

## DEVELOPMENT OF MOUZA LEVEL DATABASES OF POTATO IN MUNSHIGONG, BOGRA & RANGPUR DISTRICT

M. A. UDDIN<sup>1</sup>, K. S. RAHMAN<sup>2,3</sup>, M. M. RAHMAN<sup>3</sup>  
N. MOHAMMAD<sup>4</sup> AND S. NASRIN<sup>5</sup>

### Abstract

A study was conducted to build the mouza and union level databases of potato during 2011-12 using both primary and secondary data. Primary data were collected from potato growers of unions of three upazilas, namely Vober Char, (Gazaria, Munshigonj), Atmul, (Shibganj, Bogra) and Mittipur (Pirganj, Rangpur), respectively. Mouza, union, upazila and district level digitized maps of Bangladesh were used in the program. GIS, GPS, MIS, Modem and mobile phone technologies were used. Databases of different parameters such as area, production, yield, and varietal information etc. of potato were obtained. Mouza have been used as the smallest unit of land use management for agriculture because it has administrative boundary and social identity. Average yield of potato was 17.45 t/ha in the study areas during 2011-12. Out of total potato areas 69.06% was cultivated by HYVs and the rest 30.94% by local varieties. Out of 46 HYVs released by BARI, 11 varieties were cultivated in the study areas during the same period. Databases and maps developed by data collection from root level (Farmer's field, mouza, block and union etc.) may help to identify variety wise area coverage of potato.

Keywords: Potato, Cultivation, Variety, Mouza, HYV and Database.

### Introduction

Bangladesh is a small country with 160 million people. Its population is increasing rapidly but cultivated land is decreasing sharply. So the food production need to be increased to meet the increased demand. As such research on foods and its cultivation technique is very important in our country. Bhuiyan *et al.* (2002) studied on food requirements projection. They found that food requirement would increase from 20.96 million tons from 10.71 million ha cultivable area in 2002 to 27.81 million ton from 10.17 million ha cultivable area in 2025. The population has doubled in the last 30 years despite a decline in the annual population growth rate from 2.26 in 1961 to 1.47 in 2004 (BBS, 2005). Potato is a staple food in the developed countries and which accounts for 37% of the total production in the world (FAO and CIP, 1995). Considering the trend of population growth and consequently the increased demand for food in the country and dwindling cultivable land area, the potato is likely to play a vital role in the future. Potato is a popular and important vegetable in Bangladesh. For the

---

<sup>1</sup>Chief Scientific Officer & Head, ASICT Division, Bangladesh Agricultural Research Institute (BARI), Gazipur-1701, <sup>2,3&4</sup>Scientific Officer, ASICT Division, BARI, Gazipur-1701, <sup>5</sup>M.Sc in Statistics, Rajshahi University, Bangladesh.

whole year, it is used as the main vegetable. Potato production in Bangladesh in the fiscal year (FY) 2012-2013, hit a new record of 8.603 million tons surpassing the record of 8.38 million tonnes in FY'11. The production witnessed a negative growth in FY'12 when it plunged to 8.205 million tons- a 2.08 per cent fall compared to that of FY'11. The Government statistics provider, Bangladesh Bureau of Statistics (BBS, 2013) in its latest release, said potato the most consumed vegetable item of the country was cultivated on 444 million hectares of land in FY'13. The acreage had increased by 14,000 hectares compared to that of FY'12 which also helped achieve a higher output. Potato was produced on 4.6 million hectares in FY'11. This scenario shows that Bangladesh has to produce additional 0.274 million tons of food annually to maintain pace with the rate of population growth. The increased demand for food would have to meet with less land and water due to increasing population pressure on ever shrinking and degrading land and water resources.

Potato is an important food that may reduce the increasing demand of foods in the country. Akhter *et al.* (2001) conducted a survey on potato production in some selected areas of Bangladesh. This study showed that potato production is highly profitable and it could be provide cash money to farmers. In terms of profitability, potato production was more attractive than any other winter vegetables. Per unit yield and gross return of potato were found higher than other competitive crops. It is cultivating in all the areas of the country and Union is consisting of some Mouzas in the biggest area where potato is cultivating.

Each centimeter of land should be used properly and methodically. Union is a big place for a densely populated small country like Bangladesh. So it should be divided into small parts as possible for proper and scientific use of agricultural land. Mouza should be used as the smallest unit of land use management for agriculture because it has administrative boundary and social identity. In future, for image data analysis and social identity, it will be useful; because, it is globally representable by longitude, latitude and altitude. Database is also suitable for crop zoning and crop suitability.

Bangladesh Agricultural Research Institute (BARI) is the largest multi-crop research institute. It conducts research activities on 202 crops. Scanty information of these crops and crop related factors are in the farmers' fields. Therefore, documentation of information of all crop related factors is essential. Per head cultivable land in Bangladesh is about 12 decimals only (Rashid, 2001). Considering the above factors, the present study on "Development of mouza level databases of potato" was selected with the specific objectives:

- (1) To build mouza databases of potato at selected unions
- (2) To determine variety wise area coverage of potato in mouza, union, upazila and district.

### **Materials and Method**

A study was conducted on mouza level databases and maps of potato in 2011-12. All mouzas of three unions, namely Vober Char (Gazaria, Munshiganj), Atmul (Shibganj, Bogra) and Mittipur (Pirganj, Rangpur) were selected for the study. There were 43 mouzas in three unions, among them 9 mouzas in Vober Char, 22 mouzas in Atmul and 12 mouzas in Mittipur union of Munshiganj, Bogra and Rangpur districts, respectively (DAE, 2012). Among 43 mouza maps, 22 were digitized and 21 were collected. This root level digital databases and maps will be useful for crop zoning, crop suitability, and to compare with image data analytical result. It will be possible to use each unit of land for proper and scientific management in this way. These sites were selected purposively. Simple random sample procedure were followed for data collection and complete enumeration of different varieties of potato were taken for whole population. Data were collected from primary and secondary sources.

#### **Primary data collection**

1. Potato data were collected from all potato growers of different mouzas, blocks according to the prescribed schedule by Sub Assistant Agriculture Officers (SAAO) during 2011-12.
2. The database structure was filled up by UAO/SAAO with the help of researcher.
3. To cross check the information, farmers were interviewed by the researcher from different locations.
4. At the time of data collection, GPS and mobile phone were used.

#### **Secondary data collection**

Secondary sources were NGOs and GOs such as Soil Resources Development Institute (SRDI), Bangladesh Bureau of Statistics (BBS) and Department of Agricultural Extension (DAE) as well as international organization like Food and Agricultural Organization (FAO). Software package program such as Excel, SPSS and MS word were used in the study in addition to Arc View (GIS) program.

### **Results and Discussion**

There were 89 blocks under 36 unions in the upazilas Gazaria, Shibganj and Pirganj of Munshiganj, Bogra and Rangpur districts, respectively (Table 1). Production related different agricultural information of potato under these upazilas were noted below:

**Table 1. Blocks, unions and cultivable lands of different upazilas of Munshiganj, Bogra and Rangpur districts, respectively during 2011-12**

Upazila	Gazaria (Munshiganj)	Shibganj (Bogra)	Pirganj (Rangpur)	Total
Block	24	30	35	89
Union	08	12	16	36
Cultivable land (ha)	7456	25690	33334	66480

Source: Field Survey, 2012 & DAE (2012).

Data were recorded from the potato growers of the target upazilas regarding cultivable land, area under potato cultivation, production, as well as yield of the crop (Table 2). Databases of cultivable land, area, production and yield of potato during 2011-12 were prepared according to district, upazila and union.

**Table 2. Union wise area(ha), production(t) and yield(t/ha) of potato and cultivable land at Gazaria, Munshiganj during 2011-12**

Union	Cultivable land (ha)	Area (ha)	Production (t)	Yield (t/ha)
Hossendi	970	155	4650	30.00
Baluakandi	809	76	2270	29.87
Tangar char	692	259	7246	27.98
Vaber char	724	190	5320	28.00
Boushia	1180	250	7885	31.54
Goagachia	1035	265	7595	28.66
Emampur	1265	720	22220	30.86
Gozaria	781	220	6600	30.00
Total	7456	2135	63786	29.88
Average	932	266.875	7973.25	-
Std	214.89	193.73	6049.16	1.30
Min	692	76	2270	27.98
Max	1265	720	22220	31.54
Cv%	23.06	72.59	75.87	4.35

Source: Field survey, 2012 & DAE (2012); Std. = Standard deviation.

There were 24 blocks under eight unions at Gazaria upazila, Munshiganj. Information on area, production and yield of potato were mentioned in the

Table 2. Total cultivable land of Gazaria upzila was 7456 ha. Area production and yield of potato at Gazaria upzila were 2135 ha, 63786 t and 29.88 t/ha, respectively. Yields were 27.43 and 29.49 t/ha during the period 2009-10 and 2010-11, respectively. Weather was suitable for potato production (Uddin *et al.*, 2010).

There were 43 mouzas under three unions in the upazilas Gazaria, Shibganj and Pirganj of Munshiganj, Bogra and Rangpur districts, respectively (Table 3). Production related different agricultural information of potato under these unions were noted in the following pages.

**Table 3. Mouzas, unions and areas of different unions of Munshiganj, Bogra and Rangpur districts, respectively during 2011-12**

Union	Vober Char (Gazaria, Munshiganj)	Atmul (Shibganj, Bogra)	Mittipur (Pirganj, Rangpur)	Total
No. of Mouza	9	22	12	43
Mouza area (ha)	869	3174	2746	6789
Potato area (ha)	190	2200	600	2990

Source: Field survey , 2012.

Data were recorded from the potato growers of the target mouzas regarding mouza area, potato cultivated area, production etc. (Table 3). Database of different information of potato during 2011-12 were prepared for mouza union, upazila and district.

**Table 4. Mouza wise potato growing areas (ha) at Vober Char union, Gazariaupazila, Munshiganj, 2011-12.**

Mouza Name	Mouza Code	Mouza Area (ha)	Potato area (ha)	Production (t)	Yield (t/ha)
Anarpur	43	11	5	142.5	28.5
Umedarkandi	44	71	0	0	0
ChhotaAlipur	45	114	10	300	30
Bhitikandi	46	82	2	58	29
Satkahania	47	39	3	84.6	28.2
Bhaberchar	48	32	10	295	29.5
Lakshmipura	49	115	0	0	0
Pkhiarpar	50	69	40	1140	28.5
Srinagar	51	336	120	3300	27.5
Total		869	190	5320.1	28.00

There were nine mouzas at Vober Char union in Gazariaupazila, Munshiganj. Information on area, production and yield of potato were mentioned in the Table 4. Potato cultivated area, production and yield were 190 ha, 5320.1 t and 28.00 t/ha, respectively during 2011-12.

In each mouza of Vober Char union, database of potato area, production and yield is accessible. This database can be upgraded and fields may be added according to need.

**Table 5. Union wise area, production and yield of potato and cultivated land at Shibganj, Bogra during 2011-12**

Union	Cultivable land (ha)	Area (ha)	Production (t)	Yield (t/ha)	HYVs (t/ha)	LVs (t/ha)
Burigong	1820	1655	22698	13.71	16.00	10.71
Bihar	1920	1335	19475	14.59	16.91	12.24
Deulee	2208	1020	17565	17.22	17.50	16.44
Shibganj	2674	1450	20650	14.24	17.21	11.88
Sayedpur	2170	950	14354.5	15.11	17.14	11.00
Mosihata	1100	725	10536	14.53	16.40	11.19
Mazdanhata	2653	1210	18130	14.98	19.84	11.68
Mokamtala	2150	1150	20100	17.48	17.37	18.00
Kichok	2340	2270	33700	14.85	16.00	10.00
Pirob	1900	1900	24700	13.00	16.00	11.50
Raynagor	2120	1045	17772.5	17.01	17.16	15.60
Atmul	2635	2200	31193.75	14.18	16.09	9.90
Total	25690	16910	250874.75	15.08	16.97	12.51
Average	2140.83	1409.17	20906.23	-	-	-
Std	439.98	499.53	6529.93	1.43	1.07	2.66
Min	1100.00	725.00	10536.00	13.00	16.00	9.90
Max	2674.00	2270.00	33700.00	17.48	19.84	18.00
Cv%	20.55	35.45	31.23	9.46	6.33	21.24

Source: Field survey, 2012; Std. = Standard deviation.

Table 5 indicates that there were 30 blocks under 12 unions in Shibganj upazila, Bogra. Total cultivable land at Shibganj, Bogra was 25690ha. Area, production and yield of potato were 16910 ha, 250874.75t and 15.08 t/ha, respectively.

Yield of HYV potato was 16.97 t/ha in 2011-12 (Table 5) but it was 16.61 and 18.30 t/ha in 2009-10 and 2010-11 respectively. Yield of local varieties of potato

was 12.51 t/ha during 2011-12 but it was 10.35 and 12.54 t/h in 2009-10 and 2010-11, respectively (Anon., 2011).

**Table 6. Mouza wise potato growing areas (ha) at Atmul union, Shibganjupazila, Bogra, 2011-12**

Mouza Name	Mouza Code No	Mouza Area (ha)	Potato area (ha)	Production (t)	Yield (t/ha)
Saduria	113	90	65	891.15	13.71
Putkhur	114	121	80	1167.20	14.59
Phenigram	115	263	195	2839.20	14.56
ChakKani	116	80	65	925.60	14.24
Katgara	117	159	107	1616.77	15.11
Dabur	118	60	45	653.85	14.53
Chandanpur	119	37	30	449.40	14.98
Ramkandi	120	91	70	1085.00	15.50
Barabelgharia	121	113	85	1262.25	14.85
Paramandahpur	122	44	30	435.90	14.53
Saidpur	123	47	35	510.65	14.59
Badaldighi	124	82	70	992.60	14.18
Betgari	125	90	70	959.70	13.71
Jagadish	126	79	70	996.80	14.24
ChhotaBelgharia	127	101	75	975.00	13.00
Gorna	128	95	70	1050.00	15.00
Teail	129	101	70	992.60	14.18
Atmul	130	473	305	4880.00	16.00
Atahar	131	128	80	1139.20	14.24
Dopara	132	141	80	1040.00	13.00
Nadura	133	277	175	2537.50	14.50
Kurahar	134	502	328	3793.63	11.57
Total	-	3174	2200	31194.00	-

There were 22 mouzas at Atmul union in Shibganjupazila, Bogra. Information on area, production and yield of potato were mentioned in the Table 6. There were 2200 ha potato area and production was 31194 t during 2011-12.

**Table 7. Union wise area, production and yield of potato and cultivable land (ha) at Pirganj, Rangpur during 2011-12**

Union	Cultivable land (ha)	Area (ha)	Production (t)	Yield (t/ha)	HYVs (t/ha)	LV (t/ha)
Chaitrakal	40	58	930	17.50	25.00	15.00
Bhendabari	1886	55	1054	18.97	21.50	13.50
Bara dargah	2258	53	1071	20.14	25.00	11.00
Rosolpur	900	40	693	17.33	25.00	9.65
Kumedpur	1033	80	1090	13.63	17.00	8.00
Modankhali	2169	210	4250	19.86	22.50	15.00
Tukuria	1913	160	3075	19.27	22.00	15.20
Bara Alampur	2939	270	4155	15.34	18.50	12.00
Raipur	2100	155	2110	13.61	18.00	10.00
Pirganj	2883	180	3727	19.30	22.75	14.00
Shanerhat	2147	135	2690	19.84	20.00	13.50
Panchgachha	1800	35	600	17.25	17.50	15.00
Mithapur	2161	600	9695	16.82	17.00	14.00
Ramnathpur	2905	1350	19710	14.49	14.60	12.30
Chatra	3219	275	4745	17.25	17.30	13.00
Kabilpur	2981	180	3470	18.25	21.30	10.00
Total	33334	3836	63065			
Average	1960.81	225.65	3709.71	16.44	20.46	12.44
Std	840.90	321.18	4707.43	2.13	3.43	2.38
Min	40	35	600	13.61	14.60	8.00
Max	3219	1350	19710	20.14	26.00	15.20
CV (%)	42.89	142.34	126.90	12.97	16.79	19.11

Source: Field survey, 2012; Std = Standard deviation; HYV = High Yielding Varieties; LV = Local Varieties.

Union wise information of Pirganj upazila of Rangpur district was presented in (Table 7). Total cultivable land at Pirganj was 33334 ha. Out of which potato cultivated area and production were 3836ha and 63065 t, respectively during 2011-12. Average yield of HYV potato was 20.46 during 2011-12, which was higher than previous years. Average yield of local varieties potato was 12.44 t/ha during 2011-12 but 11.50 t/ha and 12.42 t/ha during 2009-10 and 2010-11, respectively. Weather was favorable for potato production during the period.



**Table 8. Mouza wise potato growing areas (ha) at Mittipur union, Pirganjupazila, Rangpur2011-12**

Mouza name	Mouza Code No	Mouza area (ha)	Potato area (ha)	Production (t)	Yield (t/ha)
Kutubpur Gobra	142	133	19	319.2	16.8
Bhagioar	143	99	23	325.68	14.16
Fatepur Nandaram	144	66	5	84.1	16.82
Sadra Kutubpur	145	191	28	546	19.5
Shampur	146	47	17	286.11	16.83
Kasimpur	147	307	86	1376	16
Mittipur	148	310	122	2136.74	14.17
Akobpur	149	483	30	450	15
Akobpur Para	150	124	20	336	16.8
Durapur Mittipur	151	390	200	3088	15.44
Rosanpur	152	358	35	495.6	14.16
Hasonpur	153	238	15	252.45	16.83
Total	-	2746	600	9695.88	16.16

**Table 9. Area, production and yield of potato at Gazaria, Shibganj and Pirganjupazilas of Bangladesh, during 2011-12**

Upazilas	Potato area (ha)	Production (t)	Yield (t/ha)	Price (Tk/kg)	Cost of Production (Tk/kg)	Benefit/ Profit (Tk/kg)	BCR
Gazaria (Munshiganj)	2135	63786	29.88	10.01	7.00	3.01	1.43
Shibganj (Bogra)	16910	250875	16.97(HYV)	10.53	7.21	3.32	1.46
			12.51 (LV) 15.08 (com)	12.00 -	7.53 -	4.47 -	1.60
Pirganj (Rangpur)	3836	63065	20.46(HYV)	10.91	7.56	3.35	1.44
			2.44(LV) 16.44(com)	13.85	8.50	5.53	1.62
Total	22881	377726	-	-	-	-	-
Average	-	-	22.44 (HYV)	10.48 (HYV)	7.25 (HYV)	3.23	1.45
			12.47 (LV)	12.92 (LV)	8.01 (LV)	-	-
			17.45 (com)	11.70 (com)	7.63 (com)	-	-

Source: Field survey, 2012; HYV = High yielding variety; LV = Local variety.

There were 12 mouzas at Mittipur union, in Pirganj upazila, Rangpur. Information on area, production and yield of potato were mentioned in Table 8.

Area, production and yield of potato were 600 ha, 9695.88 t and 16.16 t/ha, respectively during 2011-12.

Total cultivated area of potato in the study areas was 22881 ha and the maximum (16910 ha) at Shibganj (Table 9). Total production was 377726 t, the maximum production was 250875 t at Shibganj and the minimum 63065t at Pirganj. Average yield of potato was 17.45 t/ha for these upazilas. It was observed that yields of the local varieties at Shibganj and Pirganj were 12.51 and 12.44 t/ha, respectively. The highest yield was obtained by HYVs at Gazaria (29.88 t/h). Those were reasonably high yielders. On the other hand, Shibganj and Pirganj had low yields for HYVs.

**Table 10. Variety wise area coverage of HYVs of potato at upazilas during, 2011-12**

Variety	Gazaria (ha)	Shibganj (ha)	Pirganj (ha)	Total	Percentage (HYVs)
Diamant	1543 (72.27)	1439.6 (12.22)	81.5 (4.32)	3064	19.39
Cardinal	67 (3.14)	3554 (30.17)	842 (44.64)	4463	28.25
Granola	77 (3.61)	4840 (41.09)	261 (13.84)	5178	32.77
Binella	29 (1.360)	-	-	29	0.18
Patrones	195 (9.13)	60 (0.51)	185 (9.81)	440	2.78
KufriSinduri	-	-	507 (26.81)	507	3.21
Multa	54 (2.53)	8.4 (0.07)	-	62.4	0.39
Ailsha	86 (4.03)	-	-	86	0.54
Elvira	-	888 (7.54)	4 (0.21)	892	5.65
Ladiro	-	-	4 (0.21)	4	0.03
Asterix	-	990 (8.40)	1.5 (0.08)	991.5	6.27
Others	84 (3.93)	-	-	84	0.53
<b>Total (HYVs)</b>	<b>2135 (100)</b>	<b>11780 (100)</b>	<b>1886 (100)</b>	<b>15801</b>	<b>100.00</b>

Source: Field survey, 2012. \* Value in bracket indicates Percentage

**Table 11. Area coverage of local varieties of potato at three upazilas during 2011- 12.**

Variety	Gazaria (ha)	Shibganj (ha)	Pirganj (ha)	Total	Percentage (LV)
Pakri	-	2620 (51.07)	331.5 (17.00)	2951.5	41.69
Talpakri	-	607 (11.83)	-	607	8.57
Lalpakri	-	1080 (21.05)	348 (17.85)	1428	20.17
Indurkani	-	-	1067.5 (54.74)	1067.5	15.08
Sadapakri	-	20 (0.39)	75 (3.85)	95	1.34
Shilpakri	-	178 (3.47)	-	178	2.51
Surjimukhi	-	315 (6.14)	-	315	4.45
Shilbilati	-	100 (1.95)	16 (0.82)	116	1.64
Hagrai	-	10 (0.19)	-	10	0.14
Sadadeshi	-	-	62 (3.18)	62	0.88
Others	-	200 (3.90)	50 (2.56)	250	3.53
<b>Total</b>		<b>5130 (100)</b>	<b>1950 (100)</b>	<b>7080</b>	<b>100.00</b>

Source: Field survey, 2012. \* Value in bracket indicates percentage.

**Table 12. Area coverage (ha) by potato varieties in three upazilas during 2011-12**

Variety	Gazaria	Shibganj	Pirganj	Total
Total (HYV)	2135 (100)	11780 (69.66)	1886 (49.17)	15801 (69.06)
Total (LV)	-	5130 (30.34)	1950 (50.83)	7080 (30.94)
Grand Total	2135 (100)	16910 (100)	3836 (100)	22881 (100)

Source: Field survey, 2012; Value in bracket indicates percentage.

Adoption status and area coverage by the HYVs and the LVs of potato in the study areas are given in Table 10. Table 12 showed that out of 22881 ha, maximum (15801 ha) area was cultivated by HYVs and the rest (7080 ha) by the local varieties. Among 15801 ha HYVs potato, 2135 ha (100%) was cultivated by HYVs at Gazaria. However, 11780 ha (69.66%) and 1886 ha (49.17%) were cultivated by HYVs at Shibganj and Pirganj, respectively and the rest by the local varieties. At Gazaria, out of 2135 ha of HYV potato (Table 9) 1543 ha (72.27%), 195 ha (9.13%) and 86 ha (4.03%) were cultivated by Diamant, Patrones and Ailsha, respectively. At Shibganj, out of 11780 ha (69.66%) HYV potato 4840 ha (41.09%) and 3554 ha (30.17%) were cultivated by Granola and Cardinal, respectively and the rest (28.74%) by other HYVs. At Pirganj, among 1886 ha (49.17%) HYVs potato, 1610 ha (85.36%) was cultivated by Cardinal, KufriSinduri and Granola and the rest (14.64%) by others (Table 10).

The results in Table 12 indicated that at Shibganj, out of 16910 ha (100%) potato area, 5130 ha (30.34%) was cultivated by the local varieties. Among the local varieties, 2620 ha (51.07%), 1080 ha (21.05%) and 607 ha (11.83%) were cultivated by Pakri, Lalpakri and Talpakri, respectively and the rest by other locals (Table 11). For Pirganj (Rangpur), out of 1950 ha (100%) local varieties, 1067.5 ha (54.74%), 348 ha (17.85%), 331.5ha (17.00%) were cultivated by Indurkani, Lalpakri and pakri, respectively and the rest by others.

### Conclusion

Database of different parameters such as area, production, yield, and varietal information etc. of potato were obtained. Mouza, union, upazila, and district database of potato were developed. Mouza should be used as the smallest unit of agriculture in the root level because it has administrative boundary and social identity in comparison to union which is a big place. Average yield of potato was 17.45 t/ha in the study areas during 2011-12. Out of total potato areas, 69.06% was cultivated by HYVs and the rest 30.94% by local varieties. Out of 46 HYVs released by BARI, 11 varieties were cultivated in the study areas in the same period. Maximum area (80.41%) of HYVs potato was covered by three varieties Diamant, Cardinal and Granola. It is a system development program for data collection, variety wise area coverage determination in mouza, union, upazila production of digital databases and maps of potato as well as for other crops.

**References**

- Akhter, S .M.M Anwar and Md. Asaduzzaman. 2001. *Potato production in some selected areas of Bangladesh* .TCRC, BARI, Joydebpur, Gazipur, Bangladesh.
- Anonymous. 2011. BARI Central Research Report for 2010-11. Developing digital databases and maps of major potato growing areas of Bangladesh using ICT. Pp. 47-75.
- BBS. 2005. The Yearbook of Agricultural Statistics of Bangladesh–2004, Bangladesh Bureau of Statistics, Statistics Division, MOP, GOB, Dhaka.
- BBS. 2013. The Yearbook of Agricultural Statistics of Bangladesh–2005, Bangladesh Bureau of Statistics, Statistics Division, MOP, GOB, Dhaka.
- Bhuiyan, N. I., D. N. R. Paul and M. A. Jabber. 2002. Feeding the extra millions by 2025: Challenges for rice research and extension in Bangladesh. A Keynote Paper Presented at National Workshop on Rice Research and Extension-2002. Bangladesh Rice Research Institute, Gazipur, 29-31 January 2002.
- DAE. 2012, Department of Agriculture Extension, Ministry of Agriculture, Khamar Bari Farm Gate, Dhaka.
- FAO and CIP. 1995. Potatoes in the 1990s: Situation and prospects of the world potato economy. FAO, Rome (Italy), Pp. 39.
- Rashid, M. A. 2001. Crop Cultivation Practices: Input-Output Relationship of Major Crops in Bangladesh. Agricultural Research Management Project, BARC, 2001.
- Uddin, M. A., S. Yasmin, M. L. Rahman, S.M. B. Hossain and R. U. Choudhury. 2010. Challenges of potato cultivation in Bangladesh and developing digital databases of potato. *Bangladesh J. Agril. Res.* **35**(3): 453-463.