

Lessons from women's participation in ICRISAT R4D projects: Talking points for climate change initiatives

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Women have a key role in the organization of agricultural production. Their participation in agri-related projects is not only to make food available for the households; they participate to satisfy practical and strategic needs, where the latter are essential for self-worth. Women are one of the most vulnerable groups to bear the consequences of climate change. The experiences of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in its research for development (R4D) projects provided substantive insights for the inclusion and empowerment of women in both the physical and social environment. Lessons learned for bringing in women's perspectives into projects include the importance of tangible economic benefits and users' perspectives in the management of local economies and social networks. These lessons led to women making a difference in the areas of village and organizational leadership, livelihood management and knowledge management, which are critical in addressing climate change impacts. Designing interventions for women requires an active process of social construction and negotiation, and that interventions should not be viewed as a package with simple and linear and systematic patterns.

Keywords: climate change; knowledge management; social networks; strategic needs; women's participation

1. Introduction

Life in the arid and semi-arid regions of India is a challenge. An Indian proverb says that an Indian farmer is 'born in debt, lives in debt, dies in debt, and is reborn in debt'. Even with the significant contribution of India's green revolution programme, where the International Crops Research in the Semi-Arid Tropics (ICRISAT) focuses its research for development (R4D), farmers in dryland areas continue to gamble with the monsoon and a mélange of constraints, directly or indirectly linked with climate change. The 2007 report by the Intergovernmental Panel on Climate Change (IPCC) indicates that the poor in the semi-arid tropics (SAT) will be more vulnerable to the adverse impacts of climate change.

ICRISAT undertakes several projects, not only for developing technologies, but also for championing the cause of resource-poor farm households who are most affected by the threat of declining or damaging resources. ICRISAT was one of the first international agricultural research centres to take specific steps to bring a gender perspective and a positive attitude towards women farmers into its activities (ICRISAT, 1991). Women's domestic responsibilities were the driver for ICRISAT to provide platforms to address their needs. ICRISAT's community watershed, crop improvement and knowledge management initiatives have made headway into the agricultural development of SAT Asia and sub-Saharan Africa. A stable agricultural production, secure livelihoods and improved self-esteem, especially of women,

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are outcomes of ICRISAT's gender-sensitized projects.

With the interlocking constraints faced by farm households, it is important to understand the dynamics of resource management in relation to a web of rights and obligations (Karuhanga, 2003), or even the entire system of social behaviour. This case study focuses on social systems, specifically on the resilience of women and their adaptive capacity in a changed or changing environment. Women show great resilience in responding to production constraints and meeting the day-to-day household demands. They are managers of specific domains, curators of community seedbanks, caretakers of small livestock and handlers or processors of small grains (Mula and Niehof, 2000). The tenacity of women in household management and their propensity to meet challenges in unpredictable situations reveal the need (a must) for them to be included in the discussion and debate on climate change. This paper examines what lessons can be learned from the experiences of ICRISAT, and suggests that the potential for success is embedded in a mix of traditional and 'new' adaptation strategies, heeding lessons learned from women's experience on the ground.

2. Learning from women-led innovation

Selecting grain traits most suitable for food and selecting varieties for different micro-niches are often skills best learned from women, since food handling and preparation tend to be female domains in the SAT. In most subsistence economies, as well as home gardens or kitchen gardens, root crops like sweet potato are a woman's crop. Groundnut, before its commercialization in India, had undergone a process similar to that of sweet potato spearheaded by the International Potato Centre. The participation of women farmers was particularly key to the identification and development of ICGV 86564 (*asha*), a popular improved variety of groundnut dubbed as the 'money spinner of Anantapur' (Rupakula and

Nigam, 2006), grown not only in the dry areas of India but also in parts of West and Central Africa and northern Philippines.

It is important to break women's silence and include them in decision making, but this is a daunting task in countries like India because of limited access to land rights for women and the non-recognition of the fact that they can also be 'heads' of households (Bantilan et al., 2004). The recognition by ICRISAT of the contributions and roles of women gave opportunities for learning that made a difference in improving households' livelihood security in the SAT. Three key areas where gender issues can achieve an impact are discussed below. The first two summarize drivers of greater participation of women, and the third discusses a sphere where women excel and can complement efforts to conserve and safeguard the environment.

3. The power of technical support and tangible economic benefit

Based on ICRISAT's experience in community watersheds (Wani et al., 2003), substantial engagement by the project implementer and provision of concrete economic benefits such as more food and/or better income are the main catalysts of participation and adoption of any technology. The relevance of technical support and tangible economic benefit influenced a major policy shift in the implementation of watershed projects in India. India's Ministry of Rural Development and Ministry of Agriculture, which have distinct criteria for administering their watershed programmes, agreed to use common guidelines with single national and state mechanisms to improve coordination and that were inclusive in scope. Moreover, there was a change in focus; from mere drought-proofing of agricultural production to a more integrated and sustainable production system. The current focus of watershed projects emphasizes not only agricultural productivity but also the protection of the environment and building the human and natural resilience to cope with future challenges like

climate change (Wani et al., 2009). The concern for livelihoods, especially for the vulnerable groups that include women, comes to fore in the policy shift.

In ICRISAT watershed projects, income-generating activities designed for women and other vulnerable groups were instrumental in their taking an active role in protecting the environment and managing their resources. In Kothapally watershed in India, Tad Fa watershed in Thailand, Thanh Ha watershed in Vietnam and Lucheba watershed in China, significant improvements in women's participation were achieved due to greater availability of water, allowing women to have a greater say in farming decisions and minimizing the burden of household chores (i.e. water collection). Experience in these watersheds also revealed that opportunities for enterprise where women can earn cash without jeopardizing their domestic obligations will encourage participation and uptake of a technology.

A major lesson from the Kothapally watershed was that interventions not only require soil

and water conservation methods, but also need almost equal efforts to understand the social milieu within which they take place, that is, a systems perspective. In Kothapally, the check dams and percolation tanks that improved water recharging were combined with awareness of building efforts. These made the local people realize the importance of the dams and tanks, which in turn is key to collective action for their maintenance. Both the social and physical interventions require village commitment to serve their purpose at a sustainable level. Failure to address the various groups within the watershed community, such as women and other vulnerable groups like youths and the landless, could create greater imbalances and second-generation problems detrimental to community development.

Other interventions in the Kothapally watershed, such as nursery management of *Jatropha* and *Pongamia* saplings, bio-pesticide production, livestock rearing and vermicomposting (worm farming, see Figure 1) have been engaged in largely by women (Sreedevi et al.,

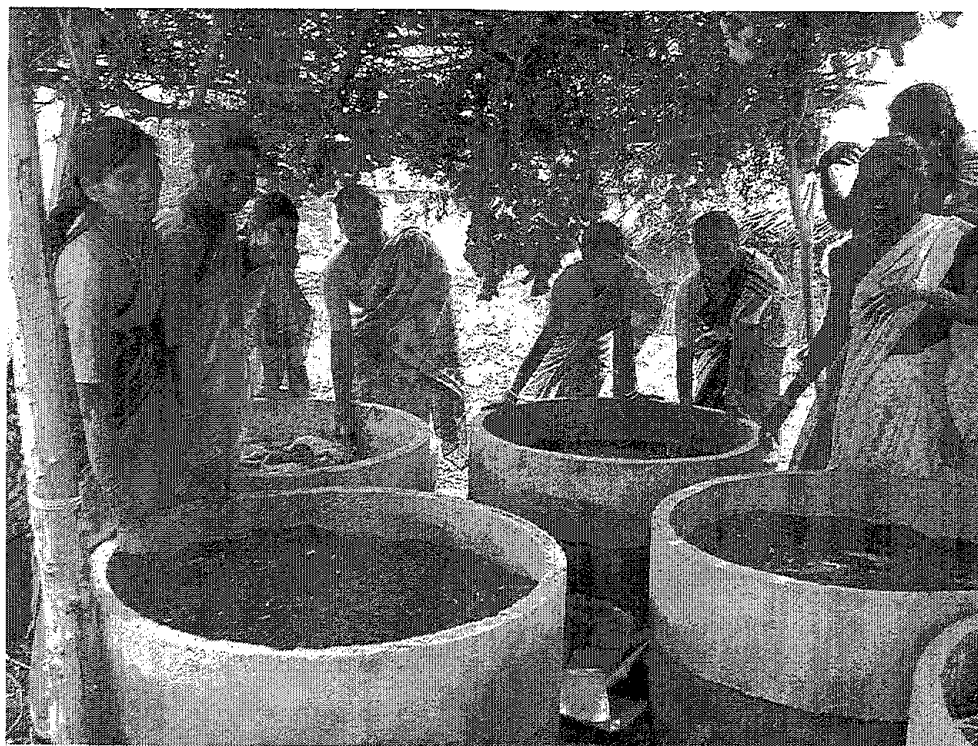


FIGURE 1 Vermicomposting as a livelihood activity managed by women SHG in Kothapally watershed, India

2009). These activities took place within their settlement and managed alongside their domestic obligations, which perhaps explains why household women viewed these interventions favourably. These interventions were individually or collectively managed by women, according to requirements. For example, in 2005 a nursery for sapling production of *Jatropha* and *Pongamia* was maintained by a group of 11 women. They rented a 0.5 ha parcel of land in the village and grew trees. Members have worked around 89 person days in six months and have provided the group with income of INR 70,320 (USD1,465), with each member receiving INR 6,393 (USD133). Saplings were supplied to the government of Andhra Pradesh with ICRISAT acting as a linking agency. This case shows how women in a very patriarchal society like India evolved to organize themselves into a formalized group to support livelihoods (Bantilan and Padmaja, 2008).

The introduction and/or replacement of red gram or pigeonpea (*Cajanus cajan* L.) cultivar with wilt-tolerant high-yielding cultivar 'asha' (ICPL 87119) in the cropping system of the Kothapally watershed benefited women through a three- to five-fold increase in productivity. It also improved soil fertility due to increased recycling of leaf fall and nitrogen fixing (Wani and Ramakrishna, 2005). Bhagyamma, a lady farmer of Kothapally, earned INR 12,800 from her red gram in one cropping season, cultivated on a one-acre farm with irrigation. The assistance of ICRISAT in the form of technical expertise and quality inputs like seeds, farm machinery (tropicultor) and good soil and water management structures contributed to her improved agricultural productivity. Her income from the cultivation of red gram over 0.5 ha increased by 31 and 70 per cent over the usual income of INR 8,860 (USD185) with irrigation, and INR 3,810 (USD80) without irrigation, respectively (Sreedevi et al., 2004). Bhagyamma singled out the contribution of the check dam built near her farm for supplying her bore-well with more water,

allowing for continuous cropping the whole year round.

In the tribal, poor village of Powerguda, watershed initiatives provided a platform for engaging women in new agri-related activities. This case demonstrates the importance of, and routes towards, empowering women. The initiative paved the way for significant changes in women's status, largely due to their capacity to excel in domains traditionally occupied by men (Box 1).

BOX 1 Women's power in Powerguda

Agricultural techniques in intercropping and the cultivation of new crops like vegetables and soybeans learned and implemented by the women imply their tenacity and openness to innovation. Contrary to Vijfhuizen's (1998) view that women can be subordinated in certain situations like an unfamiliar source of livelihood and in certain relationships, Powerguda women have stood out in their new ventures. Their propensity to excel and claim their domains even in a highly patriarchal society suggests that authority can be earned and maybe derived from their own domains of activity. A case in point is the oil mill operated by their SHG where they process seeds of *Pongamia* and neem (*Azadirachta indica*). This became an important source of income for women and the result of such skill led to the establishment of a tree nursery and massive planting of *Pongamia* saplings (8,500 in 2002 and 2003 and 10,000 in 2004) awarded to them by a donor with the endview of providing the women with a sustainable source of income. The community became also a recipient of a grant in the amount of Rs. 30,000 (US\$625) from the World Bank for *Pongamia* nursery establishment, which was part of the environmental service payment (D'Silva et al., 2004).

Identifying and supporting areas of women's expertise can also boost women's authority over other areas and provide arenas for exercising self-determination. In the case of Powerguda, women took collective action to ban alcohol in the village and take into their own hands the management of some public works that used to be handled by private

contractors. The provision of productive work for women in the village also contributed to the decline in the migration rate (D'Silva et al., 2004). The emergence of these capabilities among women illustrates the need to address both the practical and strategic needs of women for successful empowerment (Moser, 1993). Meeting the strategic needs, in particular (referred to as needs which arise as a result of the subordinate position of women in society), will significantly bring out the best in women's performance. This can result in self-reliance that leads to improved self-esteem.

4. Technological adaptation and diffusion: Requirements for success

ICRISAT experience shows that women's participation in agri-related projects, such as the cultivation of new crops or cultivars, not only secures adequate food for the household, but women also have other objectives which are shaped by their local economies and organizations. Gender has been recognized as one of the most important elements of the R4D framework, especially with respect to the different needs of men and women. This implies the importance of user orientation that takes into account equal opportunities for both sexes, including the provision of distinct interventions when necessary.

Many agricultural activities ranging from what are regarded as minor and traditional crop cultivation and processing to tending small livestock are associated with women. Root crop cultivation in the northern Philippines, specifically of the staple sweet potato, is an area in which women are heavily involved. Women maintain the best varieties (mostly traditional) of sweet potato in well-defined micro-niches to ensure availability more than productivity, and these *in situ* gene banks are the women's intellectual property. This should be acknowledged in the root

crop improvement programme. Pearl millet, another traditional crop of the semi-arid zones, can also thrive in micro-niches. Pearl millet is a crop of mostly marginal lands but has immense potential to provide nutritious and healthy food for resource-poor households in five states of India: Maharashtra, Rajasthan, Uttar Pradesh, Haryana and Gujarat

Pearl millet is a beacon of hope for dry land communities where the main concern of local people is secure and nutritious food supply. The release of ICTP 8203, a pearl millet variety developed by ICRISAT, provides the opportunity to meet these needs. Originally targeted for the states of Maharashtra and Andhra Pradesh, ICTP 8203 is now used in two other states (Rajasthan and Uttar Pradesh) without deliberate efforts from the government. In search for a pearl millet crop that not only suits the harsh socio-economic environment and uncertainty of resource-poor farmers of the semi-arid regions of India, ICRISAT's crop improvement programme worked towards incorporating the most important traits (from the users' perspective) into the crop. A study conducted by Mula et al. (2008) on the persistence of ICTP 8203, in spite of several pearl millet hybrids on the market, reveals that women's concern for their food requirement and their livestock are of equal importance in the maintenance and selection of crops. Respondents claim that grain yield of ICTP 8203 is higher than the hybrids in marginal and very dry environments. Women farmers found that even the fodder quality of ICTP 8203 is higher than other varieties and hybrids. Women farmers also found that ICTP 8203 has better 'roti' (unleavened bread) quality. Recently, pearl millet (just like sorghum) has become a special food among individuals suffering with diabetes.

The case of pearl millet shows how important a familiar crop can be that addresses specific users' needs. The cultivation of ICTP 8203 illustrates how a user (i.e. farmer)

inevitably needs to make decisions about his practices and capacities, such as whether to alter the existing farming system (i.e. for instance, changing the crop cultivars such as ICTP 8203 with hybrids). For the farmer, it is vital to have access to resources (both physical and knowledge-based) with which he can work to realize his objectives.

How an individual decides her future also determines her actions. Among farmers in Rajasthan, India, whose livelihood revolves around livestock, history and past experience (as argued by Long and Van der Ploeg, 1995) are crucial to future action. Hence, the rationality of constant cultivation of ICTP 8203 by Aparna, a lady farmer from the village of Dausa, hinged on factors such as her familiarity whether the crop would satisfy her requirements for fodder more than food.

Moreover, the successful adoption of ICTP 8203 in non-target areas illustrates the tenet of 'seeing is believing'. Since farmers have experienced the tangible benefits of ICTP 8203 for their food and fodder requirements, the diffusion proceeded without much 'push'. When a farmer tries to discover the potential of a new material, he goes through the process of negotiation, joint decision making and self-determination (Roling and Van Der Fliert, 2000). A fledgling grower of ICTP 8203 has to negotiate with his own socio-economic resources, such as the cost of production, without sacrificing food and fodder needs. This implies that success in technology adoption depends on addressing issues related to local economies and organizations where the latter are not merely viewed as the sources of input but also as key players to facilitate access. The empowerment of locals takes root through self-realization, self-organization and collective action (Lightfoot, 2004). Any support from other actors should not compromise the transfer of power to the local people. Instead, it should work for building social capital where both behaviour (especially commitment) and skills are equally addressed.

5. Partnerships and social networks for extension education and scaling activities

One of ICRISAT's most valuable resources is its strategic partnership with various organizations in the public and private sectors. The partnerships not only provide the means to obtain resources for jointly carrying out R4D projects; various institutions joined together for meaningful causes, with each member providing its individual strength and contributing to capacity development. The ICRISAT-led watershed activities illustrate this approach.

The accomplishment of ICRISAT in watershed initiatives in India, Thailand, China and Vietnam is largely a product of multilayered partnerships involving non-conventional institutions who share the vision and strategy of ICRISAT (Mula et al., 2008) and its Integrated Genetic and Natural Resources Management approach, an integrative strategy in agricultural research. The approach brings together biological and social sciences to enhance the impact of research results.

The relevance of having a women's organization as a partner is discussed below. As reported by Shiferaw and Rao (2006), the widespread upscaling of interventions in watershed activities were largely attributed to women's participation, which provided the means for creating awareness and interest in various aspects of watershed interventions. The recurrence of drought and the need to inform and prepare farm households for such problems led to the development of the Virtual Academy of the Semi-Arid Tropics (VASAT), an initiative of ICRISAT together with a women's organization (see Box 2). Insights derived from ICRISAT projects on community watersheds, participatory varietal selection, marketing, etc. are packaged using a blend of innovative methodologies embedded with Information and Communication Technology (ICT)-based approaches. The aim is to reach out to and be clearly understood by various interest groups. The case described in Box 2 provided substantive insights on social inclusion, where women are the main actors

and their physical domains and social milieu are respected.

BOX 2 Community-based women's organization in ICT-mediated learning and extension education

One of the components of the Virtual Academy of the Semi-Arid Tropics (VASAT) is an information-based programme with the aim of combating drought and mitigating its impact. This project is implemented by ICRISAT in partnership with the Adarsha Mahila Samaikhya (AMS), which means 'Women's Welfare Organization' of the Addakal block in Andhra Pradesh state of India. The AMS is a federation of all-women microcredit groups with about 5,200 members from 37 villages. It has taken action on an array of development issues relating to rural households, such as credit and other livelihood development. In 2004, the information-based support programme was launched as an activity in the local watershed under the Andhra Pradesh Rural Livelihoods Program (APRLP)-ICRISAT-AMS initiative to share knowledge with women using ICT. The State Government supported the programme. Other institutions later joined the programme and contributed expertise. The information hub in AMS makes use of low-cost connectivity with some personal computers to facilitate local operations. ICRISAT set up village knowledge centres in eight villages with basic hardware and internet connections. The whole operation is managed by AMS rural women volunteers. ICRISAT and VASAT partners provided support and technical advice (Sreedhar et al., 2009). In recognition of the village situation where rural households are not only concerned with agri-related information VASAT has created a norm for regular information dissemination that covers agriculture as well as other household concerns. (See Figure 2)

Experience with VASAT shows that women are key players in the area of knowledge management and can overcome communication barriers. Providing women with access to technology and information are effective forms of empowerment. More importantly, localizing and customizing technology content empowers individuals to participate (Balaji et al., 2008). Thus, a successful extension activity needs the involvement of credible individuals from the locality as facilitators or intermediaries. Local capacities should be developed with respect to

the essentials of practical agriculture, and an open learning paradigm should be used that blends with ICT-based communication, one of the guiding elements in the conceptualization and implementation of VASAT.

In a rapidly changing environment, people require accessible information and its timely dissemination. Developing better forecasting methods with the involvement of the community, improving management practices and enhancing the capacity of stakeholders are immediate concerns in times of erratic climate variability. ICRISAT experience has shown that preparedness is better than relief, and information is the backbone of drought preparedness. This is at the core of the VASAT programme. ICRISAT established a trial repository of core learning materials presented in different formats to suit various users. These included satellite-based video conferencing, drought vulnerability maps and preliminary initiatives on the concept of reusable learning objects and topic maps. Experimenting with methods of extension education, considering the merits of each and properly integrating these together is a powerful way to inform resource-poor households. These materials combined with village knowledge centres allowed for wider reach in providing advice on cropping patterns and water and soil management.

The set-up of the video-conferencing facility was supported by the Indian Space Research Organization, through the National Remote Sensing Centre. It is used to assess changes in the effectiveness of query response when a new digital medium is used. The most important uses of the facility include the regular conference held for 2 hours per week in the local language, and queries arising from the video conferences are documented and uploaded to an online form (www.aaqua.org). This enables registered experts to view the information. ICRISAT provides the bulk of the agri-related package of practice and special sessions.

Colour-coded maps to show micro-level drought vulnerability drawn from Geographic Information System (GIS) tools are prepared by another partner, the Indian Institute of

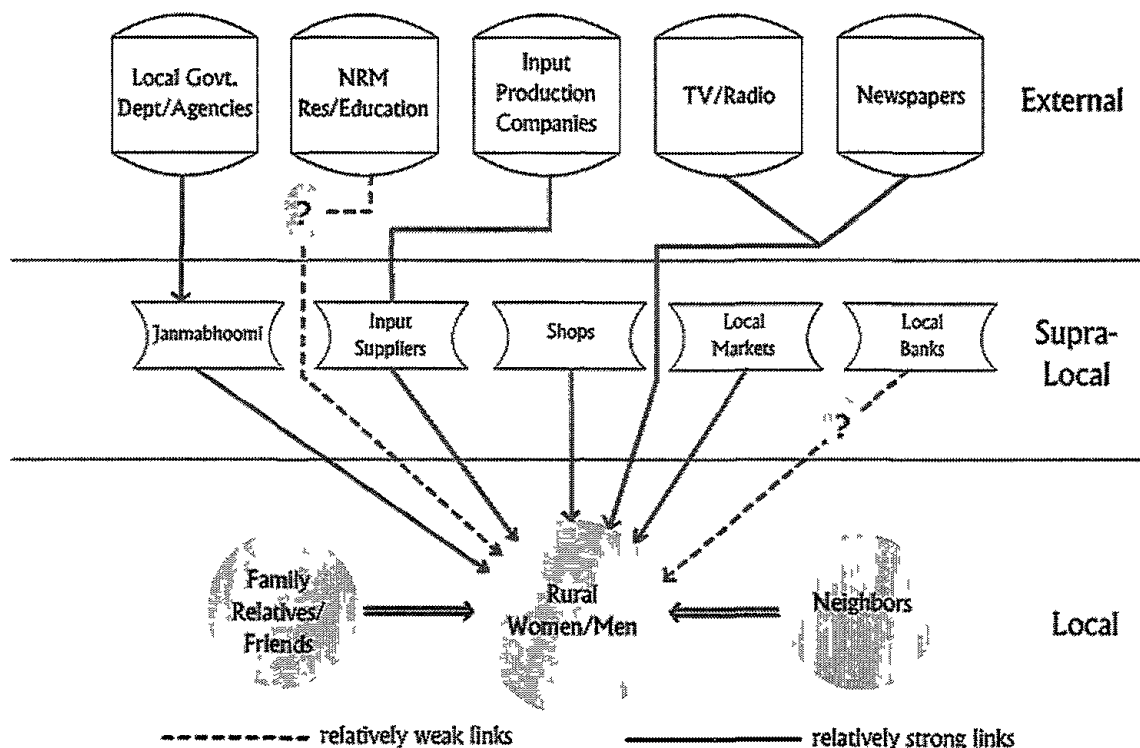


FIGURE 2 Farmers' perception of information flow in Addakal Block, Andhra Pradesh, India

Source: Balaji et al. (2008).

technology based in Mumbai. Rainfall data, which are measured, recorded and uploaded to a Wiki-based website (http://vasatwiki.icrisat.org/index.php/Rainfall_2009_kharif) by members of the AMS, helped women to determine the availability of water. Dileepkumar et al. (2007) reported that similar methodology has been successful in predicting the condition of surface water bodies and tanks in 2007 *kharif* (summer) season in Mandal, Mahabubnagar District. The use of colour-coded maps with input on rainfall data collected by local women makes it easier for the message to be disseminated and understood.

The examples above show how women orchestrate their different household functions and fulfil the demands of work in other areas. They play strategic roles. For example, they diversify livelihood for household food security while improving their communities as well. An important way to empower women is to identify their strengths and build capacity so that women are able to implement meaningful activities without jeopardizing their practical needs. Most often, women work in situations of unequal control over resources, which reduces both their morale

and performance. A meaningful amount of resources 'should continue to flow to support women's groups and activities even outside the formal structures and its supporting institutions and activities' (Institute of Social Studies Trust, 2005). Some women-led self-help groups (SHGs) have also become mechanisms to promote solidarity and to address other concerns such as health, sanitation, environmental consciousness and farm advisory services.

6. Where to from here?

This is a major lesson from the long-term implementation of ICRISAT projects. The institute has emphasized gender issues in its R4D works and learned that it is important to develop a framework to include women's domains with respect to space, activities and resources. Harnessing women's participation should include capacity building and service complementation (including flow of support) for their social organization. The design of an intervention, in this case, involves social

construction and negotiation. No intervention is simply a package with only linear and systematic patterns. Even with careful planning, the plans and expected outcomes may change during the process.

Climate change is a significant part of ICRI-SAT's operational resource strategy (ICRISAT, 2007). Pro-poor work on crops is central to the institute's work. Women's contribution is vital not only in subsistence economies, but also in low external input agricultural systems where there are cheaper sources of labour. The seasonality of rainfall, which has become more erratic in recent years, increasingly creates havoc for agricultural activities and compounds the situation of women. They are affected by the so-called 'double burden' that inevitably results in gender asymmetry, most especially among farming households, where women are reported to be doing more in both agricultural and domestic production. The need for gender to be genuinely incorporated into responses to environmental uncertainty suggests the following.

6.1. Strengthening resilience and coping

Empirical evidence from a study in lahar (fine-ash fall) areas shows the increased responsibility women bear in adverse situations because of inequitable conditions (Mula and Niehof, 2000). The same view is shared by Carvajal-Escobar et al. (2008), where disasters place more pressure on women not only in the 'domestic but also in many paid and unpaid workplaces and in the community during the stages of preparation and mitigation, as well as in the reconstruction stage (post-disaster)'.

Women show an array of coping strategies in adverse situations, defined by the time or the duration of the crisis situation, as mentioned by Barnett (1993). The most common mechanism women use for managing resources under a problematic situation is tapping their social networks. Women are able to effectively detect and manage environmental hazards like the occurrence of drought, acute food supply and illnesses

because of their solid knowledge of and relationship with the resources of the village. Women can immediately mobilize social networks to buffer or abate problems. The value of women's coping strategies intertwined with environmental realities should be a major component of efforts towards sustainable development (Martin, 2008). They possess not only untapped skills for understanding the causes and consequences (even if it is only at the local or micro-niche level) of changes in the climatic conditions (Rohr, 2007), but they also have the adaptive skills required for the eventualities of the changing environment.

6.2. Allowing for the expansion of choice when new knowledge emerges

In a study conducted by Bantilan and Padmaja (2008), successful adoption and diffusion of technologies require existing resources to be enhanced. For women in agriculture, more options and enhanced resources such as capacity building are imperative. The enhancement of human capital (e.g. through technology) represents an expansion in the choice for the user, which also requires social preparation to ensure the technology's viability. Access and entitlement to technology or knowledge are pre-conditions of the empowerment process, and women often struggle with these issues. The set of relations embodied in society's laws, customs and conventions (Griffin, 1987) should be examined and made favourable for women's access to and use of technology.

6.3. Social networks play a critical role for women as they negotiate a changed environment

A discontinued livelihood activity resulting from climate variability affects social relations, and managing livelihoods should take into account the social bonds (Swift, 1989) inherent in how livelihoods are organized. As Harris (1990)

argues, relationships emerge not from the universal existence of social entities (groups and institutions) but from universal attributes of social structures like power and control of resources. Social relations are important for understanding the dynamics of support, risk-management and decision-making processes. A thorough analysis of person(s)–environment dynamics will generate synergies between the two leading to better outcomes and optimization of trade-offs.

6.4. Knowledge management

Technologies can not only speedily exchange information, but also provide innovative means to interact in real time. ICT offers an exciting opportunity for efficient and effective knowledge sharing. This will require greater participation by the community and, most importantly, by women, because of their ability to combine this responsibility with their domestic activities. Investment in training can make them efficient and effective agents of change.

6.5. Greater access to ICT means that interconnectedness is less of an issue

ICT is particularly important in the SAT, where timeliness of information is critical. Several VASAT have initiated to utilize these technologies as platforms for interactive learning, mentoring, backstopping and even for advisory services. ICRISAT's strategic plan for 2020 underscores the relevance of knowledge management and sharing for facilitating science, and how this can impact on uncertainty in agricultural production. The strategic plan outlines the push for enhancing farmer-to-farmer and farmer-to-researcher information and knowledge flow. Likewise, it also includes engaging village facilitators, NGOs and the private sector to enable exchanges and translate information into and from local languages when needed. It is anticipated that building learning communities in this manner will have a major impact on the adoption and

evolution of technologies developed by ICRISAT and its partners (ICRISAT, 2010).

6.6. The need for institutional planning

Any R4D engagements require institutional architecture. With respect to climate change institutional arrangement becomes even more critical. One of the ways to streamline direct support for empowering women is to have explicit programmes with the necessary support, such as flexible financing mechanisms. Women can achieve greater success when they have resources at their disposal to fulfil the priorities and needs of their own spheres.

6.7. The strength of partnership

ICRISAT has built strong alliances with various institutions, resulting in policy shifts or the provision of more support, like capacity building. The value of partnerships was demonstrated in ICRISAT's work in community watersheds and knowledge management. However, in an overall assessment of watershed programmes, capacity building is regarded as the weakest link for upscaling watershed programmes. ICRISAT works with over 60 different partners using 20 technologies. Partnerships have helped to improve household welfare, commercialize technology, strengthen the voice of the poor and to assess macro-/micro-level R4D scenarios to inform research priorities. ICRISAT has four interrelated types of partnership, namely network support and participation; joint research projects to tackle specific problems and development objectives; leveraging the emerging technologies of the developed world; and professional development.

7. Conclusions

Climate change is a concern for all institutions and every individual. However, the vulnerability of women, despite their unique capacities and

roles in the protection and conservation of natural resources, is still a matter of particular concern because the gender dimension has not been genuinely brought into the mainstream of most initiatives. Interventions that can reduce women's drudgery in domestic and agricultural work that has become even more difficult to carry out in an unpredictable climate, may show promise as initial steps for their inclusion. Learning from insights drawn from past projects, some of which are discussed in this case study, is anticipated to contribute in a range of ways to an evolving R4D agenda on climate change.

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