CLIMATE CHANGE AGRICULTURE AND FOOD SECURITY

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

Global Summary of Baseline Household Survey Results

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Abstract

This report summarizes the results of a baseline household-level survey, designed by the CCAFS team and implemented in late 2010/early 2011 in 3 regions: East Africa, West Africa and South Asia (the Indo-Gangetic Plains). Maps showing the location of these sites, and a site portfolio report describing the sites in detail can be found at: http://www.ccafs.cgiar.org/where-we-work.

This survey was designed with the intent of developing simple, comparable cross-site household-level indicators, for which changes can be evaluated over time, of food security, households assets, agricultural production diversity, agricultural sales diversity, changes being made in farming practices (adaptation/innovation), changes in farming practices that also help reduce emissions or store greenhouse gases (mitigation), and gender indicators (e.g. men's versus women's reception of weather-related information).

The same questionnaire was implemented in 5 countries/sites in West Africa (Senegal, Mali, Burkina Faso, Niger, Ghana); 4 countries/6 sites in East Africa (Kenya, Uganda, Ethiopia, Tanzania); 3 countries/19 sites in South Asia (India, Nepal and Bangladesh). The survey exercise covered 203 villages and 4,060 households. The survey instrument and training materials (that also describes the sampling frame), are freely available for anyone to use at: http://www.ccafs.cgiar.org/resources).

This summary report gives an overview of the farming practices, and asset, livelihoods and food security status of rural households in these sites. It describes what changes farmers have been making in recent years, and why they are making them. We explore what kinds of weather/climate and associated information these households are receiving, how and by whom (e.g. are women accessing such information?). This information provides important baseline information, as these households will be revisited in 5-10 years time in order to evaluate the changes in these indicators. This will give us important information as to if, how, and which households are adapting to a changing climate.

There are also site reports that go into much more detail on the findings for each site. These, together with the survey and data itself, are also available at: http://www.ccafs.cgiar.org/resources

Keywords

Baseline household survey; adaptation; mitigation; climate change; Africa; India; Nepal; Bangladesh; agriculture

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Contents

1.0 Introduction

A baseline household-level survey designed by the CCAFS team was implemented in late 2010/early 2011 in 3 regions: East Africa, West Africa and South Asia (the Indo-Gangetic Plains). Maps showing the location of these sites are found at: http://www.ccafs.cgiar.org/where-we-work.

This survey was designed with the intent of developing simple, comparable cross-site household-level indicators, for which changes can be evaluated over time, of the following:

1) Food security
2) Assets/wealth
3) Production diversity
4) Selling diversity
5) Adaptation/innovation
6) Mitigation behaviour
7) Gender differences in reception of weather/climate information

The same questionnaire (available at http://www.ccafs.cgiar.org/resources) was implemented in 5 countries/sites in West Africa (Senegal, Mali, Burkina Faso, Niger, Ghana); 4 countries/6 sites in East Africa (Kenya, Uganda, Ethiopia, Tanzania); 3 countries/19 sites in South Asia (India, Nepal and Bangladesh). The survey exercise covered 203 villages and 4,060 households[1].

Here, we report on the results of a comparison of the indicators developed within each region. For a description and maps of the sites, and the results of analysis of the household baseline data collected within each site, 29 site reports are available, as follows:

1. West Africa (http://www.ccafs.cgiar.org/where-we-work/west-africa)
2. East Africa (http://www.ccafs.cgiar.org/where-we-work/east-africa)
3. India – Bihar State http://www.ccafs.cgiar.org/where-we-work/indo-gangetic-plains
4. Bangladesh http://www.ccafs.cgiar.org/where-we-work/indo-gangetic-plains
5. Nepal http://www.ccafs.cgiar.org/where-we-work/indo-gangetic-plains

This summary report, coupled with the much more detailed site specific reports, provides a good overview of the farming practices, and asset, livelihoods and food security status of rural households in these sites. It examines not only what changes farmers have been making in recent years, but why they are making them, as we know that changing weather patterns are only one of a myriad of drivers of change, and more important in some areas than others. We explore what kinds of weather/climate and associated information these households are receiving, how and by whom (e.g. are women accessing such information?). This information will be shared with the communities involved in each site survey, for example, during the follow-up village-level exercise. Another goal is to revisit these same households in 5-10 years after this baseline in order to evaluate the changes in these indicators. This will give us important information as to if, how and which households are adapting to a changing climate.

[1] Seven additional sites in another region of India were covered (49 villages and 980 households), but the sampling frame was not adhered to and thus research quality standards not met so this information was excluded from the baseline database and analyses.

1.1 The Indices

1) Food Security indicator

Households were asked about each month of the year, for a 'normal' year (i.e. not a drought or exceptional rainfall year) – first, whether the food they access normally comes from their own farm/stores during that particular month, for mainly from other sources (e.g. purchased, food aid, gifts). Second, they were asked which months of a typical year they struggle to find sufficient food to feed their families, from any source (the 'hunger months'). The food security indicator categorizes the number of hunger months reported into: zero, 1-2, 3-4, 5-6, and more than 6 hunger months.

2) Asset/wealth indicator

Households were asked about what assets they had, from a set list. The assets they were asked about include the following: *Energy*: generator, solar panel, biogas digester, liquid petroleum gas; *Information:* radio, television, cell phone, internet access, computer; *Production means:* tractor, mechanical plough, thresher, boat, fishing nets, mill; *Transport:* bicycle*,* motorbike, car or truck; *Luxury items:* fridge, air conditioning, fan, bank account, improved stove.

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

0=none of these household assets (basic level)
1=1-3 assets from the list (intermediate level)
2=4 or more assets from the list (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.

3) Production Diversity Indicator

The production diversification indicator was created by adding up the total number of agricultural products/items (including food crops, cash crops, livestock, fruit, vegetables, fodder, fish, tree products; a total of 15 in all) produced on respondents' land/farms: 1=1-4 products (low production diversification); 2=5-8 products (intermediate production diversification); 3=more than 8 products (high production diversification).

4) Selling/Commercialization Diversity Indicator

On the selling/commercialization side, the total number of agricultural products and produced on their own farms and then sold were added up: 0=no products sold (no commercialization); 1=1-2 products sold (low commercialization); 2=3-5 products sold (intermediate commercialization); 3=more than 5 products sold (high commercialization).

5) Adaptation/innovation Indicator

Households were queried about what changes they had made over the last 10 years with respect to a wide range of practices – relating to crop type, variety type, land use and management practices, and farm animals/fish management practices (59 possibilities in all – see survey for details). The idea here is that households that have already been making changes, and introducing new practices, are likely to be more 'adaptive' to weather-related shocks and long-run changes in weather patterns (i.e. climate), than those that have not been able to make adjustments or introduced any new innovations to date.

The adaptation indicator is defined as the following: 0= zero or one change made in farming practices (i.e. crop, livestock, soil, water, land, and/or tree management practices) over last 10 years (low level); 1=2-10 changes made in farming practices (intermediate level); 2=11 or more changes made in farming practices (high level).

6) Mitigation-related Indicators

Here, we are interested in the introduction of new/improved practices that help sequester green-house gases (climate change mitigation measures). These improved farm management practices have not necessarily been introduced because of climate change concerns, but they do help lower vulnerability to climate-related risks, as well as enhancing and diversifying incomes and livelihoods.

Tree management indicator. This simple indicator shows whether a household has either protected or planted trees within the last year.

Soil amendment indicator. This indicator shows if the household has used fertilizer in the last year, or have started using fertilizer or manure on at least one crop.

Input intensification indicator. There are 7 ‘changes in agricultural practices/new practices over the last 10 years’ considered here to create an indicator with 3 levels - no intensification (none of the following), low intensification (1-3 of the following), high intensification (4-7 of the following).

These include starting to: purchase and apply mineral/chemical fertilizers, use manure/compost, use pesticides/herbicides, use integrated pest management techniques, irrigate, or plant higher yielding varieties.

Productivity Indicator. This indicator shows if a household has reported achieving a better yield from any crop, or that their land is more productive for any crop over the last 10 years – such households are classified as showing an "increase in productivity".

7) Gender indicators and types, sources and access to weather-related information by gender

We distinguished women-headed versus male-headed households, allowing an analysis of differences in our indicators and other information in areas where there are significant proportions of female-headed households. We also disaggregated agricultural labour inputs by gender (see site reports for this information), and in this report we show some of the differences regarding women’s versus men’s access to various types of climate-related information.

A complementary village-level survey was also carried out in mid 2011 in one village in each of these sites. Given the rather limited coverage of gender issues in the household survey, differentiation in responses according to gender, youth, and food insecure groups are critical goals of this survey (village-level survey guidelines are available at: www.ccafs.cgiar.org/resources).

2.0 West Africa

The initial West African CCAFS sites where the baseline household survey was implemented in late 2010/early 2011 are shown in Figure 2.1.

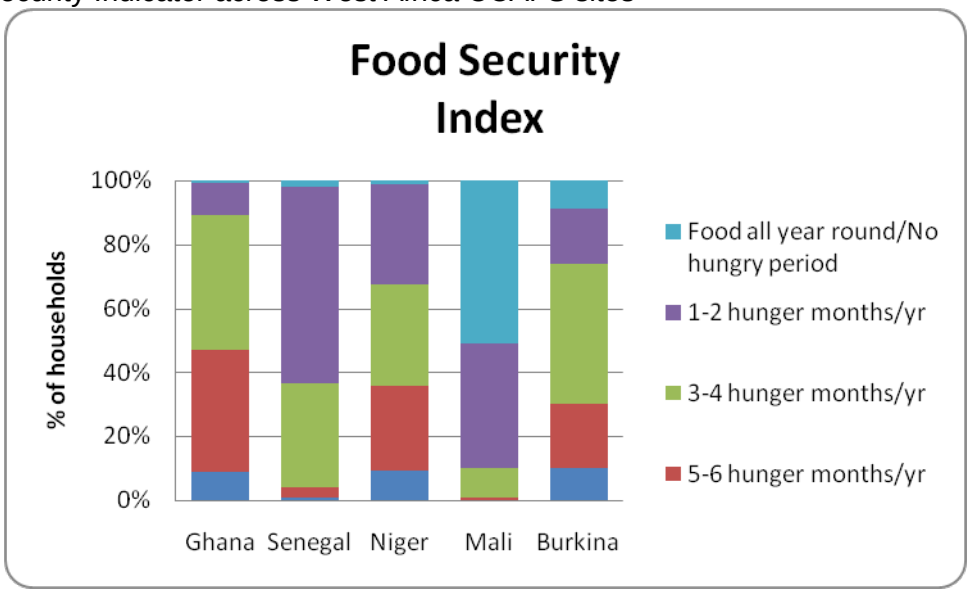
2.1 Food Security Indicator

The food security indicator is based upon the number of months that the household has difficulty getting food from any source (often referred to as the 'hunger months'), for an average rainfall year. Table 2.1 and Figure 2.2 show the proportion of households in the West Africa sites that reported having difficulty in feeding their family, from any source (e.g. purchased or received as food aid), for different periods.

Table 2.1 Number of Hunger Months

Country/Site/Block	Percent of surveyed households reporting:				
	More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
Ghana/Lawra-Jirapa/Lawra	9	38	42	10	1
Senegal/Kaffrine/Kaffrine	1	3	33	62	2
Niger/Kollo/Fakara	9	26	31	31	1
Mali/Segou/Cinzana	0	1	9	39	51
Burkina/Yategna/Tougou	10	20	44	17	9

Figure 2.2 Food Security Indicator across West Africa CCAFS sites



All of our sites show high degrees of food insecurity at the household level. The Mali site exhibits the highest degree of food security, with ½ of households reporting no 'hunger months' during the year. However, even here, 39 percent experience 1-2 months of struggling to find sufficient food to feed their families (from any source). And this is in an 'average' rainfall year.

We see the highest incidences of food insecurity in Ghana. Forty-seven percent of Ghana households surveyed reported more than 5 hunger months in an average year. In Senegal and Mali, it is rare to find households that experience more than 4 hunger months.

Main sources of food by month and hunger months

Delving into the food security situation in a little more depth, in our Mali site (Figures 2.3 and 2.4), we see that during the months that food comes mainly from their own land, these families do not

experience food shortages. In other words, few households are accessing food through markets or other sources to achieve food security.

This pattern, in fact, holds for all our West Africa sites (data not shown here). Thus is appears that own-farm production is indeed critical for food security for these households across a range of environments and experiencing different lengths of hunger periods.

Figure 2.3 Mali – Main Sources of Food (% of households; n=140**)**

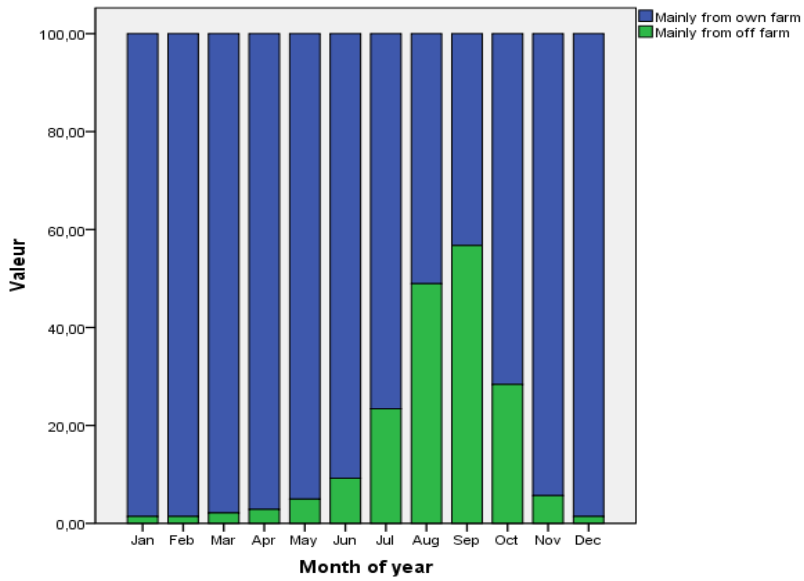
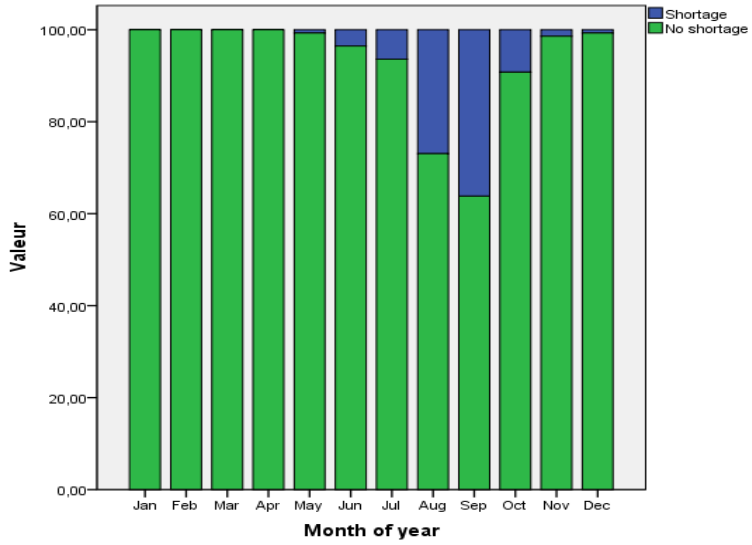


Figure 2.4 Mali – Food shortage versus no food shortage months (% of households; n=140)



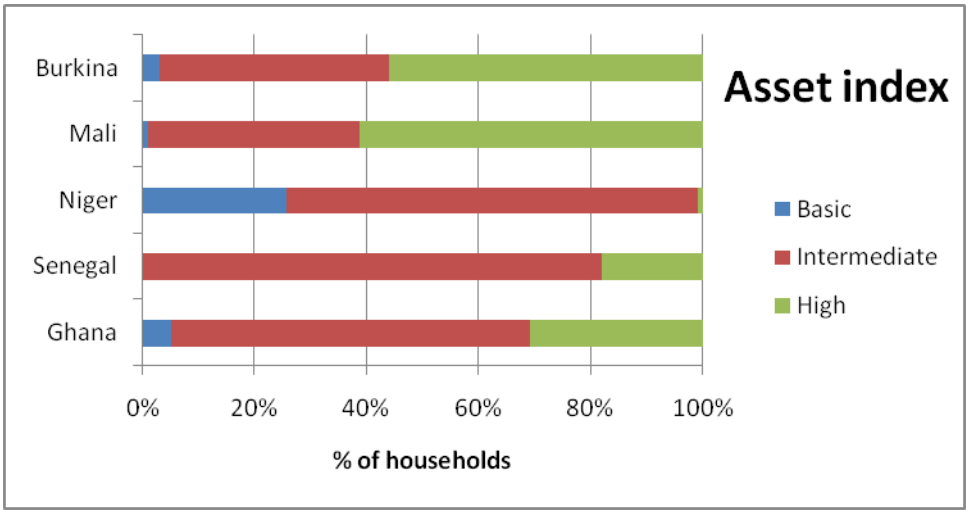
2.2 Asset Indicator

Table 2.2 and Figure 2.5 show how the survey households across West Africa compare with respect to ownership of the standard list of assets they were queried about.

Table 2.2 Asset indicator: West Africa sites

Country/Site	Percent of surveyed households reporting:		
	Basic level	Intermediate level	High level
Ghana/Lawra-Jirapa/Lawra	5	64	31
Senegal/Kaffrine/Kaffrine	0	82	18
Niger/Kollo/Fakara	26	74	1
Mali/Segou/Cinzana	1	38	62
Burkina/Yategna/Tougou	3	41	56

Figure 2.5 Asset Indicator comparison across CCAFS West Africa sites



In Mali and Burkina Faso, we see relatively higher proportions of 'wealthier' households, with 62% and 56%, respectively, of households reporting owning over 4 of these assets.

The majority of households in Niger, Senegal and Ghana fall in the intermediate level as they own 1-3 of these assets.

Niger has the highest proportion of very poor households, with 26% of households owning none of these assets.

2.3 Livelihood Diversification Indicators

2.3.1 Production Diversity

Table 2.3 shows the degree of diversification in terms of the number of agricultural products the surveyed households are producing across our West Africa sites.

Table 2.3 Production diversification indicator

Country/Site	Percent of surveyed households reporting on-farm\production of:		
	Low: 1-4 products	Medium: 5-8 products	High: More than 8 products
Ghana/Lawra-Jirapa/Lawra	1	52	46
Senegal/Kaffrine/Kaffrine	1	54	46
Niger/Kollo/Fakara	41	55	4
Mali/Segou/Cinzana	2	33	65
Burkina/Yategna/Tougou	2	69	29

This indicator shows that households in CCAFS sites in Mali (65%), Ghana (46%) and Senegal (46%) exhibit the highest levels of diversity in production, measured as producing more than 8 different products. The majority of the surveyed households fall into the medium diversity category, producing between 5 and 8 different types of agricultural products on their farms. In Niger, 41% of households produce only 1-4 kinds of agricultural products.

2.3.2 Selling Diversity

Table 2.4 shows the degree of diversification in terms of the number of agricultural products the surveyed households are both producing and selling.

Table 2.4 Selling diversification indicator

Country/Site	Percent of surveyed households reporting selling of:			
	No products sold	1-2 products sold (low commercial-isation)	3-5 products sold (intermediate commercial-isation)	6 or more products sold (high commercial-isation)
Ghana/Lawra-Jirapa/Lawra	4	16	51	29
Senegal/Kaffrine/Kaffrine	1	28	63	8
Niger/Kollo/Fakara	44	47	9	1
Mali/Segou/Cinzana	4	31	53	12
Burkina/Yategna/Tougou	4	37	57	2

The lowest levels of diversity in commercialization of produce from their own farms can be seen in Niger (44% of households selling nothing). The site with the highest percentages of highly commercialized farms (i.e. selling more than 6 products) is Ghana (29%).

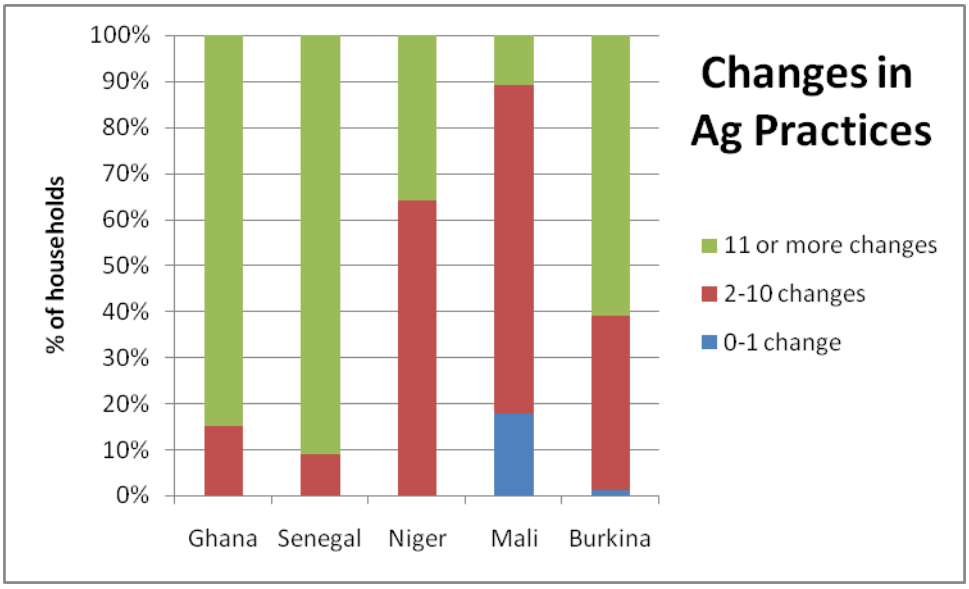
2.4 Adaptation Indicator

The degree of adaptability and innovation, as suggested by the number of changes in agricultural practices these households have made in the last 10 years, is shown in Table 2.5 and Figure 2.6 for our West Africa sites.

Table 2.5 Adaptation indicator

Country/Site	Percent of surveyed households reporting the following number of changes to their agricultural practices in the last 10 years:		
	0-1 change	2-10 changes	11 or more changes
Ghana/Lawra-Jirapa/Lawra	0	15	85
Senegal/Kaffrine/Kaffrine	0	9	91
Niger/Kollo/Fakara	0	64	36
Mali/Segou/Cinzana	18	72	11
Burkina/Yategna/Tougou	1	38	61

Figure 2.6 Adaptation indicator for the West Africa sites



Households were queried about what changes they had made over the last 10 years with respect to a wide range of practices – relating to crop type, variety type, land use and management practices, and farm animals/fish management practices (59 possibilities in all). Over 80% of households in the CCAFS sites in Senegal and Ghana appear to be quite innovative and adaptive, at least in terms of the overall number of changes they have made to their farming practices.

Eighteen percent of our surveyed households in Mali have made zero, or only one, change to their farming/livestock management practices in the last 10 years.

2.5 Mitigation Indicators

The mitigation-related indicators, showing changes in behavior with respect to agricultural-related changes in activities by the surveyed households in West Africa, over the last decade, can be seen in Table 2.6.

Table 2.6 Mitigation and farming changes related indicators

Country/site	Tree management		Soil amendments		Intensification			Productivity	
	No	Yes	None	Some	None	Low	High	No increase	Some increase
Ghana/Lawra-Jirapa/Lawra	16	84	3	97	0	46	54	17	83
Senegal/Kaffrine/Kaffrine	19	80	4	96	0	30	70	25	75
Niger/Kollo/Fakara	13	87	19	81	10	61	29	46	54
Mali/Segou/Cinzana	11	89	31	69	27	65	9	47	53
Burkina/Yategna/Tougou	14	82	7	93	5	51	44	41	59

The results show the following:

- Over 80% of households across all the CCAFS West Africa sites planted or protected some trees in the last year on their farms.
- Introduction of fertilizer in the last year has also been quite high, particularly in Burkina Faso, Senegal and Ghana, where over 90% have made soil fertility amendments over the last 10 years.
- Niger and Mali have the highest proportions of households, 10% and 27%, that have not pursued any intensification measures.
- Over half of households in the Ghana and Senegal sites fall in the high intensification category.
- Over 40% of households in Mali, Burkina Faso and Niger have seen no increases in productivity in the last 10 years.

2.6 Types, sources and access to weather-related information by gender

Forty-four percent of surveyed households in Burkina Faso reported that they had received no weather or climate-related information whatsoever in the last year. Radio, friends/ relatives/ neighbours, and extension officers were the most commonly cited sources. Table 2.7 shows the percentage of responses related to women receiving climate-related information versus men in the Burkina site, by the different types of information.

Extreme event forecasts are received by half of these households, followed by predictions as to the start of the rains (36%). It appears that in most Burkinabe households, both the women and men have access to the same information, although 2/3 of men hear 2-3 day weather forecasts and only 1/3 of women have access to these forecasts.

Table 2.7 What weather-related information is received by whom in Burkina Faso

Type of weather-related information	% of hhs receiving it	Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		Men	Women	Both
Start of the rains	36	50	4	44
Forecast of extreme event	50	61	1	36
Forecast of pest or disease outbreak	20	36	11	54
2-3 month weather forecast	18	40	4	56
2-3 day weather forecast	9	67	0	33

In Ghana, only 16% of households said they had not received any weather-related information. Radio, friends/relative/neighbours and own observations are the most frequently cited sources. An extreme event forecast is the type of weather information most frequently accessed by these households (76%), by both men and women, but with the men in the household (64%) more likely than women (34%) to be getting this information.

Close to one-half of our surveyed Ghana households heard about the forecasted start of the rains, and of a pest or disease outbreak, again with more men than women receiving these types of information.

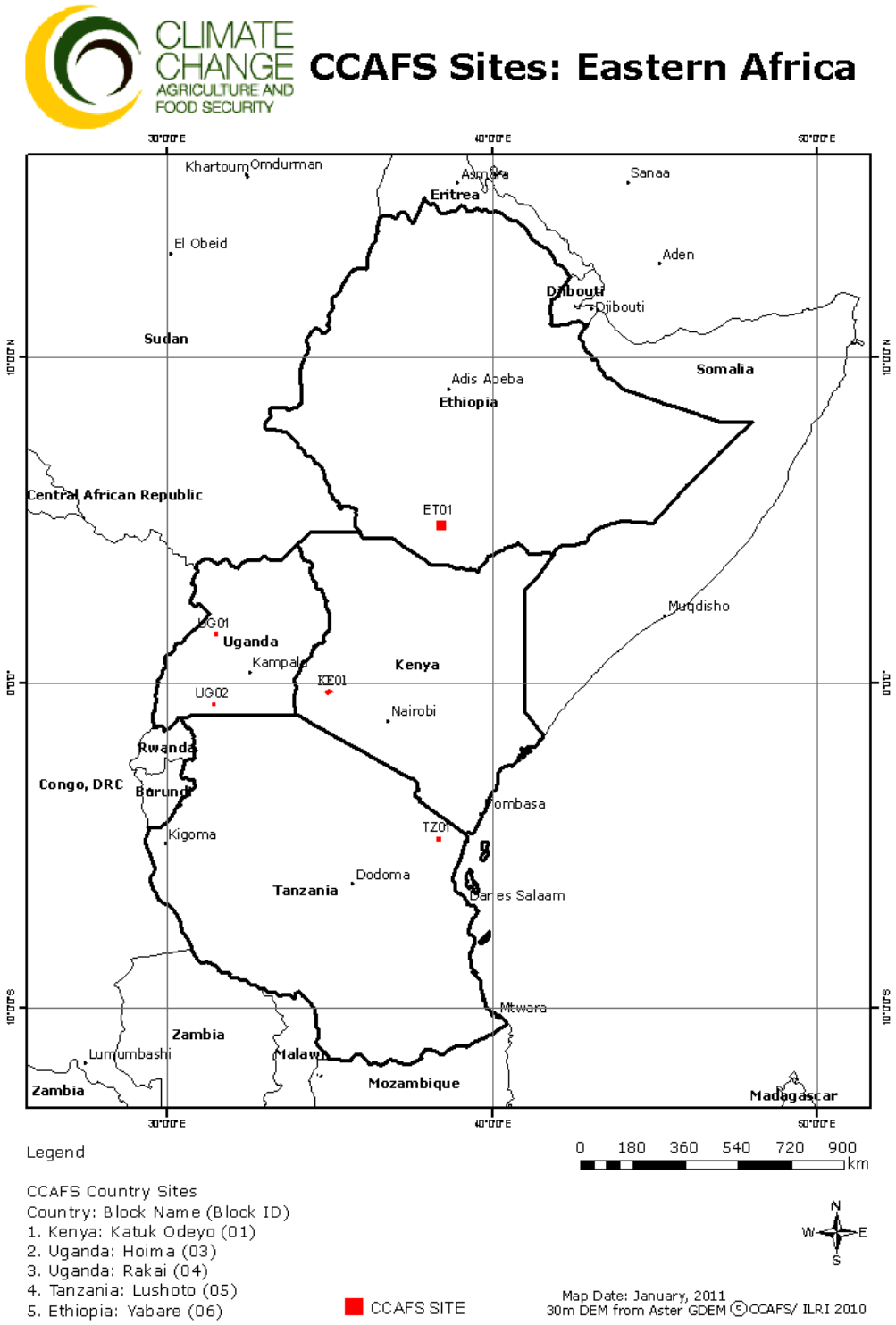
One-third of households receive 2-3 day weather forecasts, with ¼ accessing 2-3 month forecasts.

Table 2.8 What weather-related information is received by whom in Ghana

Type of weather-related information	% of hhs receiving it	Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		Men	Women	Both
Start of the rains	44	58	3	39
Forecast of extreme event	76	64	3	31
Forecast of pest or disease outbreak	51	61	7	32
2-3 month weather forecast	26	56	3	42
2-3 day weather forecast	32	56	2	42

3.0 East Africa

The initial East African CCAFS sites where the baseline household survey was implemented in late 2010/early 2011 are shown in Figure 3.1.



3.1 Food Security Indicator

Table 3.1 shows the number of months that the East Africa surveyed households have difficulty getting food from any source, in an average rainfall year.

Table 3.1 Food security/number of hunger months for the surveyed households across East Africa

Country/Site/Block	Percent of surveyed households reporting:				
	More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
Kenya/Nyando/Katuk Odeyo	0	0	17	81	1
Tanzania/Usambara/Lushoto	35	27	26	7	4
Uganda1/Albertine Rift/Hoima	10	9	16	35	31
Uganda2/Kagera Basin/Rakai	10	25	39	15	10
Ethiopia/Borana/Yabare	53	24	18	4	1

All of our sites show high degrees of food insecurity at the household level. The Albertine Rift site in Uganda exhibits the highest degree of food security, with almost one-third of households reporting no 'hunger months' during the year. However, even here, 35% experience 3 or more months of struggling to find sufficient food to feed their families (from any source). And this is in an 'average' rainfall year.

The Ethiopia, Ghana and Tanzania sites experience the highest incidences of food insecurity. Over half of our Ethiopian households experience more than 6 hunger months per year. 60% of the Tanzanian households surveyed reported more than 5 hunger months in an average year. In Kenya, it is rare to find households that experience more than 4 hunger months.

Main sources of food by month and hunger months

Delving into the food security situation in a little more depth, in our Ethiopia site (Figures 3.1 and 3.2), we see that the number of months where food comes mainly from their own land correspond very well to the months that these families experience less food shortages.

Figure 3.1. Ethiopia Main Sources of Food (% of households, n=140)

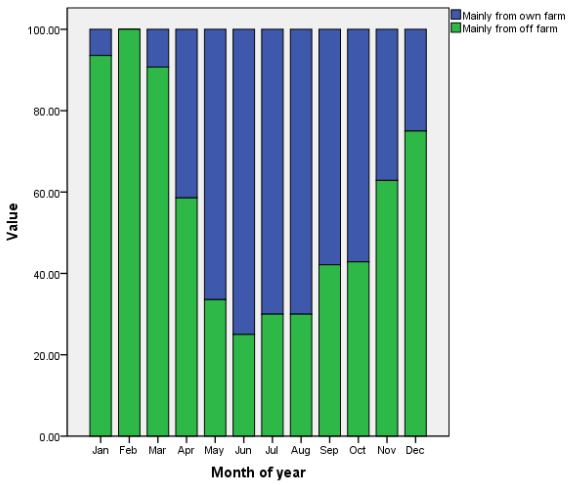
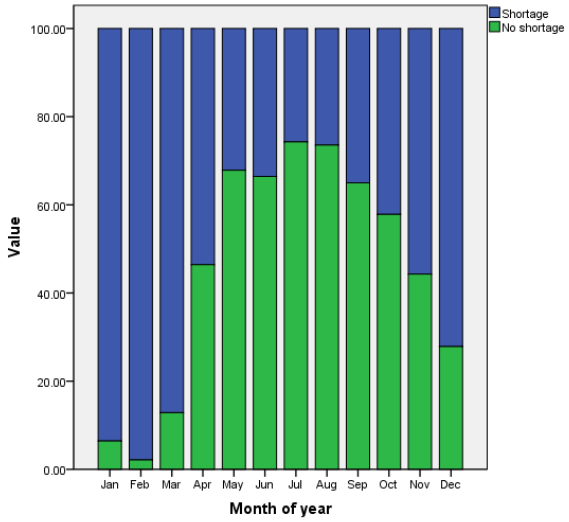


Figure 3.2. Ethiopia – Food shortage versus no shortage months (% of households; n=140)



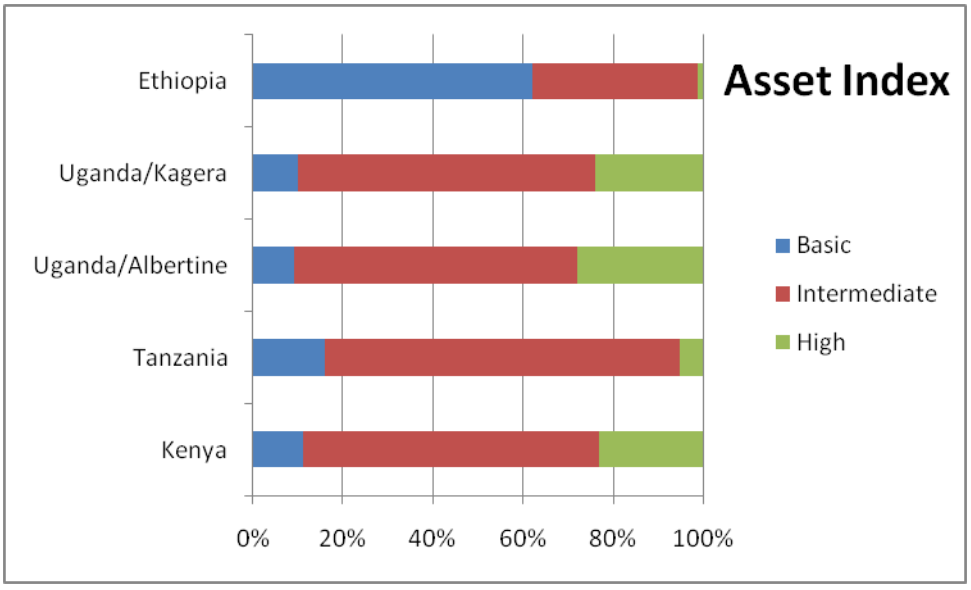
3.2 Asset Indicator

The asset indicator is shown for each of the East African survey sites in Table 3.2 and Figure 3.3.

Table 3.2 Asset indicator: East Africa sites

Country/Site	Percent of surveyed households reporting number of assets:		
	Basic (Zero)	Intermediate (1-3)	High (4 or more)
Kenya/Nyando/Katuk Odeyo	11	66	23
Tanzania/Usambara/Lushoto	16	79	5
Uganda1/Albertine Rift/Hoima	9	63	28
Uganda2/Kagera Basin/Rakai	10	66	24
Ethiopia/Borana/Yabare	62	37	1
All sites merged	*22*	*63*	*16*

Figure 3.3 Asset indicator: East Africa sites



Roughly 2/3 of households fall into the intermediate category across all sites except Ethiopia. Roughly ¼ of households own more than 4 of these assets in the Kenya site and the two Ugandan

sites. In Ethiopia, a staggering 62% of households fall in the low asset/wealth category, and the other 37% of households are at the intermediate level.

3.3 Livelihood Diversification Indicators

3.3.1 Production Diversity

Table 3.3 shows the degree of diversification in terms of the number of agricultural products, including food crops, cash crops, livestock, fruit, vegetables, fodder, fish, tree products; a total of 15 in all, the surveyed households are producing across our East Africa sites.

Table 3.3 Production diversification indicator

Country/Site	Percent of surveyed households reporting on-farm\production of:		
	Low: 1-4 products	Medium: 5-8 products	High: More than 8 products
Kenya/Nyando/Katuk Odeyo	29	65	6
Tanzania/Usambara/Lushoto	16	50	35
Uganda1/Albertine Rift/Hoima	16	62	22
Uganda2/Kagera Basin/Rakai	14	59	27
Ethiopia/Borana/Yabare	23	77	0

This indicator shows that around 1/3 of households in the CCAFS site in Tanzania exhibit a relatively high level of diversity in production, measured as producing more than 8 different types of agricultural products.

The majority of the surveyed households fall into the medium diversity category, producing between 5 and 8 different types of agricultural products on their farms. In Kenya, a surprisingly high percentage (29%), of households fall into the low production diversity category.

3.3.2 Selling Diversity

Table 3.4 shows the degree of diversification in terms of the number of agricultural products the surveyed households across East Africa are both producing and selling.

Table 3.4 Selling diversification indicator

Country/Site	Percent of surveyed households reporting selling of:			
	No products sold	1-2 products sold (low commercial-isation)	3-5 products sold (intermediate commercial-isation)	6 or more products sold (high commercial-isation)
Kenya/Nyando/Katuk Odeyo	34	44	19	4
Tanzania/Usambara/Lushoto	3	18	49	31
Uganda1/Albertine Rift/Hoima	7	29	46	18
Uganda2/Kagera Basin/Rakai	7	28	45	20
Ethiopia/Borana/Yabare	14	47	39	0

The lowest levels of diversity in commercialisation of produce from their own farms can be seen in Kenya (34% of households selling nothing) and Ethiopia (14%). The site with the highest

percentages of highly commercialised farms (i.e. selling more than 6 products) is Tanzania (31%). In the Uganda sites, roughly one-fifth are highly commercialised.

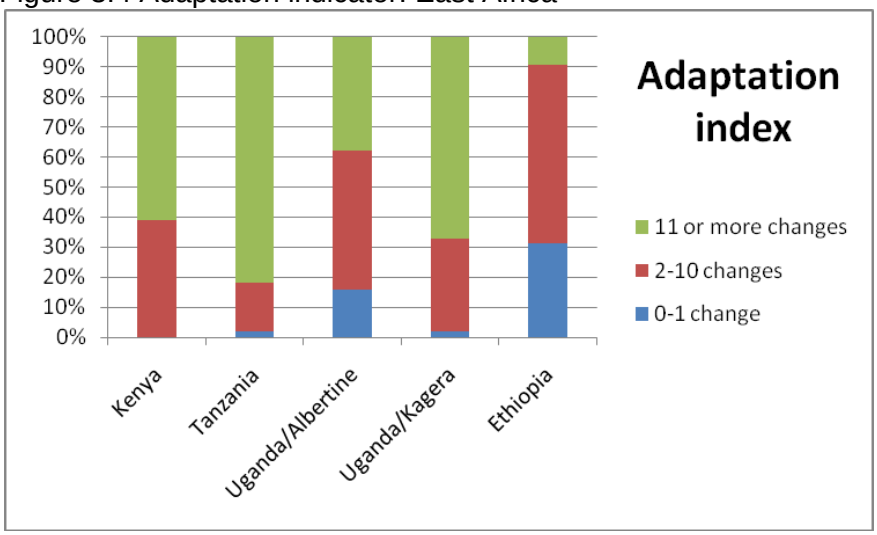
3.4 Adaptability/Innovation Indicator

Table 3.5 and Figure 3.4 shows the degree of adaptation and innovation, as suggested by the number of changes in agricultural practices these households have made in the last 10 years.

Table 3.5 Adaptation indicator for East Africa sites

Food Security Index	Percent of surveyed households reporting the following number of changes to their agricultural practices in the last 10 years:		
	0-1 change	2-10 changes	11 or more changes
Kenya/Nyando/Katuk Odeyo	0	39	61
Tanzania/Usambara/Lushoto	2	16	82
Uganda1/Albertine Rift/Hoima	16	46	38
Uganda2/Kagera Basin/Rakai	2	31	67
Ethiopia/Borana/Yabare	31	59	9

Figure 3.4 Adaptation indicator: East Africa



Households were queried about what changes they had made over the last 10 years with respect to a wide range of practices – relating to crop type, variety type, land use and management practices, and farm animals/fish management practices (59 possibilities in all). Over 80% of households in the CCAFS sites in Tanzania appear to be quite innovative/adaptive, at least in terms of the overall number of changes they have made to their farming practices. Almost a third of our surveyed households in Ethiopia have not made changes to their farming/livestock management practices in the last 10 years.

3.5 Mitigation-related indicators

The mitigation-related indicators, showing changes in behavior over the last decade with respect to agricultural-related changes in activities by the surveyed households in East Africa, can be seen in Table 3.6.

Table 3.6 Mitigation-related indicators: East Africa

Country/site	Tree management		Soil amendments		Intensification			Productivity	
	No	Yes	None	Some	None	Low	High	No increase	Some increase
Kenya/Nyando/Katuk Odeyo	9	91	58	42	14	69	17	14	86
Tanzania/Usambara/Lushoto	23	77	6	94	1	44	55	10	90
Uganda1/Albertine Rift/Hoima	25	75	69	31	24	68	9	52	48
Uganda2/Kagera Basin/Rakai	6	94	41	59	9	74	17	1	99
Ethiopia/Borana/Yabare	0	100	99	1	82	18	0	61	39

The results show the following:

- Over 75% of households across all our villages planted or protected some trees in the last year on their farms.
- Introduction of soil amendments, e.g. fertilizer, in the last year has also been quite high, with the exception of Ethiopia.
- Intensification measures are being pursued everywhere but are low in Ethiopia. Tanzania households are introducing the most intensification measures in our sample.
- High percentages of households have achieved productivity increases in Kenya, Tanzania, and Uganda-Kagera Basin. Over half of households have seen no increases in productivity in Ethiopia, and Uganda-Albertine Rift.

3.6 Types, sources and access to weather-related information by gender

Kenya. Virtually all (96%) of the Kenyan surveyed households said they had received some type of weather-related information over the last year. The radio, their own observations, and friends/relatives/neighbors were the most frequently cited sources of all types of information for these households (Table 3.7). Agricultural extension service and vets were sources of information for pest and disease outbreak forecasts.

Table 3.7 What weather-related information is received by whom and how in Kenya

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	87	Radio	Own	Friends	27	42	31
Forecast of extreme event	83	Radio	Friends	Own	22	43	35
Forecast of pest or disease outbreak	70	Radio	Own	Exten-sion	22	43	35
2-3 month weather forecast	85	Radio	Own	Friends	29	39	32
2-3 day weather forecast	83	Radio	Own	Friends	31	49	19

Table 3.7 also shows the percentage of responses related to women receiving climate-related information versus men (and when both receive it) in Kenya, by the different types of information. The predicted start of the rains is the most frequently received type of weather information (87% of households get this), and 42% of those households receiving this type of information said that women are the main recipients, while in 31% of households both men and women receive this information, and for 27% of households, men are the ones getting this information. A similar pattern holds for the other types of weather-related information as well.

Ethiopia. A different story emerges in Ethiopia, where only 64 percent of households reported receiving some type of weather or climate-related information over the past year, and 84 percent of surveyed households said women had not received any type of weather-related information at all. Indigenous knowledge or traditional forecasters were the most important source of information, followed by radio and friends/relatives/neighbours (Table 3.8).

Over half of the surveyed households are receiving predictions as to extreme weather events such as droughts (Table 3.8). For 78% of these households, it is the men that receive this information. Only 17% of households hear predictions as to the timing of the start of the rains, and again the majority of the recipients of this information are men. Only 1-2% of these households receive weather forecasts, or forecasts as to impending pest or disease outbreaks.

Table 3.8 What weather-related information is received by whom and how in Ethiopia

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	17	IK*	Radio	Friends	58	13	29
Forecast of extreme event	54	IK	Radio	Friends	78	8	10
Forecast of pest or disease outbreak	1	IK	-	-	100	0	0
2-3 month weather forecast	2	IK	Radio	Friends	25	25	50
2-3 day weather forecast	1	IK	Radio	-	67	0	33

* Indigenous knowledge

Tanzania. In Tanzania, 78 percent of households reported receiving some type of weather or climate-related information over the past year, and one-half reported that women in their households had not received any type of weather-related information at all.

The majority of these households are receiving all types of information via radio (Table 3.9). They are also largely relying on their own observations, and on friends/neighbours/relatives, but a small percentage are watching TV to see weather forecasts for the next 2-3 days. Women are less likely to receive weather forecasts, but the majority of women do appear to be receiving information together with their husbands about the start of the rains, and forecasts of extreme events and pest or disease outbreaks.

Table 3.9 What weather-related information is received by whom and how in Tanzania

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	71	Radio	Friends	Own	36	14	49
Forecast of extreme event	63	Radio	Friends	Own	40	17	43
Forecast of pest or disease outbreak	54	Radio	Exten-sion	Friends	37	15	48
2-3 month weather forecast	28	Radio	Own	Friends	51	13	36
2-3 day weather forecast	27	Radio	Own	TV	53	11	32

Uganda – Albertine Rift.
73 percent of households reported receiving some type of weather/climate-related information in Albertine. Forty-one percent said that women had received none of the kinds of information included in Table 3.10.

The three most frequently cited sources of information were the radio, friends, own observations. agricultural/veterinary extension services were mentioned in the case of pest or disease outbreaks and 2-3 month weather forecasts. Indigenous knowledge/traditional forecasters (IK) was another source mentioned for 2-3 day forecasts.

Of the households receiving such information, it appears that men and women are both hearing it, except for a small percentage of these particular households (recalling that overall, 41% of households surveyed said that women did not receive any weather-related information).

Table 3.10 Weather-related information reception by whom and how in Albertine Rift, Uganda

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	58	Radio	Friends	Own	21	18	61
Forecast of extreme event	51	Radio	Friends	Group	21	19	60
Forecast of pest or disease outbreak	54	Radio	Friends	Exten-sion	16	18	66
2-3 month weather forecast	33	Radio	Friends	Exten-sion	11	15	74
2-3 day weather forecast	23	Radio	Own	IK	12	19	69

Uganda – Kagera
In Kagera, 84% of surveyed households had received some weather-related information over the last year. Similarly to Albertine, 42% percent said that women had received none of the kinds of information included in Table 3.11.

Table 3.11 What weather-related information is received by whom and how in Kagera, Uganda

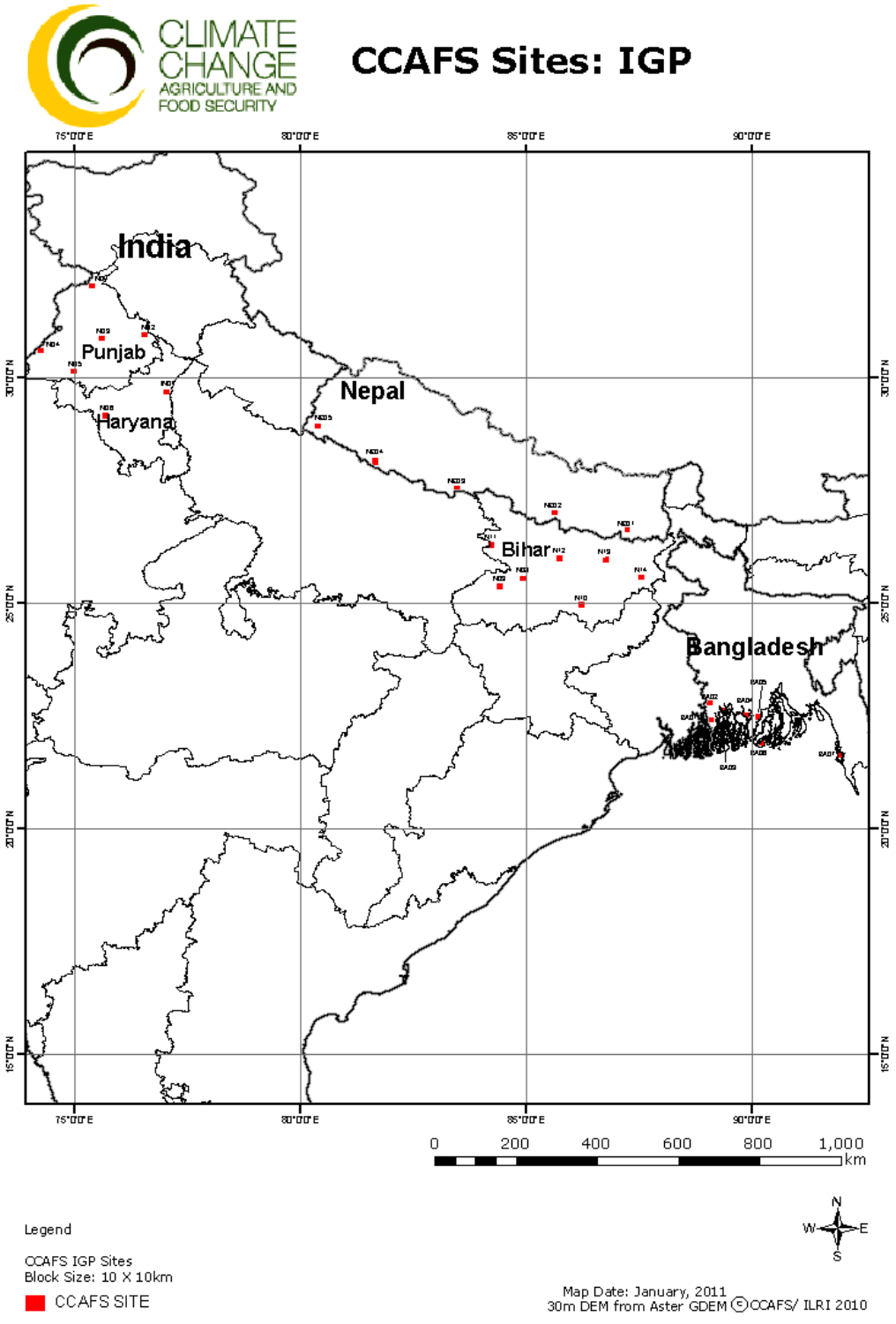
Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	80	Radio	Friends	Group	31	21	48
Forecast of extreme event	79	Radio	Group	Friends	34	20	46
Forecast of pest or disease outbreak	63	Radio	Friends	Group	30	18	52
2-3 month weather forecast	51	Radio	Friends	Own	32	16	52
2-3 day weather forecast	32	Radio	Own	Friends	20	13	67

The most frequently received information concerns the predicted start of the rains, followed by extreme event forecasts and pest and disease outbreak forecasts. The radio, friends and groups/gatherings are important ways in which these household get this information. In around 2/3 of households receiving this information, both women and men access it.

4.0 India – Bihar State

The initial CCAFS sites across the Indo-Gangetic Plains where the baseline household survey was implemented in late 2010/early 2011 are shown in Figure 4.1. Here, we summarize the results for the sites in Bihar State.

Figure 4.1 CCAFS initial sites in the Indo-Gangetic Plains



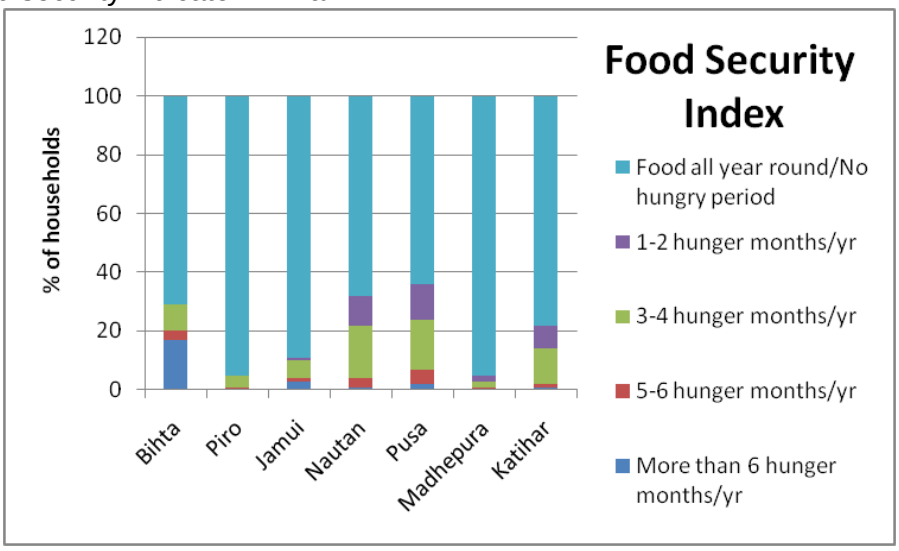
4.1 Food Security Indicator

The food security indicator for the interviewed households across the Bihar sites is reported in Table 4.1 and shown in Figure 4.2.

Table 4.1 Food security indicator – Bihar sites

Site	Percent of surveyed households reporting:				
	More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
Bihta	17	3	9	0	71
Piro	0	1	4	0	95
Jamui	3	1	6	1	89
Nautan	1	3	18	10	68
Pusa	2	5	17	12	64
Madhepura	0	1	2	2	95
Katihar	1	1	12	8	78

Figure 4.2 Food security indicator - Bihar



All of these sites show relatively low incidences of food insecurity at the household level. Bihta has the highest percentage of households (17%) that reported experiencing more than 6 hunger months in an average rainfall year. Over one-quarter of households in Pusa and Nautan households experience up to 3-4 hunger months/year, and in Katihar, one-fifth experience difficulty finding food to feed their families in a year of average rainfall (from any source).

Main sources of food by month and hunger months

Delving into the food security situation in a little more depth, in Bihta (Figures 4.2 and 4.3), one of the more food insecure sites, we do not see a distinct pattern of particular months where on-farm production is dominant, or certain months where most households rely on off-farm sources of food. The months of July, August and September are the months that over 20% of households find it difficult to obtain sufficient amounts of food, but roughly 1/5 of these households have food shortages year round.

Figure 4.2 Bihta Main Sources of Food (% of households, n=140)

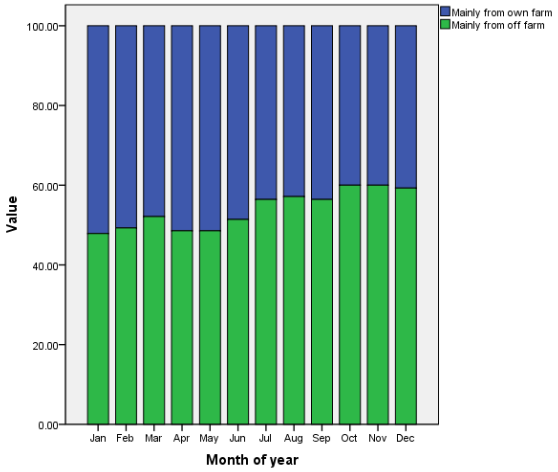
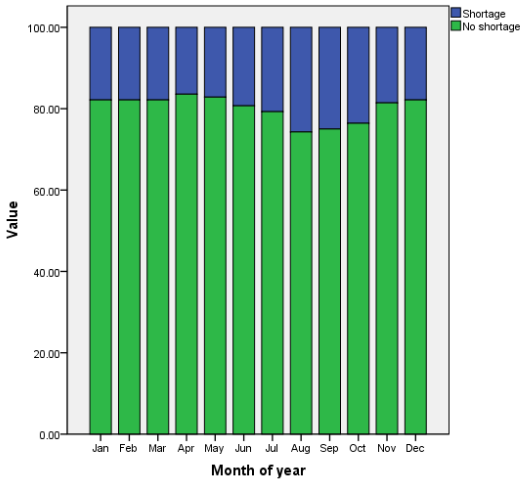


Figure 4.3 Bihta – Food shortage versus no shortage months (% of households; n=140)



In Piro (Figures 4.4 and 4.5), where our surveyed households experience a much stronger food security situation than in Bihta, we see a much greater reliance on their own farms for food, year round. Households rely more on off-farm sources from July-Dec, but in November and December, no households experience food shortages in Piro, and a very small percentage of households have hunger months during the rest of the year.

Figure 4.4 Piro – Main Sources of Food (% of households; n=140)

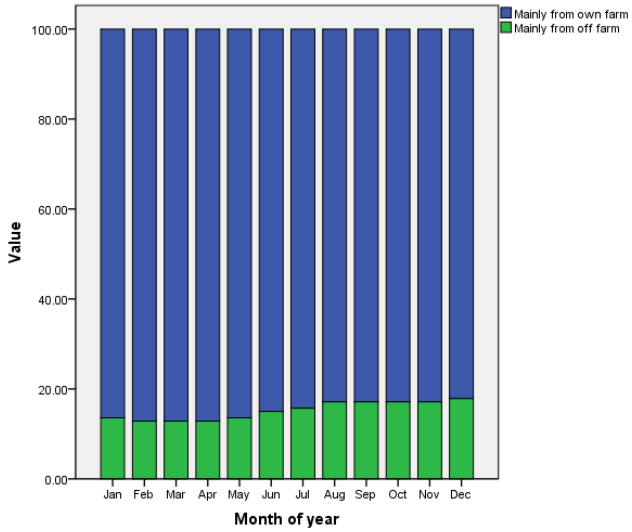
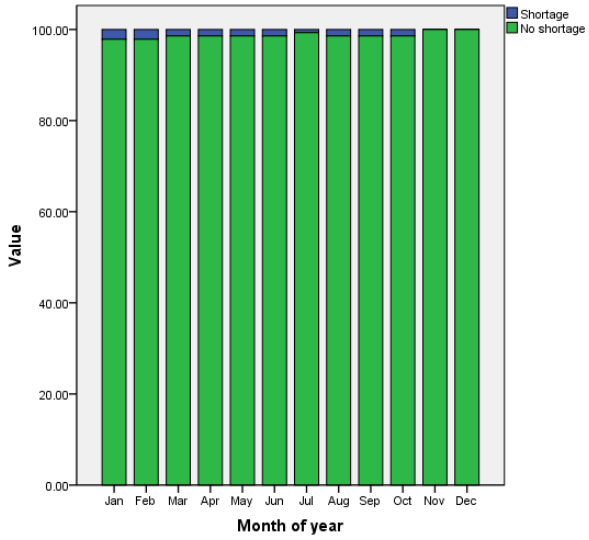


Figure 4.5 Piro – Food shortage versus no food shortage months (% of households; n=140)



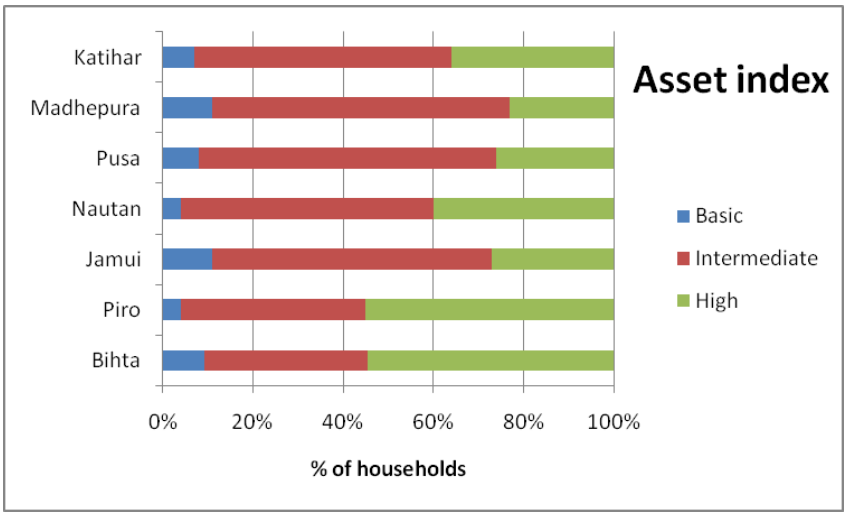
4.2 Asset Indicator

In Piro and Bihta, more than 1/2 of households own 4 or more assets, an indication of higher numbers of relatively wealthy households in these sites. The majority of households across these sites fall into the intermediate asset level category (owning 1-3 of the listed household assets). Across all sites, between 4 and 11% of households have none of the queried assets (i.e. are very poor).

Table 4.2 Asset Indicator: Bihar sites

Site	Percent of surveyed households reporting on number of assets:		
	Basic level (Zero)	Intermediate level (1-3)	High level (4 or more)
Bihta	9	36	54
Piro	4	41	55
Jamui	11	62	27
Nautan	4	56	40
Pusa	8	66	26
Madhepura	11	66	23
Katihar	7	57	36

Figure 4.6 Asset indicator



4.3 Livelihood Diversification Indicators

4.3.1 Production Diversity

The production diversification indicator for the Bihar sites is shown in Table 4.3. It shows that households in Katihar (17%) exhibit the highest levels of diversity in production, measured as producing more than 8 different products on their own farms. The majority of the surveyed households fall into the medium diversity category, producing between 5 and 8 different types of agricultural products on their farms. In Bihta, 44% of households produce only 1-4 different agricultural products. All sites except Jamui and Bihta report around 5% of households producing no agricultural products at all – these are likely landless households.

Table 4.3 Production diversity indicator for Bihar sites

Site	Percent of surveyed households reporting on-farm production of:			
	Zero products	Low: 1-4 products	Medium: 5-8 products	High: More than 8 products
Bihta	0	44	31	5
Piro	5	31	56	9
Jamui	0	38	41	5
Nautan	5	36	51	8
Pusa	5	30	58	7
Madhepura	6	34	56	5
Katihar	5	31	46	17

4.3.2 Selling Diversity

All 7 sites have 20% or more of households that are not selling any of the agricultural products they produce on their own farms, a possible indicator of households that are at a subsistence level (or relying heavily on off-farm income sources) (Table 4.4). The lowest levels of diversity in commercialization of produce from their own farms can be seen in Jamui (41% of households selling nothing), Bihta (35%) and Nauran (31%). The sites with the highest percentages of highly commercialized farms (i.e. selling more than 3 products) are Pusa (40%) and Katihar (37%).

Table 4.4 Selling diversity indicator: Bihar

Site	Percent of surveyed households reporting selling of:			
	Zero products	Low: 1-2 products sold	Medium: 3-5 products sold	High: More than 5 products sold
Bihta	35	51	13	7
Piro	20	71	9	0
Jamui	41	44	14	1
Nautan	31	49	20	0
Pusa	21	39	37	3
Madhepura	20	64	16	0
Katihar	19	44	32	5

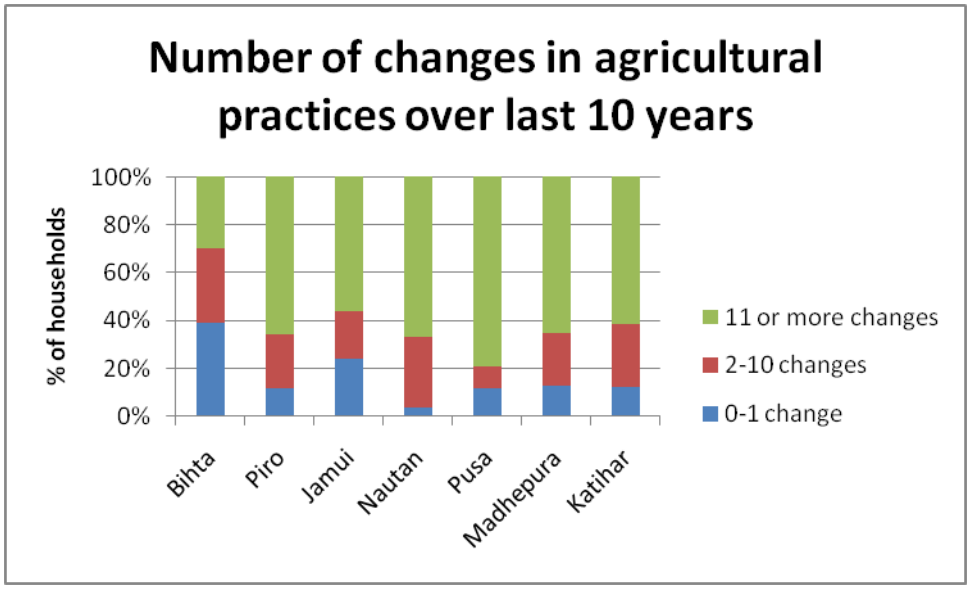
4.4 Adaptation Indicator

Households were queried about what changes they had made over the last 10 years with respect to a wide range of practices – relating to crop type, variety type, land use and management practices, and farm animals/fish management practices (59 possibilities in all). As seen in Table 4.5 and Figure 4.7, over 60% of households in all CCAFS, except Bihta, appear to be quite innovative/adaptive — at least in terms of the overall number of changes they have made to their farming practices — as they've made more than 11 different changes to some agricultural practice over the last decade. Thirty-nine percent of our surveyed households in Bihta and 24% in Jamui have made virtually no changes to their farming/livestock management practices in the last 10 years.

Table 4.5 Adaptation indicator: Bihar

Site	Percent of surveyed households reporting the following number of changes to their agricultural practices in the last 10 years:		
	0-1 change	2-10 changes	11 or more changes
Bihta	39	31	30
Piro	12	22	66
Jamui	24	20	56
Nautan	4	29	67
Pusa	12	9	79
Madhepura	13	22	65
Katihar	12	26	61

Figure 4.7 Adaptation indicator: Bihar



4.5 Mitigation Indicators

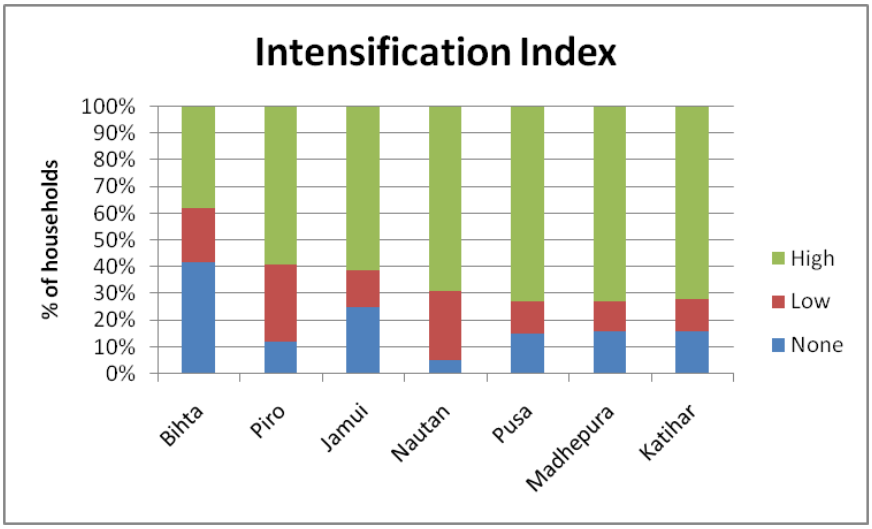
Table 4.6 shows the mitigation-related indices for the Bihar sites. The results suggest the following:

- Only one quarter or fewer households across all our villages planted some trees during the last year on their farms.
- Over ¾ of surveyed households have introduced some soil amendments, such as fertilizer, in the last year, except in Bihta, where this figure is 55%.
- Intensification measures are being pursued everywhere but in some sites such as Bihta (42%) and Jamui (25%), many households have not intensified their production practices at all. Pusa, Madhepura and Katihar have introduced the highest number of intensification measures in our sample (Figure 4.8).
- High percentages of households have achieved productivity increases in Nautan, Madhepura, Katihar, Pusa and Piro. Over half of households have seen no increases in productivity in Bihta.

Table 4.6 Mitigation-related indicators: Bihar

Site	Tree management		Soil amendments		Intensification			Productivity	
	No	Yes	None	Some	None	Low	High	No increase	Some increase
Bihta	84	16	45	55	42	20	38	51	49
Piro	75	25	12	88	12	29	59	18	82
Jamui	91	9	26	74	25	14	61	26	74
Nautan	84	16	5	95	5	26	69	5	95
Pusa	81	19	16	84	15	12	73	18	82
Madhepura	74	26	16	84	16	11	73	16	84
Katihar	85	15	16	84	16	12	72	18	82

Figure 4.8 Intensification indicator: Bihar



4.6 Gender and weather-related information

Forty-six percent of households in Bihta reported receiving some kind of weather-related information in the last year.

Start of the rains and 2-3 day weather forecasts are the types of weather-related information most frequently received. TV is the most important source for both of these.

For households receiving each type of information, in less than one-half of them, women are accessing information about the start of the rains, forecasts of extreme events and forecasts of pest and disease outbreaks. But in more than one-half of these households, women are receiving weather forecasts, for which TV, radio, own and friends' observations and indigenous knowledge are important sources.

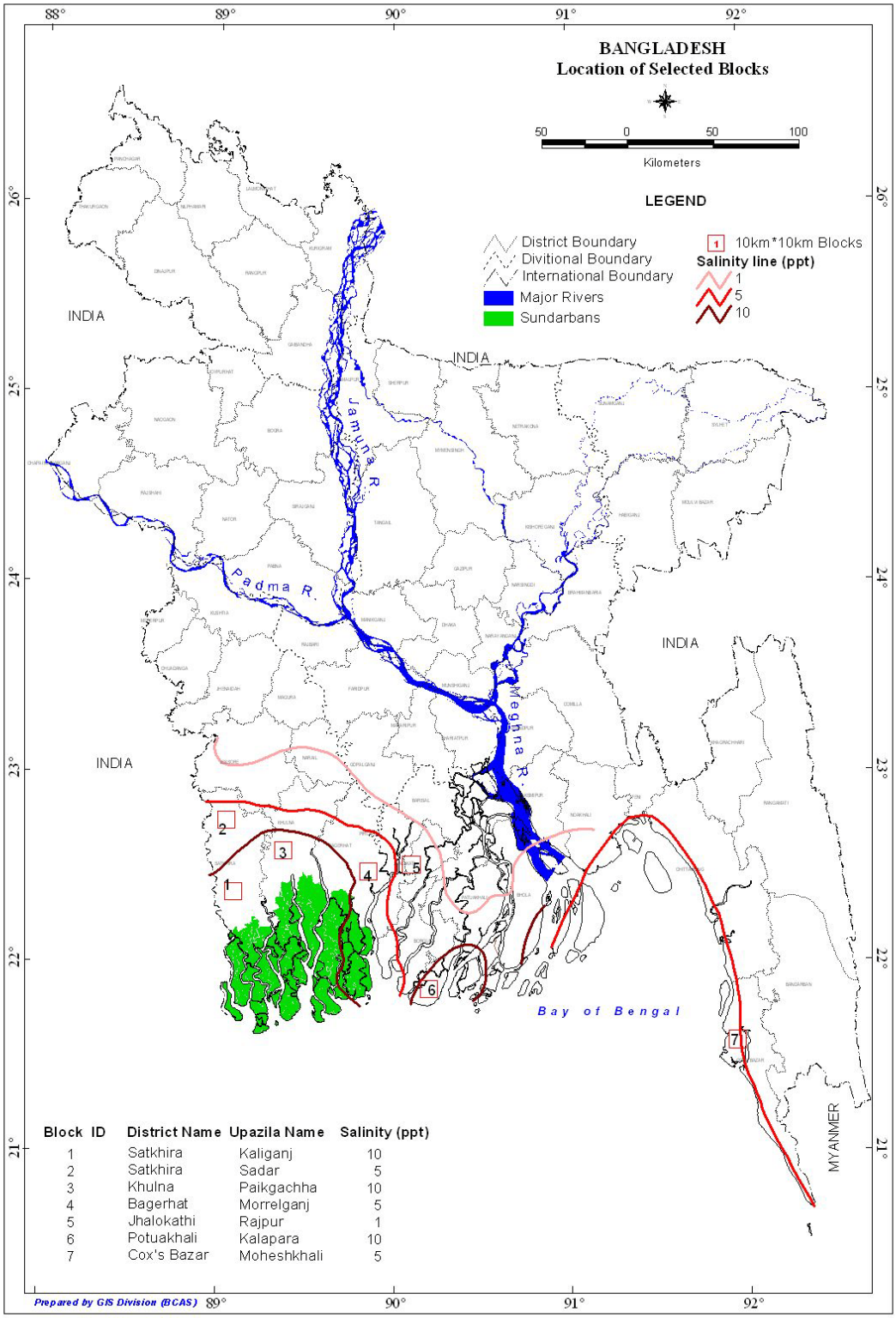
Table 4.7 What weather-related information is received by whom and how in Bihta

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	41	TV	Radio	Friends	53	5	37
Forecast of extreme event	16	TV	Radio	News-paper	68	5	27
Forecast of pest or disease outbreak	13	Radio	TV	News-paper	56	11	33
2-3 month weather forecast	12	TV	Radio	IK	29	18	41
2-3 day weather forecast	38	TV	Own	Friends	42	4	49

5.0 Bangladesh

The locations of the 7 CCAFS baseline survey sites in Bangladesh are shown in Figure 5.1.

Figure 5.1 Bangladesh survey sites



5.1 Food Security Indicator

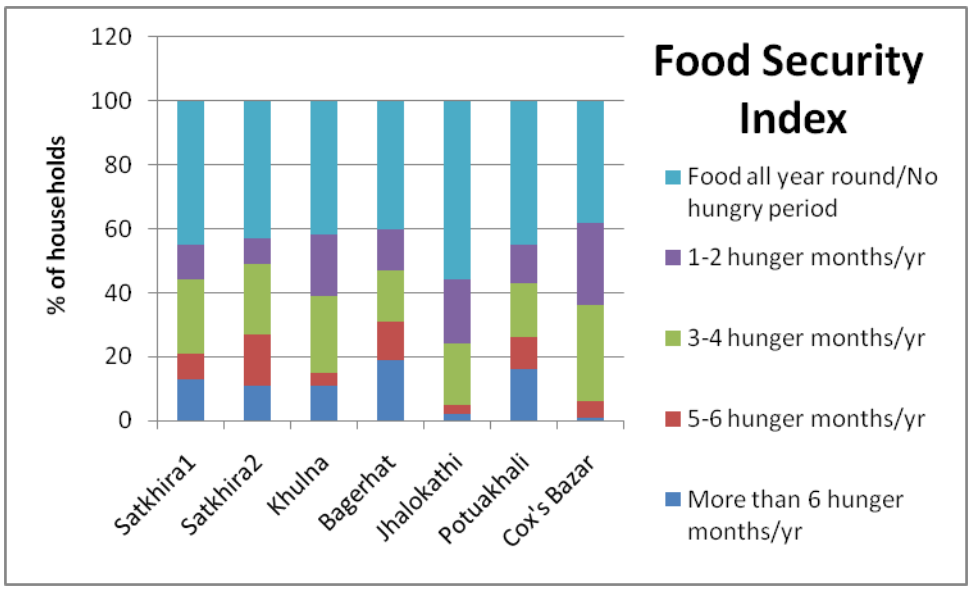
The food security indicator is based upon the number of months that the household has difficulty getting food from any source (often referred to as the 'hunger months'), for an average rainfall year. Table 5.1 and Figure 5.2 show the proportion of households in the Bangladeshi sites that reported having difficulty in feeding their family, from any source (e.g. purchased or received as food aid), for different periods.

Table 5.1 Number of Hunger Months

Bangladesh Sites	Percent of surveyed households reporting:				
	More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
Kaliganj-Shyamnagar, Satkhira1	13	8	23	11	45
Sadar-Tala, Satkhira2	11	16	22	8	43
Paikgacha, Khulna	11	4	24	19	42
Morrelganj, Bagerhat	19	12	16	13	40
Rajapur, Jhalokathi	2	3	19	20	56
Kalapara, Patuakhali	16	10	17	12	45
Moheshkhali, Cox's Bazar	1	5	30	26	38

In all sites, 40 percent or more of households are food secure year round. Bagerhat has the highest proportion of households (19%) with more than 6 hunger months/year.

Figure 5.2 Food Security Indicator across CCAFS sites in Bangladesh



As can be seen in Figure 5.2, Jahlokathi is relatively more food secure than several of the other sites, with over half of the households experiencing no hunger periods.

Main sources of food by month and hunger months

Delving into the food security situation in a little more depth, in Satkhira1 site (Figure 5.3), we see that off-farm food sources are important in all months, providing the main source of food for over

60% of households from May through October. This also corresponds to the period when over 20% of households typically experience food shortages (Figure 5.4).

Figure 5.3 Kaliganj, Satkhira1– Main Sources of Food (% of households; n=140**)**

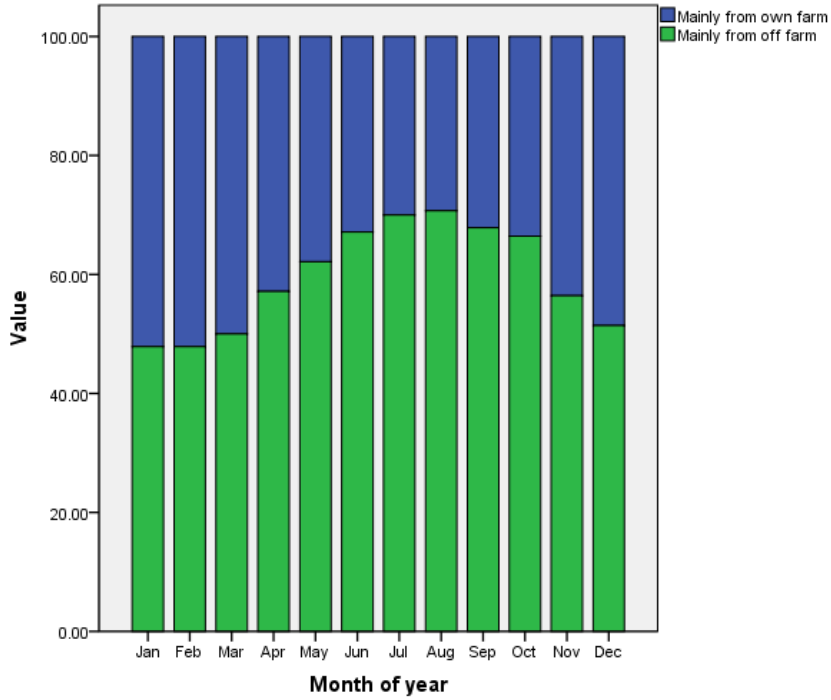
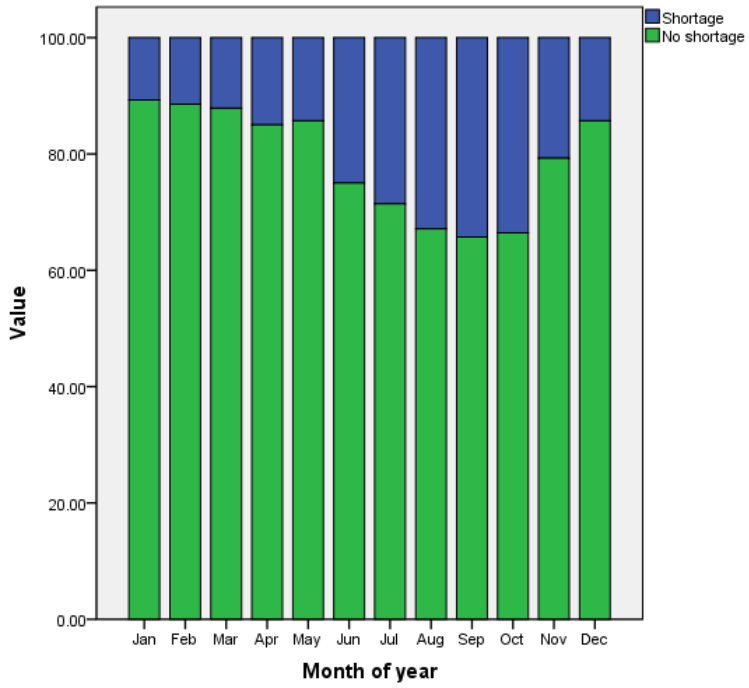


Figure 5.4 Kaliganj, Satkirha1 – Food shortage versus no food shortage months (% of households; n=140)



5.2 Asset Indicator

Table 5.2 and Figure 5.5 show how the survey households across Bangladesh compare with respect to ownership of the standard list of assets they were queried about. The majority of households in most of these sites have between 1 and 3 of these assets.

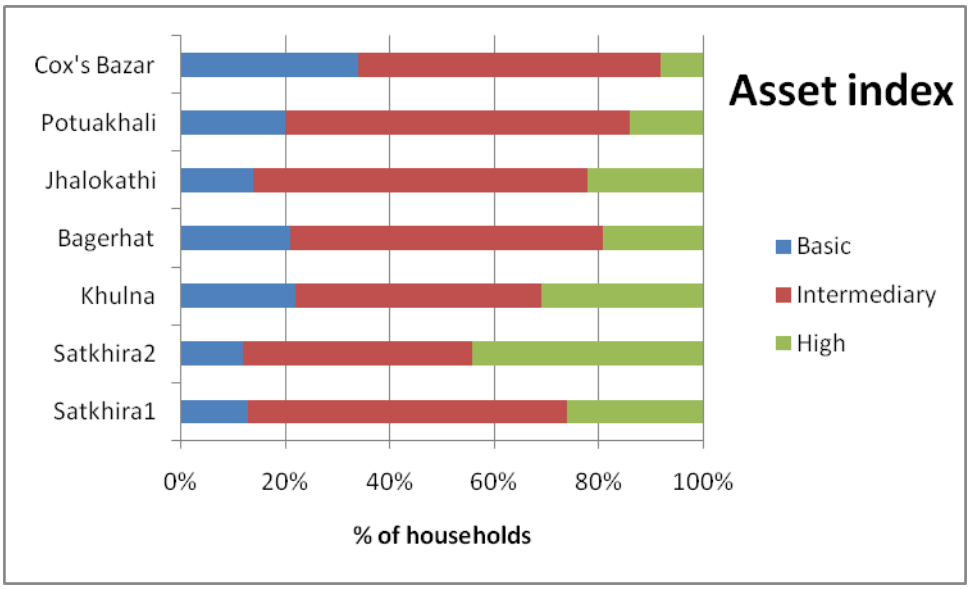
Satkhira2 and Khulna have the highest proportions of relatively wealthy households as indicated by this asset index, while Satkhira2, Satkhira1 and Jhalokathi have the least number of extremely poor households.

A high number of surveyed households in Cox's Bazar have none of these assets (34%).

Table 5.2 Asset indicator

Site	Percent of surveyed households reporting:		
	Basic level (Zero)	Intermediate level (1-3)	High level (4 or more)
Kaliganj-Shyamnagar, Satkhira1	13	61	26
Sadar-Tala, Satkhira2	12	44	44
Paikgacha, Khulna	22	47	31
Morrelganj, Bagerhat	21	60	19
Rajapur, Jhalokathi	14	64	22
Kalapara, Patuakhali	20	66	14
Moheshkhali, Cox's Bazar	34	58	8

Figure 5.5 Asset indicator comparison across CCAFS Bangladesh sites



5.3 Livelihood Diversification Indicators

5.3.1 Production Diversity

Table 5.3 shows the degree of diversification in terms of the number of agricultural products the surveyed households are producing across our Bangladeshi sites.

Table 5.3 Production diversification indicator

Bangladesh sites	Percent of surveyed households reporting on-farm\production of:		
	Low: 1-4 products	Medium: 5-8 products	High: More than 8 products
Kaliganj-Shyamnagar, Satkhira1	24	39	36
Sadar-Tala, Satkhira2	17	26	55
Paikgacha, Khulna	47	40	9
Morrelganj, Bagerhat	16	49	35
Rajapur, Jhalokathi	29	49	21
Kalapara, Patuakhali	9	35	56
Moheshkhali, Cox's Bazar	36	50	11

Looking across sites for this indicator suggests that while close to half of these households fall in the medium production diversification category, we see 2 sites – Satkhira2 and Potuakhali where over 50% of households producing more than 8 different types of agricultural products, indicating highly diversified households. Khulna is the least diversified site, with almost half of households producing only 1-4 types of products.

5.3.2 Selling Diversity

Table 5.4 shows the degree of diversification in terms of the number of agricultural products the surveyed households are both producing and selling.

Table 5.4 Selling diversification indicator

Bangladesh sites	Percent of surveyed households reporting selling of:			
	No products sold	1-2 products sold (low commercial-isation)	3-5 products sold (intermediate commercial-isation)	6 or more products sold (high commercial-isation)
Kaliganj-Shyamnagar, Satkhira1	10	34	32	24
Sadar-Tala, Satkhira2	17	21	42	20
Paikgacha, Khulna	16	46	35	3
Morrelganj, Bagerhat	26	31	36	8
Rajapur, Jhalokathi	28	34	31	8
Kalapara, Patuakhali	14	27	51	8
Moheshkhali, Cox's Bazar	23	48	24	5

Many households across all sites are selling none, or very few, agricultural products from their own farms. Over one-half of households are selling 2 or fewer types of agricultural products in all sites except Satkhira1, Satkhira2, and Potuakhali, where the majority of farms appear to more commercialized, selling more than 3 products.

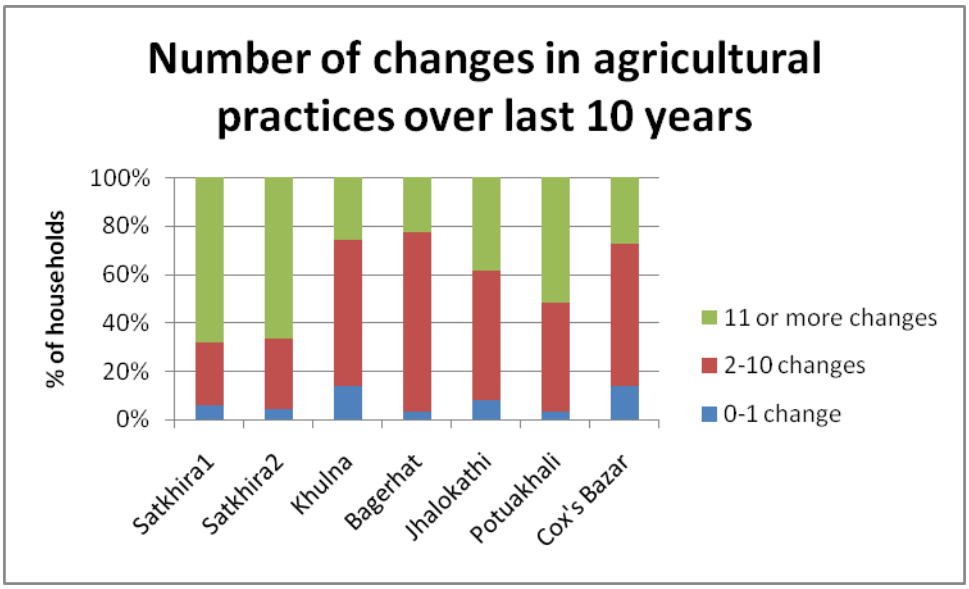
5.4 Adaptation Indicator

The degree of adaptability and innovation, as suggested by the number of changes in agricultural practices these households have made in the last 10 years, is shown in Table 5.5 and Figure 5.6 for our sites in Bangladesh.

Table 5.5 Adaptation indicator

Site	Percent of surveyed households reporting the following number of changes to their agricultural practices in the last 10 years:		
	0-1 change	2-10 changes	11 or more changes
Kaliganj-Shyamnagar, Satkhira1	6	26	69
Sadar-Tala, Satkhira2	4	29	66
Paikgacha, Khulna	14	61	26
Morrelganj, Bagerhat	3	74	23
Rajapur, Jhalokathi	8	54	39
Kalapara, Patuakhali	3	45	52
Moheshkhali, Cox's Bazar	14	59	28

Figure 5.6 Adaptation indicator for the Bangladesh sites



Two-thirds of households in Satkhira1 and Satkhira2 and one-half of households in Potuakhali have been making many changes (11 or more) to their farming practices over the last decade.

Khulna and Cox's Bazar have the least number of innovative farm households, as 14% have made virtually no changes.

5.5 Mitigation Indicators

The mitigation-related indicators, showing changes in behavior with respect to agricultural-related changes in activities by the surveyed households in Bangladesh, over the last decade, can be seen in Table 5.6.

Table 5.6 Mitigation and farming changes related indicators

Site	Tree management		Soil amendments		Intensification			Productivity	
	No	Yes	None	Some	None	Low	High	No increase	Some increase
Kaliganj-Shyamnagar, Satkhira1	49	51	26	74	26	3	71	29	71
Sadar-Tala, Satkhira2	45	55	27	73	24	23	54	24	76
Paikgacha, Khulna	58	42	69	31	69	4	27	73	27
Morrelganj, Bagerhat	41	59	3	67	30	46	24	61	39
Rajapur, Jhalokathi	34	66	40	60	40	11	49	53	47
Kalapara, Patuakhali	52	48	24	76	24	12	64	28	72
Moheshkhali, Cox's Bazar	49	51	34	66	34	6	60	50	50

Table 5.6 shows the mitigation-related indices for the Bangladesh sites. The results indicate the following:

- 42-66% of households across all sites planted some trees during the last year on their farms.
- Over 2/3 of surveyed households have introduced some soil amendments, such as fertilizer, in the last year, except in Paikgacha, Khulna, where only 31% have.
- Intensification measures are being pursued everywhere, but the majority of households (69%) in Paikgacha have not intensified their production practices at all. Kaliganj-Shyamnagar, Kalapara and Moheshkhali have introduced the highest number of intensification measures in our sample.
- High percentages of households have achieved productivity increases in Kaliganj-Shyamnagar, Kalapara and Sadar-Tala. Less encouraging is the fact that half of all surveyed households in Moheshkhali and Rajapur reported experiencing no increases in agricultural yields on their farms over the last 10 years.

5.6 Types, sources and access to weather-related information by gender

As noted above, Bagerhat is one of the less food secure CCAFS sites. 75% of households in Bagerhat reported that they have received some kind of weather/climate related information in the last 12 months. Table 5.7 shows what types of information they have been accessing, from where and by whom.

Daily weather forecasts are received by almost three-quarters of households, mainly via television, radios, or via word-of-mouth. Two-thirds of these households said it came with no additional information as to how to make use of the information, and no households reported making any agricultural practice change-related use of this information.

No one in this area is getting longer-term weather forecast information, and 12% receive forecasts of pest or disease outbreaks, virtually all of them men. This information apparently did come with some advice as to how to use it, and was used by these households to adjust their inputs (e.g. pesticide application).

Forecasts of extreme weather events are also widely heard, again with television and radio being the most important sources. In 38% of households women are receiving this information, while virtually all the men are. One-third of these households reported receiving additional information with these forecasts, but only 3 farmers used it to adjust the timing of their farming practices.

Only 11% of households receive information regarding the predicted timing of the start of the rains, and no women are hearing it.

Table 5.7 What weather-related information is received by whom and how in Bagerhat

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	11	TV	Radio	Own observ.	75	0	25
Forecast of extreme event	64	TV	Radio	Friends	62	1	37
Forecast of pest or disease outbreak	12	TV	Radio	Friends	94	0	6
2-3 month weather forecast	0	-	-	-	-	-	-
2-3 day weather forecast	72	TV	Radio	Friends	56	1	42

In contrast, Jalokathi has higher levels of household food security. Access to weather-related information in the Jalokathi site is reported in Table 5.8. Only one household reported not receiving any kind of weather-related information here, but none are receiving information regarding pest or disease outbreaks, or longer-term weather forecasts.

Seventy-three percent of households receive daily weather forecasts, and in these households, 80% of the women receive them, via television, indigenous knowledge and local 'experts' or from friends.

Extreme event forecasts are heard by 68% of households on television, over the radio, or they are making their own such forecasts based upon observations.
Information regarding the likely timing of the start of the rains is much less frequently accessed, by only one-quarter of households in this area. Here, people rely on their own observations more than other sources that also include TV and radio. Women are less likely to receive this information than forecasts of extreme events or daily weather forecasts.

Table 5.8 What weather-related information is received by whom and how in Jhalokathi

Type of information	% of hhs receiving it	Top 3 sources of this information			Of hh's receiving info, who in the household is getting it (% of yes responses)?		
		1	2	3	Men	Women	Both
Start of the rains	25	Own observ.	TV	Radio	43	3	54
Forecast of extreme event	68	TV	Radio	Own observ.	19	2	79
Forecast of pest or disease outbreak	0	-	-	-	-	-	-
2-3 month weather forecast	0	-	-	-	-	-	-
2-3 day weather forecast	73	TV	IK	Friends	21	2	77

6.0 Nepal

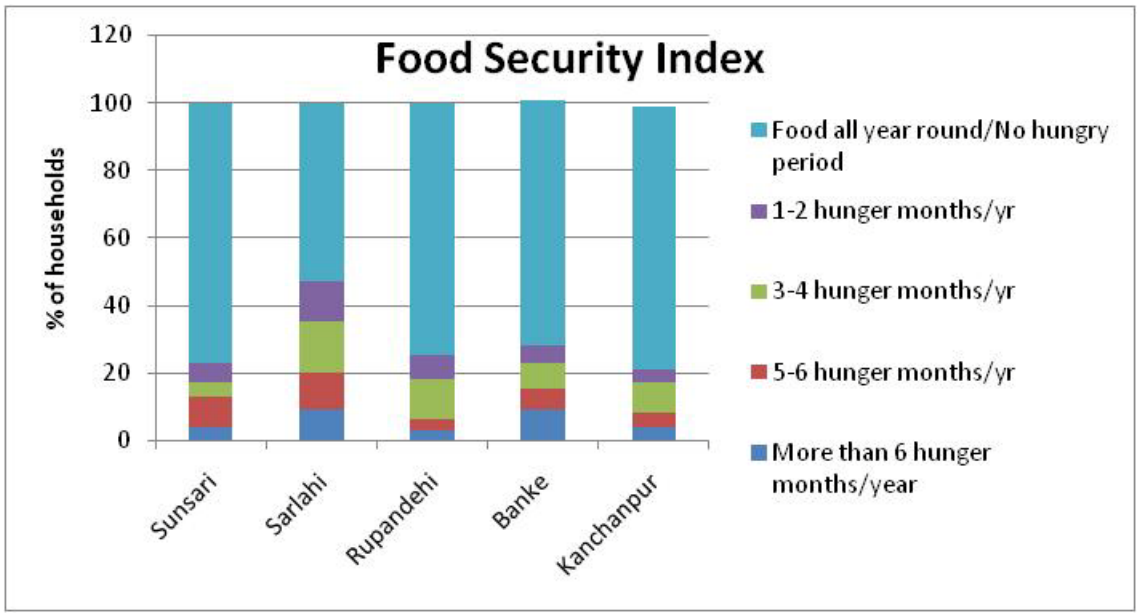
6.1 Food Security Indicator

The food security indicator is based upon the number of months that the household has difficulty getting food from any source (often referred to as the 'hunger months'), for an average rainfall year. Table 6.1 and Figure 6.1 show the proportion of households in the Nepal sites that reported having difficulty in feeding their family, from any source (e.g. purchased or received as food aid), for different periods.

Table 6.1 Number of Hunger Months: Nepal sites

Site	Percent of surveyed households reporting:				
	More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
Sunsari	4	9	4	6	77
Sarlahi	9	11	15	12	53
Rupandehi	3	3	12	7	75
Banke	9	6	8	5	73
Kanchanpur	4	4	9	4	78

Figure 6.1 Food Security Indicator across Nepal CCAFS sites



Roughly 3/4 of households in all sites except Sarlahi (53%), are food secure in that they do not experience any hunger months (where they struggle to feed their families from any sources) throughout a typical year.

We see the highest incidence of food insecurity in Sarlahi, Banke and Rupandehi, with 35%, 23% and 18% of surveyed households, respectively, experiencing 3 or more hunger months.

Main sources of food by month and hunger months

Delving into the food security situation in a little more depth, in our Rupandehi site (Figure 6.2), we see that during most months the vast majority of their food comes mainly from their own land, although they rely for up to 20% of their food from other sources July through September. These months correspond to the period when more households are food insecure (Figure 6.3).

Figure 6.2 Rupandehi – Main Sources of Food (% of households; n=140**)**

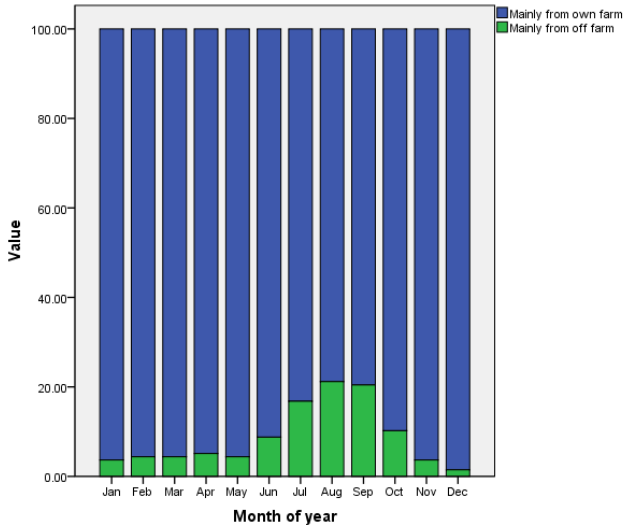
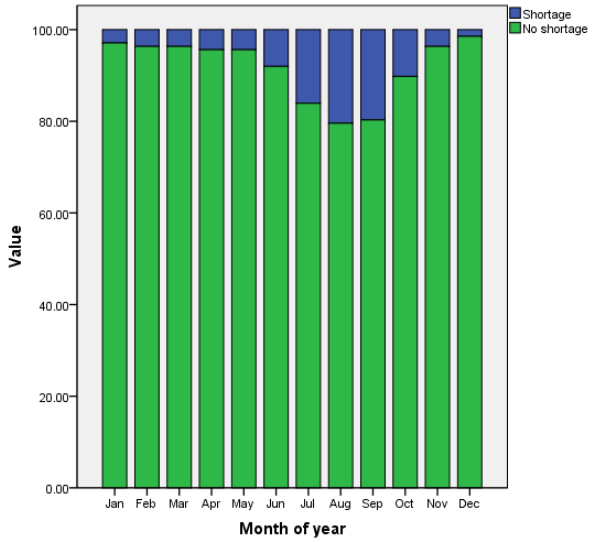


Figure 6.3 Rupandehi – Food shortage versus no food shortage months (% of households; n=140)



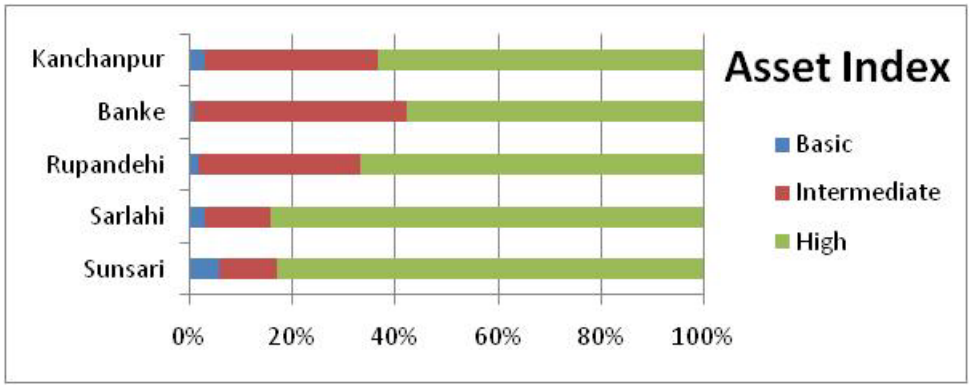
6.2 Asset Indicator

Table 6.2 and Figure 6.4 show how the survey households across Nepal compare with respect to ownership of the standard list of assets they were queried about. These sites are very similar in terms of the percentage of households falling in of these 'standard' categories (chosen in order to compare across all regions/sites), few of these households have none of the assets that were on the checklist. Sunsari and Sarlahi have the highest proportions of relatively wealthy households (using this asset proxy), with over 80% in the high category. Roughly 1/3 of surveyed households in the other villages have 1-3 of these assets, and 57-66% of households have 4 or more of these assets.

Table 6.2 Asset indicator: Nepal sites

Country/Site	Percent of surveyed households reporting number of assets:		
	Basic (Zero)	Intermediate (1-3)	High (4 or more)
Sunsari	6	11	82
Sarlahi	3	13	84
Rupandehi	2	31	66
Banke	1	41	57
Kanchanpur	3	33	62

Figure 6.4 Asset Indicator comparison across CCAFS Nepal sites



6.3 Livelihood Diversification Indicators

6.3.1 Production Diversity

Table 6.3 shows the degree of diversification in terms of the number of agricultural products the surveyed households are producing across our Nepal sites.

Table 6.3 Production diversification indicator

Site	Percent of surveyed households reporting on-farm\production of:		
	Low: 1-4 products	Medium: 5-8 products	High: More than 8 products
Sunsari	20	60	20
Sarlahi	7	51	42
Rupandehi	7	40	53
Banke	13	50	37
Kanchanpur	1	41	58

This indicator shows that households in CCAFS sites in Kanchanpur and Rupandehi exhibit the highest levels of diversity in production, with over ½ of surveyed households producing more than 8 different products. Banke has the greatest percentage of households in the lowest diversification category (13%), producing only 1-4 different types of agricultural products.

6.3.2 Selling Diversity

Table 6.4 shows the degree of diversification in terms of the number of agricultural products the surveyed households are both producing and selling.

Table 6.4 Selling diversification indicator

Site	Percent of surveyed households reporting selling of:			
	No products sold	1-2 products sold (low commercial-isation)	3-5 products sold (intermediate commercial-isation)	6 or more products sold (high commercial-isation)
Sunsari	16	42	39	3
Sarlahi	21	38	33	9
Rupandehi	17	46	27	10
Banke	33	44	19	4
Kanchanpur	44	41	14	1

The lowest levels of diversity in commercialization of produce from their own farms can be seen in Kanchanpur and Banke, where one-third and more of households are selling none of their agricultural produce. The sites with the highest percentages of highly commercialized farms (i.e. selling more than 6 products) are Rupandehi and Sunsari, with 10% of households in this category.

6.4 Adaptation Indicator

The degree of adaptability and innovation, as suggested by the number of changes in agricultural practices these households have made in the last 10 years, is shown in Table 6.5 and Figure 6.5 for our West Africa sites.

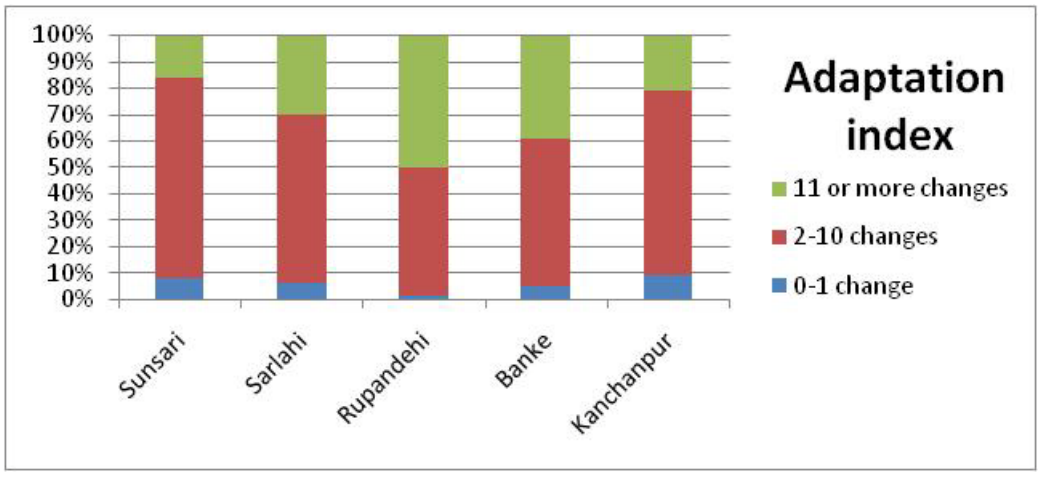
One-half of surveyed households in Rupandehi appear to be quite innovative and adaptive, making 11 or more changes to their farming practices over the last decade. The majority of the households across all the Nepal sites have made between 2 and 10 changes to their crop, livestock, land and/or water management practices.

9 percent of our surveyed households in Kanchanpur, and 8% in Sunsari, have made zero, or only one, change to their farming/livestock management practices in the last 10 years.

Table 6.5 Adaptation indicator – Nepal

Site	Percent of surveyed households reporting the following number of changes to their agricultural practices in the last 10 years:		
	0-1 change	2-10 changes	11 or more changes
Sunsari	8	76	16
Sarlahi	6	64	30
Rupandehi	1	49	50
Banke	5	56	39
Kanchanpur	9	71	21

Figure 6.5 Adaptation index for Nepal sites



6.4 Mitigation Indicators

The mitigation-related indicators, showing changes in behavior with respect to agricultural-related activities by the surveyed households in Nepal over the last decade, can be seen in Table 6.6.

Table 6.6 Mitigation and farming changes related indicators

Site	Tree management		Soil amendments		Intensification			Productivity	
	No	Yes	None	Some	None	Low	High	No increase	Some increase
Sunsari	23	77	0	100	0	78	22	14	86
Sarlahi	27	73	0	100	0	96	4	21	79
Rupandehi	29	71	0	100	0	83	17	8	92
Banke	34	66	0	100	0	86	14	25	75
Kanchapar	39	61	0	100	0	84	16	27	73

The results show the following:

- Over 60% of households across all the CCAFS Nepal sites planted or protected some trees in the last year on their farms.
- Introduction of fertilizer in the last year has also been widespread, with all surveyed households reporting having made soil fertility amendments over the last 10 years.
- Intensification measures, including starting to: purchase and apply mineral/chemical fertilizers, use manure/compost, use pesticides/herbicides, use integrated pest management techniques, irrigate, or plant higher yielding varieties, have been low across all the sites.
- Over three-quarters of all the surveyed households across the Nepal sites have experienced increases in productivity in the last 10 years.

6.5 Types, sources and access to weather-related information by gender

6.5.1 Sarlahi Site

Sixty-nine percent of surveyed households in Sarlahi reported that they had received no weather or climate-related information whatsoever in the last year. Weather forecasts over the next few days appear to be the only information these households are receiving, both over radio (by 52% of those receiving this information), and television (45%). For the majority of households, both men and women (77%) are hearing it; for 20% of households only the men do. When asked if the short-term weather information they were receiving include any advice that helped them to use it, 90% said no, and no households reported making any changes to their agricultural practices based upon weather-related information received.

6.5.2 Rupandehi Site

Seventy-one percent of surveyed households in Rupandehi reported that they had received some weather or climate-related information in the last year. As was found in other Nepal sites, weather forecasts over the next few days were the only information these households reported receiving They are receiving these short-term weather forecasts predominantly via the radio (54% of households that receive this information) and television (45%). Both women and men are getting this information, but for 22% of households it is exclusively men that receive it. Almost all households (93%) hearing weather forecasts reported that there was no complementary information/advice on how to use the weather information to improve their farming practices.

The pattern seen in Rupandehi and Sarlahi is repeated across all 5 Nepal sites – the only weather-related information these agricultural households reported having access to related to short-term (1-3 day) weather forecasts heard on radio or television.