



**CGIAR Research Program on
Climate Change, Agriculture and Food Security (CCAFS)**

Summary of Baseline Household Survey Results: Bihta Site, Bihar State (Northeast India)

November 2011

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Abstract

Bihta is in Bihar State, northeast India – the third most populous state in the country. This report summarizes the findings of a household-level baseline survey carried out between December 2010 and March 2011 (that was also carried out in 11 other countries and 29 sites) of 140 randomly chosen households in Bihta. The aim was to measure social and economic indicators that would capture a portrait of livelihood conditions and farming systems precise enough to show changes over a period of time with future repeat visits to these same households. These included information related to the size and composition of households, their means of livelihood and farming systems, including diversification of farming activities, management of resources, food security situation, and climate information. Ownership of assets and membership in agricultural/natural resource management community groups were also covered in this survey.

Bihta is a densely populated area and families are generally large (5 to 10 members) with over half of surveyed families including at least one child under five and a similar number with members over 60 years of age, both considered to be non-working. The majority of respondents were male and those females who did respond were either widows or wives and mothers of absent migrant workers.

Bihar is the least literate Indian state and nearly one fifth of respondents had no formal education. While one quarter of households had primary education and one third had reached secondary level, another 25% of households had a resident with a post-secondary education. Thus while illiteracy may be high in the area, there were also some well-educated households covered by the randomly sampled households captured in this survey.

Over one half of households in the study produce crops. A similar number rear large livestock such as cows and buffalos. Consequently, over one half households also produce milk. Both vegetables and fruit are grown by some households, mainly for their own consumption. Less than half the households sold their marketable surplus of these products. Although a quarter of respondents produce fodder and compost, most receive government assistance with this.

Off-farm products such as food crops, fruit, fish, fodder and fuel wood are collected from communal land mostly for consumption, although about a third are also selling these products gathered off-farm. Men provide most of the labour for on-farm activities, but women are mostly responsible for off-farm produce collection. About a quarter of households were deemed to be subsistence farmers, while the rest had diversified products (up to 10) and participated in agricultural marketing.

Employment on someone else's farm and payment from government projects are important sources of cash income for over half the respondents, followed by, in order of importance, informal loans, remittances or gifts, bank loans and business income. In the last 12 months, respondents reported that remittances and other paid employment have become new sources of cash income for only a small number of respondents. Renting out land and machinery was not a significant form of cash income in the area.

In terms of changes introduced in their farming practices over the last 10 years, less than half of respondents said they had not introduced any new crop or new variety over the last 10 years. Most had done so, with over one third saying they had introduced three or more new crops or varieties.

With regard to water management, the area traditionally relied on canal irrigation, which has collapsed, meaning that farmers have not been getting sufficient irrigation water for the last five years. Thus a quarter of households said that they had made changes in their water management practices. While a quarter of all surveyed households are using bore wells, and only one household is using both a bore well and a sprinkler system.

Despite reports of soil degradation in the area due to the misuse of chemical fertilizers, over one half of these households have made no changes in their soil management practices in the last 10 years. A quarter said that they had made one such change, and a similar number made two changes. Almost all households have made no attempt to integrate agroforestry into their farming systems.

The market was the overwhelmingly cited reason for making crop-related changes, followed by labour and land issues, climate, pests and diseases, and/or projects. When asked about climate-related reasons, farmers cited, in order of importance: less rainfall, declining ground water, more frequent droughts and erratic rainfall. Higher temperatures, cold spells and a later start to the rainy season were also mentioned but were of less importance.

Livestock rearing is a significant enterprise in the area, yet almost two thirds of respondents did not introduce any new animals or breeds over the last 10 years. One third said they had introduced one or two new types, while only two households had introduced three or more over the same period. Most changes in livestock management practices mentioned related to breed.

On the issue of food security, an analysis revealed that only just over one third of households is self sufficient in food all year round. Just over half said they could only be self sufficient for seven months each year, 42% said that they relied on off-farm production throughout the year, and 10% said they relied on off-farm products for seven to eleven months. This implies that the market and other sources of food are critical for at least half of the households.

Three quarters of respondents own land in Bihta, with most having less than one hectare. Hence, the agricultural output of this site comes predominantly from very small land holdings under crop production. There is little communal land, and only 5% of households actually use what communal land there is. One third of respondents claimed to have irrigation systems, and one fifth used bore wells for irrigation. While bore wells are more reliable, they are also more expensive as an irrigation system.

One half of surveyed households purchased seeds and fertilizer during the last 12 months, which seems to indicate a high level of adoption of modern technologies in the area. In addition, 42% of households purchased veterinary medicines for their livestock, and the same number bought pesticides. Although formal credit is weak in the area, nearly a quarter of respondents received credit for agricultural purposes over the preceding year. Interestingly, 8% of households had crop insurance, which is linked to the use of *Kisan Credit Cards*, and 1% took part in a pilot weather insurance scheme. Nearly half of all households hired a tractor at some point and a similar number hired labour. Very few hired animal drawn ploughs.

Despite the importance of weather in their farming systems, less than one half of respondents said that they received any weather-related information, and only one sixth received information relating to extreme weather events. The major source of information was the TV, followed by radio, newspapers, and friends and relatives. Of the 22 respondents who received extreme weather warnings, only two also received advice on how to deal with it. Most respondents did not receive weather forecasts for the next two to three months, nor received predictions of extreme weather events or likely pest and disease outbreaks.

The majority of respondents were not members of any community groups, which are lacking in the area, and while 13% belong to a credit group. Only 1% belong to an irrigation or agricultural marketing group.

When asked about asset ownership, over one half of respondents own bicycles, very few had energy assets (except LPG), and a few owned production assets such as threshers or tractors. Even though the majority of those who received weather advice got it via the TV, only 28% of respondents actually own a TV, 21% own a radio, and 40% own a cellphone. An analysis showed a positive relationship between asset ownership and the level of education in a household.

In conclusion, despite the importance of agriculture and livestock in the area, the adoption of new agricultural technologies has been low. Off-farm income – largely from employment on farms other than their own, or other wage employment - is very important for the surveyed households, especially as many face a high degree of food insecurity for long periods. Off-farm collection of agricultural commodities (food, fodder and fuel) is a common practice to supplement food insecurity.

Keywords

Climate change; Bangladesh; farming system; food security; adaptation; agricultural practices

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Table of Contents

Abstract.....	3
Keywords	5
About the authors.....	5
1.0 Introduction	7
1.1 Household respondents & type	9
2.0 Household Demographics	9
2.1 Education levels	10
3.0 Sources of livelihoods.....	10
3.1 On-farm livelihood sources	10
3.2 Off-farm livelihood sources.....	12
3.3 Who does most of the work for on and off-farm products?.....	13
3.4 Subsistence farming and diversification	13
3.5 Sources of cash income	14
4.0 Crop, Farm Animals/Fish, Tree, and Soil, Land or Water-related Management Changes	16
4.1 Crop-related changes	16
4.2 Water management-related changes	17
4.3 Soil management-related changes	17
4.4 Tree/agro-forestry management related changes.....	18
4.5 Reasons for crop-related changes.....	18
4.6 Livestock-related changes.....	19
5.0 Food Security.....	20
5.1 Food Security Index	22
6.0 Land and Water	22
6.1 Land use	22
6.2 Water for agriculture	23
7.0 Inputs and Credit.....	23
7.1 Hired machinery and labour	24
8.0 Climate and weather-related information	25
9.0 Community Groups	26
10.0 Assets.....	27
10.1 Asset Indicator	27
10.1 Discussion	28
11.0 Conclusions	29
Appendix 1. Villages Surveyed	30

1.0 Introduction

This report summarizes the results of a baseline household-level survey, led by the Climate Change, Agriculture and Food Security Consortium Research Program¹ (CCAFS), carried out between December 2010 and March 2011 in 7 villages and 140 households in Bihta, located in Bihar State in northeastern India.

The objective of this baseline effort was to describe the characteristics of the farming systems found across a wide range of research sites in 12 countries, including the Bihta site, and to better understand what kinds of farming practice changes households have been making and why. We gathered information on the socio-economic and demographic characteristics of these farming households, basic livelihood and welfare indicators, agriculture and natural resources management practices and strategies, access to and use of climate and agricultural-related information, and current risk management, mitigation and adaptation practices. Randomly selected households were the units of analysis and a face-to-face questionnaire was the primary tool that was used for data collection.

Figure 1.1 shows an aerial view of Bihta and Figure 1.2 shows a site location map.

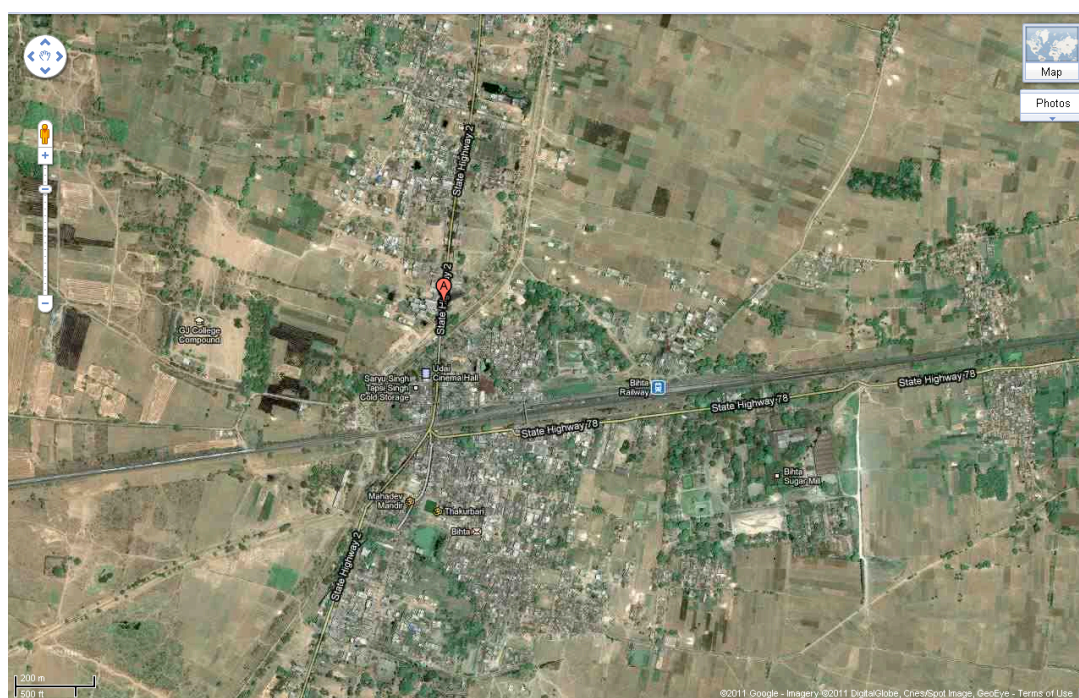


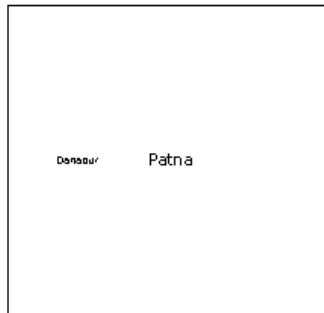
Figure 1.1 Aerial view of Bihta.

The questionnaire and training materials associated with it, including data entry and management guidelines can be found at ccaafs.cgiar.org/resources/baseline-surveys. The list of villages that made up the sampling frame is found in Appendix 1. The list of households is not shared here due to privacy reasons.

¹ For more information about CCAFS, see: <http://www.ccaafs.cgiar.org>.

Country: India (Bihar)

Block Name: Bihta



CCAFS Site Name (ID): Bihta (IN08)
 CCAFS Block Name (ID): Bihta (08)
 Block Size: 10 X 10 km
 Block Coordinates:
 1.84.851E 25.588N
 2.84.953E 25.496N
 3.84.953E 25.588N
 4.84.851E 25.496N

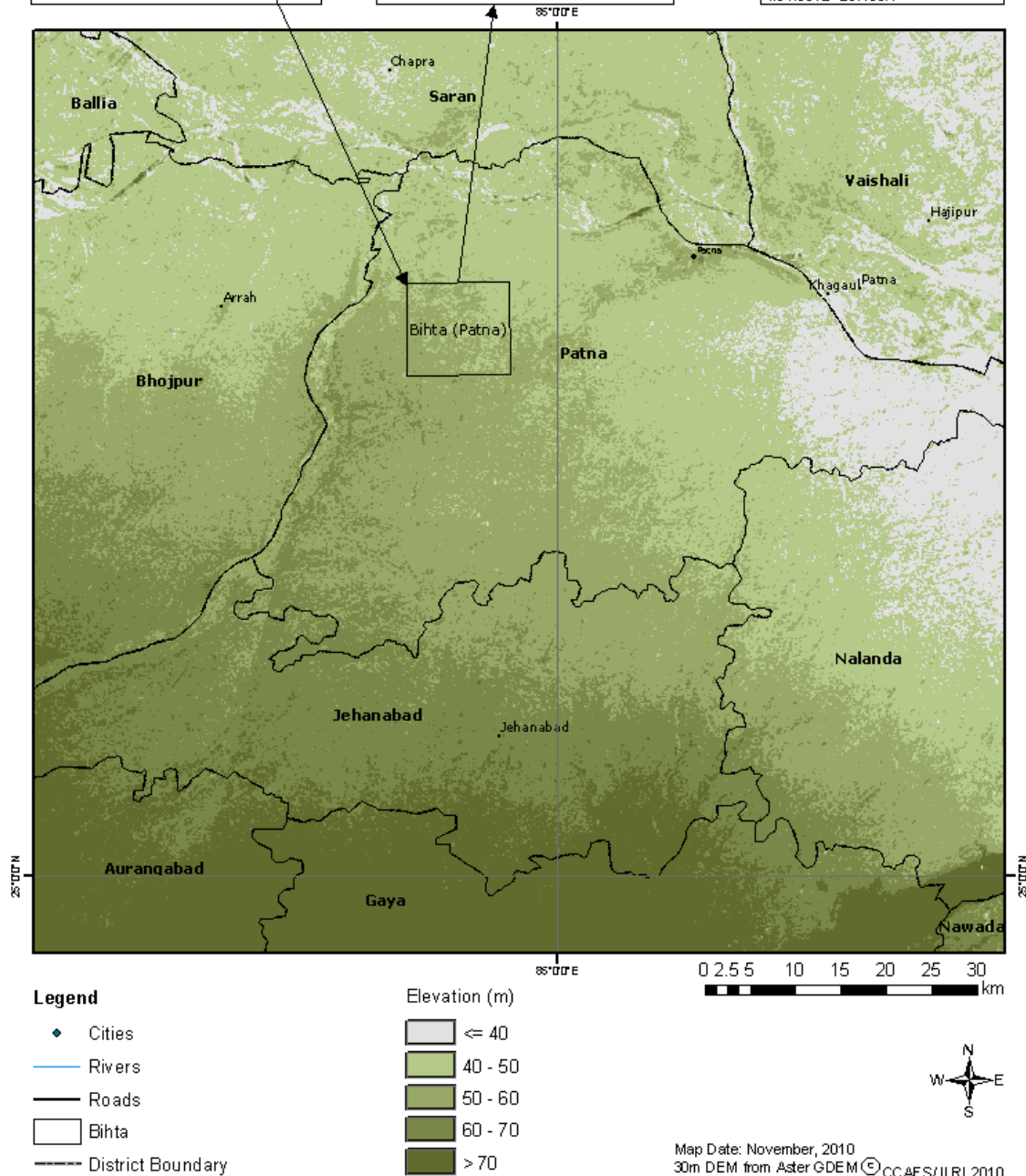


Figure 1.2 Site map of the surveyed area.

1.1 Household respondents & type

Virtually all households classified themselves as male-headed, and the majority of survey respondents were male. The female respondents were either widows or wives/mothers of migrants who were away from home at the time of interview. The majority of female respondents come from disadvantaged groups and this group is likely to be more vulnerable under stress conditions such as drought or flood.

2.0 Household Demographics

Bihar is the third most populous state in India, and the second most densely populated state (1,102 persons/km) after West Bengal. The Bihta site of the survey is also densely populated, and family size in the majority of households (64%) varies from 5 to 10 members. Sixty-six percent of surveyed households had one or more family member under five years of age (Table 2.1), whereas 55% of households had one or two members above 60 years of age (Table 2.2) The majority of households have a significant proportion of family members that are of working age. Five percent of households have relatively few workers, i.e. a very small proportion of their family (less than 20%) is of working age (Figure 2.1).

Figure 2.1 Proportion of household of working age

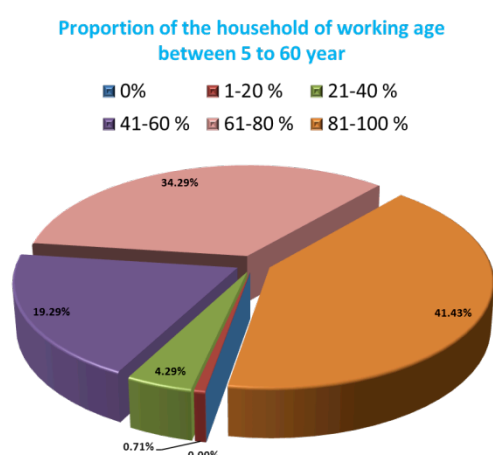


Table 2.1 Distribution of households with persons below 5 years of age

No. of persons below 5 years	% of households
0	34
1	28
2	24
3	6
4	4
5	3
7	1
8	1

Table 2.2 Distribution of households with persons above 60 years of age

No. of persons above 60 years	Percent of households
0	44
1	36
2	19
Total	100

2.1 Education levels

Bihar is the least literate state in India. In the surveyed site, 17% percent of interviewed households had no one with a formal education (Table 2.3). In about a quarter of households, the highest level of education of a resident family member was primary level, and for 32% it was secondary level. More than 26% of interviewed households had a family member educated up to post-secondary level. Hence, it may be said that while there is some illiteracy in the studied villages, there are also a considerable proportion of households with educated family members.

Table 2.3 Highest level of education within households

Highest level of education of a household resident	No. of households	% of households
No formal education	24	17
Primary	2	25
Secondary	20	32
Post secondary	29	26
Total	140	100

3.0 Sources of livelihoods

3.1 On-farm livelihood sources

In the Bihta households interviewed, crop production is the main economic activity, followed by livestock production. Fifty-eight percent of households were engaged in food crop production, and processing of food grain is done by 34% of these households (Table 3.1). As many as 57% of households have been engaged in rearing large livestock, mainly cows and buffalo. Large livestock are reared for milk production purposes, and 51% of households produced milk during the last 12 months. Small livestock are being reared by only 13% of households.

Vegetables are more common agricultural products, grown by 38% of households. However, fruit is also an important agricultural product in the area, produced by 16% of respondents.

About 25% of households produce fodder and 21% produce manure/compost (vermi-compost). The majority of these households received assistance from the state government for the production of fodder and vermi-compost under livestock and agricultural development programmes. Timber and fuel wood production are not important activities in the surveyed area.

Table 3.1 Percentage of households producing, consuming and selling various agricultural products from their own farm

Product	Percent of households producing	Percent of households consuming	Percent of households selling
Food Crop	58	58	41
Food Crop (processed)	34	34	0
Other cash crop	6	6	1
Fruit	16	16	4
Vegetables	38	38	9
Fodder	25	24	0
Large livestock	57	3	17
Small livestock	13	3	11
Livestock products	51	51	31
Timber	5	4	1
Fuel wood	19	18	0
Manure/compost	21	19	3
None from all	19	24	35

Many households engaged in the production of food crops, cash crops, vegetables, fruits and livestock products and were found to be consuming a major part of these items on their own farm, while surplus produce is marketed (Figure 3.1). None of the households surveyed is practising commercial agriculture as can be seen from the percentage selling their produce (Table 3.1).

An analysis of information relating to the production and consumption of agricultural produce revealed that the majority of households sold their marketable surplus of these products, i.e. about 41% of households sold food crops, 31% sold livestock products and 9% sold some vegetables (Table 3.1).

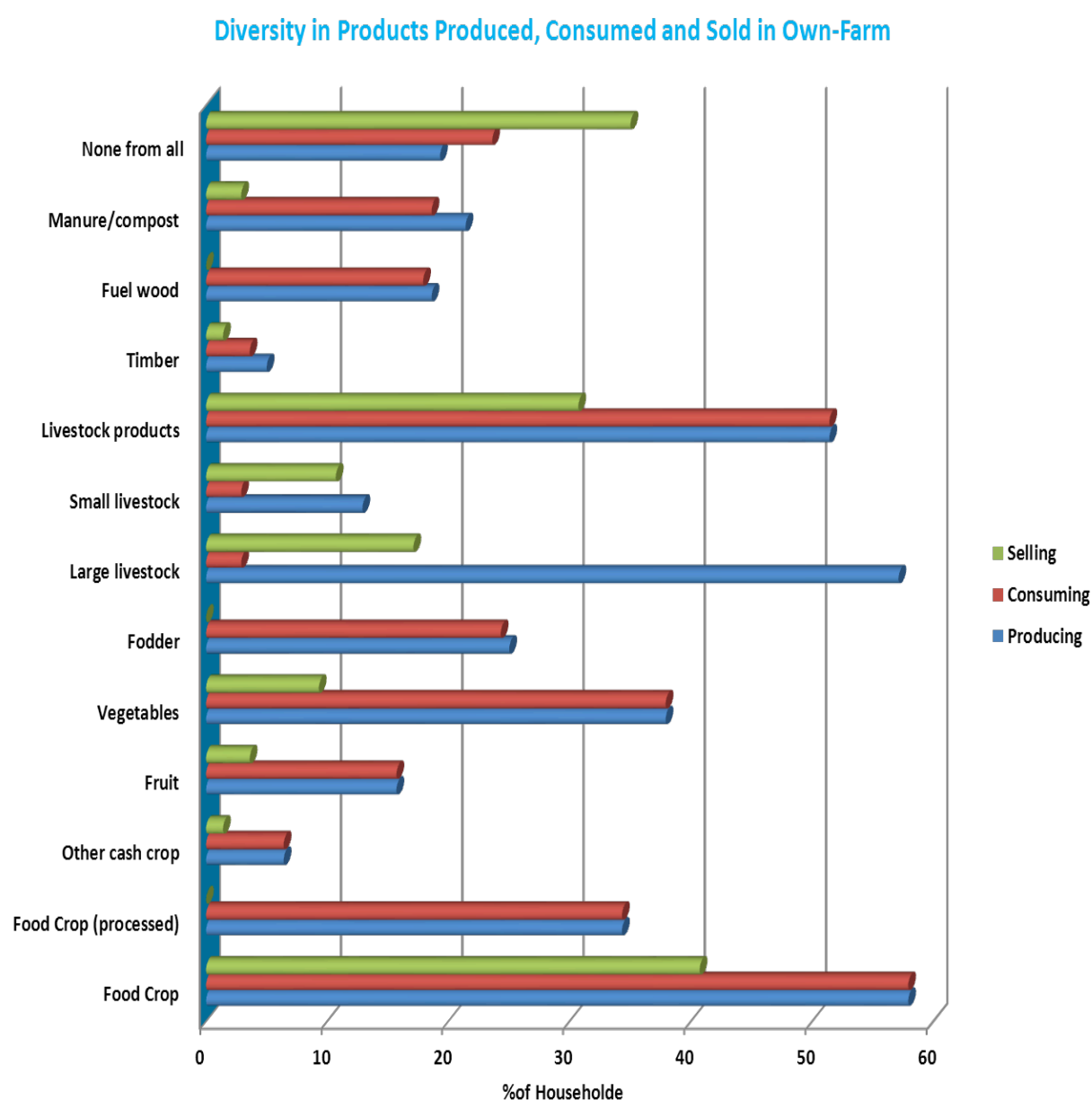


Figure 3.1 Percentage of households producing, consuming and selling various agricultural products from their own farm.

3.2 Off-farm livelihood sources

Off-farm production and collection of agricultural products from communal lands does not appear to be a common practice within the surveyed households. The main agricultural products collected from outside the households' own farms include food and fruit crops (68%), fish (7%), fodder (26%) and fuel wood (22%). Twenty-eight percent of households produced/ collected two or three products from outside their farm, and 9% gathered four to six products (Table 3.2). The data show that the products collected from off-farm are mainly for consumption purposes; however 37% of households collecting products from off-farm also sold some of these products.

Table 3.2 Number of products produced/gathered off-farm

Number of products coming from off-farm sources	No of Households	Percent of households
No products	75	54
One product	14	10
2 or 3 products	39	28
4 to 6 products	12	9

3.3 Who does most of the work for on and off-farm products?

Women and children's labour contribution to agricultural activities appears to be very low in the households studied. In 65% of households, women reportedly do not participate in agricultural production activities. In 97% of households, children were not involved in agricultural production. With respect to the collection of off-farm products such as fuel and fodder, women are more involved than men.

3.4 Subsistence farming and diversification

Households producing crops and livestock, but not selling any, were assumed to belong to a 'subsistence' farming category. Sixteen percent of our surveyed households were engaged in production of crops and livestock for their own consumption, and 12% were producing only food crops (Table 3.3). But three-quarters of households belong to neither of these categories, instead being engaged in diversified farming, and have participated in the agricultural marketing system.

Table 3.3 Extent of subsistence farming practices

Farming system	Percent of households
Subsistence (producing crops & livestock but not selling)	16
Only producing food crops - no cash crops	11
Neither subsistence nor food only	73

Farm diversification can also be determined by the number of products being grown by these households. We see in Table 3.4 that 43% of households produced 4 to 10 products on their farm, indicating a relatively high level of production diversification. Nineteen percent of these households did not produce any products because they were landless. The majority of these landless households are agricultural labourers on other people's farms.

Table 3.4 Number of agricultural products produced

Number of agricultural products produced	Percent of households
No products	19
One product	10
2 or 3 products	27
4 to 6 products	26
7 to 10 products	18

3.5 Sources of cash income

As we have seen, the main sources of livelihoods in Bihta relating to agriculture are crop farming, livestock production and gathering of food, fodder and fuel from areas (e.g. communal lands, forests, rivers, etc.). Roughly one-half of Bihta households have someone employed on someone else's farm or are receiving some cash income from another type of employment. Thirteen percent of households reported receiving some business income, and 23% receive remittances or gifts.

Government or other projects are an important source of income in this area, with 65% of households receiving some cash income from projects, pensions or other payments. Twenty-one percent of households are getting cash from formal (bank) loans, and 26% from informal (e.g. moneylender) sources. Few households receive income from renting out their machinery or land.

In terms of new sources of income in that last year, the most common were off-farm employment and government or project payments (Figure 3.2). Various agricultural and social development programmes have been launched in recent years in Bihar State. Paid employment and remittances were also important new sources of income for 5% of households.

Table 3.5 Cash inflow to households through various sources

Sources of household cash income	Present status - % of households	New sources - % of households
Employment on someone else's farm	47	1
Other paid employment	51	5
Business	13	1
Remittances or gifts	23	5
Other payment from projects/government	65	7
Loan or credit from formal financial institution	21	4
Loan or credit from informal source	26	3
Renting out farm machinery	14	1
Renting out your own land	14	1
No other source	1	78

Distribution of cash sources

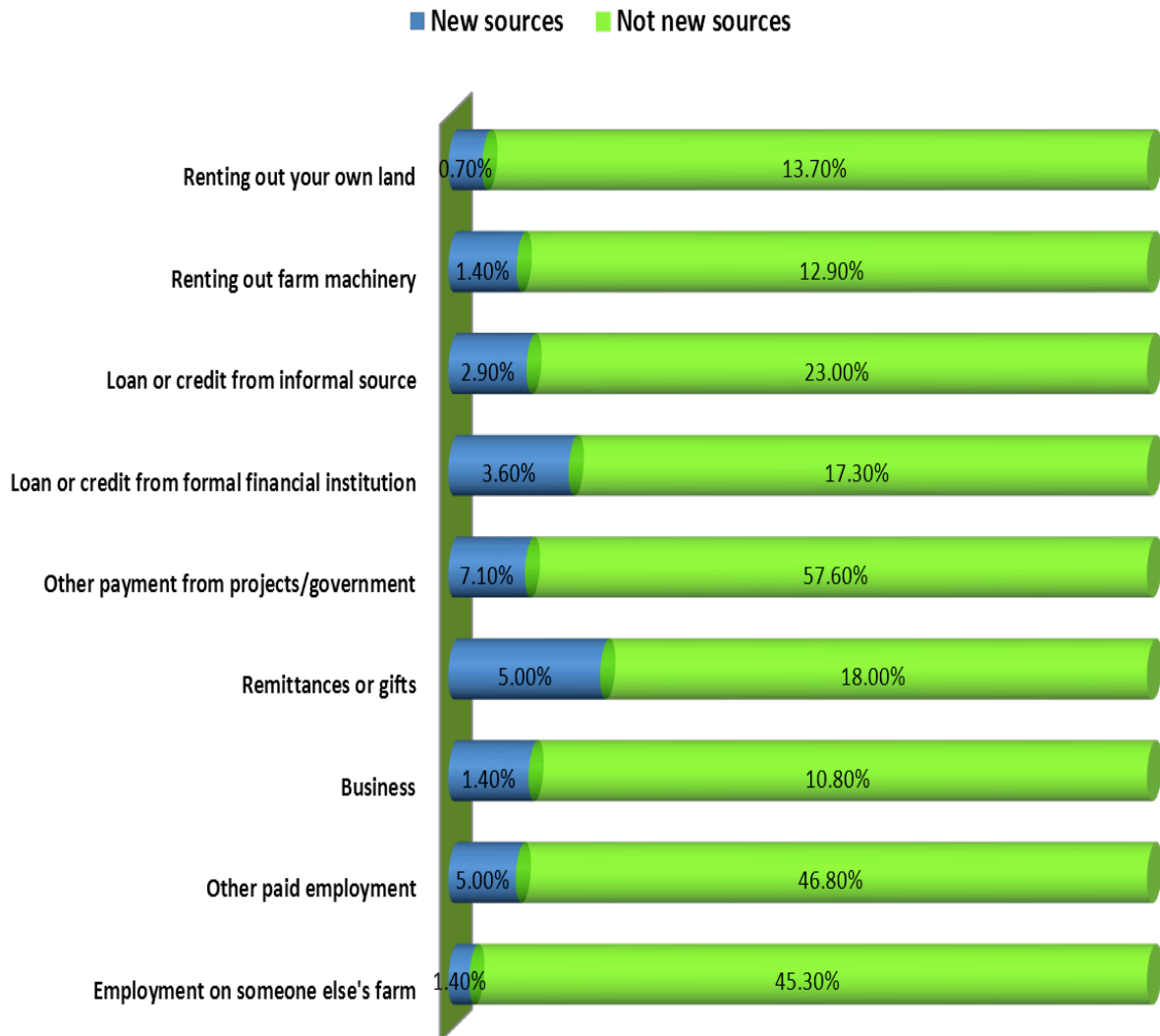


Figure 3.2 New sources of cash income

4.0 Crop, Farm Animals/Fish, Tree, and Soil, Land or Water-related Management Changes

4.1 Crop-related changes

Across the surveyed households, 46% have not introduced any new crop or new variety over the last 10 years, and 54% have. Nineteen percent of these households have introduced one or two crops and/or new varieties, while over one third have introduced three or more new crops or varieties during the last decade (Table 4.1). During the survey, it was observed that the majority of households had introduced new crop varieties to their farming systems.

Table 4.1 Introduction of new crops/varieties

Changes in crops/varieties	Percent of households
Not introduced any new crops or new varieties	46
Introduced 1 or 2 new crops and/or new varieties	19
Introduced 3 or more new crops and/or new varieties	35

4.2 Water management-related changes

Households were asked what, if any, changes they had made to their agricultural water management practices in the last 10 years. Only one-quarter of households reported making changes to their water management practices (Table 4.2). The surveyed area has traditionally relied on canal irrigation. However, the canal system has collapsed and farmers have not been getting sufficient irrigation water for the last 5 years. Farmers thus started using bore wells for irrigation of crops and a quarter of the households surveyed began using bore wells for irrigation purposes during the last 10 years. Only one household has adopted two techniques of water management, i.e. bore well and a sprinkler irrigation system.

Table 4.2 Water management-related changes

Changes in water management practices	Percent of households
No water management related changes	74
One water management related change	25
Two or more water management related changes	1

4.3 Soil management-related changes

There are reports of soil degradation in the area due to the use of unbalanced amounts of chemical fertilizers (N+P+K). Farmers have started using vermi-compost, lime, micro nutrients and green-manuring to maintain the soil fertility. However, more than half of the households (54%) said they had not made any changes to their soil management practices (Table 4.3).

Table 4.3 Soil management-related changes to cropping

Soil management related changes	Percent of households
No soil management-related changes	53
One soil management- related change	25
Two or more soil management-related changes	22

Many of the farmers that have not made any changes to their soil management regimes may be either marginal farmers, or absentee landlords. One-quarter of households reported having made one change in their soil management practices, and 22% said they had made two or more such changes.

4.4 Tree/agro-forestry management related changes

Farm diversification and healthy and sustainable land use is now being promoted in this region. However, it appears that agro-forestry practices are still not common in Bihta. Over 90% of the surveyed households have not make any attempt to integrate agro-forestry into their crop/ livestock farming systems over the last 10 years.

4.5 Reasons for crop-related changes

Respondents that had made changes were asked to indicate why they had done so, relating to crop varieties, water management practices, soil management practices and agro-forestry (multiple responses were possible). Although there were many reasons given for making these changes, market-related reasons (prices, new opportunities to sell, etc.) emerged as the important factors driving changes in farming practices in 92% of the responses (Table 4.4). The next most frequently mentioned reason for change related to labour issues, such as lack of access to labour when needed, or lack of cash to hire labour.

Table 4.4 Reasons for changes

Reasons behind changes to farming practices made	Percent of responses
Markets	92
Climate	47
Land	65
Labour	80
Pests/diseases	32
Projects	7

Land-related issues, such as declining per capita land size and land degradation, are also causing changes in farming practices, cited in 65% of cases. Government-led or other projects were cited in 7% of the responses.

Climate-related reasons were given for 47% of responses. We also asked farmers to indicate what kind of climate-related reasons had driven them to make changes (Table 4.5). Among 66 responses stating climate-related reasons as a driver of change, 77% related to less rainfall, 57% to declining ground water, 49% to more frequent droughts, and 31% to more erratic rainfall (Table 4.5). Higher temperature, cold spells and a later start of rains were not important climate-related reasons for changing farming practices for these surveyed households.

Pests and diseases were cited as a reason for crop-related changes in 32% of cases (multiple responses were possible).

Table 4.5 Climate-related reasons for changes in agricultural practices

Climate-related reasons for making changes	Number of responses	Percent of responses
More erratic rainfall	11	31
Less overall rainfall	27	77
More frequent droughts	17	49
Later start of rains	4	11
More cold spells or foggy days	7	20
Higher temperatures	9	26
Lower groundwater table	20	57
Total	95	271

Thus less overall rainfall, along with erratic rainfall, appears to be the main climate-related reasons behind the changes seen in farming practices in this area. More frequent droughts and lower ground water tables, also mentioned, are caused by low rainfall.

4.6 Livestock-related changes

In the area under study, livestock farming is an important complementary enterprise to crop production. Analysis of data relating to changes in livestock production practices reveals that 65% of households did not introduce any type of new animal or breed during the last 10 years (Table 4.6). Thirty-four percent of households have introduced one or two new animals/ breeds in the last decade. There were only two households that introduced three or more new animals/breeds during the period. These changes are from local cattle breeds to cross-bred cows, and from local buffalo to improved buffalo breeds.

Table 4.6 Adopters of new animal/breeds

Changes to Animal Production	Percent of households
Not introduced any new animal types or breeds	65
Introduced 1 or 2 new animal types and/or new breeds	34
Introduced 3 or more new animal types and/or new breeds	1

Livestock-related changes were made mainly because of market-related reasons, including improved access to markets through dairy co-operatives. Higher productivity/milk yields from improved dairy cow breeds was another driver behind adoption of new practices. Climate, labour-related reasons, and pests and disease played a role in changing animal/breeds for 25% of households.

5.0 Food Security

Households were asked to list the months during which most of their food comes from their own farms (in an average, i.e. not extreme weather event year), and which months the bulk of their food comes from other sources, including market purchases, gifts, food transfers, etc.

Table 5.1 shows that 35% of households obtain food predominantly from their own farms throughout the year (i.e. they are food self-sufficient). For 56% of households, this is only the case for less than seven months.

Table 5.1 Sources of food throughout the year

Number of months relying on:	On-farm sources (% of households)	Off-farm sources (% of households)
All months	35	42
Between 7 and 11 months	9	10
Less than 7 months	56	48

Many households (42%) reported relying on off-farm sources of food for the entire year, and a further 10% for 7-11 months annually. This implies that the market and other off-farm food sources (Figure 5.1), are critical for at least half of these households.

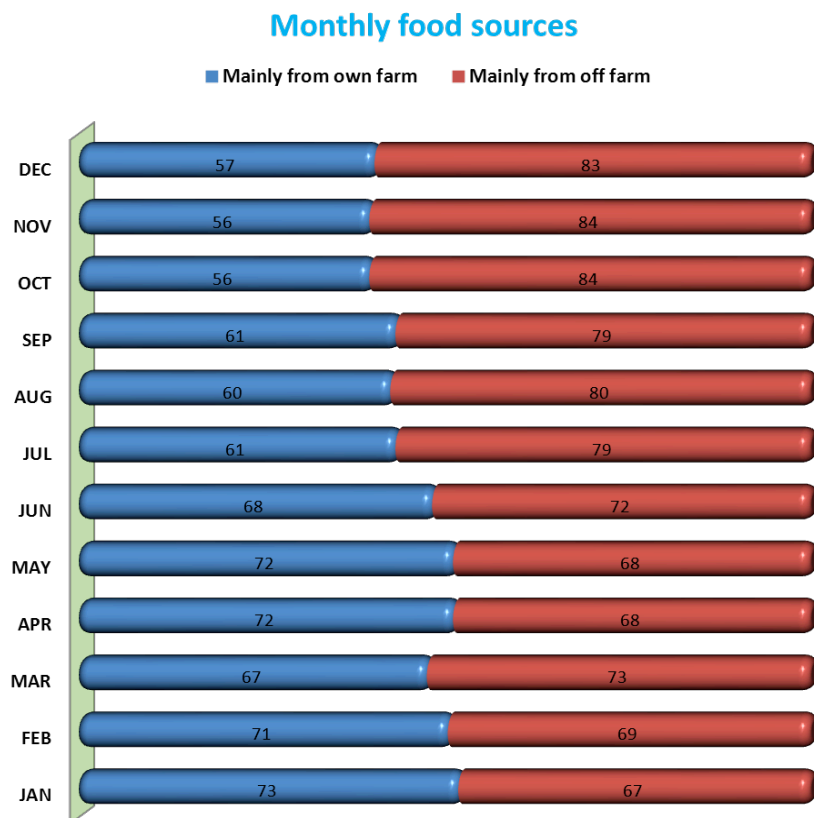


Figure 5.1 Monthly breakdown of on-farm versus off-farm sources of food

Figure 5.2 shows that in the surveyed area, July, August and September are months in which over 20% of households find it difficult to obtain sufficient amounts of food to sufficiently feed their families - from any source - but roughly one fifth of these households face food shortages year round.

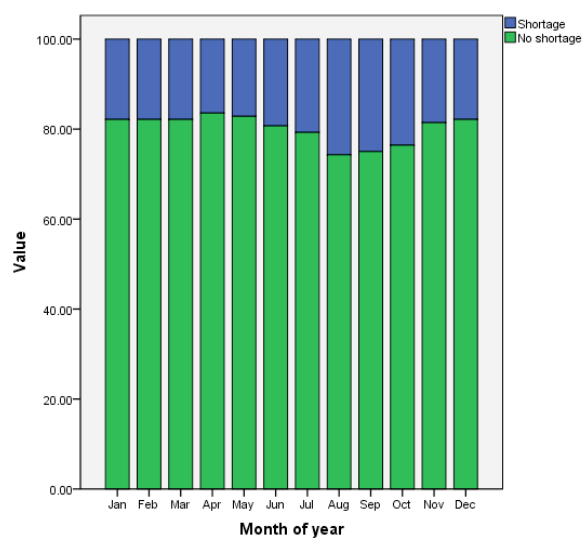


Figure 5.2 Food shortage months throughout the year

5.1 Food Security Index

The food security index we created is based upon the number of months that the household has difficulty getting food from any source (i.e. from their own farm or stores, gifts, purchases or transfers).

For our surveyed households in Bihta, 71% are 'food secure' all year long. 12% of households struggle to get enough food to feed their family for 3-6 months, and 17% are dealing with more than 6 food deficit months/year (Table 5.2).

Table 5.2 Food Security Index

Percent of surveyed households reporting:				
More than 6 food deficit months/year	5-6 food deficit months/	3-4 food deficit months/	1-2 food deficit months/	Food all year round/No food deficit period
17	3	9	0	71

6.0 Land and Water

6.1 Land use

Of the 140 respondents surveyed in Bihta, 24% are landless and 76% are land owners. Among landowners, 72% of households have a land area of less than 1 hectare, 27% own between 1 and 5 hectares, and about 1% own more than 5 hectares (Table 6.1). Hence, the agricultural output produced in this site comes predominantly from very small land holdings.

Table 6.1 Total land accessed by households in Bihta site

Land Owned or Rented	% of households
Less than one hectare	72
Between 1 and 5 hectares	27
More than 5 hectares	1

Almost all the available land area has been put under crop production, with little scope for expansion of cultivated area in the surveyed area. There is also a dearth of communal land, and that available constitutes grazing land, ponds, trees and groves and waste land (Table 6.2).

Table 6.2 Use of communal land in villages

Communal land:	% of households
Used for grazing livestock	2
Under tree cover	1
Under aquaculture	1
Degraded or unproductive	1
Do not use communal land	95

6.2 Water for agriculture

Irrigation is one of the critical inputs for agricultural production. The survey asked respondents about the availability of irrigation facilities on their farms. One third of households reported having irrigation on their own farms, 19% had bore wells, and only one farmer had a tank for water harvesting (Table 6.3). Canal and ahara/pyne (traditional water harvesting infrastructure) are also common sources of irrigation; the former is maintained by the government and the latter by the community/panchayat.

Table 6.3 Access to water for agricultural use

Access to agricultural water resources	% of households
Irrigation	33
Tanks for water harvesting	1
Boreholes	19
None of the above	47

Among all the irrigation resources, bore wells are a more reliable, but costly, source of water for irrigation in this area. The earlier canal system of irrigation collapsed, with no water in the canal for the last five years.

7.0 Inputs and Credit

The adoption of modern agricultural technologies is related to the acquisition behaviour of farmers with respect to inputs and credit. In the area under study, about half of the households purchased seeds and fertilizer during last 12 months (Table 7.1). Despite drought (low rainfall) for the last two years, the fact that this many farmers purchased seeds and fertilizer seems to indicate a high level of adoption of modern technologies in the area. In addition, 42% of households purchased veterinary medicines for their livestock. And the same number bought pesticides. The formal credit system is

quite weak in this area, but 23% of households have obtained credit for agricultural purposes during last 12 months.

Table 7.1 Input use during last 12 months

Use of inputs/services	Percent of households
Purchased seed	49
Purchased fertilizer	53
Purchased pesticides	42
Purchased veterinary medicine	39
Credit for agric activities	23
Purchased crop or livestock insurance	8
Was it weather-based insurance?	1
None of the above	37

There is not a widespread awareness of crop or livestock insurance in this area, but 8% of households had purchased crop insurance during the last 12 months. Crop insurance is linked with *Kisan Credit Cards*, so farmers utilized their credit cards for institutional loans and got their crops insured automatically. Weather insurance is still in an experimental stage here, but just over 1% of farmers took part in a pilot project of weather-based insurance.

7.1 Hired machinery and labour

The introduction of agricultural machines (tractors and threshers) is a new development in the agricultural production system of this area. Forty-four percent of households reported hiring a tractor (Table 7.2), while a similar percentage of households hired farm labour. Animal drawn agricultural implements such as ploughs are not commonly used in the surveyed area, hence only 3% of households hired animal drawn ploughs for crop production.

Table 7.2 Hiring of machinery and labour

Farm Machinery and Labour Hiring	Percent of Responses
Do you sometimes hire an animal drawn plough?	3
Do you sometimes hire a tractor?	44
Do you sometimes hire farm labour?	44
Do not hire machinery or labour	46

8.0 Climate and weather-related information

Respondents were asked various questions related to climate and weather information. Analysis of data revealed that 46% of households received some information related to weather or climate, meaning that over half the households had not received any such information. And only 16% of households received information concerning extreme weather-related events such as droughts or floods. And within these households, very few women reported receiving such information over the last 12 months.

Among four major sources of weather information, television emerged as the most important, cited by 91% of households. Radio is also an important source of weather information, with 73% of households reporting receiving weather information from the radio. Forty-one percent of households received weather information from a newspaper, while friends, relatives and neighbours were not considered important sources of weather information for the surveyed households (Table 8.1).

Table 8.1 Sources of weather-related information

Source of weather information	Percent of households
Radio	73
Television	91
Friends, relatives, or neighbours	5
Newspaper	41

Respondents were asked if forecasts of extreme weather events included any advice for mitigating the expected adverse effect of those events. Out of 22 respondents who reported receiving forecasts of extreme events, only two received agricultural advice along with the forecast.

Out of the 52 households that stated they received information regarding the timing of the start of the rains, 12 (21%) said that they also received advice along with this forecast. Out of those 12, 9 respondents were able to use the advice given.

Longer-range forecasts of expected weather conditions, i.e. over the next 2-3 months, were received by only 12% of surveyed households. Television is again the most important source for this information, followed by radio (73%), newspaper (20%) and traditional indigenous knowledge (20%).

Only 12% of respondents received forecasts of pest and disease outbreaks. The radio emerged as most common source for this information (82%) followed by television (77%) and newspaper (24%).

Thus very few households are accessing various types of weather/climate and disease outbreak forecasts in the villages studied. More than 80% of households did not receive forecasts of extreme weather events, of weather for the next 2-3 months, or concerning pest or disease outbreaks (Table 8.3). Forecasts on the start of rains and weather for next 2-3 days reached only about 64% of households.

Table 8.3 Accessing weather-related information

In the last year, have you received information on:	Not received (% of responses)	Received information from two or more sources (% of responses)
Extreme event	84	14
Pest or disease outbreak	87	11
Start of the rains	63	36
Weather for next 2-3 months	89	9
Weather for next 2-3 days	64	33
Some info of each type received	5	58

However, there were a small proportion of households who received information about various forecasts through two or more sources. About one-third of households accessing such information heard about the predicted start of the rains and the expected weather for the next 2-3 days through two or more sources. More than 10% of households received forecast information of extreme events and pest or disease outbreaks through multiple sources.

9.0 Community Groups

There are few community groups in Bihta. About 13% of the interviewed households were members of savings or credit groups and only 1% of households were members of an agricultural marketing or irrigation group (Table 9.1). The majority of respondents did not belong to any group.

Table 9.1 Membership of community groups

Group membership	% of households
Belong to an irrigation group?	1
Belong to a savings or credit group?	13
Belong to an agricultural product marketing group?	1
Not a member of any group	86

Groups promoting agricultural production and marketing are lacking in this area. Dairy Co-operative Societies and Primary Agriculture Co-operation Credit Societies have been organized in some of these villages, but they are not fully functional yet.

10.0 Assets

10.1 Asset Indicator

Households were asked about household assets they had, from a set list. The assets they were asked about include the following:

Energy: Solar panel, Generator (electric or diesel), Battery (large, e.g. car battery for power), Biogas digester;

Information: Radio, Television, Cell phone, Computer, Internet access;

Production means: Tractor, Mechanical plough, Mill, Thresher;

Transport: Bicycle, Motorcycle, Car or truck;

Luxury items: Fridge, Air conditioning, Electric fan, Bank account, Improved Stove.

The total number of assets in all categories was added up and the following asset indicator created:

- 0=no assets (basic level)
- 1=1-3 assets (intermediate level)
- 2=4 or more assets (high level)

It is important to note that this indicator is not intended to include every possible type of asset, and that the checklist includes some indicators that we expect to see becoming more important in the future than they may be at present. It also does not include a critical asset for resource-poor households, livestock assets.

The results of the analysis for these Bihta households show that 13% have none of the household assets we inquired about, 45% of the surveyed households have between 1 and 3 of these assets, and 42% own 4 or more of these assets (Table 10.1).

Table 10.1 Asset Indicator

Number of queried assets	% of households
None (basic level)	13
1-3 (intermediate level)	45
4 or more	42

Among transport assets, bicycles are owned by 52% of households, followed by motorcycles (17%) and cars or trucks (2%). Energy assets are not commonly found in this area, although liquid petroleum gas (LPG) is owned by 23% of households. Three quarters of households owned none of the energy-related assets listed.

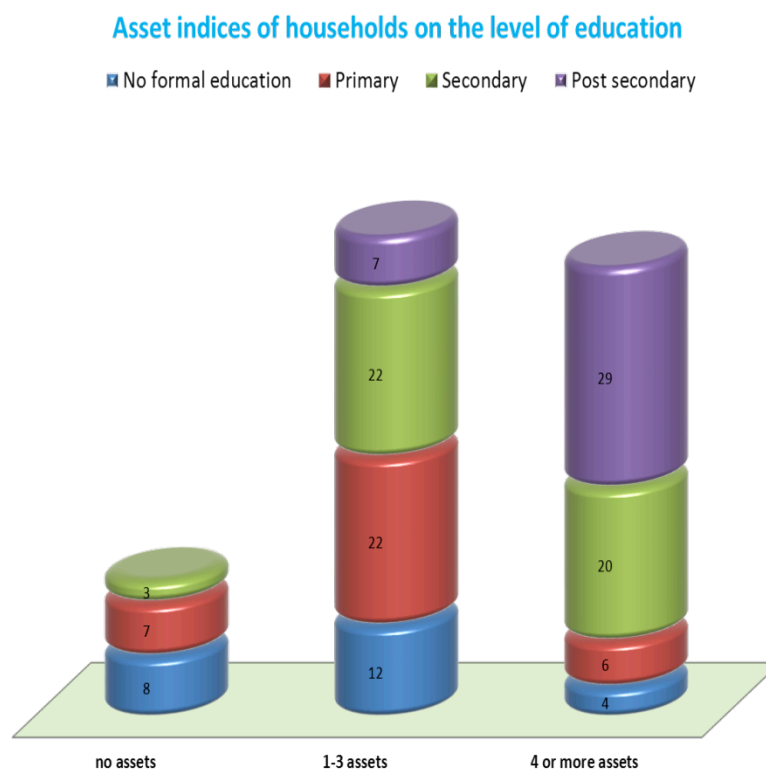
Few agricultural production assets were found – only 5% of households own a tractor, 4% a mechanical plough, 4% a mill for grinding cereals, 8% a treadle pump, and 9% a thresher.

With respect to information-related assets, 21% of households own a radio, 28% a TV, and 40% a cellphone. Three households currently have a computer, one with Internet access. Forty two percent of the households have a bank account.

10.1 Discussion

In examining whether there appears to be a relationship between wealth (as measured by the number of assets a household has) and the highest level of education obtained by a household member, we can see (Figure 10.1) that 29 households with four or more assets have a member with a post-secondary degree and 20 have someone with a secondary degree. For the households with no assets, there are no members with a post-secondary education, and 39% of these low-wealth households have only a primary education or no formal education (44%). So wealthier households do appear to be better-educated households.

Figure 10.1 Asset ownership versus level of education (number of households)



11.0 Conclusions

Agriculture is the main economic activity in Bihta, the surveyed area, but the majority of these farming households own small parcels of land (less than one hectare). Agricultural production has been adversely affected by severe drought for the last two years, and the canal irrigation system has collapsed. Livestock production is important in this area. Over 90% of households produce food crops, but only 40% sell their surplus in the market. Off-farm collection of agricultural commodities (food, fodder and fuel) is also a common practice.

Adoption of new agricultural technologies has been low, and it is largely market-related reasons that are driving many of the changes in agricultural practices in households. However, climate-related reasons are also behind many of the changes seen in agricultural practices in this area over the last decade.

In terms of livelihoods, off-farm income – largely from employment on farms other than their own, or other wage employment - is very important for these households.

Many households in Bihta face a high degree of food insecurity for long periods. Roughly one-fifth face more than six 'hunger months' per year, when they struggle to feed their families from any source.

Over half of the surveyed households had not received any type of weather-related information over the last year. For those that are receiving such information, television, radio and newspapers are the most important sources.

Appendix 1. Villages Surveyed

List of surveyed villages within Bihta Site:

Bihta

Piro

Jamui

Nautan

Pusa

Madhepura

Katihar