FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

BANGLADESH

Feed the Future Zone of Influence Baseline Report

June 2012

USAID
FROM THE AMERICAN PEOPLE

IFPRI
INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty
Supported by the CGIAR

Measuring Feed the Future Indicators for Bangladesh: IFPRI Household Survey Results

Prepared for:
United States Agency for International Development
Grant Number: EEM-G-00-04-00013-00

Prepared by:
Akhter Ahmed
Farria Naeem
Wahid Quabili
Esha Sraboni
International Food Policy Research Institute
Policy Research and Strategy Support Program for Food Security and Agricultural Development in Bangladesh
House 10A, Road 35, Gulshan 2, Dhaka 1212, Bangladesh

June 10, 2012

1. DEVELOPMENT OF THE DATA FOR MEASURING THE INDICATORS

The Policy Research and Strategy Support Program (PRSSP), funded by the USAID and implemented by the International Food Policy Research Institute (IFPRI), started in October 2010. The PRSSP has been designed to conduct applied research to fill knowledge gaps on critical food security and agricultural developmental issues in Bangladesh; and thereby, facilitate evidence-based policy formulation and policy reforms to achieve the goal of sustainably reducing poverty and hunger.

IFPRI-PRSSP empirical research to address specific food security and agricultural developmental issues requires collection of data through especially designed surveys including household, community, market and institutional surveys. IFPRI researchers designed the Bangladesh Integrated Household Survey (BIHS)—the most comprehensive nationally representative household survey ever carried out in the country. The BIHS includes modules that provide together an integrated data platform to answer a variety of the research questions posed in the PRSSP research proposal. Appendix A provides a description of the BIHS.

According to the IFPRI's research proposal for the PRSSP approved by USAID, the BIHS was originally designed to be a nationally representative rural survey with statistical representativeness of each of the 7 administrative divisions of the country: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet.[1] Each of the divisions represents a stratum in the BIHS sampling frame. In April 2011, the IFPRI-PRSSP team prepared a draft questionnaire for the BIHS, which was peer-reviewed within IFPRI. Between late June and early July, a revised questionnaire was distributed to USAID and its partners, researchers, GOB officials, and other stakeholders in Bangladesh for comments. IFPRI had received comments from a number of organizations and incorporated them in the questionnaire.

In mid-July 2011, USAID advised IFPRI to include the Feed the Future (FTF) zone of influence in southern Bangladesh as a separate stratum of the BIHS to create a baseline for the FTF. In early August, USAID provided IFPRI with the list of FTF locations. Using this list, IFPRI over-sampled the FTF zone of influence for its statistical representativeness. USAID also gave IFPRI a list of FTF indicators to ensure that the BIHS collects the necessary data to measure the indicators. IFPRI-PRSSP researchers re-designed the BIHS questionnaire to fully incorporate the FTF indicators.

For implementing the BIHS, IFPRI engaged the Data Analysis and Technical Assistance Limited (DATA), a Bangladeshi consulting firm with expertise in conducting complex surveys and data

[1] For designing the BIHS sampling, IFPRI hired a consultant statistician, Mr Faiz Ahmed, former chief statistician of the Bangladesh Bureau of Statistics (BBS), GOB Ministry of Planning, and currently statistics consultant at the World Bank Dhaka country office.

analysis. DATA works under the supervision and guidance of senior IFPRI researchers. DATA's capacity to conduct surveys to collect high-quality data was largely built by IFPRI over the past 17 years. DATA provided 140 experienced enumerators (70 female and 70 male) and 20 supervisors (3 female and 17 male) to administer the BIHS.

From August 7 to September 10, 2011, IFPRI researchers and senior DATA staff conducted training of survey enumerators on how to administer the comprehensive BIHS questionnaire. Field supervisors also participated in the enumerator training, but they received additional training related to their supervisory role. The training consisted of a 16-day formal classroom component as well as closely monitored practice fieldwork. The questionnaire was field tested in 5 rural locations. The BIHS was scheduled to start on September 20, 2011.

In early September, at the request of the Bureau of Food Security at USAID-Washington, USAID-Bangladesh asked IFPRI to add the Women's Empowerment in Agriculture Index (WEAI) modules in the BIHS. IFPRI-PRSSP researchers incorporated the WEAI modules in the BIHS questionnaire. The inclusion of the WEAI modules required re-training of survey enumerators and supervisors for 22 days from September 13 to October 17, 2011, which delayed the implementation of the BIHS by more than a month.

By October 2011, the PRSSP team completed the preparation of the BIHS. The survey started on October 26, 2011. The BIHS was scheduled to complete the survey in the FTF zone of influence first and then the other regions of the country. The DATA team completed the survey of the FTF zone on November 30, 2011. The survey of the FTF zone was carried out in 50 primary sampling units (PSUs) belonging to each of the 20 FTF districts and 50 FTF upazilas. The FTF sample covered 1,000 households and 4,100 persons living in those households. The Chief of Party of the IFPRI-PRSSP and other IFPRI researches closely monitored the survey in the field.

The DATA team completed entry, cleaning and documentation of the household survey data for the FTF zone and delivered the data set to IFPRI-PRSSP on January 16, 2012. IFPRI-PRSSP researchers analyzed the household survey data to measure the set of FTF indicators provided by USAID. On February 16, 2012 in a FTF partners' meeting in Dhaka, IFPRI-PRSSP presented the preliminary estimates of the FTF indicators and some other findings of the household survey for the FTF zone of influence.

In a meeting at USAID-Dhaka on March 8, 2012, IFPRI-PRSSP researchers informed USAID that the sample size for certain FTF indicators became too small when the USAID definitions of estimating the indicators were used. In order to address this problem and also to obtain more robust estimates, the IFPRI-PRSSP researchers expanded the FTF sample of households by adding 52 FTF upazilas with 1,040 sample households. DATA completed the survey of sample households in these 52 upazilas by end February 2012. These 52 upazilas belong to Barisal,

Dhaka, and Khulna strata (divisions) of the overall BIHS sampling frame. Since the sampling frame of the BIHS has the FTF stratum and the 7 strata representing the 7 divisions, the use of the additional BIHS sample from the 3 divisional strata—Barisal, Dhaka, and Khulna—requires the use of appropriate sampling weights in all estimates in order to obtain results that are statistically representative of the FTF zone of influence. IFPRI's statistics consultant calculated the sampling weights and trained the IFPRI research analysts on the use of the weights in analyzing the expanded sample of the FTF data set, which includes 2,040 households (1,000 households in the original FTF sample and 1,040 additional sample households). The estimates of the FTF indicators in this report as well as all other analyses of the household survey data for the FTF zone of influence use the sample of 2,040 households.

2. ESTIMATES OF THE FTF INDICATORS

2.1 Impact Indicators

1. Prevalence of Poverty: Percent of people living on less than $1.25/day (FTF Ref # 4-16)

DEFINITION (USAID Feed the Future Indicator Handbook, updated April 4, 2012):
This indicator measures Millennium Development Goal Target 1a. Halving extreme poverty refers to the period 1990 to 2015. The applicable poverty line has been updated to $1.25 dollars per person per day, converted into local currency at 2005 "Purchasing Power Parity" (PPP) exchange rates. The use of PPP exchange rates ensures that the poverty line applied in each country has the same real value. Measurement is based on the value of average daily consumption expenditure per person, where food and other items that a household consumes out of its own production are counted as if the household purchased those items at market prices. For example, all members of a household of four people are counted as poor if its average daily consumption expenditures are less than $5 per day at 2005 PPP after adjusting for local inflation since 2005. The poverty rate is estimated by dividing the measured number of poor people in a sample of households by the total population in the households in the sample.

DISAGGREGATED BY:
Gendered Household Type: Adult Female no Adult Male (FNM), Adult Male no Adult Female Adult (MNF), Male and Female Adults (M&F), Child no Adults (CNA)

<u>IFPRI Methodology:</u>

We followed the definition provided in the FTF indicator handbook, which involved the following steps:

1. Daily per capita consumption expenditures from the IFPRI household survey were adjusted for inflation using the Basic Needs Price Index (2005 base year) obtained from the World Bank

2. Used the international poverty line of $1.25 per day, measured at 2005 purchasing power parity (PPP) exchange rate for Bangladesh: PPP$1.00 = 25.49389 taka (World Bank)[2]

Note: IFPRI consulted Dr. Dean Jolliffe, Senior Economist at the World Bank/Washington, DC, who has been leading the World Bank poverty assessment for Bangladesh. Dr. Jolliffe reviewed IFPRI methodology and the $1.25 a day poverty estimate and found them correct. The most recent World Bank estimate of $1.25 a day poverty headcount incidence for Bangladesh for 2010 is 43.25 percent (PovcalNet, World Bank), which is consistent with the IFPRI estimate for the FTF zone (44.0 percent).

Results:

Table 1—Percent of people living on less than $1.25/day

Disaggregated by	N*	Mean	Standard error	Relative SE (%)**	95% confidence interval	
Adult Female, no Adult Male	284	**44.6**	4.1	9.2	36.4	52.8
Adult Male, no Adult Female	8	**-**	-	-	-	-
Male and Female Adults	1,748	**43.9**	1.8	4.1	40.3	47.5
Child, no Adults	0	**-**	-	-	-	-
All	2,040	**44.0**	1.7	3.9	40.6	47.4

Note: Adult: Aged 18 years and above; Child: Aged less than 18 years
*N = Sample size (number of households)
**Relative standard error (%) = (Standard error / mean) *100

IFPRI Observations:

Disaggregation of households suggested by the USAID Feed the Future Indicator Handbook (updated April 4, 2012) for poverty estimates results in an insignificant number of households (only 8 households) with only adult male (no adult female) in the IFPRI survey sample of households. Moreover, no households in the IFPRI survey sample has only child (no adults). Therefore, poverty estimates are not provided for these two levels of disaggregation.

In order to check the representativeness of the demographic composition of IFPRI's FTF household survey sample, IFPRI-PRSSP research analysts analyzed the demographic

[2]Source: PovcalNet, The World Bank. For more details on the construction and updating of $1.25 a day poverty lines for Bangladesh, see: http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/12/10/000333037_20081210001004/Rendered/PDF/443210ESW0P09910Box334107801PUBLIC1.pdf, http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2003/07/26/000094946_03050804024314/Rendered/PDF/multi0page.pdf,

composition of the latest (2010) Household Income and Expenditure Survey (HIES) data set of the Bangladesh Bureau of Statistics (BBS), GOB Ministry of Planning. A comparison of the findings of the IFPRI household survey for the FTF zone with those of the 2010 HIES reveals that the household demographic compositions are similar in the two surveys (see Table 2). The small differences in the results are probably because the HIES data set represents the entire rural Bangladesh, whereas the FTF data set represents the southern part of the country.

Table 2—Households with adult male, adult female, and child: Comparison of IFPRI's FTF household survey results with those of 2010 HIES

Description	2011 FTF		2010 HIES (rural Bangladesh)	
	Number of households	% of total households	Number of households	% of total households
Adult Female, no Adult Male	284	13.9	798	10.28
Adult Male, no Adult Female	8	0.4	43	0.55
Male and Female Adults	1,748	85.7	6,996	89.23
Child, no Adults	-	-	3	0.04
All	2,040	100.0	7,840	100.00

Source: 2010 HIES data set obtained from the Bangladesh Bureau of Statistics (BBS), GOB Ministry of Planning.

2. Per capita expenditures (as a proxy for income) of USG targeted beneficiaries (FTF Ref # 4.5-9)

DEFINITION (USAID Feed the Future Indicator Handbook, updated April 4, 2012):
This indicator will measure the expenditures of rural households as a proxy for income, based on the assumption that increased expenditures is strongly correlated to increased income. Data for this indicator must be collected using the Consumption Expenditure methodology of the Living Standards Measurement Survey (LSMS). Missions are encouraged to use the LSMS Integrated Survey in Agriculture Consumption Expenditure module, which has been incorporated in the FTF M&E Guidance Series Volume 8: Population-Based Survey Instrument for Feed the Future Zone of Influence Indicators.. FTF will collect consumption-expenditure data in order to calculate prevalence of poverty as well as per capita expenditures to be used as a proxy for income.

This indicator is a proxy instead of measuring income directly because of the difficulty in accurately measuring income. Expenditures are used instead of income because of the difficulty in accurately measuring income and because expenditure data are less prone to error, easier to recall and are more stable over time than income data.

IFPRI Methodology:

We used the definition provided in the FTF indicator handbook.

Results:

Table 3—Average per capita monthly expenditures of households in the FTF zone (in US$)

Disaggregated by	N*	Mean	Standard error	Relative SE (%)**	95% confidence interval	
Adult Female, no Adult Male	284	**33.9**	1.7	5.0	30.6	37.3
Adult Male, no Adult Female	8	**-**	-	-	-	-
Male and Female Adults	1,748	**31.1**	0.6	2.0	29.9	32.4
Child, no Adults	0	**-**	-		-	-
All	2,040	**31.4**	0.6	1.9	30.2	32.6

Note: Adult: Aged 18 years and above; Child: Aged less than 18 years
*N = Sample size (number of households)
**Relative standard error (%) = (Standard error / mean) *100

Table 4—Average per capita monthly expenditures of households in the FTF zone (in Taka)

Disaggregated by	N*	Mean	Standard error	Relative SE (%)**	95% confidence interval	
Adult Female, no Adult Male	284	**2,648**	131.6	5.0	2387.0	2909.7
Adult Male, no Adult Female	8	**-**	-	-	-	-
Male and Female Adults	1,748	**2,432**	48.2	2.0	2336.4	2527.8
Child, no Adults	0	**-**	-	-	-	-
All	2,040	**2,453**	47.8	1.9	2358.0	2547.7

Note: Adult: Aged 18 years and above; Child: Aged less than 18 years
*N = Sample size (number of households)
**Relative standard error (%) = (Standard error / mean) *100

IFPRI Observations:

Disaggregation of households suggested by the USAID Feed the Future Indicator Handbook (updated April 4, 2012) results in an insignificant number of households (only 8 households) with only adult male (no adult female) in the IFPRI survey sample of households. Moreover, no households in the IFPRI survey sample has only child (no adults). Therefore, estimates of per capita monthly expenditures are not provided for these two levels of disaggregation.

3. Share of rice on total cropped land in target area (new indicator)

The definition of this indicator is not provided in the Feed the Future Indicator Handbook. IFPRI household survey collected plot-level data on area cultivated under rice and all other crops and total cropped land at the household level. This information has been used to calculate the share of rice on total cropped land.

IFPRI Methodology:

Percent of cropped area under rice cultivation= (total rice cropped area of all households/total cropped area of all households)*100

Share of rice on total cropped land = [total area under rice cultivation by all households in the FTF zone survey sample from December 1, 2010 to November 30, 2011 (12 months) / total area under all crop cultivation (including rice and all non-rice crops) by all households in the FTF zone survey sample from December 1, 2010 to November 30, 2011] *100
Note: estimates were based on plot level data, taking the cropping intensity into account (i.e., how many crops were grown on each plot in the 12-month period).

Reference: IFPRI BIHS questionnaire Module H1, Questions crop code & H1_03

Results:

Table 5—Share of rice on total cropped land in target area

	N*	Mean	Standard Error	Relative SE (%)	95% Confidence Interval	
Share of rice on total cropped land (percent)	1,181	**67.2**	2.7	4.0	61.8	72.5

*N = Sample size (number of households)

IFPRI Observations:

The IFPRI household survey result of share of rice on total cropped land in the FTF zone (67.2 percent) has been compared with the data provided in the 2010 Yearbook of Agricultural Statistics published by the BBS. IFPRI calculations of the BBS data show that, in 2009/10, the weighted average (using IFPRI survey sample as weight) share of rice on total cropped area in the 20 FTF districts was 66.8 percent, which corroborates the IFPRI-PRSSP result (see Appendix B, Table B1).

4. Prevalence of households with moderate or severe hunger (FTF Ref # 3.1.9.1-3 and 4.7-4)

DEFINITION (USAID Feed the Future Indicator Handbook, updated April 4, 2012):
This indicator measures the percent of households experiencing moderate or severe hunger, as indicated by a score of 2 or more on the household hunger scale (HHS). To collect data for this indicator, respondents are asked about the frequency with which three events were experienced by household members in the last four weeks: 1. no food at all in the house; 2. went to bed hungry, 3. went all day and night without eating. For each question, four responses are possible (never, rarely, sometimes or often), which are collapsed into the follow three responses: never (value=0), rarely or sometimes (value=1), often (value=2). Values for the three questions are summed for each household, producing a HHS score ranging from 0 to 6.

The numerator for this indicator is the total number of households in the sample with a score of 2 or more on the HHS. The denominator is the total number of households in the sample with HHS data.

IFPRI Methodology:

We followed the definition provided in the FTF indicator handbook.

Results:

Table 6—Prevalence of households with moderate or severe hunger (percent of households)

Disaggregated by	N*	Mean	Standard error	Relative SE (%)**	95% confidence interval	
Adult Female, no Adult Male	284	**12.3**	2.4	19.5	7.6	17.1
Adult Male, no Adult Female	8	**-**	-	-	-	-
Male and Female Adults	1,748	**7.1**	0.7	9.9	5.6	8.5
Child, no Adults	0	**-**	-	-	-	-
All	2,040	**7.5**	0.7	9.4	6.1	9.0

Note: Adult: Aged 18 years and above; Child: Aged less than 18 years
*N = Sample size (number of households)
**Relative standard error (%) = (Standard error / mean) *100

IFPRI Observations:

Disaggregation of households suggested by the USAID Feed the Future Indicator Handbook (updated April 4, 2012) results in an insignificant number of households (only 8 households) with only adult male (no adult female) in the IFPRI survey sample of households. Moreover, no households in the IFPRI survey sample has only child (no adults). Therefore, estimates of households with moderate or severe hunger are not provided for these two levels of disaggregation.

5. Prevalence of children 6-23 months receiving a minimum acceptable diet (FTF Ref # 3.1.9.1-1)

DEFINITION (USAID Feed the Future Indicator Handbook, updated April 4 2012):

This indicator measures the proportion of children 6-23 months of age who receive a minimum acceptable diet (MAD), apart from breast milk. The "minimum acceptable diet" indicator measures both the minimum feeding frequency and minimum dietary diversity, as appropriate for various age groups. If a child meets the minimum feeding frequency and minimum dietary diversity for their age group and breastfeeding status, then they are considered to receive a minimum acceptable diet. Tabulation of the indicator requires that data on breastfeeding, dietary diversity, number of semi-solid/solid feeds and number of milk feeds be collected for children 6-23 months the day preceding the survey. The indicator is calculated from the following two fractions:

1. Breastfed children 6-23 months of age in the sample who had at least the minimum dietary diversity and the minimum meal frequency during the previous day

---

Breastfed children 6-23 months of age in the sample with MAD component data

and

2. Non-breastfed children 6-23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day

---

Non-breastfed children 6-23 months of age in the sample with MAD component data

Minimum dietary diversity for breastfed children 6-23 months is defined as four or more food groups out of the following 7 food groups (refer to the WHO IYCF operational guidance document cited below):

1. Grains, roots and tubers
2. Legumes and nuts
3. Dairy products (milk, yogurt, cheese)
4. Flesh foods (meat, fish, poultry and liver/organ meats)
5. Eggs
6. Vitamin-A rich fruits and vegetables
7. Other fruits and vegetables

Minimum meal frequency for breastfed children is defined as two or more feedings of solid, semi-solid, or soft food for children 6-8 months and three or more feedings of solid, semi-solid or soft food for children 9-23 months.

For the MAD indicator, minimum dietary diversity for non breastfed children is defined as four or more food groups out of the following six food groups:

1. Grains, roots and tubers
2. Legumes and nuts
3. Flesh foods (meat, fish, poultry and liver/organ meats)
4. Eggs
5. Vitamin-A rich fruits and vegetables
6. Other fruits and vegetables

Minimum meal frequency for non-breastfed children is defined as four or more feedings of solid, semi-solid, soft food, or milk feeds for children 6-23 months. For non-breastfed children to receive a minimum adequate diet, at least two of these feedings must be milk feeds.

IFPRI Methodology:

We followed the definition provided in the FTF indicator handbook.

Results:

Table 7—Prevalence of children 6-23 months receiving a minimum acceptable diet (percent)

Percent of breastfed children 6-23 months receiving a minimum acceptable diet	**N***	**Mean**	**Standard error**	**Relative SE (%)****	**95% confidence interval**	
Male	107	**18.0**	4.0	22.2	10.0	26.0
Female	114	**19.0**	3.7	19.5	11.6	26.4
Total	221	**18.5**	2.7	14.6	13.2	23.9
Percent of non-breastfed children 6-23 months receiving a minimum acceptable diet						
Male	5	**18.9**	17.3	91.5	-15.5	53.2
Female	7	**13.3**	12.6	94.7	-11.7	38.3
Total	12	**15.4**	10.1	65.9	-4.7	35.4
Percent of children 6-23 months receiving a minimum acceptable diet						
Male	112	**18.0**	3.9	21.7	10.2	25.8
Female	121	**18.7**	3.6	19.3	11.5	25.8
Total	233	**18.4**	2.7	14.7	13.1	23.6

*N = Sample size (number of children 6-23 months)
**Relative standard error (%) = (Standard error / mean) *100

IFPRI Observations:

Only 11.4 percent of the FTF sample households have children aged 6-23 months, and about 95 percent of the children aged 6-23 months have been breastfed at least partially. These two factors make the number of non-breastfed children 6-23 months receiving a minimum acceptable diet too small to produce any meaningful estimate of the indicator.

2.2 Outcome Indicators

6. Total value of household level sales (new indicator)

The definition of this indicator is not provided in the Feed the Future Indicator Handbook. IFPRI Household Survey has been designed to collect both quantity and value of agricultural products (crop, animal, fish) sold by producer households.

IFPRI Methodology:

Total value of household-level sales: Average total value of household level sale of crops and livestock and fisheries products sold during the Dec 2010-Nov 2011 period.
Note: Only those households who reported selling crops, livestock and fisheries product were included in the estimation.

Reference: IFPRI BIHS questionnaire Module I1, Question I1_13; Module K2 Question K2_12; Module L2 Question L2_12

Results:

Table 8—Total value of household level sales

	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Total value of household level sales in 12 months (Taka)**	1,915	**24,626**	1950.7	7.9	20752.7	28499.0
Total value of household level sales in 12 months (US$)***	1,915	**335.5**	26.6	7.9	282.7	388.3

*N = Sample size (number of households)
**Total value of household level sales of crops, livestock products and fish in 12 months from December 1, 2010 to November 30, 2011 (taka/household)
***Using monthly average exchange rate of Tk 78.1 per US$ for the period November 2011- December 2011.
Source: Bangladesh Bank

7. Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age (FTF Ref # 3.1.9.1-2)

DEFINITION (USAID Feed the Future Indicator Handbook, updated April 4, 2012):

This validated indicator aims to measure the micronutrient adequacy of the diet and reports the mean number of food groups consumed in the previous day by women of reproductive age (15-49 years). To calculate this indicator, nine food groups are used:
1. Grains, roots and tubers; 2. Legumes and nuts; 3. Dairy products (milk, yogurt, cheese); 4. Organ meat; 5. Eggs; 6. Flesh foods and other misc. small animal protein; 7. Vitamin A dark green leafy vegetables; 8. Other Vitamin A rich vegetables and fruits; 9. Other fruits and vegetables

The *Mean number of food groups consumed by women of reproductive age* indicator is tabulated by averaging the number of food groups consumed (out of the nine food groups above) across all women of reproductive age in the sample with data on dietary diversity.

IFPRI Methodology:

We followed the definition provided in the FTF indicator handbook. The IFPRI household survey collected individual food intake data for all household members in the dietary intake modules of the survey (relevant modules are X1, which lists all food items consumed in the household during the last 24 hours and X2, which looks at the intra-household distribution of these food items during the last 24 hours).

Results:

Table 9—Women's dietary diversity

Women's dietary diversity	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Mean number of food groups consumed by reproductive aged women (15-49 years)	2,125	**4.2**	0.04	1.0	4.1	4.3

*N = Sample size (number of women aged 15-49 years)

8. Yields of rice, fish and other major crops

The definition of this indicator is not provided in the Feed the Future Indicator Handbook. IFPRI Household Survey has been designed to collect plot-level data on cultivated area, production and yields of rice and all other crops; as well as production of fish, and livestock and poultry products.

IFPRI Methodology

Crop yield = total household production of a particular crop in metric tons / total land area in hectare under the particular crop.
Fish yield = total household production of all fish from December 1, 2010 to November 30, 2011 in metric tons / total area of the water body (pond, lake, etc) in hectare.
For rice yields, production of paddy was converted to rice-equivalent: Rice = paddy * 0.67

Results:

Table 10—Yields of rice (metric tons/hectare)

	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Yield of all rice**	1,043	**2.81**	0.1	2.4	2.7	2.9
Yields by type of rice:						
Aus (local)	90	**1.18**	0.08	6.4	1.0	1.3
Aus (HYV)	163	**2.32**	0.12	5.2	2.1	2.6
B. aman (local)	216	**1.41**	0.06	4.2	1.3	1.5
T. aman (local)	52	**1.51**	0.09	6.1	1.3	1.7
T. aman (HYV)	458	**2.51**	0.06	2.2	2.4	2.6
Boro (HYV)	566	**3.75**	0.08	2.2	3.6	3.9
Boro (hybrid)	118	**4.07**	0.11	2.6	3.9	4.3

*N = Sample size (number of households)
**Yields of rice for the FTF sample households during December 1, 2010- November 30, 2011

IFPRI Observations:

The IFPRI household survey result on average rice yield in the FTF zone (2.81 metric tons/hectare) has been compared with the data provided in the 2010 Yearbook of Agricultural Statistics published by the BBS. IFPRI calculations of the BBS data show that, in 2009/10, the weighted average (using IFPRI survey sample as weight) rice yield in the 20 FTF districts was 2.65 metric tons per hectare, which substantiates the IFPRI-PRSSP result (see Appendix C, Table C1).

Table 11—Yields of other major crops and fish (metric tons/hectare)

	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Yields of other major crops:**						
Wheat	78	**2.69**	0.2	6.3	2.3	3.0
Lentil (mosur)	130	**0.97**	0.0	3.9	0.9	1.0
Green gram (mung)	78	**0.76**	0.1	9.5	0.6	0.9
Black gram (mashkalai)	13	**0.66**	0.1	14.9	0.5	0.9
Mustard	65	**1.11**	0.1	8.7	0.9	1.3
Eggplant	50	**6.39**	1.5	23.2	3.4	9.3
Potatoes	24	**10.13**	1.2	11.6	7.8	12.5
Yields of fish***	495	**1.71**	0.2	8.8	1.4	2.0

*N = Sample size (number of households)
**Yields of crops for the FTF sample households during December 1, 2010- November 30, 2011
*** Yields of fish for the FTF sample households during December 1, 2010- November 30, 2011. Yields have been calculated for the following fish: silver carp, grass carp, mirror carp, rui, katla, common carp, mrigel, telapia, pona, koi, magur, shingi, shol, gojar, taki, puti/swarputi, prawn, shrimp, tengra/baim, pangash, karfu, khalse, mola/dhela/kachki, chapila, hilsha.

9. Value of household production (disaggregated by value of household production for sale and for consumption)

The definition of this indicator is not provided in the Feed the Future Indicator Handbook. IFPRI Household Survey has been designed to collect the necessary data to estimate the value of household production, disaggregated by value of household production for sale and for consumption within the household.

IFPRI Methodology

Value of household production: Average total value of household level production of crops, livestock and fisheries products during the Dec 2010-Nov 2011 period.

Reference: IFPRI BIHS Module I1, Question I1_01, I1_02, I1_03(production of crops), price of crops = 11_13/I1_10
Module K2 Question K2_02 (production of livestock products), price of Livestock products =K2_12/K2_10
Module L2 Question L2_03, L2_04, L2_05 (production of fish), price of fish = L2_12/L2_10

Value of household consumption: Average total value of household level consumption of crops, livestock and fisheries products produced by the household during the Dec 2010-Nov 2011 period.

Note: Value of quantity consumed estimated using sale price of that particular crop/livestock products /fish.

Reference: IFPRI BIHS Module I1, Question I1_06, price of crops = I1_13/I1_10
Module K2 Question K2_04, price of Livestock products =K2_12/K2_10
Module L2 Question L2_06, price of fish = L2_12/L2_10

Results:

Table 12—Value of household production (disaggregated by value of household production for sale and for consumption)

	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Total value of household production in 12 months (Taka) **	1,915	**47,994**	2781.7	5.8	42471.4	53517.5
Total value of household consumption in 12 months (Taka)**	1,915	**13,451**	618.8	4.6	12222.7	14679.8
Total value of household level sales in 12 months (Taka)**	1,915	**24,626**	1950.7	7.9	20752.7	28499.0
Total value of household production in 12 months (US$)***	1,915	**653.9**	37.9	5.8	578.6	729.1
Total value of household consumption in 12 months (US$)***	1,915	**183.3**	8.4	4.6	166.5	200.0
Total value of household level sales in 12 months (US$)***	1,915	**335.5**	26.6	7.9	282.7	388.3

Note: Consumption value and sales proceed do not add up to production value due to stock, wastage, spoilage, amount given away as gift, stored as seeds, etc.
*N = Sample size (number of households)
**Total value of household level production, consumption, and sales of crops, livestock products and fish in 12 months from December 1, 2010 to November 30, 2011 (taka/household)
***Using monthly average exchange rate of Tk 78.1 per US$ for the period November 2011- December 2011.
Source: Bangladesh Bank

10. Value of purchased food

The definition of this indicator is not provided in the Feed the Future Indicator Handbook. IFPRI household survey has been designed to collect the necessary data in the food expenditure module of the survey to estimate the value of purchased food.

IFPRI Methodology

The survey enumerators collected data on total quantity of a particular food purchased in the past 7 days and price paid (taka per unit) (variable: O1_07 and O1_08).

How household purchased food expenditure was generated:
Village, union, upazila, district and country level median prices (taka per kilogram) were generated for each of the food items by using the prices household paid (variable: O1_07 of module O1). Missing prices were replaced by village level prices.
Monthly expenditure of a food item purchased = total quantity of the food item purchased in the last 7 days*price*(365/12)/7.
The costs of all purchased food items were aggregated to estimate the value of purchased food.

Reference: IFPRI BIHS Module: O1

Results:

Table 13—Value of purchased food

	N*	Mean	Standard error	Relative SE (%)	95% confidence interval	
Per capita value of purchased food (Taka per month)	2,040	1,096	26.8	2.4	1042.8	1149.2
Per capita value of purchased food (US$ per month) **	2,040	14.0	0.3	2.4	13.4	14.7

*N = Sample size (number of households)
**Using monthly average exchange rate of Tk 78.1 per US$ for the period November 2011- December 2011.
Source: Bangladesh Bank

3. WAY FORWARD

Based on the IFPRI household survey data, IFPRI-PRSSP researchers will prepare a comprehensive report on the profile of the FTF zone of influence by end July 2012. The report will be shared with GOB for its review and endorsement. The profile report will present analyses disaggregated income groups (per capita household expenditure quintile groups), farm size groups and gender as appropriate. The report will include the following analyses:

- Household composition and education (literacy, level of education, current enrollment in school, occupation)
- Employment status for all household members aged 7 years and older
- Migration, remittances, transfers and other income
- Current household assets (ownership disaggregated by gender)
- Savings and loans

- Landownership and tenure (homestead land, cultivable land, other land, access to irrigation/water resources, soil type, current value of land)
- Agricultural production practices and costs (using plot-level data)
    - Land and soil quality
    - Crop yields, use of produced crops
    - Input use and expenditure on inputs (irrigation, fertilizers, pesticides, machineries, gender-disaggregated labor use)
    - Agricultural technologies used, including irrigation source, irrigation technology, volume applied, timing, and cost incurred
    - Crop marketing practices and revenues
    - Ownership of farming assets
    - Access to agriculture extension services and input subsidies
- Livestock and poultry ownership, production, consumption, and sales
- Fisheries (production, consumption, and sales)
- Household level food grain stock and storage capacity
- Nonfarm enterprises/activities
- Food consumption (quantity of food purchased, price of purchased food, quantity consumed from home production, food received from other sources)
- Nonfood expenditures (fuel, housing, clothing and footwear, health, education, communication, transport, travel, entertainment, furniture/appliances, utilities/taxes/fees, family events, miscellaneous)
- Housing and amenities (dwelling characteristics, cooking fuel, lighting fuel, electricity, telephone)
- Sanitation and water (type of latrine, garbage disposal, source of drinking, cooking, washing, and bathing water)
- Women's status
    - Earnings, mobility, reproductive decisions, commodity buying decisions, domestic violence, abuse and threats, wife's assets brought to marriage, husband's assets brought to marriage
- Negative shocks and coping strategies (death of main earner, loss of a regular job, loss of assets, crop loss, loss/decrease of remittances, natural calamities)
- Social assistance received
- Participation in safety net/social protection programs (Government relief/transfers, NGO assistance, stipends)
- Quantities of food intake by individual household members (food weighing and 24-hour recall of individual dietary intakes)
- Nutritional status of all of all household members showing relationships with household income, education, agricultural production
- Health and illness

- Nutrition practices and services
    - Infant and Young Child Feeding (IYCF) practices and use of micronutrients
    - Nutrition knowledge of mothers
    - Immunization and health status of young children (<2 years)
    - Nutrition related prenatal care during pregnancy with youngest child
    - Access to Community Nutrition Center
    - Exposure to nutrition information from health workers and media
- Household food security indicators, including use of validated food security assessments

By end September 2012, IFPRI-PRSSP will produce a report on Women Empowerment in Agriculture Index (WEAI) for the FTF zone of influence. The analysis will include access to productive capital, income, individual leadership and influence in the community, time allocation, and decision making.

By end December 2012, IFPRI-PRSSP will produce a comprehensive report on the profile of rural Bangladesh, based on the full BIHS data set. The analyses will be similar to those provided above for the FTF profile report. The results will be disaggregated by 7 divisions and will be compared with those of the FTF zone. The Chief Party of the IFPRI-PRSSP met with the Director General of the BBS to explore the feasibility of joint BBS-IFPRI publication of the profile report. In this regard, a memorandum of understanding between BBS and IFPRI might be signed.

Appendix A

2011-2012 BANGLADESH INTEGRATED HOUSEHOLD SURVEY: BRIEF DESCRIPTION

The Bangladesh Integrated Household Survey (BIHS) has been designed to provide the data for several studies planned under the USAID-funded Bangladesh Policy Research and Strategy Support Program (PRSSP). The BIHS also serves the baseline for a set of key indicators of the Feed the Future (FTF) program of the USAID-Bangladesh. The BIHS instruments have been designed to fully capture the FTF indicators.

Sampling

The BIHS sample is statistically representative at the following levels: (a) nationally representative of rural Bangladesh; (b) representative of rural areas of each of the 7 administrative divisions of the country: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet; and (c) representative of the FTF zone of influence. USAID provided IFPRI with the list of FTF locations (districts and upazilas). Using this list, over-sampling of the FTF zone has been done for its statistical representativeness.

A sound and appropriate statistical method was used to calculate the total BIHS sample size of 6,500 households in 325 primary sampling units (PSUs). The sample design of the BIHS follows a stratified sampling in two stages—selection of PSUs and selection of households within each PSU—using the sampling frame developed from the community series of the 2001 population census. In the first stage, the total BIHS sample of 325 PSUs were allocated among the 8 strata (7 divisions and the FTF zone) with probability proportional to size (size being the number of households in each stratum), which resulted in the following distribution: 21 PSUs in Barisal, 48 in Chittagong, 87 in Dhaka, 27 in Khulna, 29 in Rajshahi, 27 in Rangpur, 36 in Sylhet, and 50 in the FTF zone. In the 2nd stage, 20 households were randomly selected from each PSU. Therefore, the total BIHS sample has 6,500 households, of which the FTF sample has 1,000 households.

The sampling process and survey administration included the following steps:

- Listed all villages in each of the stratum (7 divisions and the FTF zone of influence)
- In each stratum, randomly selected villages (PSUs) with probability proportional to size (PPS) sampling using the number of households in the 2001 population census data
- Conducted complete census in each of the 325 selected villages
- Randomly selected 20 households from each village from census list

- Male and female enumerators interviewed, respectively, male and female respondents of each selected household.

Survey Instruments

IFPRI has extensive experience in Bangladesh and in other countries in the design and implementation of similar surveys. We also consulted the Household Income and Expenditure Survey (HIES) questionnaires of the Bangladesh Bureau of Statistics (BBS) in order to collect data on a comparable set of variables.

The BIHS questionnaires include modules that provide together an integrated data platform to answer a variety of the research questions posed in the PRSSP research proposal. The survey has been designed to collect gender-disaggregated information as much as possible.
The IFPRI-PRSSP team prepared a draft questionnaire for the BIHS, which was peer-reviewed within IFPRI. A revised questionnaire was distributed to USAID and its partners, researchers and other stakeholders in Bangladesh for comments. IFPRI had received detailed comments from a number of organizations and incorporated them in the questionnaire.

Two questionnaires were prepared—one for female respondents and the other for male respondents. The modules of the questionnaires are listed below:

- Household composition and education (relation to household, marital status, literacy, level of education, current enrollment in school, occupation)
- Employment for all members aged 7 years and older (employment status, type of work, number of days worked per week, wages)
- Migration, remittances, transfers and other income
- Time spent in daily activities by all members aged 7 years and older
- Current household assets (date of purchased/acquired, purchase price and current value, sale, loss, damage, disaggregated by gender
- Savings
- Loans (individual loans source, use of loan, outstanding amount of loan, interest rate)
- Landownership and tenure (homestead land, cultivable land, other land, access to irrigation/water resources, soil type, current value of land)
- Agricultural production and costs (plot-level data)
    - Land and soil quality
    - Crops grown and area planted on own land and mortgaged/rented/leased-in land
    - Crop yields, use of produced crops
    - Input use and expenditure on inputs (irrigation, fertilizers, pesticides, machineries, gender-disaggregated labor use)

    - Agricultural technologies used and desired, including irrigation source, irrigation technology, volume applied, timing, and cost incurred
    - Crop marketing practices and revenues
    - Ownership of farming assets
    - Access to Agriculture Extension Services and subsidies
- Livestock and poultry ownership and rearing
    - Current inventory, bought/sold/slaughtered in past 12 months, buying/selling price, rearing costs
    - Livestock and poultry products (production, consumption, and sales)
- Fisheries (production, consumption, and sales)
- Food grain stock and storage capacity
- Nonfarm enterprises/activities
- Food consumption in the last 7 days (quantity of food purchased, price of purchased food, quantity consumed from home production, food received from other sources)
- Household food inventory on the day of survey, food purchase frequency and quantity of each purchase
- Nonfood expenditures (fuel, housing, clothing and footwear, health, education, communication, transport, travel, entertainment, furniture/appliances, utilities/taxes/fees, family events, miscellaneous)
- Housing and amenities (dwelling characteristics, cooking fuel, lighting fuel, electricity, telephone)
- Sanitation and water (type of latrine, garbage disposal, source of drinking, cooking, washing, and bathing water)
- Access to facilities (distance, and time taken to commute by mode of transportation)
- Women's status
    - Earnings, mobility, reproductive decisions, commodity buying decisions, domestic violence, abuse and threats, wife's assets brought to marriage, husband's assets brought to marriage
- Negative shocks and coping strategies (death of main earner, loss of a regular job, loss of assets, crop loss, loss/decrease of remittances, natural calamities)
- Positive shocks (new job, new or increase in remittances)
- Social assistance received
- Participation in safety net/social protection programs (Government relief/transfers, NGO assistance, stipends)
- Quantities of food intake by individual household members (food weighing and 24-hour recall of individual dietary intakes)
- Anthropometry (weight and length or height) of all household members
- Health and illness
- Nutrition practices and services

    - Infant and Young Child Feeding (IYCF) practices and use of micronutrients
    - Nutrition knowledge of mothers
    - Awareness-trial-adoption of sentinel practices
    - Immunization and health status of young children (<2 years)
    - Nutrition related prenatal care during pregnancy with youngest child
    - Access to Community Nutrition Centre (CNC)
    - Exposure to nutrition information from health workers and media
- Household food security indicators, including use of validated food security assessments
- Women Empowerment in Agriculture Index (recommended by USAID)
    - Individual identification
    - Role in household decision-making around production and income generation
    - Access to productive capital
    - Income
    - Individual leadership and influence in the community
    - Time allocation
    - Decision making

Training

For implementing the BIHS, IFPRI contracted the Data Analysis and Technical Assistance Limited (DATA), a Bangladeshi consulting firm with expertise in conducting complex surveys and data analysis. DATA works under the supervision and guidance of senior IFPRI researchers. DATA's capacity to conduct surveys to collect high-quality data was largely built by IFPRI over the past 17 years.[3]

DATA provided experienced survey enumerators and supervisors to administer the BIHS, most of them hold masters degree in social science, nutrition and home economics. IFPRI researchers and DATA experts trained 140 experienced enumerators (70 female and 70 male) and 20 supervisors (3 female and 17 male) to conduct the BIHS. The training of the survey enumerators consisted of a formal classroom component as well as closely monitored practice fieldwork. The training was conducted by IFPRI researchers and senior DATA staff. In the formal training, IFPRI researchers briefed the enumerators and supervisors on the objectives and methods of the survey, the sampling design, and the responsibilities of the enumerators. They were trained in how to carry out the interviews, including line-by-line explanation and interpretation of the

[3] DATA carried out all IFPRI surveys in Bangladesh, including over 40 household surveys and several market, school, and other institutional surveys. Besides IFPRI, it conducted numerous surveys for various international organizations such as the World Food Programme (WFP)-Bangladesh, the World Bank, European Union, U.S. Department of Agriculture (USDA), CARE-Bangladesh, World Vision-Bangladesh, Population Council-New York, Save the Children (USA), Tufts University School of Nutrition Science and Policy, and IRIS Center at the University of Maryland.

questionnaires, the flow and skip-patterns, definitions, and explanations of how to handle unusual cases and when to contact the supervisor for assistance.

Field supervisors received additional training related to their supervisory role. In particular, they were trained on the quality control process, cross checking, editing and coding of the questions, security and confidentiality issues, and the delivery of the completed questionnaires to the DATA office in Dhaka for simultaneous data entry.

The questionnaires were field tested in 5 rural locations. The field testing determined the appropriate distribution of questionnaire modules among the male and female questionnaires, identified problems with the questionnaires or additional rules that were needed to address difficult cases. The field testing resembled the actual implementation of the survey in order to test the full range of survey activities, including questionnaire completion, questionnaire delivery, and data entry. An additional function of the field testing was to provide practical training to the enumerators in administering the questionnaire.

Survey Administration

Going into the field, the teams of enumerators were equipped with a number of documents (such as the survey manual, serial numbered questionnaires, identification cards), weighing and height scales for anthropometric measurements, GPS units for geo-referencing, etc.[4] Letters of authorization to conduct the survey were issued by the Director General, Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management.

The household survey has been designed to be administered by a team of male and female interviewers who would complete separate male and female questionnaires for each household. The male interviewer would question an adult male member of the household (usually the household head), and the female interviewer would question an adult female household member (typically the wife of the head of the household). IFPRI's knowledge from its previous surveys in Bangladesh and elsewhere and the pre-testing of the BIHS questionnaire in the field will determine the appropriate distribution of questionnaire modules among the male and female questionnaires.

The enumerators would conduct the interviews one-by-one and face-to-face with the respondents assigned to him or her. The enumerators would be supervised by the field supervisors who would accompany them to the village. Each field supervisor would be responsible with his/her defined region. All field staff would report their activities to their superiors using a standard

[4] Health O' Meter weighing scales and GPSs have been imported from the USA for the BIHS.

progress report form. Completed questionnaires would be delivered to the DATA central office on a regular basis for further quality control and validation during data entry.

IFPRI and DATA took much care to ensure the quality of the household survey data. In the field, survey supervisors would routinely oversee interviews conducted by enumerators, and verify all questionnaires completed by enumerators on a daily basis. If inconsistencies in responses are detected in completed questionnaires, then the supervisors would visit the related respondents to find out the reasons and correct the responses as needed. In addition, the supervisors would make random checks of about 10 percent of the completed questionnaires by revisiting the sample households. IFPRI researchers would make frequent field visits to supervise the fieldwork.

Data Entry

The data entry has been designed to be carried out at the DATA office in Dhaka simultaneously with data collection, with a about a week lag. It is important to carry out the data entry as soon as possible after data collection in case there are errors that can only be addressed by returning to the village where it occurred.

The data entry could be carried out using specialized software that can be programmed to identify values that are out of range or inconsistent with other responses in the questionnaire. In previous studies, IFPRI has used Microsoft Access and CSPro for data entry; either would be suitable for the purposes of the BIHS.

Appendix B

Table B1— 2009/10 Share of rice on total cropped land in FTF districts: BBS data

FTF Districts	Area under rice (acres)	Gross cropped area (acres)	Share of rice on total cropped land (%)	Weight (number of farm households in IFPRI survey sample)	Weight*Share
Barisal Division					
Barguna	239826	332744	72.1	36	2594.7
Barisal	304069	424748	71.6	94	6729.3
Bhola	338901	473649	71.6	51	3649.1
Jhalokathi	104407	132164	79.0	32	2527.9
Patuakhali	363791	543849	66.9	41	2742.6
Pirojpur	156323	195494	80.0	43	3438.4
Dhaka Division					
Faridpur	147791	429439	34.4	74	2546.7
Gopalganj	188773	274807	68.7	81	5564.1
Madaripur	114558	231713	49.4	51	2521.4
Rajbari	108849	279537	38.9	14	545.1
Shariatpur	92968	206988	44.9	46	2066.1
Khulna Division					
Bagerhat	246060	301297	81.7	60	4900.0
Khulna	280564	331651	84.6	78	6598.5
Satkhira	303261	387678	78.2	74	5788.6
Chuadanga	171537	346120	49.6	54	2676.2
Jessore	534368	674505	79.2	130	10299.1
Jhenaidah	386271	592440	65.2	89	5802.8
Magura	206392	356414	57.9	52	3011.2
Meherpur	114476	235451	48.6	35	1701.7
Narail	162947	234337	69.5	46	3198.6
Total				1181	78902.3
Weighted average for FTF districts					**66.8%**

Source: Calculated from data from 2010 Yearbook of Agricultural Statistics, Bangladesh Bureau of Statistics, Ministry of Planning, Government of Bangladesh.

Appendix C

Table C1— 2009/10 rice yields in FTF districts: BBS data

FTF districts	Rice yields (metric tons/hectare)	Weight (number of rice growing in IFPRI survey sample)	Weight*Yields
Barisal Division			
Barguna	1.76	35	61.71
Barisal	2.27	89	201.70
Bhola	1.91	50	95.61
Jhalakathi	2.00	28	55.91
Patuakhali	1.65	40	66.05
Perojpur	1.99	32	63.69
Dhaka Division			
Faridpur	2.51	55	137.81
Gopalgonj	3.07	77	236.73
Madaripur	2.87	33	94.58
Rajbari	2.59	10	25.87
Shariatpur	2.46	34	83.62
Khulna Division			
Bagerhat	2.42	53	128.21
Khulna	2.79	76	212.11
Satkhira	2.89	70	202.62
Chuadanga	3.02	47	142.17
Jessore	3.09	126	389.83
Jhenaidah	3.13	76	238.05
Magura	2.81	43	120.68
Meherpur	3.16	31	98.01
Narail	2.77	45	124.63
Total		1,050	2,779.58
Weighted average rice yield in FTF districts			**2.65 metric tons/hectare**

Source: Calculated from data from 2010 Yearbook of Agricultural Statistics, Bangladesh Bureau of Statistics, Ministry of Planning, Government of Bangladesh.