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Experiencing and coping with change: women-headed farming households in the Eastern Gangetic Plains

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Cover: Caught in the winds of change: a woman head of household contemplating the future (Photo: Kuntala Lahiri-Dutt)

Foreword

In the contemporary world, agriculture is undergoing substantial and radical transformations. Of the various forces triggering these changes, one is environmental and linked to the realities of unprecedented temperature and rainfall changes. The other forces are social and economic, connected to globalisation, resulting in widespread and more permanent male migration out of the poorer rural areas. A consequence of these two changes is that women, particularly in less-developed countries, are taking up more active roles in agriculture.

Known as the 'feminisation of agriculture', farming women are no longer just part of the family labour unit or just care for the household gardens. Women have emerged as the key producers, performing a wide range of tasks related to planning, cropping, managing, processing and marketing, in and around the agricultural fields. The rural areas of most developing countries are now dotted with households that have women as de facto heads and that comprise primarily children and the elderly.

Despite women's increased agricultural roles, in most developing countries rural women are operating under serious constraints. Besides poverty, these women are generally characterised by low or no education, have little or no exposure to new and more-efficient methods of agricultural production, are overburdened with domestic responsibilities, have little access to credit and/or markets, and above all, no title to the lands they till. Besides these gender-based limitations imposed on them by society, the practical difficulties of working within the labour-constrained agricultural economy have deep implications for their wellbeing.

At the same time, feminisation has policy implications for agricultural productivity, food security from the household to the national and to global levels, and gender equity within the household and the labour market. Therefore, it is as much an area of interest for agricultural scientists as it is for development specialists. At the outset, it is crucial to know what the baseline situation is—the constraints, the needs, interests and the perceptions of change of those women who are performing all the household chores in addition to taking up the responsibility for agricultural production in the fields. Development agencies, including the Australian Centre for International Agricultural Research (ACIAR), need this knowledge to ensure that their programs and project activities are in tune with the actual needs as expressed by women.

For decades, it was generally assumed that only men did the farming and that resources expended on them, and knowledge generated, would automatically 'trickle down' to everyone within the household. Consequently, in agricultural development, only men got access to training, agricultural extension services and credit, and it was thought that women would look after the subsistence production for the household. The contemporary transformation offers a great opportunity to correct this situation.

This ACIAR Technical Report is based on a detailed survey of the issues, concerns and challenges of a large number of women-headed farming households. These households are located in one of the poorest parts of the world—the Eastern Gangetic Plains of South Asia—which is marked by male out-migration and deteriorating livelihoods. The report adds substantially to the field of agricultural knowledge by bringing in the voices of women, and will assist agricultural scientists and development agencies in incorporating gender issues into project design and implementation.

Nick Austin
Chief Executive Officer, ACIAR

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
EGP	Eastern Gangetic Plains
FAO	Food and Agriculture Organization of the United Nations
ha	hectare
ICAR	Indian Council of Agricultural Research
KVK	Kishan Vikash Kendra (local farmer organisations)
n/a	not applicable
Rs	Indian rupee (currency)
WHH	woman-headed household
WHHs	women-headed households

Summary

This technical report is the outcome of an extensive field survey undertaken in 2012. Because of increasing rates of male migration from poor farming households, usually to work in the cities, the survey targeted women heads of households to better understand the problems associated with the feminisation of agriculture in a changing world. The main objective of the research was to provide a set of recommendations, based on the data generated from the field survey, to integrate gender into a larger Australian Centre for International Agricultural Research (ACIAR) project on climate-resilient agriculture in the Eastern Gangetic Plains (EGP).

The women heads of households surveyed were drawn from three districts in Bihar state (East Champaran, Madhubani and Purnea), two districts in West Bengal state (Coochbehar and Malda) and five districts in the Eastern Terai region of Nepal (Rautahat, Jhapa, Morang, Mahottari and Saptari), which are close to the Indian districts and, by virtue of their low-lying nature, comprise part of EGP.

The respondents were mostly in their early 40s, but somewhat younger in Coochbehar. Most lived in *kuccha* huts and were illiterate. There was significant variation in their marital status—for example, 85% of the respondents in Nepal were married, whereas 74% in Madhubani were widowed. Male out-migration was common throughout, affecting over 50% of women-headed households (WHHs) surveyed; in East Champaran, all households had someone who had migrated outside of the village. The respondents' involvement in farming was also diverse, with share-cropping being prominent in Purnea and East Champaran, while owner-cultivators and agricultural labourers were more frequent elsewhere.

The average amount of land farmed by each woman-headed household was about 0.5–0.6 hectares (ha) in Purnea, Nepal and Coochbehar, decreasing to 0.4 ha for Malda, 0.3 ha in Madhubani and less than 0.1 ha in East Champaran—the lowest being technically landless; however there were landless households in all the districts. Very few respondents had title to their land apart from those in Nepal (20%) and East Champaran (30%). About 25% of respondents had no easy access to a bank and a similar proportion appeared to have no bank account.

One of the distinct gender differences observed was the far greater range of activities that women undertake during the day, mostly due to looking after children and cooking.

All households grew rice for their own consumption and sometimes a second rice crop for cash. The major cash crops were wheat (all but Coochbehar and Malda), maize (Purnea and East Champaran), jute (Coochbehar and Malda), lentils (Nepal and Madhubani) and tobacco (Coochbehar). There were few animal assets—1 or 2 cows, 1 or 2 sheep or goats, with some having poultry. Domestic assets were much the same, most having 1 or 2 chairs and similar numbers of beds and mosquito nets, while farming assets were limited to spades/shovels and sickles, with an overall 16% of households having an irrigation pump and the occasional chaff cutter. Overall, 21% had a grain silo; however, Malda had none and Madhubani had only one (omitting those districts, the figure becomes 44%).

There was a spread of perceived farming-related problems, with too much heat or unreliable rain being prominent except for Nepal, which had problems with lack of irrigation facilities. Pests/insects, high input costs and need for good-quality seed were also prominent. Respondents in East Champaran noted lack of land as a limiting factor, along with falling soil quality, whereas those in Madhubani wanted a greater degree of training.

With regard to fears, two were dominant, namely environmental threats and production worries. Needs were also cross-linked to the problems and fears. The needs focused largely on input-related matters and family issues.

However, the key point to note is that due to differences in gender-based roles in farming, women and men in the villages in EGP have different needs. The control of women over land and non-land productive

assets is in general less than that of men. Yet, their day-to-day interaction with the intricacies of farming livelihoods imparts to them a more acute sense of environmental change, as well as the awareness of changes in farming systems. Consequently, their perceptions of climate and market changes should lead to different developmental planning and interventions. While several agricultural improvement projects have encouraged women to participate in development and decision-making processes by specifically targeting them, it is now recognised that a more gender-focused approach is necessary.

Ensuing from my analysis of the data, I provide a synthesis of recommendations for consideration in developing projects targeted at WHHs in EGP with an appropriate and successful approach to gender equity. These include: incorporating 'gender mainstreaming' into the design of projects; investigating solutions to labour shortages; recognising diversity between local contexts and individual circumstances; helping to form community support for women heads of households, to assist them to secure both financial (bank loans etc.) and technical support; involving men in gender-equity processes; building capacity of women heads of households; and improving women's access to information, markets and transport. Last but not the least, considering the constraints on women as identified in this report on EGP, I would recommend that further studies be undertaken to examine the role of remittances in WHHs in farming, and their adaptive strategies to deal with labour-constrained farming systems.

Introduction

Women in agriculture

Women have always performed important roles in agriculture, whether in less- or more-developed countries and irrespective of time. Throughout human history, women have worked side-by-side with men, working often as a family unit of labour on the farm, although the powerful sexual division of labour meant that their labour and active participation were limited to only certain parts of agriculture and to certain tasks, or even to certain crops. Often, the bulk of this labour was performed under the direct or indirect control of men, which resulted in inaccurate information, invisibility and undervaluing of women's contributions to agricultural production systems.

When international development planners aim to improve agricultural productivity, they usually assume that men are the most productive workers—the 'natural' farmers. When these planners use innovative means to increase agricultural production, they assume that increased food production will benefit everyone in the rural community equally. Caroline Sachs (1983, pp. 119–120) noted that: 'The emphasis on production without simultaneous focus on the issues of distribution and equity has often resulted in increased deprivation for the rural poor'. She argued that without attention to gender equity, agricultural development may increase women's workload, decrease their status in rural society, and increase the difficulty with which a woman meets the subsistence needs of her family, resulting in malnutrition and even conflicts over food. Holmboe-Ottesen and Wandel (1991, pp. 94–95), researching food-related conflicts between women and men in a rural Tanzanian community, found that as women's control over resources lessened, their bargaining power within the household decreased, leading to more and more intense conflicts over the allocation of time and labour in food production, in use of productive land, and in the use of food crops and cash. Moreover, the exclusion of women from the agricultural development process may actually increase the difficulties of many rural women's everyday lives.

The study reported here aims to revise these mistaken and socially constructed beliefs of women's and men's roles in agricultural production systems, by highlighting women farmers' roles and responsibilities, their needs and interests, and perceptions of change in one part of South Asia.

This chapter provides a brief background that led to the study: theoretical debates, the contextual specificities and emergent contemporary forces that are rapidly changing gender roles of women and men in rural production systems.

Gendered division of labour—a historical perspective

Women's labour in agriculture in less-developed countries differs from that in the more-developed ones. In the former, women were traditionally responsible for what Boserup (1970) described as the 'feminine sector' of subsistence farm production that was separate from the male-dominated cash-crop sector. Deere (1976) also supported this view and argued that women's work in the subsistence sector of agriculture allowed the male wages in the sector to remain lower than was necessary to maintain a family. Because of these low wages, women had to support the families through subsistence food-production activities, and so the cycle continued.

Tinker (1976, p. 25) suggested that colonialism played a key role in entrenching the sexual division of labour, stating that 'erosion of the role that women played in subsistence economies began under colonial rule'. Colonial policies were often aimed at increasing the production of cash crops and favoured men and lowered the status of women in agricultural production systems. Most importantly, colonialism undermined women's access to, and ownership of, the most important productive resource—land. Other ways in which colonial rule altered women's status included

the separation of public and domestic labour through the expansion of large-scale and market-oriented production and the spread of private property. Women became associated with household labour, subsistence production and reproductive activities more firmly than ever, subsuming their productive roles in farms in particular and the economy in general.

Rogers (1979, p. 36) showed that much of the ideology of male dominance was passed on from the colonisers to the local, educated male elites who came to dominate the production systems. Consequently, even when new technologies (such as the high-yielding varieties of wheat and rice) were introduced along with modern agricultural practices during the late 1960s, they marginalised women farmers by neglecting to focus on their productive roles. In African countries, where women are probably most active in agricultural production—working as primary providers of food and shelter for their families—the exclusion of women from agricultural development has had serious negative impacts. Mechanisation of agricultural production tends to replace women's labour and intensify the sexual division of labour, as men monopolise the use and care of the mechanical farm equipment, pushing women further into more manual and repetitive chores. Beneria and Sen (1981, p. 286), however, critiqued this view and argued that the crucial feature lies not in the tools used—hoe or plough in African or Asian farming—but in 'the forms of appropriation of land, of surplus and of women's reproductive capacity'. Kandiyoti (1985, pp. 19–20) agreed with this perspective and noted that the sexual division of labour in productive activities needs to be considered within the overall patterns of rural transformation, processes of differentiation among peasant households, and the impact of such processes on the structure and internal dynamics of the household.

More recently, researchers (such as Quisumbing et al. 2011) have focused more holistically on overall livelihood patterns and the asset dynamics of households to show how men and women are coping differently with major livelihood shocks. For example, using a longitudinal dataset of 957 households in rural Bangladesh constructed with a 10-year survey interval between 1996–97 and 2006–07, Quisumbing (2009) found that within a household, men's and women's non-land assets are drawn down for different types of shocks. Yet, a recent death in the household, even when it is followed by the receipt of inheritance, is generally associated with reductions in the wife's asset holdings and increases in the husband's. Gender-based differences in responsibilities for coping with shocks (such as having to manage illness-related problems) have implications for long-term asset management.

Influence of globalisation

As the agriculture sector changes in response to globalisation, the ways things have traditionally operated in agriculture also change. Most farmers in rural areas today are increasingly trying to diversify their livelihoods by seeking more options, most often in non-farm (or off-farm) activities or sectors. In Latin American countries, for example, higher numbers of women are now engaged in non-agricultural activities, but, at the same time, the involvement of women in both rural and urban agricultural production has risen since the late 1970s (Deere 2009). Whitehead's (2009) study in Tanzania, Africa, noted that those who have more-or-less successfully opted for non-farm incomes constitute the relatively richer households rather than the poorest ones. She also noted that the poor tend to work intermittently and seasonally on others' farms while the better-off households are more likely to be involved in non-farm enterprises or even in government jobs. In addition, she observed that men were more likely to work in the non-farm enterprises or jobs because of their relatively better access to financial, human and social capital compared with women.

Thus, within the overall context of livelihood diversification, one can clearly notice differences according to income status—the poorest households are trying to increase their survival chances, adopting any strategy that is likely to offer them a way out of poverty. Therefore, it is generally among the poorest of families that one expects to see more male out-migration as a family survival strategy, leaving women, children and the elderly in rural areas. Women are left behind to care not only for the young and the elderly but also for the farm and livestock. Feminisation of agriculture is thus linked to the adoption of migration as a coping strategy to deal with changes as they are unfolding within the overall rural economy.

Feminisation of agriculture

In the 21st century, women's roles have changed in comparison with the 1970s; today, a signficant portion of the world's population are women farmers and

rural women make up the majority of women living in less-developed countries. A conservative estimate by the United Nations Human Rights Council (UNHRC) in 2010 suggests that in the present day, female farmers produce 50% of all food crops. Women comprise, on average, 43% of the agricultural workforce in developing countries, ranging from 20% in Latin America to 50% in East Asia and Sub-Saharan Africa and more than 70% of farm labour in China, although these proportions vary according to the social, ecological and economic contexts (Song et al. 2009). Over 75% of the daily time of a rural woman is spent on farming-related activities, including caring for livestock and collecting water.

The general pattern in Asia suggests that the poorer the area, the higher is women's contribution, and that women generally farm small pieces of land. In South Asia, 70% of agricultural workers are women and 60–70% of rural marketing is done by women. Throughout India, women are more likely to be engaged in agricultural work than men, but much of this work is informally done as part of the family's subsistence. Consequently, official statistics continue to grossly underestimate the female workforce in the region (Krishnaraj and Shah 2004, p. 44). Vepa (2004) estimated that, in India alone, close to 33% of cultivators (a census category, implying farmers with land) and nearly 47% of agricultural labourers are women.

Driving factors

A rapid process of feminisation of agriculture has been unfolding throughout most of the world. Deere (2009) suggests that a multitude of factors can be responsible for this circumstance: increases in rural and urban women's participation rates in the agriculture sector; a rise in the share of agricultural labour force that is female (which can, in turn, be the result of the higher female activity rate in agriculture and/or a decrease in men's); an increase in the number of agricultural tasks in which women participate (and which could overtake the traditional male-only roles in agriculture); a greater input in the total labour time that women dedicate to fieldwork or agricultural tasks; an expansion in women's roles in agriculture-related decision-making; and last, but not the least, the under-enumeration of women as unpaid family labour in the past, combined with their greater current visibility as agricultural wage workers or own-account farmers. Moreover, depending upon the existing agricultural and livelihoods system, feminisation can mean slightly different things in the context of agriculture in different countries.

Experts think that feminisation of agriculture is a process in which different combinations of a multitude of economic, social and political factors intensify women's contributions to farm labour. That a process of feminisation is taking place in South Asian agriculture is more or less accepted, although the precise reasons for it are not well understood. The process is most likely connected and related to contemporary global changes in both environmental factors (such as climate change) and economic factors (such as the stagnation and poor productivity of the agriculture sector, the globalisation of crop markets and rising input costs, as well as country-specific situations of agricultural decline).

Consequences of male out-migration

Most relevant to this study is distress out-migration of male members of the household, forcing women to become de facto heads of households. Such gender-selective out-migration from the rural sector is a phenomenon that characterises the developing world; however, its pace has accelerated in recent decades, leading to the emergence of a feminised agriculture in many countries. The work of Zhang et al. (2006) in China assessing the impacts of feminisation on productivity, farm labour supplies, household income management and food security, has highlighted the urgent need for, and significance of, policy-oriented research to enhance women's productive agency. Increased male out-migration from villages is just one facet of agrarian change under neo-liberal economic policies (Lastarria-Cornhiel 2006; Razavi 2009). Besides the blurring of traditional gender-based divisions of labour, adoption by women of not only more wage-based work in agricultural processing but also the investment of more time in cash-crop production has been observed (Katz 2003, pp. 33–35; Deere 2005, p. 17). Internationally, there is growing recognition of the decisive roles that women play in ensuring household food security; however, they are generally not seen as farmers—for examples, see Alston (2002, 2006) and Pini et al. (2008) for Australia, and Brandth (2002) for Scandinavia.

In India, distress out-migration of rural men in favour of 'non-agriculture sectors' leaves women to undertake the production of labour-intensive cash

crops and changes the traditional gender division of farm work, with women accepting, at lower wages, jobs that were formerly done only by men, such as land preparation, cultivation of crops, pesticide spraying, harvesting, postharvest processing and marketing of the products.

Male out-migration needs to be seen within the context of an oppressive stagnation of the farm sector and an agrarian crisis that is unprecedented in its depth and extent. Experts (such as Mohanty 2005; Reddy and Mishra 2009) note that the plight in rural India is due primarily to the inability of farmers to generate and retain, in adequate quantities, surplus from agriculture. They have shown that in addition to male out-migration, external factors—such as the rising costs of cultivation, inability to cope with the vagaries of rainfall and global prices, crop failures and indebtedness and bottlenecks in agricultural marketing—are deepening the rural predicament. This crisis is manifested through a complex interplay of shrinking landholdings, degraded soil and water resources, declining access to traditional seeds and other inputs, distorted market incentives for crop choice and technology, growing labour shortages and mechanisation (Mishra and Reddy 2011). Of the various consequences of the irreparability of livelihood shocks and indebtedness is an increased incidence of suicides by male farmers who feel unable to uphold their responsibility to provide for their families (Vasavi 2012).

Encompassing women in development planning

The 'masculine market' in agriculture has been proven to be a myth; women are no longer regarded primarily as subsistence food producers and as helpers and assistants in relation to the production of surplus in cash-crop farming (Spring 2000). Recognising women's involvement in commercial crop production has been described as 'the heart of the development issue' (Gurung 2002). Ensuring that women benefit from research, extension, credit and land-tenure rights, market access and other elements of production, innovation and participation therefore are upheld as key elements for future food security (Mehra and Rojas 2009). However, most rural women in India have less access than men to agriculture-related assets, inputs and services (Shah 2004), as well as water, all of which are critical inputs for productivity (Meinzen-Dick and Zwarteveen 1998; Lahiri-Dutt 2009).

According to the Food and Agriculture Organization of the United Nations (FAO), if women enjoyed the same access to productive resources as men, they could boost yields by 20–30%, thereby raising the overall agricultural output in developing countries by 2.5–4.0% and reducing hunger by 12–17% (FAO 1996). Not surprisingly, therefore, FAO considers identification of women's roles in farming as one of the *nine key challenges for rural women in Asia.* But any assistance must consider women's lack of assets—FAO observed that 'land rights can serve multiple functions in rural women's lives, which are not easy to replicate through other means' (FAO 1996; Chen 2000). Agarwal (1992, 1994) noted the disjunction between public policy formulation and the rights encased in personal law; even today, this remains one of the marginal concerns of policymakers and development planners (as noted in National Alliance of Women 2006).

South Asian context

Compared with the global scenario, the South Asian agriculture sector, overburdened with labour and housing massive under-employment, offers no exception to its growing feminisation. In poorer families with little or no land, men must leave to earn cash to supplement family subsistence while, in better-off families, the young educated boys are generally averse to agriculture and keener for an outside job (Chowdhury 1993, p. A137). The drive for a job or cash incomes from outside agriculture is not exclusive to land-based rural households and many landless poor are leaving villages in favour of cities, in search of better and non-seasonal wages. However, the petty, poorly paid jobs and higher costs of urban living mean that women have to be left behind. In exploring the complex interrelationship between women agricultural producers and their lack of rights to land and related factors of production, Kelkar (2009) observed that feminisation has serious implications for the producers' economic agency and productivity, and farm income. Without autonomy and ownership of assets, improvement of agriculture would be difficult to accomplish. Yet, greater involvement of women in farming is changing the ways in which farming systems are managed. These changes are incompletely understood and, as a consequence, so are the necessary adjustments to research and development investments that would potentially be more responsive to the unique risks, opportunities and challenges faced by women.

Attributes of climate change relevant to the project

Effects of climate change on the Eastern Gangetic Plains

Climate change here refers to the overall effect on the atmosphere of the greenhouse gases emitted by anthropogenic factors; that is, human-induced causes. Greenhouse gases are essential for maintaining the temperature at the Earth's surface at levels suitable for human habitation and comfort. However, since the Industrial Revolution began in the 1760s, human societies have become increasingly dependent on burning fossil fuels for transport and energy consumption, leading to severe enhancement of the greenhouse effect (Zalasiewicz et al. 2008). The agriculture sector, primarily through fertiliser production and use, cattle-rearing, rice production and biomass burning, contributes up to one-third of greenhouse-gas emissions (Gilbert 2012; Vermeulen et al. 2012). However, of the various results of this phenomenon, the ones that most affect agriculture—particularly in the Eastern Gangetic Plains (EGP) of South Asia—include the overall increases in mean temperatures, frequency of heatwaves, number and intensity of floods and drought risks (variability of rainfall), and frequency of heavy rains.

The biophysical impacts of climate change will differ according to the local terrain and other geographical contexts in the EGP region, but have the potential to affect the agriculture and fisheries sectors in general and the poor and vulnerable populations in particular. FAO (2008) envisages that crop yields will reduce; that people, livestock and plants will experience heat stress; that crop varieties and local animal species will be affected; and that water supplies for farming will become irregular and unreliable, leading to water stresses. In another major document, FAO (2012, p. 17) states: 'In essence, for people whose livelihood depends on agriculture, climate change will alter what they can do, as well as their ability to manage natural resources and access traditional safety nets. Climate change impacts also limit access to basic resources, such as water and agro-biodiversity'.

In EGP, the reality of climate change is not just measured and assessed in the laboratories, but acutely felt by those who are working on the ground. Many agricultural scientists and development professionals are witnessing first-hand the devastating effects of a changing climate. The changes all have significant consequences for the livelihoods of a very large number of rural poor farmers living in South Asia, and present additional vulnerabilities to their already insecure lives.

In general, climate change is expected to impact on four dimensions of food security: *availability* (geographical variations in the availability of food crops, livestock, forest produce and fisheries), *stability* (weather extremes and climate variability harming rainfed farming systems), *utilisation* (exposure to vector-borne diseases, lowering people's capacity to utilise food effectively) and *access* (complex secondary impacts of climate change, such as conflict and human insecurity, migration and rising food prices). Rapid aggregate income growth in India over the past two decades has hidden the increasing food insecurity among the poorer and rural populations of the country. Ghosh (2010, p. 33) observes that nutrition indicators have stagnated and per capita kilojoule consumption has actually declined, suggesting that the problem of pervasive hunger may have worsened. The rise in food prices makes matters much worse for the poor, further deteriorating their access to food.

Gender-divergent impacts

Lambrou and Nelson (2010) confirm that there is a strong gender dimension to the way climate variability is experienced and expressed by farmers in their coping strategies to ensure their livelihoods. Although each of the food security impacts affects both women and men, they are 'gender differentiated' in the sense that some women and men are more or less affected, and some changes are more strongly (or less strongly) felt by women and men of different age, economic class and social status. To give examples of the distinct and specific gender aspects, one might note that when food availability decreases, women are more likely to be concerned over the wellbeing of their families (Kabeer 1990; ADB 2013), whereas men may migrate in search of cash incomes (Maddox 1996). A shortage of water encourages women to focus more on securing drinking water and to feel concerned over the health implications for their families, whereas men tend to focus more on securing water for farming (Crow and Sultana 2002).

When traditional crops are no longer available in changing farming systems, women as primary providers of household food security are affected more strongly than men (Kasente et al. 2002; Razavi 2002).

Also, women may be more vulnerable in conditions of conflict and may be left behind to look after the farm and take care of the children, the elderly and the livestock at home. Such a trend is already noted in the study region, although its connection to climate change is yet to be firmly established; it is, however, clear that women's work burdens have increased enormously, leaving them with few recreational or leisure opportunities.

Frame of reference and objective of the project

As noted in Balakrishnan (1998), a 'radical reorientation of [the] agricultural research agenda' has become necessary. If the reality is a feminised agriculture, then efforts to improve agriculture must ensure that they lead to the empowerment of women and enhance gender equity, while at the same time addressing gender-specific needs so that investing in women leads to more efficient and productive farming systems.

The current research project was undertaken in the context of this overall background. The rapidly changing situation calls for an innovative research approach that integrates a wide range of concepts and methods to support policy formulation and resource management more effectively. Close attention to gender aspects of farming systems is one part of the new approach. The main objective of this research was to provide a set of recommendations, based on field survey and analysis of data, to integrate gender into a larger Australian Centre for International Agricultural Research (ACIAR) project proposal on 'climate-resilient agriculture' in EGP. Figure 1 presents a schematic view of how gender issues can overlap the two broad thematic areas of climate change and agricultural development, and the plans to deal with both can present the opportunity to consider women's empowerment, thus mainstreaming gender in interventions in both areas. The constraints posed by a changing climate may further undermine women's autonomy in contexts where women already face unequal opportunities, own fewer resources, and bear disproportionately high burdens of labour in agricultural communities. The overlaps in the diagram present a reminder that the involvement of women is essential in all projects designated to improve agriculture in a climate-change-affected world.

A host of factors is currently affecting farming-based livelihoods in the region, such as recent institutional changes (including economic liberalisation and commercialisation), appearance of new technologies, growing awareness of an impending food crisis, deepening poverty in specific 'pockets' or geographical regions and, above all, climate-related changes. Future food security also needs to be understood within the paradigm of climate change. Most importantly, the study emphasises gender-based differences in the perceptual worlds of women and men. The findings demonstrate that gender analysis enhances the ability of agricultural planners to understand what farmers perceive as change, which areas they see as changing and which changes they see as affecting agriculture, as well as how they are responding to climate change. These findings are significant for informing policy decisions to ensure that the experiences of both women and men are embedded into policy design and that gender is integrated into any policy program that might prepare the agriculture sector for adaptation to climate change.

Background to the study region

EGP is a large area, covering the Nepal–India–Bangladesh borderlands. The project focused on

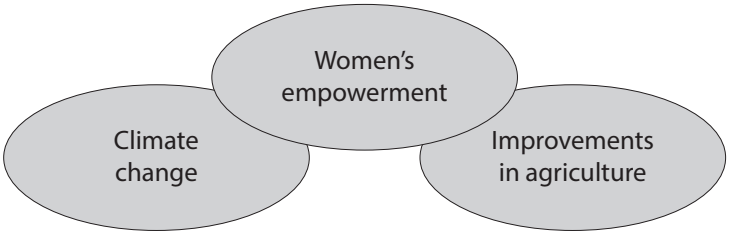

Figure 1. A gendered approach to climate-resilient agriculture

selected districts of Bihar and West Bengal states in India and the proximate low-lying Eastern Terai region of Nepal. The unique feature of the region is that it cuts across the national boundary between India and Nepal, highlighting the commonality of poverty and the porosity of the border. The long land border between India and Nepal is an open one, which means that citizens of either country can move freely across it without even being recorded. Migration has always been one of the livelihood options for generations of Nepalis; however, in recent years, the ever-growing population, scarcity of agricultural lands and high cost of farm inputs have forced many Nepali villagers to seek alternative forms of livelihood, mainly in India, but more recently, also in South-East Asia and the Gulf countries. Although the actual number of migrants remains unknown, Sharma and Thapa (2013) estimate that anywhere between a few hundred thousand to a few million Nepalis could be living in India. They also emphasise that Nepal's Terai belt, although erroneously ignored while considering out-migration from Nepal, is a major source region, as nearly 30% of all Nepali migrants (as per the 2001 census) were from the area. Terai is where a large number of Madhesis live and the males from this community primarily go to India for work.

EGP was identified by ACIAR in a scoping study undertaken in 2011 as one of the 'poverty–climate hotspots' of South Asia. In other studies, livelihood and poverty considerations were incorporated (Hellin et al. 2010). EGP is primarily an agroecological region, but it also takes into account state and district administrative boundaries. The region has a predominantly agricultural economy, with no major industry or non-agricultural activities to provide additional, non-farm incomes. At the same time, the ratio of land available per capita is low, with the social structure marked by vestiges of feudal exploitation and caste oppression, resulting in intense poverty. Although parts of West Bengal state moved ahead in agricultural productivity after the introduction of water-intensive rice farming in late 1960s (Rawal and Swaminathan 1998), the northern districts that comprise EGP have lagged behind in agricultural production.

Consequent to the intense poverty in EGP, migration out of the area has always been a key livelihood strategy for men of working age. Male out-migration has increased in recent years; in a study of six districts of Bihar state covered under the World Bank–funded Bihar Rural Livelihoods Project and the International Fund for Agricultural Development (IFAD)–funded Women's Empowerment and Livelihoods Project in the Mid-Gangetic Plain (WELPMGP), Deshingkar et al. (2006) found that rural people have become even more mobile since around 2000. They cite two reasons for this increase in migration rates: deteriorating employment prospects locally and emerging opportunities elsewhere. However, more striking are the class differences in the nature (and reasons) of migration: men from the better-off farming families are migrating for more secure and better-paid jobs with regular incomes, whereas men from poorer rural families migrate in search of casual labouring work in construction, in brick kilns, in rickshaw pulling and for farm work in richer areas of the country. Usually these men migrate seasonally, but increasingly in recent years, short-duration and seasonal labour migration (usually to the agriculturally better developed states in India) has been replaced by long-duration migration (extending up to 9–11 months) to industrial and urban areas of Gujarat and Maharashtra states and Delhi (National Capital Territory of India). For example, a study conducted in three districts in Bihar by Singh et al. (2011) found that the rate of gender-selective out-migration has increased in recent decades, particularly from households with small sizes of landholdings located in less favourable ecosystems, and that a very high proportion of these migrants are now moving to cities for longer durations.

Within this nexus of labour out-migration and deepening agrarian crisis within the overall rural poverty dynamics, two factors affect the wellbeing of farm households: labour loss and the influx of capital from remittances. Lokshin and Glinskaya (2009) explored the costs and benefits of gender-selective out-migration in Nepal and concluded that male out-migration has a negative impact on the wellbeing of the household and more specifically on the level of labour-market participation by women from these migrant-sending households. Both alter the social relations of labour and land in agriculture and warrant closer scrutiny, which is outside the ambit of this study. For the time being, however, suffice it to say that although remittances may improve the wellbeing of the families, there is increasing concern expressed by agricultural scientists that male out-migration has had far-reaching consequences for agricultural productivity in this broad region (McCarthy et al. 2006).

Methodology

Studying women heads of households

For the purposes of this study, a specific subgroup of women within the major category of 'rural women' was selected—those heading households. While the term 'women heads of households' is usually used within India to mean widows and abandoned women[1], a further category needs to be included for women who, due to an absentee husband, generally run the household on their own and, in some cases, take household decisions. In a report on the 2011 Census of India data, Chandramouli (2011) defined the 'head of the household' as the person who bears the chief responsibility for the maintenance of the household and takes decisions, and is recognised as the head. In this study, the term 'women-headed households' (WHHs) was broadly defined to include those households where farm-level decision-making is done primarily by women—that is, both de jure and de facto WHHs. Male household members may be entirely absent, engaged in proximate off-farm employment, too ill, too young or too old to work or have migrated outside the village for work.

According to the 2011 Census, there are about 27 million WHHs in India[2], constituting about 11% of all households. Lakshadweep union territory (nearly 44%) and Kerala state (23%) have the highest proportions. Of the total number, there are nearly 5 million single-member WHHs of which three-quarters live in rural areas. Generally, the size of these households is smaller than those headed by men[3], the dwelling units are smaller (fewer rooms), they have fewer assets, and have poor access to amenities and services (such as drinking water, sanitary latrines etc.).

These findings from the 2011 Census data broadly corroborate earlier studies. Almost three decades ago, Visaria and Visaria (1985) noted that throughout the world the incidence of WWHs was increasing. They examined the census data of 1961 and 1971 (as well as National Sample Survey Organisation data pertaining to Maharashtra and Gujarat states for 1972–73) and found that nearly 10% of the total households in India were headed by women at that time. The incidence of women's headship of households was relatively higher in South and East India than other regions (Unisa and Datta 2005). One needs to add a caveat here; much depends on what kinds of data are used and how the data are processed. For example, Gangopadhyay and Wadhwa (2004) suggested that listing the sex of the household head is a mere reference point, without necessarily any income-earning responsibility, or authority. Therefore, it derives that such secondary data may not reflect the actual conditions of WHHs, particularly of those in rural areas.

The diversity within WHHs was noted by Chant (2009), who questioned the popular wisdom of regarding them as the 'poorest of the poor'; instead suggesting that, although poverty may precipitate the formation of such households and some aspects of female headship can give rise to economic disadvantage, members of these units are not necessarily worse off than people in male-headed domestic arrangements. This line of argument has generally followed the debates around remittance incomes that many such households receive from the absentee male. In a recent study undertaken in the hill areas

[1] Lingam (1994) noted the impact of marital dissolution (such as the death of the spouse, divorce, separation or abandonment) as the key factors in women becoming the head of the household, but at the same time strongly noted the importance of male out-migration in women taking over the responsibility of cultivation.

[2] Over 72% of all households in India are in the rural areas (NIC 2008).

[3] The average size of the household in India is about 4.5 persons, with rural areas recording a slightly higher value (4.7).

of Nepal, Maharjan et al. (2012), following the previous work by Buvinic and Gupta (1997), suggest actual decision-making power depends on the amount of remittance received. Clearly, there are practical difficulties here, particularly because of the issues around identifying the actual head of the household.

It should not be assumed that female headship is always positively correlated with poverty, as this can lead to erroneously focusing exclusively on poverty reduction as the only important goal for WHHs. Studies that also focus on women heads of households' multiple roles in agriculture (as well as in the home) are much more likely to devise concrete policy recommendations. That said, however, to speak broadly for the Indian case, evidence tends to indicate that WHHs are poorer than male-headed households. For example, using 2005 National Family Heath Survey data, Rajaram (2009) calculated the relative poverty of such households (defined as housing conditions, wealth index and standard of living index) and identified them as marginally poorer.

As discussed in later chapters of this report, we observed that the ownership of land provides one of the keys to understanding the level of wellbeing of women heads of households in the Eastern Gangetic Plains (EGP) region. One significant observation is the importance of disaggregating this group due to the wide variability in terms of involvement in farming, contribution of farm income to the overall livelihood basket, asset ownership and expressed needs. In this regard, the initial observation from the region is contrary to Chant's (2009) view, since less than 5% of women actually own significant amounts of productive assets. Moreover, such households remain the victims of both subtle and overt discrimination; Mencher and Saradamoni (2012, p. 144) note that the general social attitudes towards widows, as well as the actual lack of a partner to physically share responsibility and economic loads, make their position more onerous. At certain times in the farming cycle, WHHs are without any income—such as when the available work involves only masculine activities, such as ploughing, or whenever the tasks in agricultural production require a man and woman to work as a pair; a woman without a husband, brother or a related male cannot work with a strange male person. Lastly, if a child falls ill, or the care burden increases in any other way, the woman heading a household must refrain from productive work, causing a decline in family wellbeing.

Partners in the survey

There were several local partner organisations that assisted in the smooth collection of data for the study and provided easy access to village communities. In India, the partners were the Indian Council of Agricultural Research (ICAR), Rajendra Agricultural University and Bihar Agricultural University in Bihar, North Bengal Agricultural University (Uttar Banga Krishi Viswavidyalaya) in West Bengal and International Development Enterprises (IDE) Nepal.

Selection of villages

Villages were chosen by the national partners in collaboration with ACIAR and the International Maize and Wheat Improvement Center (CIMMYT). The selection criteria ensured that these villages would approximately represent the conditions existing across the EGP region. This report explores inter-district variability to illuminate different patterns of women heads of households' involvement in agricultural practices (and perceptions of change) between different ecological regions, to highlight the differences between the districts.

The women heads of households were drawn from:

- Bihar state, India: East Champaran, Madhubani and Purnea
- West Bengal state, India: Coochbehar and Malda
- Eastern Terai region, Nepal: Jhapa, Mahottari, Morang, Rautahat and Saptari (subsequently referred to collectively as 'Nepal').

The general locations are indicated in Figure 2 and lie on the plains between the Himalayan foothills to the north and the River Ganga to the south.

Survey design and implementation

Rationale

As the objective of this research project was to provide a set of recommendations, based on field surveys and data analyses, to integrate gender in the larger ACIAR proposal on 'climate-resilient agriculture' in the EGP, an extensive region-wide field survey of women heads of households was undertaken in July–August 2012, using a basic set of mixed methods that can robustly combine a questionnaire-based field survey with qualitative interviews and case studies. In addition to the main survey, in each study village a focus group discussion was held to inform

Figure 2. Location of the study areas in the Eastern Gangetic Plains

the villagers of the study, to seek their permission to survey the households and interview individuals, and to talk in general about the condition of women in agriculture. At least one in-depth interview of one woman head of household was conducted in each village to ensure that the quantitative data were enriched with more qualitative, narrative-style information.

The study attempted to explore, as far as practicable, rural women heads of households' lives, livelihoods, roles, assets and perceptions of change in a holistic manner. Broadly, a modified Harvard Analytical Framework (see March et al. 1999, pp. 32–42) was used. This framework, also referred to as the 'gender roles framework', primarily aims to make women and their various kinds of contributions through reproductive [domestic] and productive work more visible to development planners. To put it simply, the framework is based on the understanding that the household is not an undifferentiated grouping of people with a common production and consumption function. According to Locke and Okali (1999, p. 284), the cornerstone of the framework is data that highlight the key differences between the incentives and constraints under which men and women work:

> Data-collection centres on the completion of an activity profile aimed at detailing gender-based divisions of labour, the gendered allocation of resources (both resources and benefits), and the gendered control of decision-making. The final component is a list of factors, such as population increase and environmental degradation, which affect the different opportunities and constraints on men's and women's participation in development.

Modified versions of the Harvard framework have been widely adopted by agencies working on gender in rural contexts. Locke and Okali (1999, p. 284) further say that 'within farming systems research and extension, it is the accepted way in which gender issues are addressed and the adapted framework appears as part of standard monitoring practice'.

The study also attempted to step outside conventional understandings of social and economic relations between women and men at the household level. The basic operating principles were to not

isolate women's interests and issues from those of men, and to not universalise among the diverse nature of women heads of households or to simplify either women's or men's diverse social roles as either food-crop producers or cash earners. These social relations of different kinds often act together to produce (and reproduce) disadvantages. Both women and men act as members of the household. While there are conflicts of interest between them, there are also substantial levels of cooperation, regard for mutual wellbeing and common interests. It is also important to remember that no preconceived notion of 'what is good or bad for women' is actually valid or desirable, and in attempting to examine agriculture in a gender-sensitive manner, one must 'listen to the voices' of the poor women. This is especially important as, although the situation is improving slowly, such women still generally lack any voice in many institutions.

Questionnaire development

A draft framework questionnaire for semi-structured interviews of women farmers to elicit case studies/narratives was prepared and presented to the partners for feedback. Women in the region have conventionally been involved in farm work in two main ways: as wage labourers (primarily during transplanting and harvesting and in processing) and as housewives (in supporting roles and in market gardening). As men move out of farming, new forms of cropping arrangements are emerging and women's work burdens have intensified; in some of the surveyed villages, 80–90% of the work is currently done by women, and can include the following:

- supporting (and supplementing) farm work (cooking, feeding livestock etc.)
- working on the farm (and processing etc.) alone
- working on the farm with family
- hiring male/female labour for regular or selected work
- a combination of the above
- entering diverse kinds of share-cropping (*bataiya*) arrangements
- combining own labour and crop sharing.

The need to disaggregate rural farming households on the basis of gender to identify planning and intervention needs is well recognised. Therefore, the household survey instrument, developed by the author for deployment among women-led farm households, aimed to elucidate specific details on assets, decision-making, perceptions of change, coping strategies and development needs as they pertain to building resilience to major production challenges. Suggestions for modification of the questionnaire were presented in a consultative meeting at ICAR in Patna (Bihar state, India), during which it was also adapted to reflect the diverse local farming conditions in the selected districts.

The questionnaire was then pilot-tested in nearby villages to ensure that the process of interviewing was smooth and easy, and was thus modified as required. Lastly, the questionnaire was translated into Hindi, Bengali and Nepali by Indian and Nepali partners for use by local enumerators. For the Madhubani, West Bengal (Coochbehar and Malda) and Nepal survey teams, training sessions were held to explain the questionnaire.

Sampling strategy

The sampling strategy was also discussed in the meetings at ICAR and, given the nature of the study population, it was decided to use a purposive strategy. Maxwell (1997, p. 87) defines purposive sampling as a type in which 'particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices'. Such sampling can draw from a wide cross-section of populations and can give rise to samples of WHHs that may be considered sufficiently representative to reasonably warrant the drawing of inferences relating to the entire population. Such sampling is widely used to achieve representativeness or comparability within populations. It is of use for two goals: to find instances that are representative or typical of a particular type of case on a dimension of interest; and to achieve comparability across different types of cases on a dimension of interest (Teddlie and Yu 2007). Thus, it was deemed as a suitable strategy in order, as per the research approach adopted in consultation with the partners, to characterise the evolving roles of women in agriculture in the region and, based on that analysis, to identify opportunities for increasing resilience among women-led farm enterprises.

In all, 263 women heads of households were surveyed—20 from East Champaran, 73 from Madhubani, 50 from Purnea, 38 from Coochbehar, 42 from Malda and 40 from districts sampled in Nepal. The specific villages and the numbers of participants from each are detailed in Appendix 1. Note that data gathered from Madhubani and Coochbehar with respect to some questions were inadequate for

some analytical purposes; and, due to the small size of the sample in comparison to the Indian districts, all districts in Nepal were combined for the purposes of this analysis.

Survey questions

The questionnaire comprised 17 questions, many of which included a number of subquestions. The questions covered a wide range of topics exploring:

1. characterisation of the individual woman and her household
2. the migration status of the family and what impacts such migration might have had on the woman-headed household (WHH)
3. household incomes and the respondent's access to and control over these incomes
4. the respondent's 'triple roles'; that is, roles at home, on the farm and in the community
5. the respondent's use of time in different seasons, in comparison to the work performed by the men in her household
6. the respondent's perception of changes in productive assets during the past 10–15 years
7. the perception of changes in farming practices, in view of the deeper engagement by the woman head of household in farming
8. access to and control over a whole range of non-land domestic as well as productive assets
9. access to agricultural services, infrastructure and markets
10. decision-making on the farm and at home
11. access to and ownership of farm machinery
12. access to and ownership of irrigation.

From Question 13 onwards, the aim was to provide an opportunity for the respondents to express themselves more qualitatively; in other words, to 'open their hearts', to express some of their greatest worries and fears. These questions investigated the respondent's views on:

13. top-three difficulties, shocks and constraints they face
14. top-three farming-related problems
15. general fears and worries
16. most pressing needs.

The final question (17) offered a semantic differential scale asking respondents to rank a number of statements about changes in farming, in livelihoods and in the climate.

Data synthesis

An extensive amount of data was collected, but not all of the information was suitable for analysis. Given the nature of partnerships in the study, the data were collated to reflect district-wise variation; that is, given a treatment at the spatial scale. The information contained in the responses to the 17 questions and their subquestions was classified under six major themes:

- individual/household characterisation of the respondents
- respondents' multiple roles (time-poverty)
- access to and control over assets
- perceptions of changes in farming practices
- perceptions of difficulties, livelihood shocks and most pressing needs
- use of a semantic differential scale to gauge attitudes to pertinent subjects.

The results are presented and analysed in the chapters that follow.

Woman heads of households: individual/household characterisation

Attributes of women heads and their households varied between districts, and the average results of the survey are presented below. As expected, the 'average respondent' is marked by minor diversities. Detailed data related to this theme are given in Appendix 2. The case study in Box 1 exemplifies one such household and the woman who heads it.

Box 1. The case of Dukhni Safi, Sankarthu village (Pandol block), Madhubani district

The average woman heading a household in Madhubani district could be Dukhni Safi, whom I interviewed during the field visit. Dukhni, a widow from the low caste of washermen Safi, was married at the age of 8 years, and is now 38. Her husband, Boku, went to Kolkata (formally Calcutta) to work as a domestic servant, but had an accident which disabled him and he came back home. After suffering for a few years, Boku died, leaving four daughters and a young son. This village is one of the poorest, has no electricity connection and perennially suffers from water shortage due to a low watertable. After the marriage of her daughters, Dukhni now has only 7 *kathas* (0.09 ha) of land left, recorded in her dead father-in-law's name, which provides for only about 4–5 months of food for the household members.

An interesting livelihood strategy is that Dukhni has kept her youngest daughter, Bina, with her even after her marriage; Bina's husband works as a temporary labourer in Mumbai and every now and then sends Rs1,200 or 1,500 through the post office. The money is sent in Dukhni's name. Aside from this, Dukhni also receives a small sum as a widow's pension. Dukhni's son is apprenticing as a driver's help in Kolkata and does not yet send home any cash. Dukhni and her daughter together look after the farming activities, excepting ploughing. She sows rice during the Kharif season, then wheat during the winter and moong [mungbean] as a Rabi crop. But she thinks that farming conditions are getting worse than before; when we asked about the specific problems she faces in farming, Dukhni complained about seedlings desiccating because of the late onset of rains. She also grumbled about the high cost of agricultural inputs such as seeds, fertilisers and insecticides.

Average age of respondents

The average age of a woman heading a household varied between 32 and 45 years (Appendix 2). Purnea had the highest average age, 45, while for the contiguous Malda, it was 41, and for East Champaran, 42. The average age in Madhubani and Nepal was 38, whereas in Coochbehar it was 32.

House type

It was most likely that the woman-headed household (WHH) lived in a *kuchha* (makeshift) home or a hut made of either straw or mud. Only one household in each of Purnea and East Champaran and two in Coochbehar lived in a *pucca* house (a 'proper' house made of brick, concrete etc.), whereas Malda and Madhubani had the highest number of *pucca* houses (eight and seven, respectively) among the surveyed women (see Appendix 2). The number of *pucca* houses in Nepal was also notable, at six.

Marital status

In East Champaran, Purnea, Coochbehar and Nepal, the respondent was most likely to be married, but in Madhubani and Malda, she was most likely to be a widow (Table 1).

Educational status

In East Champaran, Madhubani, Purnea and Nepal, the woman head of household was most likely to be completely illiterate (Appendix 2). In Malda, however, this individual may have had some basic literacy, and in Coochbehar she may have been to secondary school.

Migration status

Out-migration was a consistent phenomenon across the surveyed households. In all households surveyed in East Champaran, at least one person had migrated away from the village (see Appendix 2). Among the rest, Nepal had the next highest proportion of out-migration, at 65%. This figure was closely followed by Coochbehar at 53%, Madhubani at 52%, Purnea at 38% and Malda at 36%. In three districts—Nepal, Coochbehar and Malda—the husbands made up about two-thirds of the migrating males, while the situation was reversed for the other three. One female was a migrant in the Nepal households.

The main destinations varied widely: for East Champaran and Purnea, they included richer agricultural regions like Punjab and Haryana states and cities like New Delhi but, in general, migration for farm work was the dominant factor. Migration destinations from Madhubani, Coochbehar and Malda were cities like Kolkata, Mumbai and New Delhi; that is, for non-farm work. Only Nepal had households from which migration to overseas countries had taken place (to Malaysia and the Middle East).

Family composition and dependency

The family composition appears to be relatively similar across the region: within the household, the average number of males (other than the husband) present in the household was 2.3, varying from 1.7 (Madhubani) to 2.4 (Nepal), although East Champaran had almost twice as many (4.9) (see Appendix 2).

The average number of females present in the household, aside from the respondent, was 2.3,

Table 1. Marital status of surveyed women heads of households

Marital status	East Champaran (n = 20)	Madhubani (n = 73)[a]	Purnea (n = 50)	Coochbehar (n = 38)	Malda (n = 42)	Nepal (n = 40)
Married	16	15	33	22	15	34
Unmarried	–	–	–	–	–	1
Deserted	–	3	–	2	2	1
Divorced	–	–	–	–	1	–
Widowed	4	54	17	14	24	4

[a] Answer was missing for one respondent.

varying between 1.5 in Coochbehar and 3.6 in East Champaran.

The average number of children who could not work (because they were too young or were attending school) was highest in East Champaran at 2.9, closely followed by Purnea at 2.7, then Nepal at 2.5, Madhubani at 2.4, Coochbehar at 1.9 and Malda at 1.3 (see Appendix 2). Madhubani and Purnea had the highest maximum numbers of children in an individual household: 11 and 8, respectively. The next highest was East Champaran with 7, then Nepal (5), Malda (4) and Coochbehar (3).

Besides children, dependants of the respondents include the elderly. Coochbehar had the highest maximum number of elderly persons in a household at five, whereas Madhubani, Nepal and East Champaran had the least at two. However, the average number of elderly varied from 0.3 to 0.5 persons, except in Coochbehar where it was 1.9.

Despite the diversity within the households, clearly the dependency burden on women heads of households is high: each individual respondent has to provide for, on average, three children and one elderly person. This is a significant burden.

Involvement in farming

It has been noted that rural women with some kind of education in South Asia are resistant to undertaking agricultural work, except in managerial–supervisory roles (Ramakumar 2006). This was observed in our study area as well; interesting systems of share-cropping (*bataiya*) have been emerging in the area as a result. For example, several women heads of households hire additional labour during the sowing and harvesting seasons (Table 2). They take other WHHs' land on share or give out their own to others, if unable or unwilling to farm themselves. This fact encourages us to rethink the idea that, when offered, rural women would accept any kind of 'work', especially in ongoing food-for-work programs (as noted by the First Report of the National Commission on Farmers—Government of India 2004, p. xiii). Gender-based division of labour exists in all farm practices; for example, in rice farming, ploughing is traditionally a task for men, and in jute cropping, cutting the stalks is a task for men, whereas women ret the stems. The lesson that one takes from Table 2 is that farm work may not involve manual labour, but for women it may also be complemented by a range of other community activities in which they are involved, such as the preparation of noon meals, running of crèches and day-care centres (data not shown). From the data gathered from in-depth interviews, it seems that education and skills are contributing to differences in the involvement, rather than just the size of landholdings. Hence, it is important to enable women to compete in these areas.

Table 2. Respondents' involvement in farming

Type of involvement	East Champaran (n = 20)	Madhubani (n = 73)	Purnea (n = 50)	Coochbehar (n = 38)	Malda (n = 42)	Nepal (n = 40)
Agricultural labourer	1	12	23	9	4	7
Share-cropper	5	3	1	–	–	4
Owner-cultivator	3	29	15	13	21	11
Owner employing labour and cultivator	–	–	6	1	–	10
Owner employing labour	–	21	2	4	1	1
Agricultural labourer and owner-cultivator	–	–	1	7	15	6
Share-cropper and owner-cultivator	10	–	1	–	–	1
Did not respond	1	8	1	4	1	–

Land ownership (by households)

Access to 'resources and opportunities' (economic assets such as land, property or infrastructure and resources such as income and employment) is imperative for establishing gender equality. However, the socially embedded nature of land means that women's property rights remain on paper for lack of action and implementation. Land is valued in South Asian society not just for material reasons or as a productive resource, but also for symbolic reasons in terms of identity, status and hierarchy within a given social context. Thus, ownership of land represents economic *and* social power. Consequently, in our survey population in India and Nepal, while most respondents do have access and use rights to land, ownership of land by a woman is usually contingent on their relationships to/with men. Hence, unless the relationship breaks down, they often do not find the need to claim independent rights. For example, in a study of 23 villages in Gujarat state, Velayudhan (2009, p. 77) found that less than 12% of women heads of households owned land and, of those who actually did, 48% came to own it following widowhood and about 41% were 'given' ownership to avail benefit from a government program, escape a landownership ceiling, get tax benefits or even pay fewer bribes to revenue officials. In only 18 of the 403 cases studied by Velayudhan did women receive landownership because their parents had no male heirs. Therefore, the following data generally pertain to the land that is owned by the absentee male member of the household.

The size of the land 'owned' by the WHHs varied from 0.1 to 0.6 hectares (ha), making some of the surveyed WHHs 'functionally landless' (defined as <0.2 ha). National Sample Survey Organisation data from India suggest that close to 60% of rural households have less than 0.4 ha; this figure is 56% for male-headed and 75% for female-headed households. In general, the average amount of land owned by WHHs was larger in Coochbehar, Purnea and Nepal than in Malda and Madhubani, with very small landholdings in East Champaran (Table 3). However, in Nepal, some of the land is commons or 'public land' that has been traditionally used by the families but where ownership remains unspecified. This may explain why Nepal had one of the largest size of land (4.0 ha) owned by a WHH. Purnea and Coochbehar had equally large maximum land size, whereas the maximum size of landholding was smaller in Madhubani (only 2.2 ha) and smallest in Malda (only 1.0 ha, see Table 3). Nepal, however, also had a very high proportion of landlessness, so did Purnea and Madhubani. East Champaran has a complex pattern of land ownership; here, the size of the largest landholding of a WHH (0.2 ha) was not much bigger than the average size of holdings. This complexity is perhaps a result of the local history of land ownership, management policies and also settlement history, which are beyond the purview of this report. Broadly, one can comment that the size of land is generally small in the region, due to two reasons: fragmentation of families' landed assets through inheritance, usually by all male children over many generations; and the need to sell off part of the landed assets to pay for the burden of costs (or debts) incurred for daughters' marriages. The small size of the land, however, is a crucial consideration in how families develop agricultural livelihood strategies—male out-migration being one key strategy—and how women cope with the onslaught of changes. Any agricultural improvement program would therefore need to take into consideration the size of the land that is available to the WHH.

Table 3. Size of land or farm owned by the women-headed households

Land in hectares (*bighas*)[a]	East Champaran (*n* = 20)	Madhubani (*n* = 73)	Purnea (*n* = 50)	Coochbehar (*n* = 38)	Malda (*n* = 42)	Nepal (*n* = 40)
Average	0.1 (0.2)	0.3 (1.2)	0.6 (2.2)	0.6 (4.4)	0.4 (3.0)	0.5 (0.8)
Maximum	0.2 (1)	2.2 (9)	4.0 (16)	4.0 (30)	1.0 (8)	4.0 (6)
Landless (number of households)	4	28[b]	9[b]	3	1	8

[a] The values in parentheses are the equivalent areas in local *bighas*. The size of a *bigha* is highly variable (a factor of 5 across the studied districts). In West Bengal state (i.e. Coochbehar and Malda), it is 1,330 m^2; in Bihar (East Champaran, Madhubani and Purnea), it is approximately 2,500 m^2; and in Nepal, it is 6,700 m^2.

[b] The 'landless' category for Purnea and Madhubani includes households with very small plots which may be 'undeclared residential'.

Crops important to WHHs

In general, most WHHs grew rice for their own consumption and some possible sales. The other crops were generally grown to supplement their livelihoods as cash incomes. There were distinct differences as to what respondents considered as important crops for them. Usually, when answering this question, women placed rice as the top priority, for the reason that 'it provides food for the family'. There were, however, district-wise differences in the second most important crop (see Table 4).

Contribution of agriculture to household income

Data from all over South Asia indicate that the share of agriculture to household incomes has been declining over the past decade, land ownership is no longer the predominant source of household income in rural areas, and more and more rural people have been driven to look for alternative income and employment sources, largely in the urban, informal sector, in trade and services. Heyer's (1989) study in the Indian state of Tamil Nadu showed that asset strategies of poor WHHs involved investing in human resources, such as education and social support networks, rather than land. Most of the non-farm income consisted of male income, as women's lower literacy status has disadvantaged them in the labour markets. Data from the current survey show that the contribution of agriculture to the livelihoods of WHHs varied from a low of 24% (in East Champaran) to a high of 78% in Malda (Table 5), with an overall average of 40% (data not shown).

Debt burden

Similarly, the debt burden of WHHs was also on the high side: on average, 45% households had a loan to repay (see Appendix 2). As many as 65% households in Nepal and 67% in Madhubani were in debt, while East Champaran had none. The average debt burden (amount of debt) was rupees (Rs)38,000; but was highest in Purnea (Rs62,000), closely followed by Nepal (Rs60,000). Some debts for individual WHHs were substantial: the highest being in Purnea (Rs300,000) and Nepal (Rs250,000). Such high level of debts were incurred to pay to 'employment contractors' or 'agents' who organise unskilled or semi-skilled jobs outside India. Thus, there may be some correlation between the distance migrated or the kind of jobs taken up by the male migrant, and the level of indebtedness of the WHHs, but again that investigation was outside the scope of the current study.

Table 4. Crops being grown by women-headed households

Crop	East Champaran (n = 20)	Madhubani (n = 73)	Purnea (n = 50)	Coochbehar (n = 38)	Malda (n = 42)	Nepal (n = 40)
Rice	21	55	38	39	38	30
Maize	19	1	37	1	9	9
Wheat	20	55	31	1	1	18
Vegetables	–	–	2	4	2	10
Potato	–	1	2	3	5	2
Tobacco	–	–	–	19	–	–
Lentils	2	43	–	–	–	11
Jute	–	–	4	30	13	–
Sugarcane	–	1	–	–	–	5
Mustard	–	–	–	2	7	–
Other	–	–	–	1	1	6

Table 5. Percentage of income from farm work

	East Champaran	Madhubani	Purnea	Coochbehar	Malda	Nepal
Average	24	53	35	58	78	40
Maximum	40	100	100	100	100	100

Children's education

Most of the WHHs with school-age children sent their children to school; only Purnea and Madhubani had less than 90% of households with school-age children actually attending school (see Appendix 2). There were some, but not many, WHHs that did not send all of their school-age children to school. It is possible that extreme time-poverty and other difficulties, including financial, in managing the household contributed to the reluctance or inability of the WHH to send these children to school.

Outside assistance

Overall, a third of respondents were members of a self-help group, although the proportion varied greatly between districts, from none in East Champaran to 45% in Coochbehar to 90% in Nepal. The other three districts ranged from 20–24% (Appendix 2). In the Indian districts, some WHHs had labour provided through the National Rural Employment Guarantee (NREG) scheme. The proportion was very small in Purnea (2%) and somewhat higher in East Champaran and Madhubani (15% and 18%, respectively), while almost half had received this assistance in Coochbehar and Malda (47% and 48%, respectively) (Appendix 2).

Although the scope of the current project was limited to a cursory tally of these two avenues for assistance, especially in the context of the discussion that follows, it would be beneficial to further investigate these and possible other outside help available to women heads of households in the future, especially in terms of availability and uptake. It is particularly intriguing as to the reasons for such wide variation between districts.

Women's multiple roles

Caroline Moser drew attention to the 'triple roles' women play in farming communities of developing countries and noted the important contribution of gender—socially constructed norms of behaviour—in determining them: 'Because women and men have different positions within the household and different control over resources, they not only play different and changing roles in society, but also often have different needs' (Moser 1993, p. 15). Therefore, it is this 'role and need differentiation' that provides the conceptual rationale for this part of the analysis. Qualitative observations form the basis of this section, along with the time-use section of the questionnaire.

Time use

Time is one of the basic human resources and studying the way time is allocated provides an appropriate way of comparing activities both inside and outside the household (McGinnity and Russel 2008, p. 5). Examining the use of time tacitly recognises time as a direct source of utility. Women who head households are not only poor in terms of money, they also suffer from time-poverty. Time-use surveys are a quantitative approach to understand the participants' actual workload and gender disparity (United Nations 2003, p. 21). To create a more complete picture, it is important to understand the labour supply within the households. It is common knowledge that, in most countries, women work longer hours than men when the time they spend on domestic work is added to the hours they work outside the home and in family enterprises. Therefore, it was important to include time use by women and men in the survey data; paucity of information on time use and the omission of the household economy from conventional development planning have been criticised by experts (such as Apps 2003).

The important point for women-headed households (WHHs) is to link labour mobility with labour availability. This can be accomplished by investigating women's and men's contributions to the 'household time overhead', so that a policy recommendation does not have the effect of raising women heads of households' labour burdens. Also, it is important to invest in 'what is not visible'; thus, recognition of the trade-offs or positive links among different tasks and activities within the household and on the farm offers the complete picture that we are after. All rural livelihoods involve continual domestic labour to maintain the household and care for its members. Women play a central role in providing these services—child care, food preparation, fuel and water collection, care of the ill and elderly and a range of activities that move into food production and income-generating work, such as livestock care, homestead gardening and so on.

The section on time use in the survey questionnaire captured women's diverse use of time in rural and urban contexts. However, given the complexity of time use by respondents, the figures were averaged to broadly reflect the overall pattern of their time use compared with that of men in the study area. Figures 3 and 4 show the typical use of time by men and women, respectively, over a 24-hour period; that is, one full day. These diagrams clearly show three things:

- women in general undertook many more chores as individuals—these chores were performed not only at home, but included a range of agriculture-related tasks, including care of livestock as well as farming
- respondents spent more time on a combination of domestic chores and farm work than men (when they are present at home)
- household chores were sharply and almost universally associated with women.

The dense activity pattern of women has serious implications for agricultural development planning. First, it becomes apparent that women have very limited opportunities for education and leisure activities. Second, Figure 4 shows that women are not only poor in terms of money, but time as well. Any project or intervention involving women must be cognisant of this 'time-poverty'. Third, Figure 4 also indicates a considerable amount of overlap between women's roles at home (reproductive [domestic] functions) and those on the farm (productive functions). Lastly, the data point to the need to distinguish between domestic work and leisure. The case study presented in Box 2 demonstrates the stark reality of a typical respondent's workload.

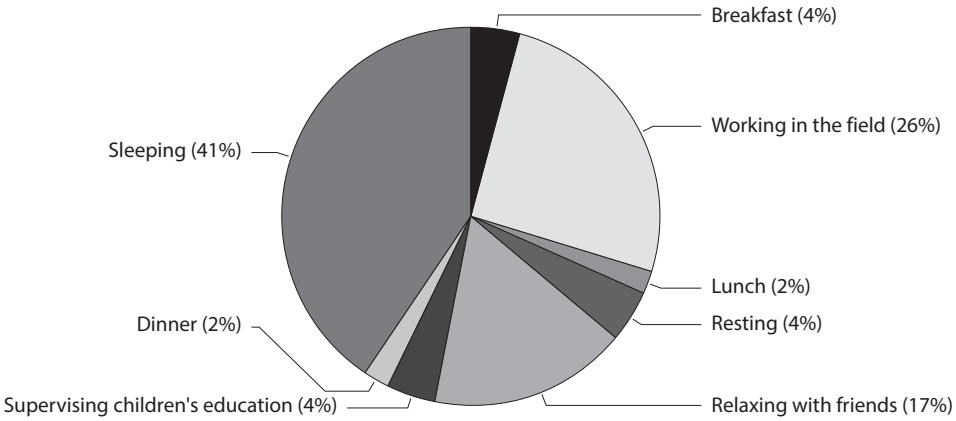

Figure 3. Use of time over a 24-hour period (clockwise from top) by a typical man in the study area

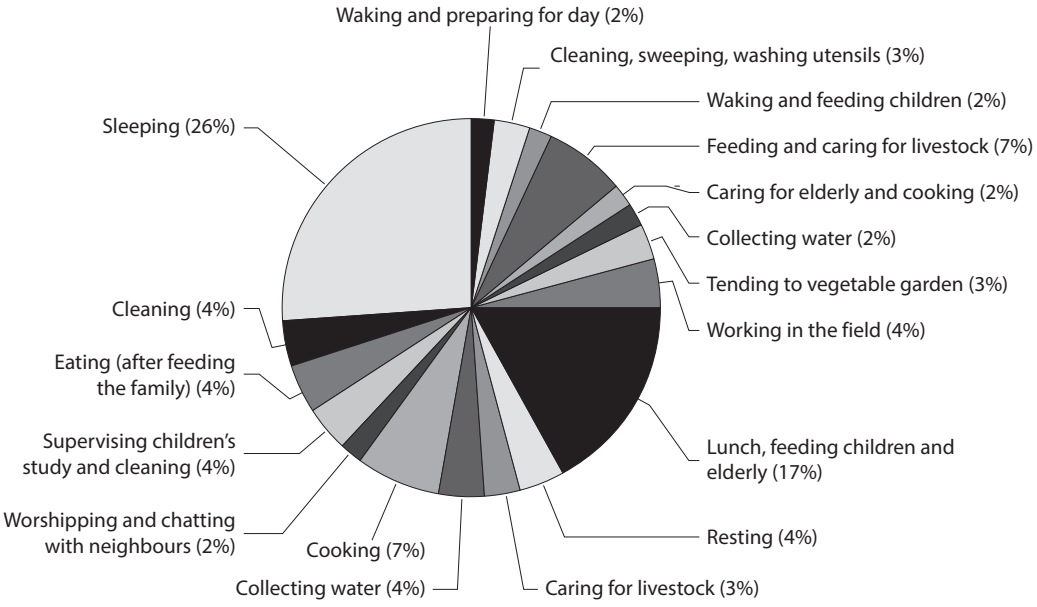

Figure 4. Use of time over a 24-hour period (clockwise from top) by a typical woman head of household participating in the survey

Implications for planning

The observed gender differences in time use can be expected to have policy implications for agricultural development. The data also indicate considerable heterogeneity in the allocation of time between farming and domestic work across genders within the surveyed populations; men have a simpler work schedule. Clearly, such heterogeneities would limit the availability of time to access new opportunities arising in the market. The policy implications of this time-poverty must be kept in mind in shaping intervention policies.

Box 2. The case of Sajjan Devi, Mangrona village (Andhrathri block), Madhubani district

The burden of work on women is exemplified by the case of Sajjan Devi. Sajjan is now 30 years old and belongs to the Rai caste, members of which have traditionally been farmers. She was married when she was only 12 years old and has been a widow for 7 years. Her husband, who had gone to Patna for work, died from AIDS.

Illiterate, with three children, Sajjan works as an agricultural labourer from 8 am until 2 pm, for a wage that comprises Rs40 and a meal of chapatti and pickles. Sajjan's father-in-law, the owner of 4 *bighas* (1 ha) of land, had four sons, all of whom lived elsewhere for work. After the death of her husband, the family was partitioned; the mother-in-law looks after the land that produces rice that feeds the family for about 2 months and wheat for another 2 months.

Sajjan's time-poverty was apparent when we visited her house: the three daughters look after each other and in general are unable to attend the village primary school where they are notionally enrolled. The eldest one assists her mother in the field and the middle sister looks after the youngest one. After returning from the field, Sajjan cooks for the family, brings water and does the cleaning. In the afternoon, she works as a cleaner in the home of an upper-caste, better-off family in the village.

Access to and control over assets and resources

Meinzen-Dick et al. (2011) noted that a stable and productive livelihood for both women and men largely depends upon the ability to access, control and own productive assets such as land, labour, finance and social capital. Sabates-Wheeler (2006) suggested that agricultural development programs are increasingly expected to deliver a host of social outcomes. However, without specific attention to redressing asset inequalities, interventions that promote agricultural growth are likely to reinforce inequalities, which may eventually undermine their poverty and equity objectives. Yet, not much is known about how agricultural development programs can most effectively deliver sound outcomes with regard to social wellbeing, empowerment and higher incomes while acknowledging differential access to and control over assets by women and men. This section explores the different kinds of asset ownership by the women heads of households in the study area, in order to reveal potential linkages between gender, assets and future agricultural development programs.

Within the livelihoods approach, assets have been defined as a set of 'capitals' that include natural, physical, human, social and financial capitals, all of which jointly play a key role, not just in poverty reduction, but also in reducing vulnerabilities to stresses and shocks (Scoones 1998). Thus, through a livelihoods approach, the plethora of resources available in a given context would include (apart from land) livestock and labour as key individual/household assets and common property—whether forests, grazing land or water resources (including marine and coastal)—as community/state assets.

Land ownership by women heads of households

The foremost asset for women heads of households in farming would be land. As indicated in Tables 6 and 7, only a very small proportion of respondents own the land they till.

Looking at the source of land that is owned by respondents, a more complex picture is revealed. Two major routes—inheritance and purchase from the market—and a number of combinations become apparent from Table 7.

Table 6. Ownership of land by women heads of households (% owning land)

	East Champaran	Madhubani	Purnea	Coochbehar	Malda	Nepal
Self	–	4	–	5	–	20
Self and husband	–	16	8	11	–	5

Table 7. Source of land ownership by women heads of households

	East Champaran (*n* = 20)	Madhubani (*n* = 73)	Purnea (*n* = 50)	Coochbehar (*n* = 38)	Malda (*n* = 42)	Nepal (*n* = 40)
Self	–	3	–	2	–	8
How?	n/a	All I	n/a	1 × P, 1 × I	n/a	6 × P, 2 × I
Self and husband	–	12	4	4	–	2
How?	n/a	5 × I, 2 × P, 5 × other	All P&I	All I	n/a	1 × P, 1 × P&I

Note: P = purchased; I = inherited; P&I = part purchased and part inherited; 'other' sources include gift, dowry etc.

In East Champaran, Purnea and Malda, of all individuals surveyed, none owned farming land in their own name. Three respondents in Madhubani and one in Coochbehar had inherited land and another in Coochbehar had purchased it. In comparison, eight respondents (20%) in Nepal owned land themselves, with a combination of purchase and inheritance (Table 7).

In comparison, only East Champaran and Malda had no respondents owning land jointly with their husband (Table 7). In the other districts, such land was acquired through a mix of inheritance and purchase, reflecting the use of remittance income in the farming sector itself. Interestingly, Madhubani had the highest number of co-owned landholdings.

Land remains a key means of claiming identity as a full person throughout rural India (Rao 2012). From the survey data, it becomes apparent that the lack of, or poor control over, property rights is one of the key areas that constrain women's autonomy in farming communities in the Eastern Gangetic Plains region.

Economist Amartya Sen (1981) observed that assets can be meaningfully understood as offering a range of 'entitlements': ownership (through trade, production, own-labour or inheritance), exchange (through market-based trade or transfers from the state, such as public works, social security and food subsidies) and legal. An 'entitlements' approach is, at its core, a political struggle over negotiating power relations, whether through legal recognition or manipulation of custom. In the case of land, this would imply recognition of inheritance rights, but also other 'secondary' rights. To strengthen women's bargaining power and control over decision-making, it imperative to devise strategies to enable women to gain more control over assets; however, legal entitlement over physical assets and their control, although a crucial aspect, is not enough. It is also necessary to strengthen other areas of entitlements, as different assets may have different meanings for men and women, and these too could vary with context. For example, while land is a major physical asset for most rural communities, it may become a non-asset if its productive uses are restricted.

Ownership of non-land assets

Details of the various assets owned by some of the women heads of households in each district are listed in the following tables—livestock (Tables 8 and 9), domestic assets (Table 10), productive assets (Table 11), financial assets (Table 12) and machines (Table 13).

With respect to livestock, looking at the average per household for each district, we can evaluate the wealth of each district in terms of animal assets by applying a value per animal. This is shown in Table 9 from which it can be seen that East Champaran and Madhubani were the poorest in this regard.

One can do the same for domestic assets (Table 10), but putting a value on each of the items is more problematic than for livestock—does one use a plausible sale value, for example, or a replacement value? Using a combination of these values (data not shown), there was little difference in the value of domestic assets between districts. Turning to productive assets (Table 11), the districts were much the same as one another, except that Malda and East Champaran had no chaff cutters and Malda had no grain silos, while Madhubani had only a single irrigation pump and grain silo among all 73 surveyed households (by far the biggest cohort). Table 12 offers an overview of financial asset-poverty of the women-headed households (WHHs). Those in East Champaran had the lowest overall number of financial assets, but had a comparatively high number receiving remittance income. WHHs in the survey area of Nepal appear to have better financial assets, but their debt burden (as previously noted; see also Appendix 2) is higher. WHHs in Madhubani have a range of financial assets of all kinds, probably indicative of the higher rate of male out-migration from that district. While, overall we receive a picture of intense poverty and misery, these differences in the relative status of WHHs from one district to another are most probably due to the variations in the local social–economic–agricultural contexts of individual villages studied. They reflect the fact that WHHs cope differently in different locations, depending on the context, and underline the point that agricultural improvement programs would be more effective if these local differences in women's conditions were considered.

Overall, WHHs had little access to machinery, and East Champaran had none (Table 13). In Nepal, the heaviest user of agricultural machinery, the devices were mostly rented (data not shown), whereas in Purnea, they were mostly owned, but these were smaller machines, there being fewer tractors and threshers. No respondents had, however, received any training in how to use the equipment.

Table 8. Animal/livestock assets of women-headed households (by district)

District (and no. of households)	Factor	Cattle: cows	Cattle: oxen/ bullocks	Goats/sheep	Poultry (including ducks)
East Champaran (n = 20)	No. of HHs with asset	1	2	15	2
	Maximum no. per HH	1	2	6	2
	Total no. in district	1	3	36	3
	Average no. per HH	0.1	0.2	1.8	0.2
Madhubani (n = 73)	No. of HHs with asset	24	21	12	5
	Maximum no. per HH	2	2	6	5
	Total no. in district	25	24	35	23
	Average no. per HH	0.3	0.3	0.5	0.3
Purnea (n = 50)	No. of HHs with asset	20	4	18	4
	Maximum no. per HH	3	2	4	20
	Total no. in district	25	6	40	39
	Average no. per HH	0.5	0.1	0.8	0.8
Coochbehar (n = 38)	No. of HHs with asset	29	9	19	10
	Maximum no. per HH	6	2	6	12
	Total no. in district	69	13	51	57
	Average no. per HH	1.8	0.3	1.3	1.5
Malda (n = 42)	No. of HHs with asset	26	3	17	4
	Maximum no. per HH	5	3	9	4
	Total no. in district	45	7	57	12
	Average no. per HH	1.1	0.2	1.4	0.3
Nepal (n = 40)	No. of HHs with asset	21	15	27	11
	Maximum no. per HH	5	3	10	16
	Total no. in district	35	25	76	69
	Average no. per HH	0.9	0.6	1.9	1.7

Note: HH = household

Table 9. Animal asset value (in A$) by district (average per surveyed household)

District	Cows $600	Oxen/bullocks $400	Goats/sheep $100	Poultry $5	Total value $
East Champaran (20)	0.1	0.2	1.8	0.2	321
Madhubani (73)	0.3	0.3	0.5	0.3	352
Purnea (50)	0.5	0.1	0.8	0.8	424
Coochbehar (38)	1.8	0.3	1.3	1.5	1,338
Malda (42)	1.1	0.2	1.4	0.3	882
Nepal (40)	0.9	0.6	1.9	1.7	979

Table 10. Domestic assets of women-headed households (by district)

District (and no. of households)	Factor	Stoves	Electric fans	Televisions	Refrigerators	Radio/cassette players	DVD players	Bicycles	Motorcycles	Scooters	Mobile phones	Chairs	Wood beds	Mosquito nets/ cooking utensils	Other (e.g. jewellery)
East Champaran (20)	No. HHs with asset	1	–	–	–	19	–	14	–	–	12	16	17	17	–
	Maximum no. per HH	1	–	–	–	4	–	1	–	–	1	4	2	2	–
	Total no. in district	1	–	–	–	22	–	14	–	–	12	33	25	22	–
	Average no. per HH	0.1	n/a	n/a	n/a	1.1	n/a	0.7	n/a	n/a	0.6	1.7	1.3	1.1	n/a
Madhubani (73)	No. of HHs with asset	1	1	–	–	2	1	25	–	–	17	19	44	58	–
	Maximum no. per HH	1	1	–	–	1	1	1	–	–	1	3	5	15	–
	Total no. in district	1	1	–	–	2	1	25	–	–	17	31	68	256	–
	Average no. per HH	<0.05	<0.05	n/a	n/a	<0.05	<0.05	0.3	n/a	n/a	0.2	0.4	0.9	3.5	n/a
Purnea (50)	No. of HHs with asset	10	19	12	2	–	5	25	4	–	26	26	43	39	–
	Maximum no. per HH	1	4	1	1	–	1	3	2	–	3	6	3	5	–
	Total no. in district	10	28	12	2	–	5	29	5	–	35	67	73	76	–
	Average no. per HH	0.2	0.6	0.2	<0.05	n/a	0.1	0.6	0.1	n/a	0.7	1.3	1.5	1.5	n/a
Coochbehar (38)	No. of HHs with asset	5	4	4	–	1	1	26	6	–	26	25	31	35	–
	Maximum no. per HH	1	3	1	–	1	1	2	1	–	3	7	5	4	–
	Total no. in district	5	7	4	–	1	1	34	6	–	32	54	58	62	–
	Average no. per HH	0.1	0.2	0.1	n/a	<0.05	<0.05	0.9	0.2	n/a	0.8	1.4	1.5	1.6	n/a
Malda (42)	No. of HHs with asset	2	22	9	–	1	2	21	1	–	23	19	30	39	27
	Maximum no. per HH	1	3	1	–	1	1	3	1	–	2	6	4	4	2
	Total no. in district	2	36	9	–	1	2	27	1	–	27	45	66	82	31
	Average no. per HH	<0.05	0.9	0.2	n/a	<0.05	<0.05	0.6	<0.05	n/a	0.6	1.1	1.6	2.0	0.7
Nepal (40)	No. of HHs with asset	6	21	17	–	13	3	34	7	1	36	24	40	39	–
	Maximum no. per HH	1	5	2	–	1	1	4	1	1	3	7	8	5	–
	Total no. in district	6	35	18	–	13	3	44	7	1	51	62	109	104	–
	Average no. per HH	0.2	0.9	0.5	n/a	0.3	0.1	1.1	0.2	<0.05	1.3	1.6	2.7	2.6	n/a

Note: HH = household

Table 11. Productive assets of women-headed households (by district)

District (and no. of households)	Factor	Spades/ shovels/ sickles	Irrigation pumps	Chaff cutters	Grain silos	Any other farming equipment
East Champaran (20)	No. of HHs with asset	20	4	–	8	2
	Maximum no. per HH	5	1	–	2	1
	Total no. in district	73	4	–	9	2
	Average no. per HH	3.7	0.2	n/a	0.5	0.1
Madhubani (73)	No. of HHs with asset	50	1	2	1	–
	Maximum no. per HH	6	1	2	1	–
	Total no. in district	143	1	3	1	–
	Average no. per HH	2.0	<0.05	<0.05	<0.05	n/a
Purnea (50)	No. of HHs with asset	32	12	7	10	6
	Maximum no. per HH	10	1	1	2	1
	Total no. in district	81	12	7	14	6
	Average no. per HH	1.6	0.2	0.1	0.3	0.1
Coochbehar (24)	No. of HHs with asset	28	12	3	8	3
	Maximum no. per HH	5	2	1	1	2
	Total no. in district	65	12	3	8	4
	Average no. per HH	2.7	0.5	0.1	0.3	0.2
Malda (42)	No. of HHs with asset	37	6	–	–	–
	Maximum no. per HH	10	1	–	–	–
	Total no. in district	125	6	–	–	–
	Average no. per HH	3.0	0.1	n/a	n/a	n/a
Nepal (40)	No. of HHs with asset	37	6	9	28	–
	Maximum no. per HH	7	1	1	3	–
	Total no. in district	124	6	9	36	–
	Average no. per HH	3.1	0.2	0.2	0.9	n/a

Note: HH = household

Table 12. Financial assets of women-headed households (by district)[a]

District (and no. of households)	Factor	Savings	Pension income	Remittances	Interest (from remittance and other sources)
East Champaran (20)	No. of HHs with asset	–	4	19	–
	Maximum no. per HH	–	1	1	–
	Total no. in district	–	4	19	–
	Average no. per HH	n/a	0.2	1.0	n/a
Madhubani (73)	No. of HHs with asset	7	13	17	12
	Maximum no. per HH	1	1	1	1
	Total no. in district	7	13	17	12
	Average no. per HH	0.1	0.2	0.2	0.2
Purnea (50)	No. of HHs with asset	15	7	2	–
	Maximum no. per HH	1	1	1	–
	Total no. in district	15	7	2	–
	Average no. per HH	0.3	0.1	<0.05	n/a
Coochbehar (38)	No. of HHs with asset	14	2	7	–
	Maximum no. per HH	1	1	1	–
	Total no. in district	14	2	7	–
	Average no. per HH	0.4	0.1	0.2	n/a
Malda (42)	No. of HHs with asset	12	–	–	–
	Maximum no. per HH	1	–	–	–
	Total no. in district	12	–	–	–
	Average no. per HH	0.3	n/a	n/a	n/a
Nepal (40)	No. of HHs with asset	32	8	19	3
	Maximum no. per HH	1	1	1	1
	Total no. in district	32	8	19	3
	Average no. per HH	0.8	0.2	0.5	0.1

[a] Only some households specified pension or other financial information.
Note: HH = household

Table 13. Number of machines accessed (owned, shared or rented) by women-headed households

Equipment type	East Champaran (n = 20)	Madhubani (n = 73)	Purnea (n = 50)	Coochbehar (n = 38)	Malda (n = 42)	Nepal (n = 40)
Water pump for irrigation	0	2	19	9	8	19
4-wheeled tractor	0	0	2	2	0	17
2-wheeled tractor	0	0	0	1	0	0
Mechanised seeder	0	0	1	1	1	0
Pesticide/herbicide sprayer	0	0	8	4	9	28
Mechanical thresher	0	1	1	1	1	15
Fishing gear (nets etc.)	0	0	2	4	1	1
Other	0	1	0	0	0	0
Did you receive training in how to use them?	n/a	No	No	No	No	No

Implications for planning

Seeing resource rights as a range of entitlements, with different routes to access (inheritance, markets etc.) and varying levels of control, provides a helpful framework for policies on gender equality. For agricultural development planning, this approach allows the adoption of the framework developed by Sara Longwe (see March et al. 1999, pp. 92–101). In this model, women's empowerment is seen as a process that moves through five levels of intervention (as expressed in Figure 5). Longwe considers that interventions intended for the welfare of women would lead to improved access to resources, leading to the raising of awareness (or critical consciousness) that will offer women not only a clearer understanding of the existing social and political oppressions but also allow them to act to initiate change. As women demand to be a part of agricultural improvement plans and programs with heightened consciousness of the specific elements that are constraining them, they will be encouraged to assume greater control of the resources, planning processes and the benefits that accrue from these programs.

In the context of this study's respondents, working through the five stages could result in increasing control by women over farming-related decision-making processes to reach a level on par with men. Nevertheless, it is important to remember that it is neither an easy nor a simple task. Control over farmland is complicated because it is rarely considered individual property by either men or women but is seen as a joint household resource, whose use is subject/open to negotiation. Women and men make decisions jointly, often when the man is absent from home for long periods of time at a stretch. In our survey region, women do not act as autonomous individuals in relation to land. Neither do men, as both women and men have gendered roles to play and gendered ideologies to live up to. Hence, simply demanding a legal title that threatens the symbolic elements of land ownership and the gendered relationships these represent is likely to be both resented and even resisted.

A second important point to note is the complementarity between assets—land, livestock and labour—that tend to mutually reinforce each other. This also points to the possibilities of different starting points, rather than a single blueprint for the entire region. New institutional approaches for control of farming equipment and inputs, infrastructure (such as roads, irrigation channels etc.), enhancement of skills to engage in new forms of production and so on may lead to improved gender-equity outcomes.

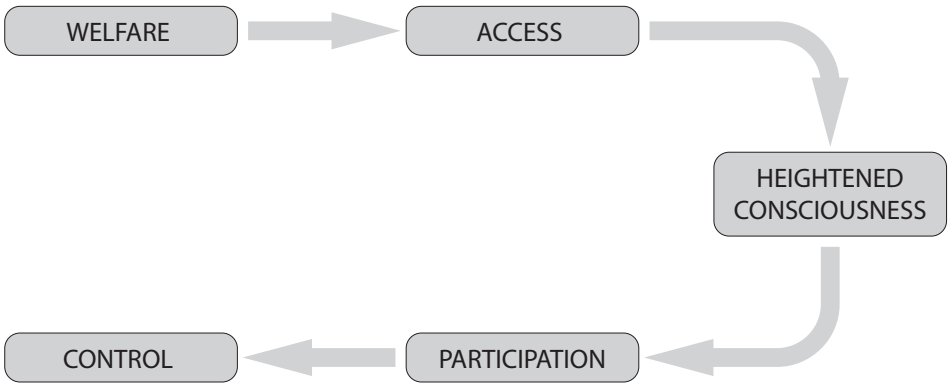

Figure 5. Longwe's women's empowerment framework (adapted from March et al. 1999)

Perceptions of changes in farming practices

Theoretical framework

One can argue that instead of being an objective reality, risks related to any sudden or slow change are highly subjective; the women heads of households' perceptions of change constitute the cognitive lifeworld— a pre-intellectual world as we experience it directly and immediately—which is evaluated and assessed through essentially subjective processes. Hence, no change can be absolute and entirely value-free; they necessarily imply the mental images of various conditions associated with farming experienced in a particular place and borne by the particular resident of an area.

This claim has a long methodological history: rejecting of the explicit positivism of survey assessment techniques and their neglect of subjective values ingrained in rationalism. In recent years, scholarly research has entered a more ideographical domain in which the environment is more a perceived reality in which the material world is also assessed in a personalised manner. David Lowenthal (1961) was the first to suggest that the phenomenal environment is refracted through 'the filters of culture and the lens of personal experience and imagination' to produce the behavioural environment in which occurs individual behaviour. Superimposed on the accepted world shaped by one cultural group, there are also the somewhat different personal viewpoints that are formed by unique individual experiences, imaginations and memory.

Gender differences in perceptions arise from gender-differentiated roles in most rural, farming societies. As men move out of agriculture and women take up the roles of farm managers and labourers as well as carers and primary providers of food security at the household level, their behavioural environment changes. In Malda, one respondent commented that as compared with 10–15 years ago, now, 'due to my excessive work, I cannot look after the field as I did before'. This includes not being able to apply fertiliser on time. With intimate use of farming-related resources and conditions (such as inputs and weather), women form a deep knowledge about them. Observations such as 'the decrease in land quality, productivity or the greater incidence of pests are related to high input costs' reveal the low access of the women heads of households to credit and cash.

Perceptions of changes in farming practices

In Table 14, the broad, district-wise differences are collated to provide a glimpse into the mental worlds of women heads of households with regard to perceptions of changes in farming practices in recent years.

An interesting picture emerges from the data contained in Table 14. While more or less all respondents believed that some changes had taken place, there were some major variations between the districts with regard to individual criteria of change. For example, in Madhubani, only 27% of women who provided a response felt that use of labour had changed, whereas in all other districts the percentage was much higher at 78–100%. And in Coochbehar, while 70% of women perceived there had been a shift/delay in the cropping season, this was noticeably lower than the other districts, where 85–100% felt that way. Overall, respondents in Madhubani and Nepal were less likely than those in the other four districts to have perceived that farming practices had changed over the past 10–15 years. It is of note that these two regions are geographically close to one another (see Figure 2). The key point emerging from the table is that the response depends on the particular agroecological condition within which the farming practices under consideration are located.

Table 14. Perceptions of changes in farming practices

	East Champaran (n = 20)		Madhubani (n = 73)		Purnea (n = 50)		Coochbehar (n = 38)		Malda (n = 42)		Nepal (n = 40)	
Has the practice changed?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Shifting/delaying of cropping season	20	–	53	2	47	2	26	11	33	6	31	4
Number of crops: declined/ stopped growing/ introduced	–	–	49	5	40	8	20	4	25	8	18	17
Practice of ploughing	20	–	19	29	45	2	26	6	35	4	26	9
Use of seed	19	–	42	9	47	–	36	2	35	5	27	8
Use of fertiliser	19	–	43	9	47	–	37	1	39	2	31	4
Use of labour	19	–	13	36	40	6	32	2	25	7	28	6
Use of machines in general	19	–	33	18	45	1	34	0	32	5	25	10
Use of irrigation water	14	–	24	28	40	5	31	4	31	6	15	19
Harvesting time, use of labour and technology	–	–	18	22	40	4	33	1	27	8	13	19

Note: pairs of values may sum to less than the district totals as some individuals did not respond.

Perceptions of changes in productive assets

Respondents were asked their opinions on whether their productive assets had changed over the 10–15 years. The assets considered were: productive land of different kinds, such as farming and grazing lands; share-cropping; different kinds of livestock; and the condition of associated waterbodies. Not all women surveyed responded to express their perceptions of changes in each of these assets because of the variations in the local contexts. The results are detailed in Appendix 3.

Respondents from East Champaran, Madhubani and Purnea were more likely than those from other districts to feel that productivity of farming land had decreased, except for the higher elevations of Purnea which were generally perceived to be better than before, possibly due to the study villages being generally located in waterlogged areas where uplands provide somewhat better drainage. Respondents from the other districts tended to be positive about current land productivity, although results were quite variable. Leased land and share-cropping provided greater returns in Purnea and East Champaran, while respondents in Madhubani and Coochbehar were more likely to feel leased land had become less productive, although the reasons why were not clear.

In terms of livestock, women from East Champaran, Madhubani, Purnea and Nepal generally perceived that productivity was down in most classes, but varied in terms of which they thought had improved over time. The remaining regions were more variable in their consideration of livestock. Overall, there was no significant consensus between the regions over perception of changes in a particular asset over time. Interestingly, respondents from Malda were more likely than those from other districts to feel that there had been no changes to productive assets.

General problems, shocks, worries and needs

Background theory

Following from the above section, we observe that the environment (and all changes in it) has an experiential foundation. For example, the environment around us is meaningful because one can relate it to direct experience. One knows subjectively the meaning of these things and, therefore, the environment is experienced not as a set of objects, which are apart from us and fixed in time and space, but as a lifeworld (as defined above). Similarly, the women heads of households' lifeworlds—individual and collective understanding of the environment—comprise the major element in shaping their farming practices through the action of their choices and selective behaviour. This subjective approach begins with the premise that for each objective element and relationship, there are many perceived elements and relationships as seen and understood by different people and at different times and places. Each decision and action taken by us occurs within the framework of our perceived sets of elements and links, rather than any externally defined objective set. Within any given time frame or culture, scientific knowledge of the day may also be viewed as more formalised and rigorous sets of perceived environmental elements and relationships. The present state of scientific knowledge of the environment is usually taken to be the objective reality. An exploration into this subjective world of perception of environmental and livelihood shocks is critical in order to formulate policies that are aimed at supporting women's roles in agricultural communities.

This chapter emphasises the subjective nature of understanding risk. Beginning with the premise that assessment is essentially an appraisal process, here we outline the cognition, risk assessment and, finally, the decision. Through such an exercise, it is possible to identify conflicts or differences in aspects of developmental support to rural farming households headed by women, and their resource use and management.

Understanding risk and shock is a complex exercise, because different people with different sociocultural and religious backgrounds and philosophies of life perceive and interpret the same situation in various ways. The environmental or livelihood shock, when perceived by human beings, is refracted by 'the filters of culture and the lens of personal experience and imagination' (Lowenthal 1961) to provide the behavioural environment. Therefore, the following sections outline the general fears and worries, shocks and needs within the overall sociocultural context of the districts, but which are also framed by unique experiences, imaginings and memory of the individuals. The latter framework is an area we were not able to investigate in this study.

General fears and worries

The general, fears and worries were expressed in free form by the respondents and ranked as 1, 2 or 3 in order of most concern. In analysing them, these worries were categorised into seven main areas of concern listed in the leftmost column of Table 15. For example, 'family disruption' may rate as 1 for some respondents, 2 or 3 for others and not at all for the remainder. These have been aggregated or weighted to give a district-wise ranking by assigning the value 1 to rank 1, 1/2 to rank 2 and 1/3 to rank 3, then adding up to provide the values, which have then been expressed as a percentage of the total. (Other ranking aggregation procedures could have been chosen.) It can be seen, for example, that 'production worries' in Purnea relate to 54% of respondents in that district. Respondents from Madhubani did not provide any significant information in regard to this aspect. Except that women in Nepal were more worried about family disruption, results were mostly similar across districts, with respondents being most fearful of production worries and environmental threats.

Table 15. General fears and worries of respondents (weighted percentages)[a]

General fears/worries (classified)	East Champaran	Purnea	Coochbehar	Malda	Nepal
Social disruption	2.5	3.9	1.0	–	5.0
Family disruption	8.7	3.9	13.6	–	23.7
Environmental threats	34.1	24.0	39.3	45.0	26.3
Livestock	2.9	9.3	1.0	0.5	1.8
Production	48.0	53.6	29.3	54.5	35.7
Work—supply chain, trade	2.4	3.9	3.7	–	4.7
Market related—costs etc.	1.3	1.5	12.0	–	2.9

[a] Madhubani has been omitted due to lack of reliable data.

Farming-related problems

Women heads of households were asked to choose the five most-important problems from a list of 15. The ranks have been aggregated by decreasing the values by 1/15 for each lower value, then expressing the result as a percentage of the total problems identified (Table 16). In some instances, there was a problem in the way the survey was carried out; for example, rather than indicating 1 to 5, the answer 'yes' was recorded and in other instances the ranking was done for the first five potential problems in the list of 15, then again for the next five and so on. Such responses have been omitted from the table, as have the Madhuabani data which were again problematic and not capable of reliable analysis. Table 16 shows a much wider diversity between districts than does Table 15, possibly reflecting that farming-related problems are very much influenced by local conditions. For example, respondents in East Champaran found lack of land to be a much greater problem than respondents in any of the other districts.

Table 16. Farming-related problems of respondents (weighted percentages)[a]

Problem	East Champaran	Purnea	Coochbehar	Malda	Nepal
Climate-related: increasing heat	21.5	11.5	12.7	15.2	4.5
Climate-related: changing rainfall pattern	1.1	17.3	13.7	18.6	9.4
Lack of irrigation facilities	–	2.6	8.0	8.0	11.5
Access to irrigation (inability to buy machinery or water)	–	2.8	5.8	2.5	2.7
Rising incidence of pests/insects	21.2	15.5	9.3	5.0	14.6
Weeds	–	13.2	6.3	12.4	3.7
Caring for livestock	–	2.2	3.1	0.9	2.6
Input costs, e.g. price of seeds, animal feed etc.	19.7	4.5	11.3	21.4	14.3
Availability of good-quality seeds	–	8.8	7.7	9.5	13.6
Lack of land	19.2	5.6	6.8	3.2	7.4
Falling quality of land/soil	17.3	6.4	4.2	2.9	5.4
Inability to buy machinery	–	5.0	3.2	0.4	0.5
Inability to access banking/credit	–	1.3	2.9	–	3.9
No training facility nearby	–	3.2	1.5	–	4.8
Inability to access training	–	–	2.6	–	1.1

[a] Madhubani has been omitted due to lack of reliable data.

Although individuals were asked to provide their top-five concerns, taken together the results covered more than five issues in the list of 16 provided. Thus, six major concerns could be identified. They are illustrated below for East Champaran, Purnea, Coochbehar, Malda and Nepal (Tables 17–21, respectively). Increasing climate-related heat is a major issue for East Champaran, but not water, while both heat and water were of concern to Purnea, Coochbehar and Malda. Input costs rated highly in all regions except Purnea, and a combination of weeds, pests and diseases featured in all districts.

Table 17. Major farming-related problems for women-headed households in East Champaran

Rank	Problem
1	Climate-related: increasing heat
2	Rising incidence of pests and insects
3	Input costs, e.g. price of seeds, animal feed etc.
4	Lack of land
5	Falling quality of land/soil
6	Climate-related: changing rainfall pattern

Table 18. Major farming-related problems for women-headed households in Purnea

Rank	Problem
1	Climate-related: changing rainfall pattern
2	Rising incidence of pests and insects
3	Weeds
4	Climate-related: increasing heat
5	Availability of good-quality seeds
6	Falling quality of land/soil

Table 19. Major farming-related problems for women-headed households in Coochbehar

Rank	Problem
1	Climate-related: changing rainfall pattern
2	Climate-related: increasing heat
3	Input costs, e.g. price of seeds, animal feed etc.
4	Rising incidence of pests and insects
5	Lack of irrigation facilities
6	Availability of good-quality seeds

Table 20. Major farming-related problems for women-headed households in Malda

Rank	Problem
1	Input costs, e.g. price of seeds, animal feed etc.
2	Climate-related: changing rainfall pattern
3	Climate-related: increasing heat
4	Weeds
5	Availability of good-quality seeds
6	Lack of irrigation facilities

Table 21. Major farming-related problems for women-headed households in Nepal

Rank	Problem
1	Rising incidence of pests and insects
2	Input costs, e.g. price of seeds, animal feed etc.
3	Availability of good-quality seeds
4	Lack of irrigation facilities
5	Climate-related: changing rainfall pattern
6	Lack of land

Efficiency as a farmer

The survey asked what assets would make women heads of households more efficient as farmers. Respondents in all districts agreed that more machinery would help, along with better seeds and pesticides. However, only two districts, Coochbehar and Malda, provided a detailed breakdown of information as to which machines would help the most (Figure 6). The handheld pesticide sprayer is becoming popular with women, many of whom are using it themselves. Pump sets for irrigation, as well as better seeds, featured heavily, along with training and the need for their own land. Data from Purnea and Nepal were dominated by the general mention of 'machines' to assist the efficiency (25 and 17 respondents, respectively) (data not shown). One may draw the conclusion that such an overwhelming response reflects the excessive work burdens of respondents. Clearly, women who are overburdened with the labour-intensive farming work believe that their agricultural efficiency would improve if they had more machinery. In Purnea, besides machines in general, 13 respondents mentioned the need for land ownership as the key to improving efficiency as a farmer. A similar pattern was observed in Nepal (with nine respondents noting land as their main asset needed to improve farming efficiency).

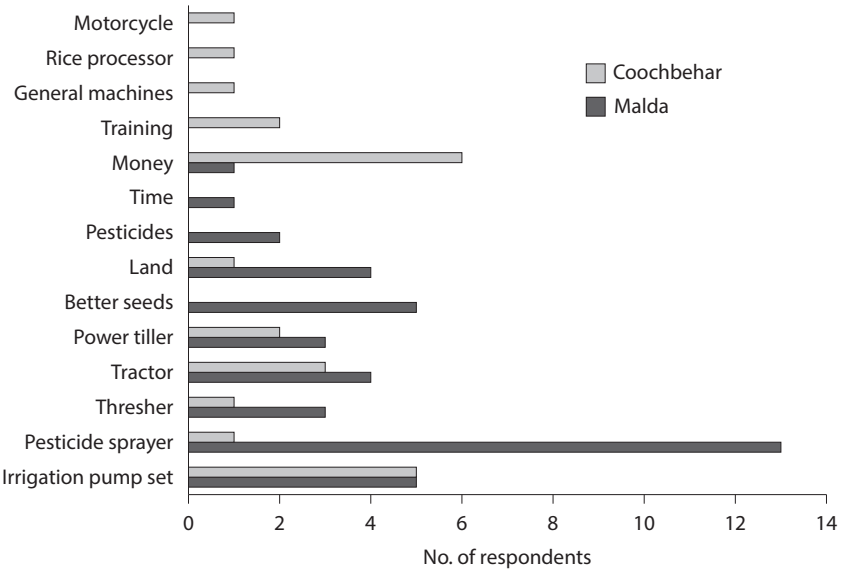

Figure 6. Assets that respondents felt could potentially improve their efficiency as farmers

Recent major livelihood shocks and assistance needed

Women-headed households (WHHs) in rural areas face different kinds of livelihood shocks. These shocks are closely associated with risks, defined by Dercon as the 'presence of a potentially large number of different possible circumstances that may materialize at a particular moment in time in the future' (Dercon 2010, p. 15). A shock is a realisation of one of these possible circumstances (Quisumbing et al. 2011, p. 3). WHHs, due to the heavy dependency burden of elderly and children members, are particularly susceptible to shocks. In this survey, we attempted to focus more on farming-related livelihood shocks; however, given the complicated nature of entanglement in a woman's life, many respondents mentioned family problems that caused, exacerbated or were the result of farming-related shocks. Given the possibility of a wide variety, the responses to this survey question were given in free form rather than providing predetermined multiple-choice answers. Respondents often provided more than one crisis in response to the question and mixed farming-related shocks with livelihood shocks. Only the first-mentioned crisis was analysed in more detail.

In collating data, these diverse responses were classified into 13 broad categories: (1) seed/fertiliser/inputs; (2) incidence of insects/pests; (3) labour shortage; (4) lack of machinery/equipment; (5) lack of irrigation; (6) floods; (7) drought/lack of rain/fire; (8) money/financial problems; (9) poor production/crop damage/crop loss; (10) extensive rains; (11) extreme cold; (12) death of livestock; and (13) illness/death in family. These categories are broad in the sense that they include 'similar' responses and may hide more detailed description of the exact nature of the problem. For example, shock category 1 includes agricultural inputs like seed, fertiliser and other things—meaning the general problem of availability, lack of access to, but also the timely availability of these inputs. Similarly, category 10, 'extensive rains', includes hailstones and windstorms and is separate from category 6, which is floods. The detailed responses to category 3, 'labour shortage', include those such as 'hired labour does not work' and 'delay in hiring tractor which delayed sowing time'. These crises were then ranked

according to the number of respondents citing them in terms of the proportion of responses.

The subsection of the question interrogated the need for specific assistance for the crisis concerned, the responses to which were classified into nine categories: (1) money/loan/credit/compensation; (2) money/food; (3) training/knowledge (prior warning); (4) equipment/machines; (5) money/equipment; (6) seeds (early ripening/better quality); (7) water management; (8) fertiliser/pesticides; and (9) labour/supervisory/social/mental support. The types of assistance that the respondent felt could have assisted in dealing with the crises were then matched. Not all of these women experienced a severe livelihood shock; even among those who did, not everyone indicated what assistance they were seeking at that time to cope with the shock. The most significant categories of shocks by district are listed in Table 22, along with the most prominent types of assistance that the respondents believed could have helped them to cope with that particular crisis. A point to note is that for a given type of crisis, some respondents chose a different kind of help than those listed in the table. The kind of help listed below is the major one. Districts generally had a range of crises, but Madhubani and East Champaran had an overwhelming selection of two: floods (Madhubani)/extensive rains (East Champaran) and money.

Table 22. Major livelihood shocks and assistance needed

Crisis	Frequency[a]	Assistance
East Champaran		
Extensive rains	17/20	Money/equipment
Money/financial problems	3/20	Money/equipment
Madhubani		
Floods	25/44	Money/loan/credit/compensation
Money/financial problems	14/44	Training/knowledge
Purnea		
Labour shortage	6/21	Equipment/machines
Seed/fertiliser/inputs	4/21	Money/equipment
Drought/lack of rain/fire	4/21	Water management
Extensive rains	4/21	Money/loan/credit/compensation
Coochbehar		
Illness/death in family	5/22	Money/food
Labour shortage	4/22	No major consensus
Floods	4/22	Labour/supervisory/social/mental support
Extensive rains	4/22	Training/knowledge (prior warning)
Malda		
Labour shortage	9/30	Money/loan/credit/compensation
Incidence of insects/pests & floods (combined)	5/30	Money/loan/credit/compensation
Poor production/crop damage/crop loss	5/30	Fertiliser/pesticides
Money/financial problems	4/30	Money/loan/credit/compensation
Nepal		
Drought/lack of rain/fire	8/20	Equipment/machines
Floods	4/20	Money/loan/credit/compensation
Incidence of insects/pests	4/20	Fertiliser/pesticides
Extensive rains	3/20	Money/loan/credit/compensation

[a] The number of times this crisis was mentioned out of the number of households who identified a crisis.

Most pressing needs

Table 23 presents the data on the most pressing needs as expressed by the respondents. These comprise a key input to participatory decision-making. These needs were expressed in free form by the respondents and, during data collation, were classified into seven broad groups or categories: (1) climate-related; (2) input-related; (3) process-related; (4) marketing/trade–related; (5) family/work–related (e.g. children's education or labour issues); (6) community-related (e.g. the need for medical facilities in the area); and (7) knowledge-related (e.g. the need for training). A number of important observations emerge from the following data, pointing once again to the diversity of needs within the study region.

Clearly, family/work–related needs and input-related needs featured strongly among the expressed needs. For East Champaran and Purnea, the most pressing needs were related to family/work, whereas for the rest of the districts, input-related (lack of good seeds, pesticides, fertilisers, irrigation facilities and water management etc.) needs featured as critical. Climate-related needs were most strongly felt in Coochbehar. The reason why marketing/trade–related needs were expressed less intensively is probably the subsistence nature of the farming in the region.

Table 23. Most pressing needs of women heads of households[a]

	Weighted rankings					Weighted percentages				
Needs classified	East Champaran	Purnea	Coochbehar	Malda	Nepal	East Champaran	Purnea	Coochbehar	Malda	Nepal
Climate-related	0.0	0.0	2.0	0.0	0.0	–	–	7.5	–	–
Input-related	0.0	14.7	10.7	52.0	27.7	–	17.1	40.2	76.7	45.6
Process-related	0.0	3.8	5.3	9.7	4.0	–	4.4	19.9	14.3	6.6
Marketing/trade–related	1.0	0.0	2.0	0.5	0..3	3.3	–	7.5	0.7	0.5
Family/work–related	20.5	67.3	6.3	5.7	19.2	68.3	77.0	23.7	8.4	31.6
Community-related	8.5	0.0	0.3	0.0	9.5	28.3	–	1.1	–	12.9
Knowledge-related	0.0	0.5	0.0	0.0	1.7	–	0.6	–	–	2.8

[a] Madhubani has been omitted due to lack of reliable data.

General attitudes to empowerment and wellbeing, and climate change: semantic differential scale

The last question of the questionnaire dealt with a number of subquestions on issues arising out of the overall situation of women-headed households (WHHs). This question was designed as a semantic differential scale to assess the subjective attitudes to specific succinct statements on topics covered in the questionnaire. Semantic differential scales are widely used in studies that aim to elicit qualitative material, such as individuals' personal feelings, opinions, attitudes and perceptions towards environment-related matters, such as its quality at a certain point of time or changes in its attributes over a period of time (see Burgess (1980) for an early example of a similar scale used to study urban residents' perceptions of the urban environment in Hull, United Kingdom). The 'scale' is purely a descriptive measure and represents an attempt to express qualitative depictions quantitatively. At the simplest level, the scale could be a three-point gauge; that is, present the three categories of 'good', 'neutral' and 'bad'. More complicated versions present five- or seven-point scales. In the present case, a five-point scale was used.

The respondents were asked to indicate whether and how strongly they agreed or disagreed with each of 21 propositions. The responses were averaged for each subquestion (Q) and each district. In order to gain an average of the results, the semantic scale was converted to numeric values where 100 corresponded to 'strongly agree', 75 to 'agree', 50 to 'neutral', 25 to 'disagree' and 0 to 'strongly disagree'.

Average/trend data on the responses to individual subquestions were then calculated for each district. The responses are presented diagrammatically in Figures 7–18. (This particular question was not properly pursued in Nepal and hence Nepal is not included in this chapter.)

The first subquestion (Q1) explored the general wellbeing at the time of the survey compared with 'the past', defined as in rest of the survey as 10–15 years ago. There was general agreement across all survey districts that life has improved, with Purnea strongly in agreement (Figure 7). No definitive conclusion can be drawn based purely on the response to just this question, for several reasons. Firstly, women in rural India in general, irrespective of their grinding poverty, tend not to highlight their difficulties and so give a positive response to such general questions. More importantly, in this survey, we were unable to explore the roles of remittance in economically (and otherwise) empowering rural women. Thirdly, the relationship between feminisation of agriculture and women's wellbeing needs further investigation.

It is for these reasons that the second subquestion (Q2) addressed one aspect of women's empowerment; that is, decision-making power inside the household, particularly with regard to children's wellbeing. Again, Figure 7 shows that respondents generally agreed with this proposition, with those from Malda giving the strongest vote in favour of the statement.

Q3 explored the financial decision-making power of the respondents. As evident in Figure 8, in general there was positive agreement about women's control over finance, although generally not as strongly felt as for the earlier questions. Q4 queried the decision-making power in relation to the production activities on the farm. With regard to the respondents' confidence about their ability (and rights) in making decisions on the farm, women from East Champaran appeared very empowered to make these decisions. In contrast, in all the other districts, women who agreed with this proposition were far from certain this was the case.

Flowing on logically, the next two subquestions further probed into respondents' decision-making power with regard to agricultural activities, such as hiring labour (Q5) and raising small livestock (Q6). Figure 9 shows a similar distribution for Q5 as for Q4 (Figure 8). Respondents from East Champaran were very positive about their empowerment in farming, this time in regard to hiring labour. Respondents from the remaining districts were ambivalent.

As noted earlier in this report, whereas large and more capital- and space-intensive livestock like cattle continue to remain the assets that are generally controlled by male members of the household, smaller livestock that do not require large amounts of capital to purchase and maintain, grow quickly to yield speedy returns, and do not require too much space for forage or too much time for care generally belong to women in rural areas. Goats are typical of

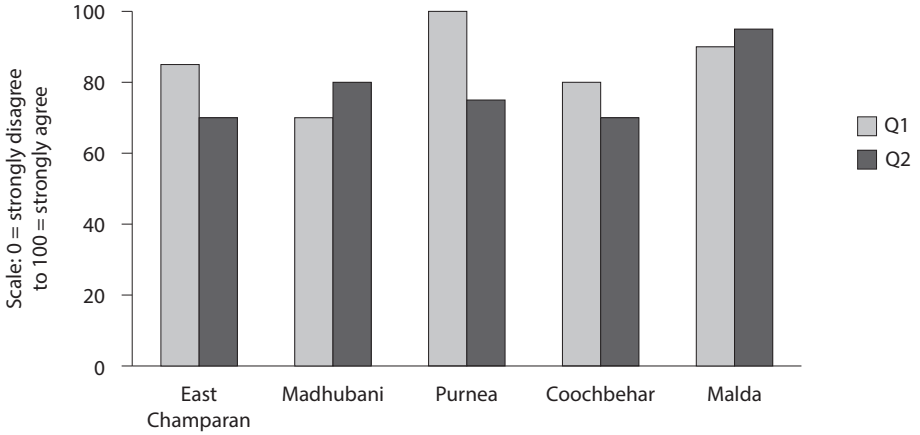

Figure 7. Responses to Q1: *Life is in general better than before (10–15 years ago)*; and Q2: *I generally decide about our children*

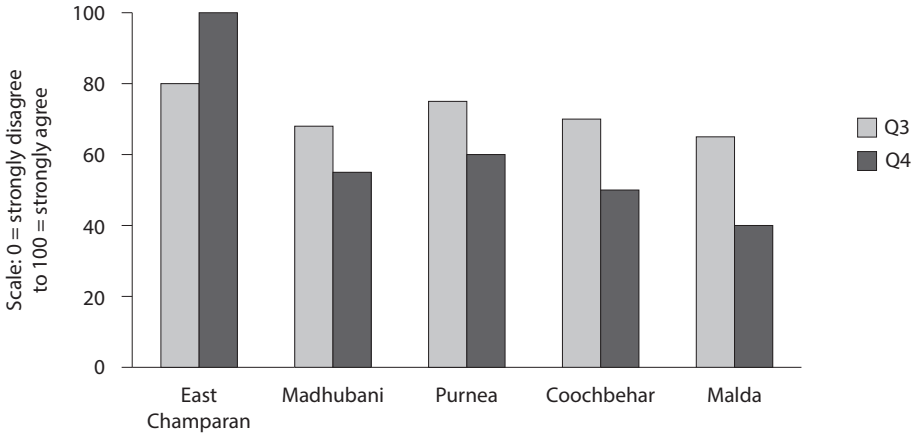

Figure 8. Responses to Q3: *I generally decide about money and expenditure in my household*; and Q4: *I generally decide about which crop to cultivate and when, how to process and to whom to sell*

such small animal assets over which women generally have more decision-making power and hence control, as the responses to Q6 demonstrate. Figure 9 shows that respondents in all the surveyed districts were confident in dealing with goats.

With Q7, we return to other aspects of women's empowerment. Cooking represents the minor decision-making powers at home. Curiously, East Champaran women felt they were the least able to decide what to cook (Figure 10), whereas the remaining districts were more positive about this aspect of empowerment at home. Again, the deeper reasons for such inter-district variability need to be further explored.

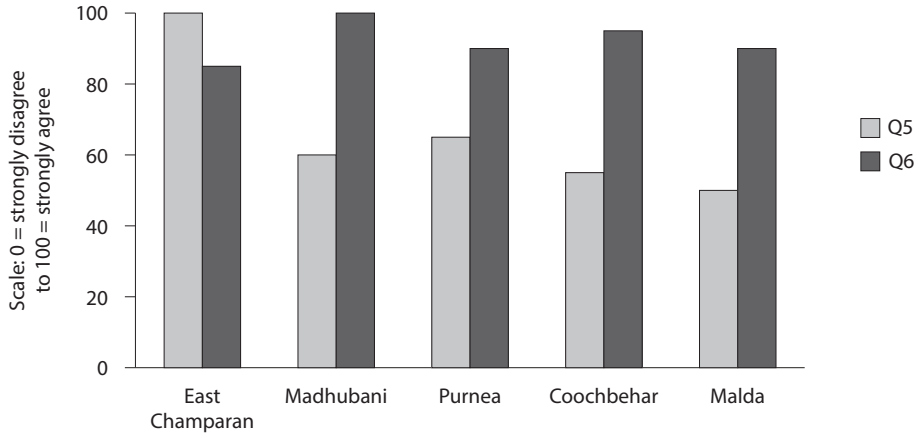

Figure 9. Responses to Q5: *I decide whether or not to hire labour on my farm*; and Q6: *I can decide the number of goats to keep*

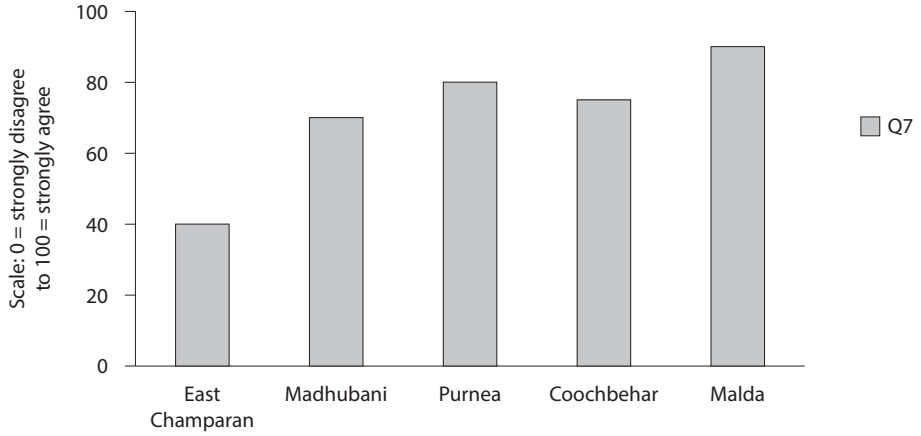

Figure 10. Responses to Q7: *I can decide what food to cook*

Subquestions 8 and 9 explored the political empowerment of women heads of households. Voting-related decision-making and the freedom to attend political meetings represent overall political empowerment. With regard to political decision-making power, most respondents in the surveyed districts opined that they could vote for whichever party they chose (Figure 11). Respondents in all districts except Coochbehar felt that they probably could decide which political meeting they would attend—although, apart from Purnea, they were not very definite. The Coochbehar women were unsure about this.

With Q10, we turn towards respondents' perceptions of, and attitudes to, climate change and related issues in agriculture. Figure 12 shows that Purnea respondents were very sure that the summer heat had got worse. Women from East Champaran were also fairly sure this was so, while those from Madhubani and Malda said 'maybe' and Coochbehar women were not convinced.

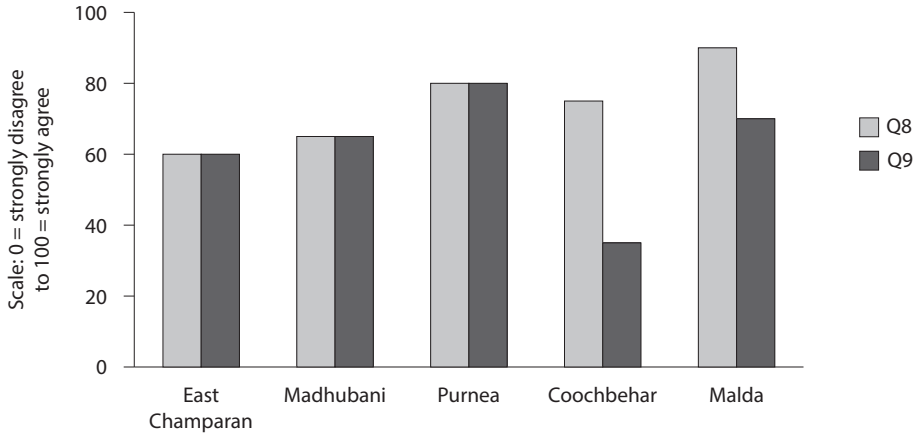

Figure 11. Responses to Q8: *I can decide which political party to vote for*; and Q9: *I can decide which political meeting to go to*

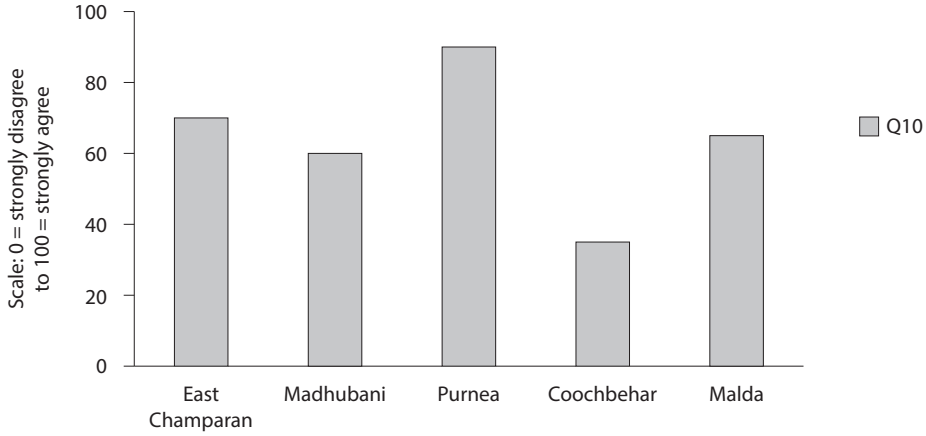

Figure 12. Responses to Q10: *I think the summer heat has generally increased over the past 10–15 years*

All the districts were quite convinced that monsoon rains had not significantly increased over the past 10–15 years (Q11, Figure 13). The implication is that they might have decreased. Perhaps surprisingly, no districts agreed that prior knowledge of the pattern of rainfall to be expected during the annual monsoon season would be beneficial (Q12, Figure 13).

Q13 was the inverse of Q10. Except for Coochbehar, the overall responses (Figure 14) were also the inverse compared with Q10, and hence consistent. Respondents in Coochbehar disagreed with both statements. The most logical conclusion is that these women feel the heat levels have not changed, i.e. they have neither increased nor decreased over time.

Q14 is the inverse of Q11. Respondents in Purnea thought the rains had decreased, while those in Coochbehar did not (Figure 14). The other districts were unsure but tended to disagree with the proposition. Except for Purnea, these responses are rather inconsistent with Q11; however, one does not expect that a perfect mirror would emerge. This may also indicate local climate differences: while Purnea residents have definitely perceived a decrease in the monsoon rains over time, those in other districts have not.

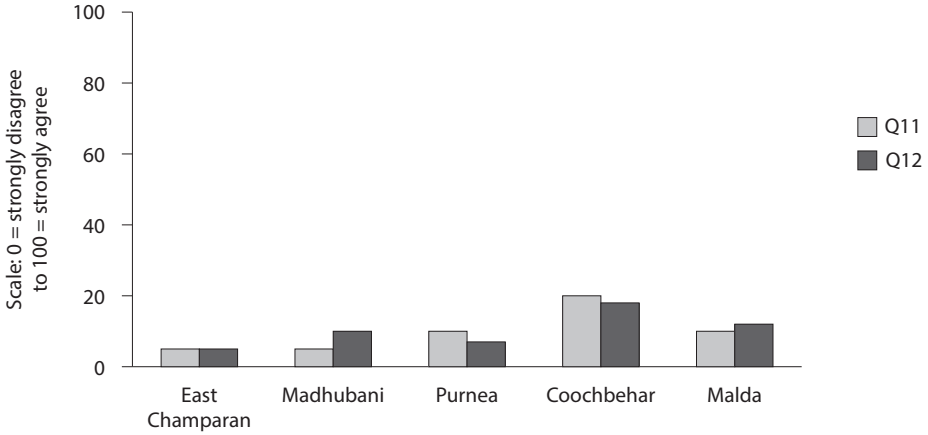

Figure 13. Responses to Q11: *I think the monsoon rains have generally increased over the past 10–15 years*; and Q12: *It would help us if we knew beforehand what the amount of rains would be each year*

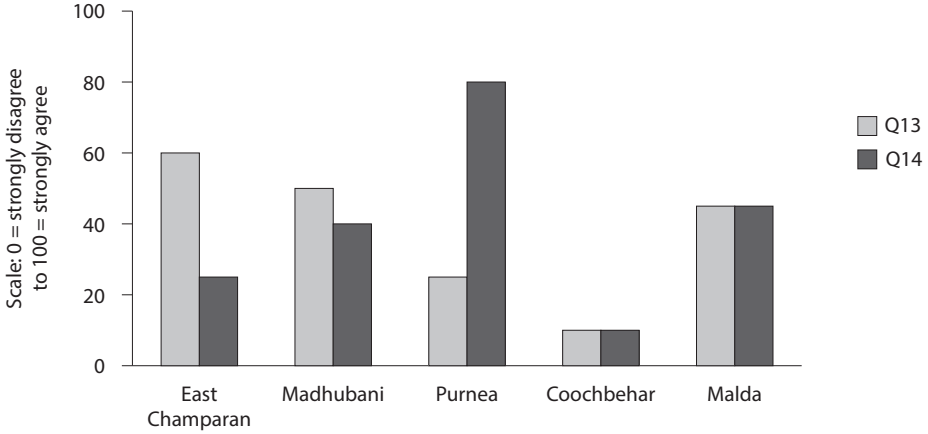

Figure 14. Responses to Q13: *I think the summer heat has generally decreased over the past 10–15 years*; and Q14: *I think the monsoon rains have generally decreased over the past 10–15 years*

Subquestions 15 and 16 related to women's livelihoods in farming and the needs of women heads of households (in relation to farming). Purnea, Coochbehar and Madhubani were quite sure that irrigation capability would be highly beneficial, with Malda less so and East Champaran undecided (Figure 15). All districts agreed that access to farm machinery would be an advantage—Malda and East Champaran more so than the other three districts (Figure 15).

Q17 focused in particular on the sense of achievement and autonomy, whereas Q18 focused on the need for credit. Generally, a relatively high level of autonomy was expressed by respondents, in response to the question that their care might have improved the farm; however, how far that reflects the actual condition is doubtful. Respondents in Purnea were the most confident that farming land under their care had become more productive (Figure 16). A large divergence across the districts was noticed in response to Q18 on the need for bank credit (Figure 16). Women in Purnea and Coochbehar thought getting a bank loan when necessary would be a great help, while those in Madubhani and Malda were unsure and those in East Champaran disagreed.

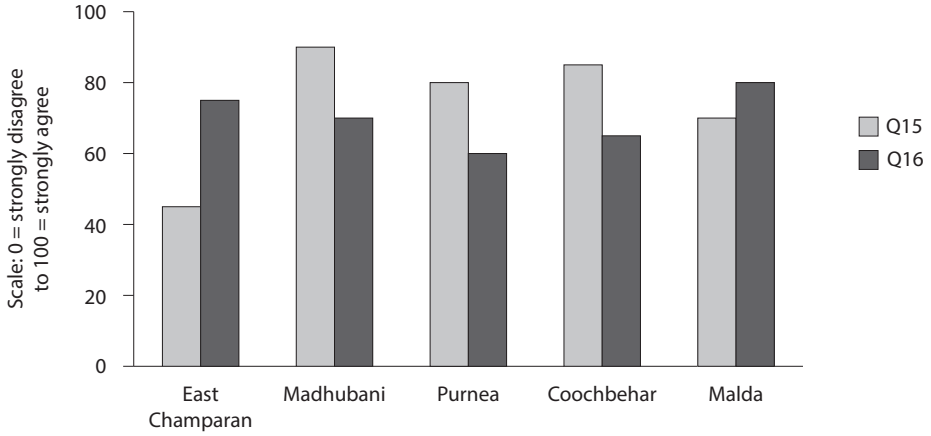

Figure 15. Responses to Q15: *It would be helpful if I could irrigate my farmland*; and Q16: *It would be useful if I could buy more sophisticated farm machinery*

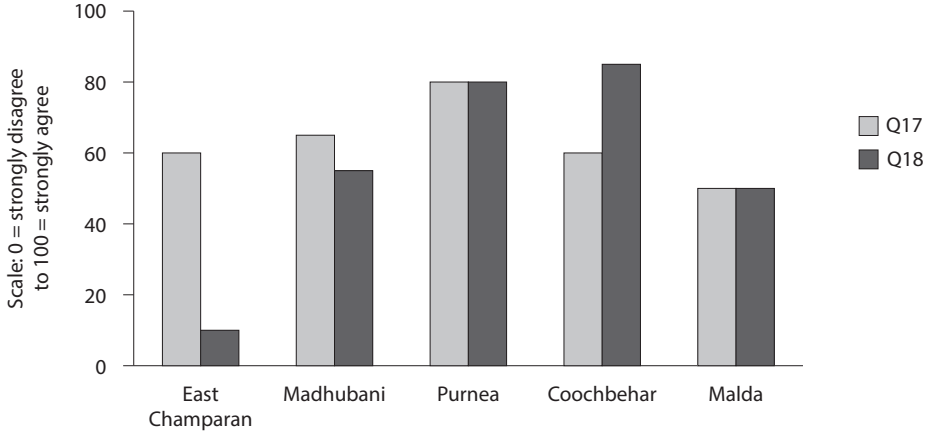

Figure 16. Responses to Q17: *Now that I look after the farming tasks, I think my land is more productive than before*; and Q18: *I could use bank credit*

The next two subquestions were targeted at understanding the availability of (and attitudes to the availability of) agricultural services (Q19) and a particular need, namely the need for voice and expression (Q20).

From the average responses to Q19, it appears that women heads of households from Purnea, Coochbehar and, to a lesser extent, Madhubani would like greater access to agricultural services (Figure 17). It was interesting to note that respondents from Malda and East Champaran were undecided about whether this would be helpful.

All women in all districts were sure that community help through village meetings would be beneficial in overcoming any problems and difficulties that they might face (Figure 17).

The last subquestion (Q21) attempted to bring the question of land ownership back into focus, before ending the interview process. Respondents in all districts were of the opinion that things would be better if they owned their own land (Figure 18). This is an interesting finding, considering the view expressed in the earlier discussion around land ownership that ownership by women could potentially cause cultural problems. This central topic warrants follow-up and further analysis to understand the apparent discrepancy.

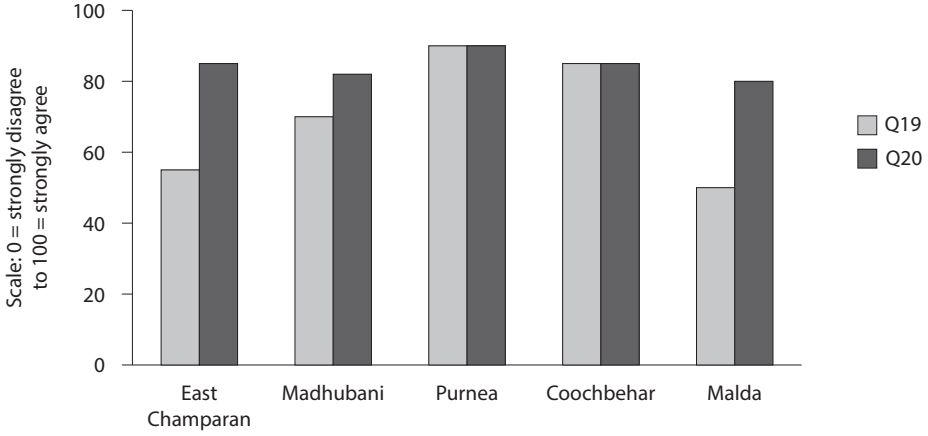

Figure 17. Responses to Q19: *It would help me if the government's agricultural extension services were closer and gave me assistance*; and Q20: *It would be useful if I could attend village meetings and talk about my problems with others*

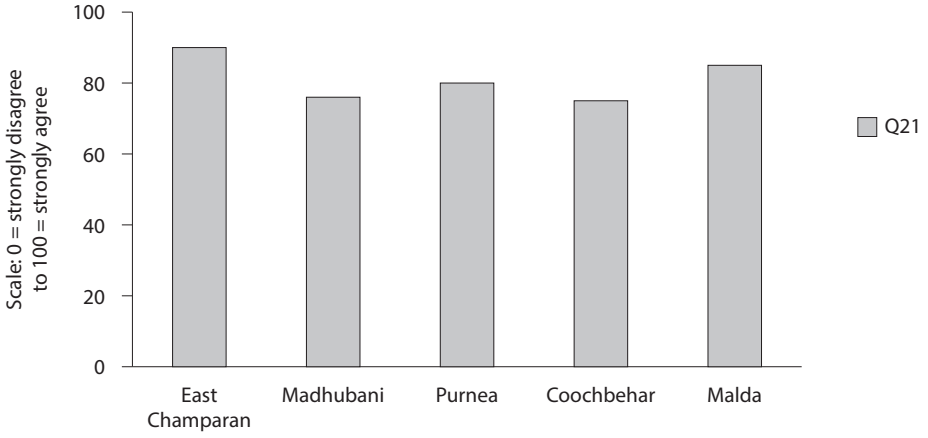

Figure 18. Responses to Q21: *It would be better if the farming land was owned by me in my own name*

Conclusions and recommendations

Hazards of assumptions and generalisations

The purpose of this study, as described at the outset, was to develop evidence on women heads of households' roles in farming and their gender-specific needs/interests as well as their perceptions of change in general and climate change in particular. Recently, Okali (2012, p. 3) critiqued the manner in which gender has been 'incorporated' into agricultural research and development activities and suggested ways in which more nuanced understandings of gender and social relations can be fruitfully brought into agricultural research and policy processes. She warns planners of the futility of portraying women as victims, overburdened with work as compared with men, and as vulnerable and poor: 'This picture of women labouring in the fields and even taking prime responsibility for farm management, while having little power to take decisions and no control over key resources, is painted across the agricultural sector and is reproduced in new policy areas such as climate change' (Okali 2012, p. 7). As we have seen in this study, although these observations are true at a broadbrush scale, many of them are contestable, depending on the age, class and caste locations of the woman concerned. Indeed, as evident from the survey of individuals' perceptions presented in this study, many women expressed confidence in coping with uncertainty and change.

Many conventional policy measures arising out of such a universalistic portrayal of rural women as isolated opposites of men either lead to the dissociation of women's and men's interests in the realms of policy and practice, or ignore the complex and entangled power dynamics within which women's and men's lives exist. Thus, it is important that we avoid treating all rural women in the Eastern Gangetic Plains (EGP) as victims, highlighting their disadvantages, and instead explore the nuances of gender relations at the level of household and community by examining the relationships between women and men as spouses, parents, community leaders and representatives, farmers and farm labourers. Once the attention is diverted to that kind of study and analysis, there would be important policy benefits; for example, women's interests in agriculture would not get compartmentalised within everything that is small in size and subsistence in nature, creating an artificial and unsurpassable binary between interventions in the area of commercial agricultural improvement and the area of household food security.

Beyond technology

Conventionally, agricultural research in developing countries has had an excessive orientation towards technological inputs into the farm sector to improve agricultural production. In recent years, farm systems research has changed this explicit technological thrust by involving farmers in research and through the adoption of participatory and livelihood approaches. But to take the next step, in order to introduce gender into agricultural policy and developmental planning, a social relational approach will be useful.

Okali (2012, p. 12) suggests that gender needs to be considered along with other social divisions and categories and the messiness of social realities must be acknowledged and addressed in agricultural policy planning on gender. Moreover, things that are seen from outside as 'gender issues' may actually not be of critical importance to women farmers themselves and indeed, in this study, active effort was made to bring out the diversity of women's voices, interests and concerns *as noted by themselves*. However, some compression of differences might be required in order to produce a practicable model of intervention for the entire EGP region.

Recommendations

The analysis of the data collected through the field study has helped develop a series of recommendations, which I discuss in turn below.

Incorporate 'gender mainstreaming' at all levels

In general, the study points to the need for a solid gender-focused approach through all institutions and in all agricultural development projects. Such an approach would both benefit farming women and make agricultural interventions reach those who are most disadvantaged and in need of assistance. This is generally known as 'gender mainstreaming', and could be done in two ways: first, gender considerations could be mainstreamed both vertically and horizontally—that is, within the institutions that undertake and manage the agricultural development projects, and second by ensuring that each project has a concrete gender component. Therefore, knowledge enhancement on women-headed households (WHHs) and farming systems through continued and intensive research will illuminate certain specific aspects of women heads of households in farming.

Investigate solutions to labour shortages

Further exploring the farming-related issues arising from labour constraints in EGP due to male out-migration is a related priority. As evident from this study, currently, agricultural systems are highly labour-constrained due to the exodus of working-age-group males to cities and other areas for cash incomes. Timely availability of labour during the critical days of ploughing the land, transplanting and harvesting was raised by women heads of households as a major difficulty. One way of overcoming this is by better connecting government work provisions, such as the National Rural Employment Guarantee (NREG), with agriculture to ensure that field labour is provided to WHHs during these critical phases.

Based on the current findings, future research projects need to investigate, for example, the evolving needs, emerging patterns and changes in farming livelihoods in the region. This includes analysing the causes and gendered consequences of the new contract farming system that seems to be a new element along with the share-cropping systems, where—due to the shortage of labour, unwillingness to work in the field or physical inability—women are offering their lands on half-share (*adhiya battaiya*). The use of remittance incomes by women heads of households is another area that needs to be further investigated.

Think holistically, act locally

In a context where money and markets dominate, access to assets alone is not enough, but wider-ranging support is required to enable women to overcome the various constraints posed by different institutions in all aspects of life to make these assets more productive in the face of the threat of climate change. A holistic treatment, however, does not imply that the diversities within WHHs or the local context of farming in which they are situated should be ignored. A village-level approach would be useful in this regard. Thus, each intervention program should be tailored to the specific needs and interests expressed by the WHHs.

Instigate personal and financial group support

We have seen that the women heads of households are time-constrained and burdened with excessive work pressures; therefore, an emphasis on enhancing social capital among such women through group formation might be helpful for both farming activities and women themselves. The observation made in this study that overall a third of survey respondents already belong to a self-help group indicates that many women already recognise the benefit of such groups. The collated data reveal the importance that respondents place on money, credit and financial assistance to enable them to operate their farms more smoothly. In fact, a large segment of these women expressed credit/money as a key need. To connect women heads of households to the banks, cooperatives may need to be formed. Such cooperativisation may be particularly successful in harnessing surpluses from small domesticated livestock and may play a key role in breaking the current caste-based knowledge-sharing systems.

Involve men in gender-equity processes

The involvement of men is crucial if gender is to be mainstreamed in agricultural development projects: strategic shifts in access to resources and benefits (linked as they are to responsibilities for maintaining them) can emerge only if men, at least those remaining at home, also support such a shift and take on a more equal share of farm and domestic work. In the context of structural reform, poor men too are facing a critical problem in terms of accessing productive assets, markets and income, leading to a crisis of masculinities that is often reflected in

growing trends of violence against women and in male farmer suicides. If gender equity is indeed to be achieved, there is need to pay attention to the interests of women, but also to men and to shifts in gender relations occurring on account of contextual changes. Simultaneously, there is a need to encourage men to share in reproductive [domestic] work, by making it an essential part of livelihood strategies.

Consider the constraints on EGP women

Specific attention to women heads of households would need to consider a larger array of factors. Certain characteristics of the society and culture of the EGP are significant in determining how farming is carried out by women with low literacy, low mobility and in the absence of support networks that might have played a role in gaining further knowledge. In this region, village communities are generally caste-bound and women in farming families are generally illiterate or have very low levels of education. In most of the villages studied, women are generally given away into marriage at an early age, allowing them little or no time to gain higher level knowledge of better farming practices. The virilocal system of marriage, in which the married woman goes to live in the husband's village no matter how far away it is located, often results in women losing their original family supports. New networks take time to be built in their villages of residence. Women heads of households are otherwise characterised by low levels of mobility and therefore not exposed to the external world that may otherwise create the mindset for behavioural change with regard to farming practices. Together, these factors result in an extremely low voice for women in the community, with low control over assets and low decision-making power.

Build capacity in women heads of households

Women who participated in the survey felt an acute lack of support services and improved inputs, and expressed training needs. Therefore, to meet these needs in order to build a climate-resilient agriculture, it is imperative that processes are put in place for women's knowledge enhancement and capacity building. In particular, several low-investment measures could easily be taken up to improve the situation. These include:

- exposure visits to other areas where different farming techniques are practised—with consideration for women heads of households' triple burdens and excessive time commitments
- farm advisory services for women—these could be women-only services, and be developed in the model of *Anganwadi* (village-level health extension workers)
- special agricultural demonstrations with women heads of households as the target group
- wider inclusion of women in the *Kishan Vikash Kendra* (or KVK, which are local organisations of farmers) which to date have been dominated by men. Gaining that inclusion is an important task. It should begin with gender sensitisation of KVK members, followed by focus group discussions on the needs and interests of women. Once 'engendered', these organisations could play important roles in supporting women.

Recognise differences in needs based on land ownership

The study revealed that the key differences in the needs and wellbeing of women heads of households were a result of land ownership; in other words, land ownership is the key feature of intergroup difference. Respondents who own land expressed very different needs from those who do not. For example, landed women are suffering from labour shortage, high input costs, poor access to markets and poor agricultural extension services.

Therefore, specific attention to land-based women heads of households would mean that they are: provided with access to irrigation through inclusion in water-user committees; introduced to cash crops that have a local market demand; trained in the rearing of small animals, possibly including projects such as a duckery and backyard poultry or trained in running fisheries using the locally available water bodies; and provided with postharvest assistance. Although most of the rice–wheat crops are meant for family subsistence, certain measures could be taken to improve the market value of the produce. These measures include postharvest technologies that will add value to the products harvested by women.

Specific attention to the landless women heads of households, on the other hand, would mean that specific projects for non-land-based activities are taken up. These could include the advancement of farming knowledge through training, including mechanical training, particularly in the use of smaller labour-saving devices, such as sprayers and power tillers.

Improve access to information, markets and transport

The provision of good-quality, reliable and timely information is one of the critical inputs for improved farming. The need for information on weather was acutely felt and expressed during conversations and interviews; currently, a large number of respondents receive incomplete and inadequate information on weather. The major source of information is word of mouth, followed by the radio. Information needs to be provided on new and available farming and processing technologies and new agro-inputs, such as seeds or ways to deal with pest attacks. Such information could include weather-based advisory services, such as recorded voice through mobile phones; and regular demonstrations of the use and operation of new farming inputs. Projects that aim to diversify livelihoods by integrating crops, livestock, fisheries and/or horticulture are possible in the region. The provision of better marketing channels specifically for the WHHs would be helpful to access markets that are located farther away and may lead to a diversification of crops as well.

Transport to and from markets and the fields affects the women heads of households' wellbeing, particularly because of their low access to water and fuel. Performing productive tasks in addition to the growing burden of reproductive [domestic] work is likely to ultimately deplete women's 'physical capital' and negatively affect their capacity to work. While women are often engaged in a range of productive tasks, restrictions on mobility may prevent them from accessing the best markets directly and if this has to be done, they then become dependent on their male relatives for this purpose.

Give priority to small livestock development

Prioritising livestock and fodder development would impart a key asset for rural WHHs, provide the much-needed insurance against risk and allow some amount of savings by women and the entry of capital into the household. It is essential to recognise that women have greater control over the capital earned from smaller animals. Rather than attempting to ban goats as environmentally destructive (as was tried by the Andhra Pradesh state government in India), it is much better to recognise their value for the poor WHHs and try to overcome the negative environmental effects through provision of fodder and forage (as was done by the government in Nepal).

Enhance understanding of the role of remittances

The reasonable amount of cash that enters the region in the form of remittance incomes, its regularity, the control over it, and the utilisation of this money remain unclear. Often, indebted households receive the cash *after* the need threshold has been crossed and hence it is used in paying off a debt. At the same time, there are families that have been able to build assets with these incomes. The role(s) of remittance incomes in moving WHHs out of farming systems is also unclear and needs further investigation. However, certain fundamental steps towards this could be connecting women to banks/sources of credit, leading to farming loans, possibly through self-help group bank linkage programs, as discussed above. Further investigations need to be undertaken into remittance incomes and their relationship with women's involvement in farming.

Final remarks

The key understanding is that there is a need to create an enabling environment for enhancing farming-based women heads of households' control over a range of livelihood assets, while also ensuring women's voices and rights in the new institutions that are created to manage resources such as water and land. The key objectives of interventions towards a climate-resilient agricultural system would be to optimise the current conditions and minimise the vulnerabilities of women and men to future changes. Both risk management and change management, undertaken in an interrelated manner to modify behaviours and practices over the medium to long term, must then help to build the resilience of WHHs of the region.

The organisation of women heads of households in groups should be a key strategy for helping them gain access to productive assets in farming. Group formation has been an essential means for building confidence and leadership skills as well as the bargaining powers of women. This is because the process of claiming assets implies challenging the status quo, with its consequent social risks, which becomes possible only when women have substantial common interests and intra-group social support to take such actions.

Giving (or enhancing) the women heads of households access to existing institutions, such as KVKs

and farmer's clubs, would allow them to interact at par with male farmers and may potentially break the caste–gender boundaries, by encouraging them to take up things that they have not done previously. For example, during the interviews, several women expressed the need for pesticide sprayers and raised the point that although these have traditionally been used by men, due to their light weight and ease of handling they can be used by women. The entry by women into the higher cluster-level farming federations would play an important role in ensuring that they do not only facilitate forward and backward linkages, but also lead to structural changes in gender relations in farming systems in the region.

Postharvest technology provision, market access and infrastructure development are significant for enhancing the productivity of key natural resources in rural areas (such as land and water in EGP) and developing human and other assets, as they imply that the premium value of women's time is recognised. They also provide appropriate support to ease their labour burdens. The focus on dealing with competitive markets is essential to help women heads of households overcome the structural constraints to achieving equal economic participation.

Monitoring and evaluation of projects should move beyond just inputs and outputs and include quality and process factors. There is need to specifically monitor how far gender has been mainstreamed in each program component. Similarly, the gender-differentiated impacts of each project should be investigated to assess not just the performance, but also to eliminate the possibility of any real or potential negative impacts on women.

Lastly, there is a need to refocus attention away from the notion that agricultural development, poverty reduction and gender equity can be achieved cheaply, with 'micro-investments' and small-scale interventions that 'target' women. Thus, the 'add women and stir' approach must be rejected at the outset to ensure gender is integrated thoroughly from the beginning to the end, at every stage and at every level in a project. The need for adequate investment of resources is a lesson that has emerged repeatedly in a range of sectoral interventions (for instance, in eradicating illiteracy). In building a climate-resilient agriculture, the investment of adequate resources to mainstream gender needs to be taken seriously.

Appendix 1: Numbers of respondents by village and district

District	Subdistrict (where relevant)	Village	Number of respondents
Bihar state, India			
East Champaran	Murtia	Gamharia Khurd	10
	Ekdari	Murli	10
Subtotal			*20*
Madhubani		Alpura	7
		Ganguli	13
		Ithar	7
		Maheshpur-Simra	10
		Mangrona	6
		Ratupar	6
	Shiva	Sahuriya Navtali	7
		Shiva	4
		Sankarthu	13
Subtotal			*73*
Purnea	Purnea Sadar	Belauari Satdov	9
	Dhamdaha	Dhamdaha	2
	Dhamdaha	Dhamdaha Central	9
	Dhamdaha	Dhamdaha Middle	2
	Purnea Sadar	Dogachchhi	8
	Purnea	Dogachchhi Kasba	2
	Purnea	GaneshPur	3
	Purnea Sadar	Kathaili	8
	Purnea	Udaynagar	7
Subtotal			*50*
West Bengal state, India			
Coochbehar	Coochbehar – I	Charakpara	4
	Tufanganj	Debagram	5
	Dinhata – II	Durganagar	8
		Gopaler Kutir	3
	Dinhata – II	Kishamat Das Gram	1
	Tufanganj	Mansai (Barokadi) II	4
	Dinhata	Patchara	7
	Dinhata	South Kismat Das Gram	1
		Uttar Kismat Das Gram	3
		Uttar Patchhara	1
		Dakshin Patchhara	1
Subtotal			*38*

District	Subdistrict (where relevant)	Village	Number of respondents
Malda	Manikchak	Benitala	1
	Manikchak	Beridola	1
		Fatepur	2
	Gazole	Gourongapur	7
		Jodupur	8
	English Bazar	Kalinagar	12
	Manikchak	Nabadia Para	2
	Manikchak	Nawandiyatala	4
	Manikchak	Bagritola	2
	Manikchak	Dadpur	3
Total			*42*
Eastern Terai region, Nepal			
Jhapa		Ramnagar	11
Mahottari	Dhaijan	Kalijhoda	5
Mahottari	Ramnagar	Kusmari Tole	1
Morang	Rangeli	Madhubani	5
Morang	Shreepur	Shreepur	2
Morang	Dangibari	Shimulchowk	5
Rautahat	Hardiya	Baunna Tole	5
Saptari	Amardaha	Sugatole	5
Saptari	Shreepur	Taramtor	1
Subtotal			*40*
Total			***263***

Appendix 2: General characteristics of respondents—summary of collated data

Attribute	East Champaran (*n* = 20)	Madhubani (*n* = 73)	Purnea (*n* = 50)	Coochbehar (*n* = 38)	Malda (*n* = 42)	Nepal (*n* = 40)
Age (years)						
Average	42	38	45	32	41	38
Minimum	22	22	20	20	22	23
Maximum	65	65	72	54	65	58
House type						
Pucca	1	7	1	2	8	6
Kuccha	4	35	38	34	31	30
Hut	15	31	11	0	3	3
No response	–	–	–	2	–	1
Marital status						
Married	16	15	33	22	15	34
Unmarried	–	–	–	–	–	1
Deserted	–	3	–	2	2	1
Divorced	–	–	–	–	1	–
Widowed	4	54	17	14	24	4
No response	–	1	–	–	–	–
Education status						
Illiterate	20	56	30	7	13	27
Literate	–	9	4	–	10	–
Completed primary school	–	6	10	4	7	4
Attended secondary school	–	1	6	27	6	6
No response	–	1	–	–	6	3
Household (HH) migration status						
Husband	7	15	6	15	9	16
Son	13	27	15	7	6	10
Sister	–	–	–	–	–	1
At least one HH member	20	38	19	20	15	26

Attribute	East Champaran (n = 20)	Madhubani (n = 73)	Purnea (n = 50)	Coochbehar (n = 38)	Malda (n = 42)	Nepal (n = 40)
Main destinations						
Most popular	Punjab	Kolkata	Punjab	Punjab	New Delhi	Kathmandu
Second-most popular	Benaras	Mumbai	New Delhi	New Delhi	Other Indian cities	Malaysia
Third-most popular	New Delhi	New Delhi	Haryana	Haryana		Middle East
Purpose	16 farm work; 4 non-farm work	All but 3 non-farm work	11 farm work; 10 –on-farm work	All non-farm work	All but 1 non-farm work	All but 2 non-arm work for better money
Family composition						
Average males other than husband	4.9	1.9	2.3	1.8	1.7	2.4
Maximum males	13	4	7	4	4	6
Average females other than respondent	3.6	2.1	2.1	1.5	1.8	2.1
Maximum females	10	8	6	4	4	6
Dependants						
Average no. of elderly	0.5	0.4	0.5	1.9	0.4	0.3
Maximum no. of elderly	2	2	4	5	3	2
Average no. of children (not working)	2.9	2.4	2.7	1.9	1.3	2.5
Maximum no. of children	7	11	8	3	4	5
Occupation						
Agricultural labour	1	12	23	9	4	7
Share-cropper	5	3	1	0	0	4
Owner-cultivator	3	29	15	13	21	11
Owner employing labour and cultivator	–	–	6	1	–	10
Owner employing labour	–	21	2	4	1	1
Agricultural labour and owner-cultivator	–	–	1	7	15	6
Share-cropper and owner-cultivator	10	–	1	–	–	1
No response	1	8	1	4	1	–
Land in hectares (bighas)						
Average	0.1 (0.2)	0.3 (1.2)	0.6 (2.2)	0.6 (4.4)	0.4 (3.0)	0.5 (0.8)
Maximum	0.2 (1)	2.2 (9)	4.0 (16)	4.0 (30)	1.0 (8)	4.0 (6)
Landless (no. of HHs)	4	28	9	3	1	8
Loans						
HHs with loan (no.)	–	49	15	20	9	26
Average amount (Rs)	n/a	25,400	62,000	18,500	15,500	60,000
Maximum amount (Rs)	n/a	100,000	300,000	40,000	35,000	250,000
Minimum amount (Rs)	n/a	3,000	2,000	4,000	10,000	1,000

Attribute	East Champaran (*n* = 20)	Madhubani (*n* = 73)	Purnea (*n* = 50)	Coochbehar (*n* = 38)	Malda (*n* = 42)	Nepal (*n* = 40)
Schooling of HH children (no. of HH)						
Children attending school	18	53	38	28	22	33
Children not attending school	2	14	8	3	2	2
Not applicable (no school-age children in HH)	–	4	3	4	17	5
No response	–	2	1	3	1	–
Member of a self-help group						
No. of respondents who are members	0	16	10	17	10	36
Labour provided through the National Rural Employment Guarantee (NREG)						
No. of HHs receiving assistance	3	13	1	18	20	n/a

Appendix 3: Perceived changes to productive assets

	East Champaran			Madhubani			Purnea			Coochbehar			Malda			Nepal		
	+	same	–	+	same	–	+	same	–	+	same	–	+	same	–	+	same	–
Cultivated land	0	0	19	7	0	38	8	0	41	16	1	15	3	20	16	19	5	12
Upland	0	0	20	19	0	27	47	0	2	18	2	7	5	18	9	0	0	0
Grazing land (quality, quantity and availability)	0	0	20	7	0	37	0	0	47	4	2	21	1	18	8	0	3	3
Leased land	20	0	0	4	0	35	31	0	14	7	2	15	2	23	4	0	0	0
Share-cropping	19	0	0	0	0	0	31	0	14	7	5	3	1	24	2	0	0	0
Livestock: cows	0	0	20	25	0	18	36	0	12	16	1	19	4	14	20	0	0	0
Livestock: buffalo	0	0	20	7	0	34	6	0	41	6	12	3	1	22	6	11	5	16
Livestock: bullocks	0	0	20	8	0	34	0	0	45	6	13	3	1	22	6	1	1	0
Livestock: pigs, sheep and goats	1	0	17	7	0	32	20	0	24	18	4	7	6	19	11	12	4	13
Livestock: poultry	13	0	1	0	0	37	26	0	15	10	7	4	2	21	7	4	0	7
Changes in the fish pond (silting, pollution of water, weeds)	0	0	0	4	0	32	23	0	7	10	5	19	1	17	10	3	2	0

Note: '+' and '–' indicate a respondent perceived that productivity of the asset was higher or lower, respectively, than 10–15 years ago.

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