

Trends in the Rice-based Crop-Livestock Systems in the MFS Action Sites in Bangladesh

Crops, Vegetables, Livestock & Poultry

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The [Sustainable Intensification of Mixed Farming Systems Initiative](#) aims to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems through sustainable intensification within target agroecologies and socio-economic settings.

Through action research and development partnerships, the Initiative will improve smallholder farmers' resilience to weather-induced shocks, provide a more stable income and significant benefits in welfare, and enhance social justice and inclusion for 13 million people by 2030.

Activities will be implemented in six focus countries globally representing diverse mixed farming systems as follows: Ghana (cereal–root crop mixed), Ethiopia (highland mixed), Malawi: (maize mixed), Bangladesh (rice mixed), Nepal (highland mixed), and Lao People's Democratic Republic (upland intensive mixed/ highland extensive mixed).

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Abbreviations and acronyms

WP	Work Package
MFS	Mixed Farming System
SI-MFS	Sustainable Intensification of Mixed Farming Systems Initiative
BBS	Bangladesh Bureau of Statistics
ICARDA	International Center for Agricultural Research in the Dry Areas
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
IWMI	International Water Management Institute

Objectives

- To identify the trends of rice cultivation in the selected study districts.
- To know the temporal changes in crop area, production, and yield in the study districts.
- To know the temporal changes in vegetable cultivated area, production, and yield in the study districts.
- To know the temporal changes in the number of livestock and poultry in the study districts.

Introduction

Mixed farming is defined as agricultural production systems with the integration of crops, agroforestry, fisheries, and livestock in a system approach. Crops and livestock are critical components of the mixed farming system. The sustainable intensification of the mixed farming systems entails the integration of different components of the mixed farming systems with efficient and sustainable use of resources, such as the use of domesticated animal manure (organic farming) for crop production, feeding crop residues to livestock, growing crops with fruit trees, integrating fish with rice (rice-fish farming), and so on. It provides a high return on agricultural labor because every product is utilized.

In this report, we try to know the temporal changes in crop area, production, yield, and livestock in the MFS-selected study districts in Bangladesh.

Study Area

The WP1 of the SI-MFS study is focused on five districts covering the northern and southern regions of Bangladesh (Figure 1). The study areas are Rangpur, Dinajpur, and Nilphamari districts in the northern region and Khulna and Patuakhali districts in the southern region of Bangladesh.

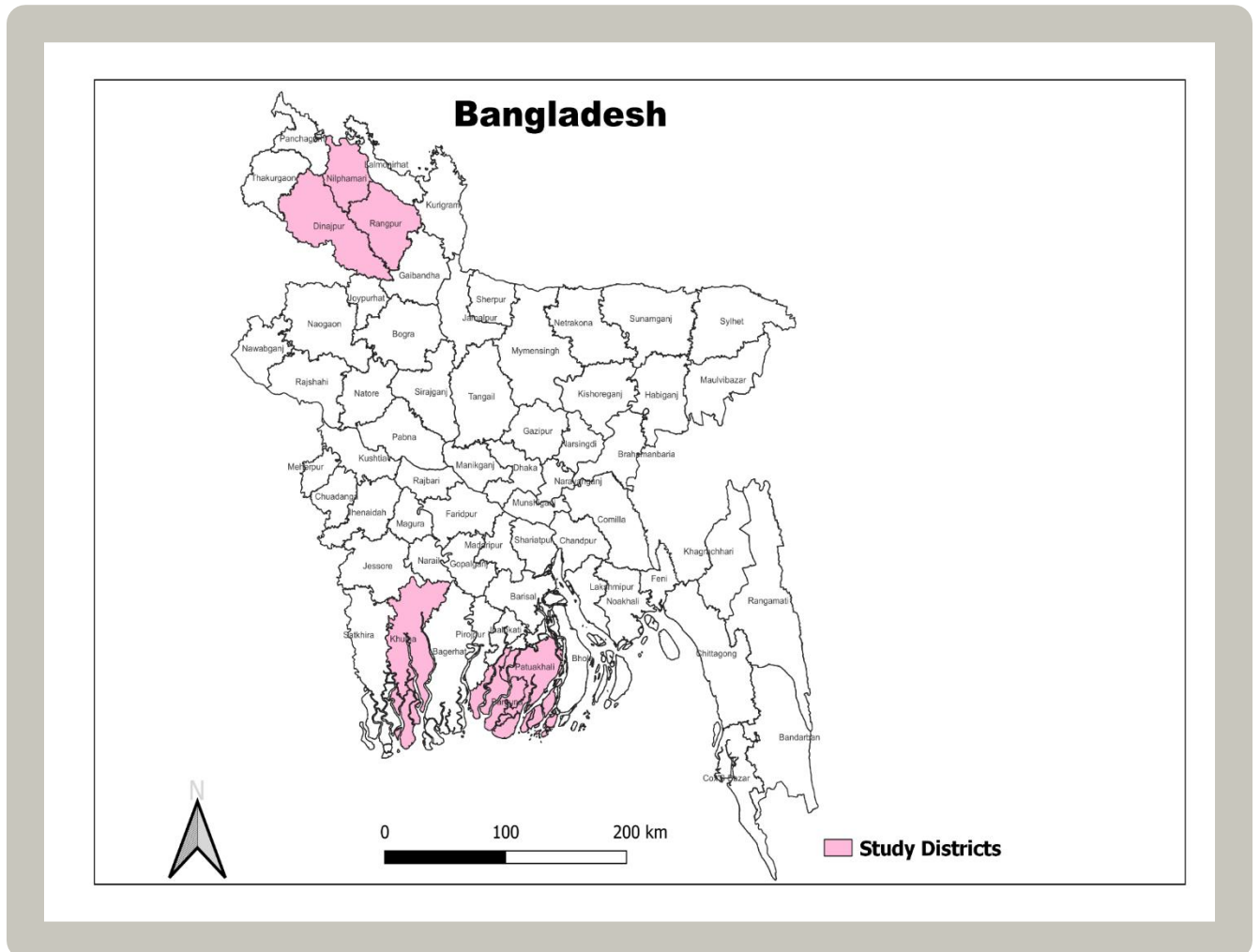


Figure 1: Map showing the WP1 study area in Bangladesh.

Trends of Rice Cultivation in the Selected Study Districts

Rice Cultivation in Bangladesh

In Bangladesh, rice is cultivated in the following three seasons:

- Aus season:** The season designates the cultivation of the rice varieties which are planted in mid-March-April and harvested in mid-June-July. (The season is synonymous to Kharif- I). It accounts for 9% of the total rice area of Bangladesh.
- Aman season:** The season designates the cultivation of the rice varieties which are planted in mid-July and harvested in mid-November-December. (The season is synonymous with Kharif -II). This is the main rice growing season. It accounts for about 50% of the total rice area of Bangladesh.
- Boro season:** The season designates the cultivation of the rice varieties which are planted in November-December and harvested in March-April. (The season is synonymous with Rabi). It accounts for about 41% of the total rice area of Bangladesh.

Trend of Rice Pattern in MFS Districts in Bangladesh

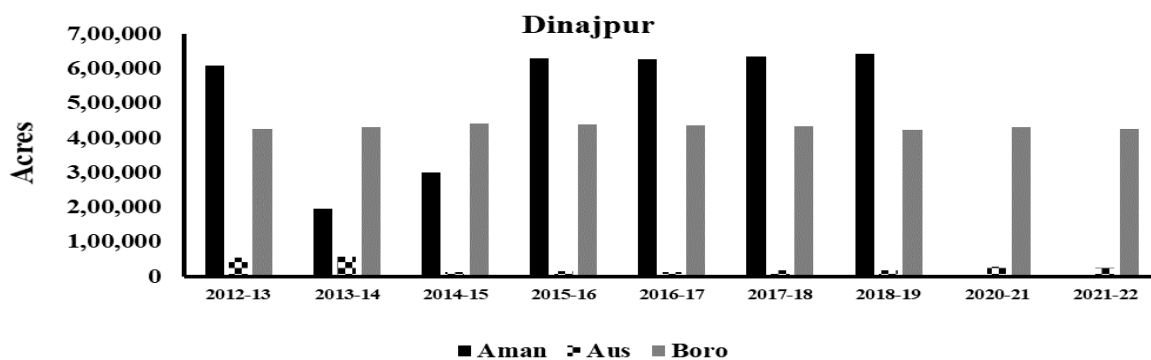


Figure 2: Trend of rice pattern in Dinajpur district.

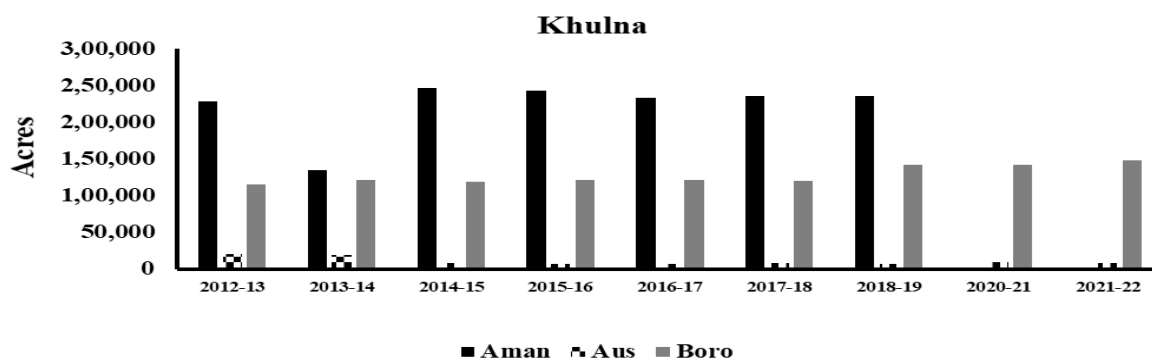


Figure 3: Trend of rice pattern in Khulna district.

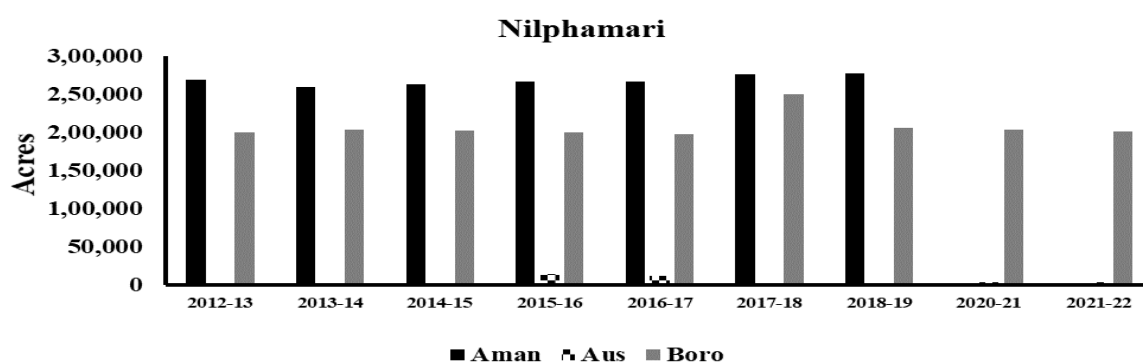


Figure 4: Trend of rice pattern in Nilphamari district.

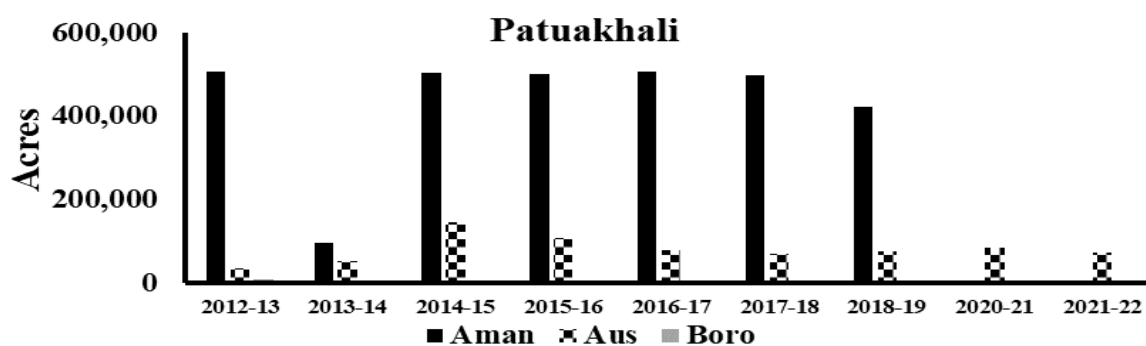


Figure 5: Trend of rice pattern in Patuakhali district.

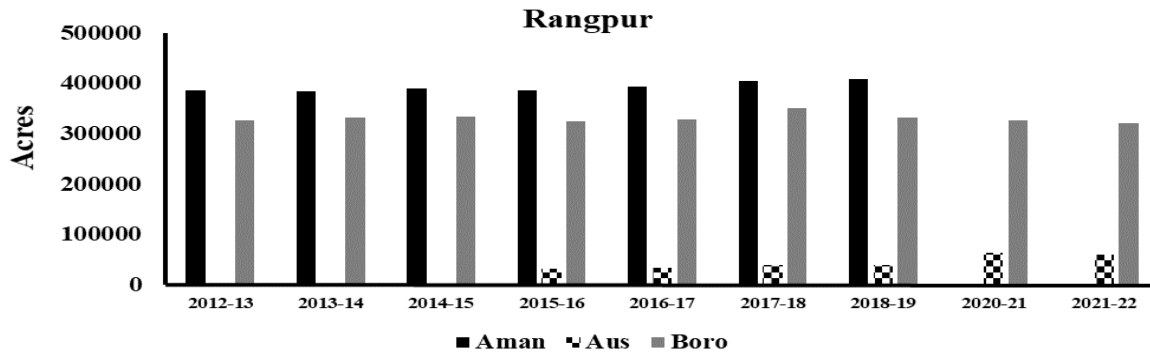


Figure 6: Trend of rice pattern in Rangpur district.

Based on our trend research, it has been observed that there has been a rise in Boro rice production in the study districts of Dinajpur, Khulna, Nilamphari, and Rangpur. However, in the Patuakhali area, we have only observed the existence of Aus rice in recent years. Based on the study conducted, it can be inferred that there has been a substantial shift in the rice cultivation pattern, particularly with a notable rise in the cultivation of Boro rice over the past decade. If we can uncover the underlying components behind this phenomenon, it will greatly assist us in understanding the recent development of MFS.

Temporal Changes in Crops Area and Production in the Selected Study Districts

Table 1: Temporal changes in crop area and production in Khulna district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	13986	8569	0.61	9017	4942	0.55
Aman rice	200321	176017	0.88	237461	266183	1.12
Boro rice	107614	162899	1.51	142077	243273	1.71
Wheat	353	381	1.08	497	517	1.04
Maize	350	405	1.16	213	602	2.82
Jute	8530	8413	0.98	3181	3567	1.12
Potato	770	3935	5.11	1407	10616	7.55
Green gram (Mug)	1005	212	0.21	217	62	0.28
Khesari	2888	5844	2.02	243	178	0.73
Sesame	6596	1961	0.30	3627	441	0.12
Mustard	8982	3545	0.39	442	150	0.34
Sunflower	-	-	-	-	-	-

“-“ indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato& Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Table 2: Temporal changes in crops area and production in Patuakhali district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	164908	116945	0.71	83287	84712	1.02
Aman rice	504165	347730	0.69	431833	323593	0.75
Boro rice	10929	11456	1.05	2655	3517	1.32

Wheat	13	6	0.46	31	41	1.32
Maize	251	347	1.38	112	167	1.49
Jute	-	-	-	-	-	-
Potato	1815	13467	7.42	1064	9335	8.77
Green gram (Mug)	11071	1733	0.16	12559	4614	0.37
Khesari	14480	3332	0.23	6496	3201	0.49
Sesame	861	269	0.31	536	171	0.32
Mustard	348	75	0.22	112	36	0.32
Sunflower	35	13	0.37	37	23	0.61

“-“ indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato & Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Table 3: Temporal changes in crops area and production in Barguna district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	116932	88051	0.75	136821	140059	1.02
Aman rice	252020	179308	0.71	231401	178315	0.77
Boro rice	1085	959	0.88	17220	22680	1.32
Wheat	1	-	-	-	-	-
Maize	-	-	-	126	181	1.44
Jute	-	-	-	-	-	-
Potato	2733	22685	8.30	1544	11866	7.69
Green gram (Mug)	-	-	-	13617	4786	0.35
Khesari	-	-	-	6010	2208	0.37
Sesame	-	-	-	82	30	0.37
Mustard	-	-	-	91	55	0.60

Sunflower	-	-	-	2391	847	0.35
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“-“ indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato& Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Table 4: Temporal changes in crops area and production in Dinajpur district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	10705	8603	0.80	28663	24277	0.85
Aman rice	604853	637965	1.05	645472	696412	1.08
Boro rice	435223	667421	1.53	429961	711738	1.66
Wheat	52130	55104	1.06	10237	13095	1.28
Maize	131385	316279	2.41	166533	584980	3.51
Jute	27120	26453	0.98	9383	10521	1.12
Potato	97646	619306	6.34	108921	838837	7.70
Green gram (Mug)	397	100	0.25	38	12	0.32
Khesari	249	86	0.35	34	11	0.32
Sesame	6100	1957	0.32	35	10	0.29
Mustard	20358	8897	0.44	28839	15877	0.55
Sunflower	3	0.12	0.04	-	-	-

“-“ indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato& Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Table 5: Temporal changes in crops area and production in Rangpur district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	-	-	-	63967	71011	1.11

Aman rice	343825	368115	1.07	405055	442446	1.09
Boro rice	316099	480287	1.52	326394	586598	1.80
Wheat	9149	9572	0.87	4235	16265	1.30
Maize	86154	243844	2.83	67401	215831	3.20
Jute	20705	22720	1.09	19997	27864	1.39
Potato	138957	1085321	7.81	127144	1018493	8.01
Green gram (Mug)	277	89	0.32	46	20	0.43
Khesari	1616	951	0.59	36	25	0.69
Sesame	1086	341	0.31	144	60	0.42
Mustard	13427	4603	0.34	4351	2069	0.48
Sunflower	85	31	0.36	-	-	-

“-“ indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato& Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Table 6: Table 6: Temporal changes in crops area and production in Nilphamari district.

Crops	2010-11			2020-21		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Aus rice	-	-	-	4312	3565	0.83
Aman rice	272632	269707	0.99	279581	308476	1.10
Boro Rice	189918	309887	1.63	204505	360529	1.76
Wheat	11024	9572	0.87	12475	16265	1.30
Maize	-	-	-	59987	251708	4.20
Jute	24652	21469	0.87	17177	20008	1.16
Potato	53660	331402	6.18	54895	421631	7.68
Green gram (Mug)	-	-	-	11	5	0.45

Khesari	-	-	-	88	52	0.59
Sesame	-	-	-	37	15	0.41
Mustard	-	-	-	2327	1273	0.55
Sunflower	-	-	-	-	-	-

"-" indicates negligible

Data source: 45 years Agriculture Statistics of Major Crops (Aus, Amon, Boro, Jute, Potato& Wheat) - 2018, BBS & Yearbook of Agricultural Statistics – 2022, BBS

Temporal Changes in Vegetables Cultivated Areas in the Selected Study Districts

Table 7: Temporal changes in vegetables cultivated Area and production in Khulna district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	365	1618	4.43	406	3058	7.53
Kharif Brinjal	511	1379	2.70	398	629	1.58
Patal	111	175	1.58	105	319	3.04
Lady's Finger	347	576	1.66	358	545	1.52
Cucumber	186	239	1.28	313	462	1.48
Rabi Brinjal	746	1768	2.37	824	1963	2.38
Cauliflower	599	3111	5.19	607	3229	5.32
Cabbage	640	4876	7.62	624	4516	7.23
Rabi Pumpkin	778	2562	3.29	748	2366	3.16
Tomato	703	1635	2.33	817	2387	2.92
Beans	537	1989	3.70	590	2267	3.84
Carrot	12	22	1.83	21	41	1.93

Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Table 8: Temporal changes in vegetables cultivated area and production in Patuakhali district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	93	95	1.02	108	450	4.17

Kharif Brinjal	27	32	1.19	33	85	2.58
Patal	-	-	-	-	-	-
Lady's Finger	98	66	0.67	118	93	0.79
Cucumber	95	120	1.26	148	240	1.62
Rabi Brinjal	152	261	1.72	151	443	2.93
Cauliflower	40	40	1	73	88	1.21
Cabbage	93	579	6.23	104	380	3.66
Rabi Pumpkin	231	769	3.33	325	900	2.77
Tomato	125	98	0.78	196	246	1.26
Beans	107	59	0.55	238	478	2.01
Carrot	-	-	-	8	5.46	0.70

"-" indicates negligible

Data source: Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Table 9: Temporal changes in vegetables cultivated area and production in Barguna district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	20	28	1.40	43	160	3.72
Kharif Brinjal	18	18	1	86	530	6.16
Patal	-	-	-	-	-	-
Lady's Finger	75	52	0.69	123	235	1.91
Cucumber	118	135	1.14	136	273	2.01
Rabi Brinjal	107	182	1.70	152	397	2.61
Cauliflower	53	53	1	152	397	2.61
Cabbage	78	617	7.91	155	815	5.26

Rabi Pumpkin	164	769	3.33	225	900	2.77
Tomato	82	44	0.54	155	745	4.81
Beans	84	50	0.60	230	323	1.40
Carrot	-	-	-	23	44	1.91

“-“ indicates negligible

Data source: Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Table 10: Temporal changes in vegetables cultivated Area and production in Dinajpur district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	461	1503	3.26	486	2626	5.40
Kharif Brinjal	1234	4123	3.34	1140	3483	3.06
Patal	824	1872	2.27	810	2282	2.82
Lady's Finger	602	902	1.50	608	3542	5.83
Cucumber	332	829	2.50	390	906	2.32
Rabi Brinjal	1553	3542	2.28	2294	10867	4.74
Cauliflower	1420	5379	3.79	3097	22112	7.14
Cabbage	1302	7978	6.13	2473	24245	9.80
Rabi Pumpkin	591	1708	2.89	718	2991	4.17
Tomato	6098	70201	11.51	4356	39010	8.96
Beans	558	776	1.39	730	1534	2.10
Carrot	104	193	1.86	159	365	2.30

Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Table 11: Temporal changes in vegetables cultivated Area and production in Rangpur district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	522	1609	3.08	655	2596	3.96
Kharif Brinjal	1011	2542	2.43	1045	2616	2.50
Patal	1002	3164	3.16	833	2421	2.91
Lady's Finger	377	405	1.07	448	798	1.78
Cucumber	483	1129	2.34	549	1402	2.55
Rabi Brinjal	1437	3595	2.50	1704	4863	2.85
Cauliflower	848	12456	14.69	1306	15372	11.77
Cabbage	1060	5016	4.73	2074	13909	6.71
Rabi Pumpkin	608	1918	3.15	922	4868	5.28
Tomato	510	1300	2.55	718	5183	7.22
Beans	423	683	1.61	554	964	1.74
Carrot	122	287	2.35	216	594	2.75

Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Table 12: Temporal changes in vegetables cultivated area and production in Nilphamari district.

Vegetables	2013-14			2021-22		
	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)	Area (Acres)	Production (M. ton)	Yield (M. ton/Acre)
Kharif Pumpkin	220	521	2.37	393	1663	4.23
Kharif Brinjal	625	1542	2.47	490	1948	3.98
Patal	293	714	2.44	331	1127	3.40

Lady's Finger	263	315	1.20	234	558	2.38
Cucumber	352	937	2.66	381	1257	3.30
Rabi Brinjal	843	3530	4.19	1633	8169	5.00
Cauliflower	985	5066	5.14	1725	13158	7.63
Cabbage	926	5854	6.32	1419	13728	9.68
Rabi Pumpkin	281	1467	5.22	630	3769	5.99
Tomato	397	1398	3.52	359	1971	5.50
Beans	295	709	2.40	399	1179	2.95
Carrot	58	207	3.57	116	594	2.75

Data source: Yearbook of Agricultural Statistics – 2016 & 2022, BBS

Temporal Changes in the Number of Livestock and Poultry in the Selected Study Districts

Table 13: Temporal changes in the number of livestock and poultry in Khulna district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	271216	369225	428289
Goat	106854	258839	248438
Cock; Hen	794431	1107635	3026435
Duck	435624	656361	1467359

Data Source: Agriculture Census 2019, BBS

Table 14: Temporal changes in the number of livestock and poultry in Patuakhali district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	359509	434232	446488
Goat	122674	182126	184556
Cock; Hen	2140558	2501511	2612141
Duck	917447	1040808	1920977

Data Source: Agriculture Census 2019, BBS

Table 15: Temporal changes in the number of livestock and poultry in Barguna district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	237238	279048	270279
Goat	73200	112565	100887
Cock; Hen	1230985	1673572	1534650
Duck	550864	740253	969850

Data Source: Agriculture Census 2019, BBS

Table 16: Temporal changes in the number of livestock and poultry in Dinajpur district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	717362	412184	368388
Goat	506620	160411	185012
Cock; Hen	2972342	2197388	3143661
Duck	662300	1075097	1662643

Data Source: Agriculture Census 2019, BBS

Table 17: Temporal changes in the number of livestock and poultry in Rangpur district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	530370	808950	1071077
Goat	362457	453163	588716
Cock; Hen	2470230	2312024	3503038
Duck	399961	757477	1168535

Data Source: Agriculture Census 2019, BBS

Table 18: Temporal changes in the number of livestock and poultry in Nilphamari district.

Livestock & Poultry	1996	2008	2019
	nos	nos	nos
Cow	286776	471533	605978
Goat	229497	288627	376568
Cock; Hen	1190016	994461	1586265
Duck	189958	249909	699907

Data Source: Agriculture Census 2019, BBS



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