dropped out. The girl children did not read much. One of them studied up to second class and dropped out. They wanted to continue their studies. We didn't have the strength to support their studies. They stopped studying because we didn't have the

capacity. They were caring for the younger siblings. Considering that things were not going well for us, we thought that they should care for their younger siblings and assist at home.

We let the sons study as we thought it would be good to have some education.

I am not educated. I do oral calculations. If we have to make payments, we do make mental calculations. We don't use any signs or materials to record, everything is oral. I can remember all of them. Usually when we make purchases, we enquire the prices of each item purchased for a kilogram, calculate and make the payments. Even if they calculate, we review the list, ask how they arrived at each of them, and ask for the money that they need to return. I calculate and make payments to the laborers. We get the necessary change and then make payments by telling that this amount is for this work and so on. Everything is based on oral calculations. We do not record anything. How can we write down when we are illiterate? I don't need to record them as I can remember the amounts that need to be paid for that week. Also, I can remember how many laborers worked on Friday, how many on Saturday, and how many on Sunday. We make payments based on that. I have never experienced difficulty because I don't know how to read and write.

Recently, a farmer took our land documents and raised a loan of rupees five thousand. We would have been in debt and would have had to repay it. The government has waived all (farmer) loans. So, we don't need to worry. Else, repayment of that money would have been our responsibility.

7. ABDUL

I have three daughters and two sons. With these five children, we have been able to get along comfortably so far, by not incurring unnecessary expenditure. Timely decisions on usage of pesticides and fertilizers have brought us good yields in turmeric, banana, and paddy. We made good profits by growing banana, turmeric, sunflower etc. So far things have gone well. From now on, I don't see things going well. In spite of all the precautions we take, we are incurring losses in growing turmeric, banana, or paddy. The expenses are increasing and the investments are going up. We are slowly getting into debts. In the past two years, new strains of crop diseases (or pests) are appearing. We are not using Zinc as suggested. We are also making a mistake. They say, if we put zinc when ploughing, the eggs burst and there would be no pests. We don't do that. But, we are eager to use super phosphate because of ignorance. We are not doing that because of ignorance.

We do get guidance from the agriculture officers. But, if we adopt those practices, we won't get any yield. They ask us to use very limited (quantities). They ask us not to spoil the land, as it will increase salinity. They recommend the usage of cattle manure and suggest how many kilograms of this and that we should use. They suggest us on how much of urea and phosphorous we need to use. They also tell the iron content and lime content (in the soil). They even take the soil from our fields and test its chemical composition in the labs. They share with us the analysis that there is more potash, less iron. So, use this, use that. We follow their advice. But, we waste a lot on chemical medicines (fertilizers & pesticides). Very high usage of medicines. For a paddy crop they are using about 10 bags (of fertilizer). If it is banana they are using up to 50 bags (of fertilizer). How can the soil withstand? There

are people who even use 60 bags of Ammonia, DAP, Urea, Super, etc.. Those days were good for us, not these days.

In our childhood, we used to powder groundnut (shell) cake, neem cake, and castor and use it in the field. We used to use urea only once. You don't find anyone doing that. Only one in a hundred do this, nowadays. Where are those people who powder the neem bark and use it?

In our efforts to get better yields, we compete with each other in the usage of the medicines (fertilizers and pesticides). Some people's eyes have been affected. Their eye sight has considerably reduced. Sight has considerably reduced. They say we need to spray on every alternate day. We are not doing so. We decided not to do that even if that means we won't get good yields. Two or three people who spray continuously have become very dehydrated (weak). Even now they don't listen. They continue to spray. They wear glasses and spray. Spraying pesticide has many harmful effects on the body. My brother's son developed joint pains because of this. My children too say that even if we are finished, no problem. But, we need to get a good yield. Some cleverly do not let their children do the job but, use laborers to spray pesticide. They use the services of the laborers and are not bothered about what happens to them.

We don't get good yields, if we don't use medicines (pesticides and fertilizers). We are incurring losses. Last year, I did not even get a lakh of rupees growing banana plantation on five acres (of land). I had to let it go waste for animals to eat. The price of one bunch of plantains was rupees ten. The whole country⁸ grew the same crop, banana. One follows the other. When the cost of growing a bunch of plantains is rupees thirty, we sold them for ten

⁸ Colloquial usage

to fifteen rupees. The fellow who raises the crop earlier and markets it ahead of the rest, makes money. The poor who cannot invest gets the crop later and loses money. The person who gets the yield first makes profits. Initially, the price for a bunch of bananas goes up to even a hundred, hundred and thirty, hundred and fifty (rupees). In January, February, and March when the poorer farmer brings his yield into the market the price of a bunch of bananas falls to rupees ten or five.

A farmer will never disclose that he has incurred a loss. The reason being, he fears that if he admits that he has incurred a loss, the person lending money might not give him another loan. He might think, if I give a loan to this fellow, he might not be able to pay back. Even if he incurs a loss, he will not disclose it. One automatically comes to know of it, when things go really bad for a farmer and tears start swelling up in the eyes. When others come to offer solace and admonish him for not letting them know of the seriousness of the issue before hand, he says: "what can I do? If I had admitted it earlier, I would not have been able to raise a loan. That is why I had to hide the truth." That is how things are.

We should sow (paddy) in the Aarudra Astral month (late-June). They release water from KC canal in June. We can wait till the end of July or at most till the first of August. If we delay it further, winter sets in and there would be a high incidence of diseases (pests). The chief minister said that the water will be released by 15th August, as there are not enough water reserves in the dam. Hopefully God's grace will make that happen. Even then, from where do we get paddy saplings? Most people would not raise paddy nursery now because they worry about the onset of winter. If one were to raise paddy nursery towards the end of June, you would get a very good yield. If we were to raise paddy now, the onset of winter will bring the sucking pest.

I did not study. No, no, not at all. I can keep track of things. I do oral calculations. How is it possible for us to record anything? When we take a loan, the person lending the money would write. They write the bond (legal document) and then give the money. After we sign on the bond, they lend us money. After we get the yield, we look into our expenses and repay the principal amount. Else, we tell the moneylender that yield was poor: we only pay the interest and assure him that we would repay the principal amount the next time.

My children are not educated. Only my eldest son studied till 9th standard. We have land. What did the others get even though they are educated? There are educated people in the village.

Nowadays, every one wants to educate their children even though they might not have enough food to eat. People get their children educated at least till 10th standard. They say, "Our lives are ruined, at least let our children benefit from education." In the past, even the government didn't care that much. Even I attended the adult literacy program for some time. The adult literacy program is there even now. No one is showing interest, even though the president wants to run it. Education is for all, not for children alone. When we repay loans, we have to pay whatever the moneylender has written in the document. We do not know what is written. Well, there are people who get cheated that way. We didn't. There are some who get cheated that way. Who knows, we might as well.

8. ISWARAIAH

I have five acres of land. I take the borewell on lease and grow crops. I have been taking it for lease for the past four years. Usually we (farmers here) grow bengal gram, jowar, green chilli, and cotton. Since the beginning, (we have been growing) these (crops). If there is (water), we might grow paddy. We grow bengal gram because it is suitable and gives good income. We had stopped growing cotton. We are growing it this time, because of the introduction of BT variety.

Usually the lease for the borewell is for one year, from Ugadi (Telugu New Year Day falls in April) to next Ugadi. The borewells are drilled to a depth of 200 to 300 feet. The yield is two and half to three inches. Usually, we pay four thousand rupees for irrigating once acre (of land). Currently, it is five thousand rupees. It depends on the season (climatic pattern). Suppose, the crop yield in the previous year was good, another farmer might compete (for the borewell water), the lease amount could go up by a thousand or fifteen hundred rupees. If there is no one to compete, then the lease amount would decrease.

When drilling, we usually we get (water) within a depth of two hundred feet – at hundred and seventy or hundred and eighty. After that, the more deep we go the more water we get. Sometimes borewells go dry. Then we have a crop loss, why not. If there is a green chilli crop growing in the field, it will wither away. There have been times when the entire crop withers away. That fellow drilled four borewells to save his green chilli crop. He spent two lakhs of rupees on borewells. Now he is still struggling to repay the loan. What to do, the crop was growing, it was withering away? We get less rainfall. Rain has an impact on borewells. If there are good rains, water levels in the borewell don't go down. If the rains are not good, the water levels go down. Last year, we had a good rainfall. That is why the water

levels have not fallen down (this year). Even if it doesn't rain, there will be no problem for another year. If it doesn't rain well this year, it would affect the water levels in the borewells the next year. This year we can do (our) work, next year we might have difficulty.

This year we have sown cotton. We irrigate (the fields) based on the rains. Usually it takes four irrigations (for cotton). If the rains are good, then two irrigations would suffice. I have sown cotton on three and half (acres of land). (I am cultivating) around ten acres of land (this year). I plan to grow bengal gram, jowar ... bengal gram, jowar, on the rest of the land. We still have to wait for three months to sow bengal gram. We sow it in October. For jowar we will have to wait for one and half month. We don't grow any other crops. Those are the crops (you will find) anywhere. We do grow paddy, but in the areas adjoining the catchments (tank/reservoir). We don't grow (paddy) using water from the borewell.

Farmers who have borewell grow green chilli on one to three acres (of land) and cotton on two acres. We can't afford to raise crops on seven or ten acres of land. We have (only) seven hours of electricity. How much land can you irrigate in seven hours? Even if we have lots of water, we do not have uninterrupted power supply for the seven hours. We have three hours of power supply at one time and then four hours. Look, the electricity supply is not there now. It was supposed to come at 1 pm, it came now and again it is not there. It hasn't come back. Who knows when it will come and what would I irrigate? I mean that we do not have enough time to water the crop. That is why; we have to grow only rain fed (dry) crops.

This is the time to grow cotton. It's 10 or 15 days since, we have sown the seeds. We usually sow (cotton) in this month. But, sowing is dependent on rain. If the rains are delayed, we delay the sowing. It is usually sown in the seventh month. We don't sow any

crops in June. What else to do? We have to grow only bengal gram. Those who have a borewell don't leave (the land) fallow. Look, those with borewells sow cotton. Those solely dependant on rains will have to grow Bengal gram.

We have reduced growing everything (other crops) and are growing only bengal gram. Even if we get a yield of two to four bags (per acre), we can recover the investment. Our major problem is with the rain. Rain is a major issue. We have problems if they come in abundance or if it doesn't rain well. The problem of pests is a usual one.

We use a lot of pesticides and fertilizers. We are struggling between life and death. We use DAP, Potash, and urea as fertilizers. We use the costlier pesticides like Confidor, and Monocrotophos. For cotton, we usually spray once every ten days for four rounds. After that we mount a sprayer on to the tractor and spray the pesticide. We have to spray the pesticide even if it means taking a loan. We have to take a loan and then payback after the yield. If we spray any other thing, the crop won't grow. That is how the lives of small farmers are. It is a struggle. Survival is at question. We are trapped. What to do? We take loans, grow crops, and then repay it to them. That is how things are. What can we do? There is nothing left. There is nothing left for the farmer! Farmer problems are manifold. Farmers have a lot to agonize about. We keep hoping that this year it will happen (good rains and good yield), this year it will happen, this year it will happen, that year has never come!

This time we have sown now because we have water. That means it is based on rain. We haven't received rains so far. We sow crops in the hope that it will rain well. If in the previous year it didn't rain, how will there be water in the borewell? What is there to observe about it? The water levels in the borewell will automatically go down if there was not enough rain. Sometimes, even if the water levels in the borewell are receding, we sow

crops in the hope that it will rain in the next two or three months. Even if it rains in two or three months, the water levels in the borewells go up. What to do otherwise? We think that way and sow. If the rain doesn't come, we let the crop wither away. Otherwise if a good rain comes at least once in August or so, we would get a yield of two to four bags (per acre).

Three or four years ago we used to depend on the **Hindu almanac**. Some elderly person used to interpret and state that it would rain in this astral month. In our village there was an old man who could predict on which day it would rain. That too correctly! It would rain in this month. There would be cloud formation in this month, etc. That is how it is. On the day of Ugadi (Telugu New Year's Day – spring festival), the Brahmin will read and interpret the Hindu almanac. He would say this crop will give a good yield. Usually (farmers) adhere to the interpretation of the Hindu almanac. Well, each one goes according to his own will as well. You can't say.

I studied only up to 3rd class. I do not know how to read. I can figure out (the destination of) the bus. I mean to say, I can figure out to which town the bus is going. We remember the transactions. We note down the numbers or figures when needed. If it is not necessary, we don't. When we purchase fertilizers in the shop, they write the amounts. We take books. They write the loan amount. We bring them back. Again when we are repaying, we take the books. There will be someone who is educated. They will calculate and let us know. It is not important that we do our own calculations. Others can do as well. They will calculate and we will pay.

Do you read newspaper? No paper. The prices in the market keep changing. We keep track of them by phone. We find out over phone. What's the big deal? We telephone them and find out the price and how is the market doing. For example, if you are a trader, I will

telephone you and enquire about the market position. I enquire with two or three others. We go to a place where we get a good deal.

I did business in chillies. I used to go to Chennai, Bangalore, and Anantapur. In Chennai they speak Tamil. But, there will be people who speak our language. The shop keepers are all from our state. We experience some difficulty the first time. After making the first visit, the second time around we speak a lot. What's there in it? After the first time, we lose fear. Now you have come, we are hesitant to speak the first time. The next time you come, not only me others will also speak. What's there in it?

My children are studying. I have two children. Both are girls. One is in second year degree (under graduate). Another girl is studying intermediate (Grade 11&12). Then our situation was not good. That is why my parents couldn't educate me. Not many studied in those days. Who used to think of studying and getting a job? Now everyone thinks so. We need to go accordingly. Somehow or the other we need to get our children educated. Isn't it so?

We did not experience much difficulty because of lack of education. We didn't experience difficulty because, our's is a donkey's hardship. We work in the field, eat in the field, water the crops in the night with snakes or scorpions crawling around us. We get them educated as we don't want them to struggle like us. If we are lucky they might get jobs or might not. If they have some intelligence, they can survive. They can survive. They could work in private companies. If our daughters are educated, we could find a bridegroom who is employed. Sometimes employed people look for educated spouses. If we have the ability, then we could get our daughters married to them. Who is marrying uneducated people nowadays?

We do experience difficulty because we are illiterate. Why won't we experience difficulty? If someone next to us is reading, we will have to keep looking at them. Isn't it so? If we are in the midst of people and we get to see the newspaper, we can only look at the pictures and keep it down. Otherwise, we have to ask someone and know about it. We ask them to read aloud if there any interesting matter. If we have someone whom we know, we will ask him to read. It will be difficult if don't know anyone around. We have to listen like sheep. That is it. Who knows if the fellow is telling you the truth?

If we need to know something, we do listen to TV and know about it. We listen to the news and they also tell about the weather like, there will be heavy rains in the next 24 hours or there will be floods. We do listen. We usually come to know of new seed varieties through TV – sow Mallika BT⁹, it grows well.

⁹ A cotton variety

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