Flood Action Plan
FAP 3
North Central Regional Study

Supporting Report I
Land Resources and Agriculture

February 1993

Financed by: Commission of the European Communities and
Caisse Française de Développement;
Project ALA/90/03

Consortium:
BCEOM, Compagnie Nationale du Rhone
Euroconsult, Mott MacDonald International,
Satec Développement

in association with:
Desh Upodesh Ltd.
BETS Ltd.

Flood Action Plan
FAP 3
North Central Regional Study

Supporting Report I
Land Resources and Agriculture

February 1993

Financed by:

Commission of the European Communities and
Caisse Française de Développement;
Project ALA/90/03

Consortium:
BCEOM, Compagnie Nationale du Rhone
Euroconsult, Mott MacDonald International,
Satec Développement

in association with:
Desh Upodesh Ltd.
BETS Ltd.

The Regional Water Resources Development Plan - Final Report consists of the following:-

Main Volume REGIONAL WATER RESOURCES DEVELOPMENT PLAN

Supporting Reports:-

SR I	LAND RESOURCES AND AGRICULTURE
SR II	WATER RESOURCES
SR III	FISHERIES
SR IV	HUMAN RESOURCES SOCIO-ECONOMICS AND INSTITUTIONS
SR V	ENVIRONMENT
SR VI	INFRASTRUCTURE AND EXISTING SCHEMES
SR VII	ENGINEERING
SR VIII	DEVELOPMENT OPTIONS
SR IX	PLANNING UNITS AND REGIONAL SCHEMES
SR X	ECONOMIC, AND MULTICRITERIA IMPACT ASSESSMENT

North Central Regional Water Resources Development Plan
FAP-3
Supporting Report I, Land Resources and Agriculture

Contents **Page Nrs.**

1 Land Resources

1.1 General I-1
1.1.1 Location I-1
1.1.2 Physical Features I-1
1.2 Land Resources I-1
1.2.1 Agro-Ecological regions (Zones) I-1
1.2.2 Soils I-2
1.2.3 Land Suitability I-4

2 Agriculture

2.1 General I-6
2.2. Crops I-7
2.2.1 Rice I-7
2.2.2 Other Crops I-12
2.3 Cropping Patterns and Land Use I-15
2.4 Inputs I-16
2.4.1 Fertilizers I-16
2.4.2 Pesticides I-18
2.4.3 Irrigation I-18
2.4.4 Labour use I-21
2.4.5 Draught Power and Land Preparation I-21
2.4.6 Credit I-23
2.5 Marketing of Agricultural Produce I-23
2.5.1 Marketing I-23
2.5.2 Prices I-24
2.6 Constraints to Agricultural Production I-26
2.6.1 Floods I-26
2.6.2 Drainage I-26
2.6.3 Soils I-26
2.6.4 Irrigation I-27
2.6.5 Inputs I-27
2.6.6 Institutional Constraints I-27
2.6.7 Other Constraints I-27
2.7 Agricultural Development Potential I-28
2.7.1 Land Suitability Potential I-28
2.7.2 Agricultural Potential I-29
2.7.3 Yield Projections I-31
2.8 Possible Impacts of Controlled Flooding and Improved Drainage I-31
2.8.1 Rainfed Agriculture I-32
2.8.2 Irrigated Agriculture I-32
2.8.3 Other Impacts I-32

3 Livestock and Forestry

3.1 Livestock I-35
3.2 Forestry I-38

REFERENCES I-39

List of Tables

Table Nrs.		Page Nrs.
I.1.1	Proportions(%) of Depth of Flooding Land Types and Soil Textural Families in Agro-Ecological Zones	I-3
I.1.2	Proportions (%) of Inundation Categories and Permeability of Soils in the NCR	I-4
I.2.1	Estimated Land Utilization in the NCR According to Planning Units	I-7
I.2.2	Estimated Production of Paddy in the NCR ('000 kg) (1986-87 to 1990-91)	I-8
I.2.3	Proportional Area and Production per Rice Crop in 1990-91	I-8
I.2.4	Area of Boro and Aus crop, 1986-91	I-9
I.2.5	Rice Crops Average Yield (Tons/Ha) in 1990-91	I-10
I.2.6	Rice Crop area and Production per Planning Unit (Ha and Tons of Paddy)	I-11
I.2.7	Area (Ha) of Jute in the NCR 1985-86 - 1990-91	I-12
I.2.8	Area (Ha) of Wheat in the NCR 1986-87 - 1990-91	I-13
I.2.9	Area (ha) of Potato in the NCR	I-14
I.2.10	Other Crops Average Yield Ton (Ha) in 1990-91	I-15
I.2.11	Present Cropping Patterns	I-17
I.2.12	Fertilizer Distribution in the NCR in Mt, Fy 1981-82 - Fy 1989-90	I-19
I.2.13	Area (Ha) Irrigated by Different Methods in the NCR 1990-91	I-20
I.2.14	Inputs used to Grow one Ha of Rice in 1987	I-22
I.2.15	Food Grain Storage in the NCR	I-25
I.2.16	Yields of Selected Crops that Researchers and Better Farmers have obtained in Bangladesh using the Current Best HYV and Recommended Husbandry Practices	I-29
I.2.17	Estimated Yield Gap for Selected Crops Between National Average Yields and Yields Obtained by Better Farmers using HYVs and Recommended Husbandry	I-30
I.2.18	Future Cropping Patterns	I-33
I.3.1	Livestock and Animal Production per Planning Unit	I-35
I.3.2	Number of Livestock and Poultry per Ha of the Gross area in NCR Districts, 1990-91	I-36
I.3.3	Number of Animals and Birds Lost in 1987 and 1988 Floods	I-36
I.3.4	A Plantation Programme of Tangail Forest Department	I-38
I.3.5	Some Roadside and Forest Trees propagated by Forestry Nurseries in the NCR	I-39

List of Figures

Figure Nrs.		Following Page Nrs.
I.1.1	Map of Planning Units, FAP-3	I-1
I.1.2	Agro-Ecological Zones, FAP-3	I-1
I.2.1	Crop Calendar of Existing Crops in the NCR	I-7

List of Annexes

ANNEX I.1 **Land Use Study of the North Central Region**
ANNEX I.2 **Cropping Data in the North Central Region**
ANNEX I.3 **Livestock and Poultry Data in the North Central Region**

List of Annex Tables

Annex Table Nrs.		Page Nrs.
I.2.1	Agronomic characteristics of some Recommended HYV rice varieties.	I.2-1
I.2.2	List of recommended varieties of some agricultural crops	I.2-3
I.2.3	Some details about major crops in the NCR	I.2-5
I.2.4	Land Resources and Agricultural Characteristics of Planning Units Nrs.1-11 & 13.	I.2-10
I.2.5 a-h	Area and production of Boro Rice in NCR-Districts	I.2-25
I.2.6 a-h	Area and production of T.Aman Rice in NCR-Districts	I.2-34
I.2.7 a-h	Area and production of Aus Rice in NCR-Districts	I.2-43
I.2.8 a-c	Area and production of D.W.Aman Rice in NCR-Districts	I.2-52
I.2.9 a-h	Area and production of Jute in NCR-Districts	I.2-56
I.2.10a-h	Area and production of Wheat in NCR-Districts	I.2-65
I.2.11a-h	Area and production of Sugarcane in NCR-Districts	I.2-74
I.2.12a-h	Area and production of Potato in NCR-Districts	I.2-78
I.2.13a-h	Area and production of Mustard in NCR-Districts	I.2-87
I.2.14a-h	Area and production of Pulses in NCR-Districts	I.2-95
I.2.15a-h	Area and production of Onion in NCR-Districts	I.2-103
I.2.16	Area and production of Rice crops in NCR-Districts, 1989-90	I.2-107
I.2.17	Area and production of Rice crops in NCR-Districts, 1990-91	I.2-108
I.2.18	Area of HYV and Local Rice crops in the NCR Districts, 1989-90	I.2-109
I.2.19	Area of HYV and Local Rice crops in the NCR Districts, 1990-91	I.2-110
I.2.20	Average yields of rice crops in the NCR District 1989-87 to 1990-91	I.2-111
I.2.21a-h	Utilization of cultivated land in NCR Districts	I.2-112
I.2.22a-h	Area Irrigated by Different Methods in NCR Districts	I.2-120
I.3.1a-h	Livestock and Poultry numbers per District in the NCR	I.3-1

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AEZ	Agro-Ecological Zone
BADC	Bangladesh Agricultural Development Corp.
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BB	Bangladesh Bank
BBS	Bangladesh Bureau of Statistics
BCAL	Bangladesh Census of Agricultural Livestock
BCAS	Bangladesh Centre for Advanced Studies
BCEOM	French Engineering Consultants
BFDC	Bangladesh Fisheries Development Corp.
BIDS	Bangladesh Institute of Development Studies
BIWTA	Bangladesh Inland Water Transport Auth.
BJRI	Bangladesh Jute Research Institute
BKB	Bangladesh Krishi Bank
BNPP	Bangladesh National Physical Plan. Board
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
BRRI	Bangladesh Rice Research Institute
BUET	Bangladesh University of Engg.Technology
BWDB	Bangladesh Water Development Board
CA	Catchment Area
CAS	Catch Assessment Survey
CAT	Coordination Advisory Team
CCCE	Caisse Centrale de Coopération Economique
CEC	Commission of European Communities
CIP	Chandpur Irrigation Project
CNR	Compagnie National du Rhône
CPM	Coarse Pilot Model
CS	Consultants' Studies
DAE	Department of Agricultural Extension
DAE	Department of Agricultural Extension
DANIDA	Danish International Development Agency
DHI	Danish Hydraulics Institute
DOE	Department of Environment
DOF	Department of Fisheries
DOS	Disk Operating System
DSSTW	Deep Set Shallow Tubewell
DTW	Deep Tubewell
DUL	Desh Upodesh Ltd.
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIP	Early Implementation Programme
FAO	Food & Agricul.Organ.of the United Nations
FAP	Flood Action Plan
FCD	Flood Control and Drainage
FCDI	Flood Control,Drainage & Irrigation Project
FFYP	Fourth Five Year Plan
FHS	Flood Hydrology Study
FMM	Flood Management Modelling
FPCO	Flood Plan Co-ordination Organisation
FRI	Fisheries Research Institute
FRSS	Fisheries Resources Survey System
FSR	Farming Research System
FWP	Food for Work Programme
FY	Financial Year
GOB	Government of Bangladesh
GW	Groundwater
HTW	Hand Tubewell
HYV	High Yielding Variety
IDA	International Development Agency
IRRI	International Rice Research Institute
JICA	Japanese International Cooperation Agency
JPPS	Jamalpur Priority Project Study
LAD	Least Available Depth
LGEB	Local Government Engineering Bureau
ME	Ministry of Education
MF	Ministry of Finance
MIWDFC	Minist.of Irrig., Water Dev.& Flood Control
ML	Ministry of Land
MLGRDC	Minist.of Local Govt.,Rural Dev.& Coop.
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forestry
MOFL	Ministry of Fisheries & Livestock
MOSTI	Manually Operated Shallow T/W for Irrig.
MP	Ministry of Planning
MPO	Master Plan Organisation
NARS	National Agril.Research Sys.in Bangladesh
NCA	Net Cultivable Area
NCR	North Central Region
NCRM	North Central Regional Model
NCRMG	North Central Regional Model Group
NCRS	North Central Regional Study
NFMP	New Fisheries Management Policy
NGO	Non Government Organisation
NGR	Natural Growth Rate
NWP	National Water Plan
O&M	Operation and Maintenance
ODA	Overseas Development Administration (UK)
PA	Planning Area
PFDS	Public Foodgrain Distribution System
POE	Panel of Experts
PSO	Principal Scientific Officer
PU	Planning Unit
PWD	Public Works Datum
RARS	Regional Agricultural Research Station
RHD	Roads and Highways Department
SATEC	French Engineering Consultants
SOB	Survey of Bangladesh
SPARRSO	Space Research & Remote Sensing Organ.
SRDI	Soil Resources Development Institute
SRP	Systems Rehabilitation Project
SRTI	Sugarcane Research and Training Institute
STW	Shallow Tube Well
SWMC	Surface Water Modelling Centre
SWSMP	Surface Water Simul.Model. Programme
TOR	Terms of Reference
Tk	Taka
UFO	Upazila Fisheries Officer
UNDP	United Nations Development Programme

CHAPTER I
LAND RESOURCES

1.1 General

1.1.1 Location

The North Central Region covers an area of 12,000 sq.km., bounded by the Jamuna River in the west, the Padma and Meghna rivers in the south and the Old Brahmaputra and Lakhya rivers in the north and east. Figure I.1.1 shows the Project Area of the North Central Regional Study split into Planning Units, see SR IX.

1.1.2 Physical Features

The area is low-lying with elevations varying from +4m in the south to +18m in the north (Public Works Datum). The single notable physical feature of relief is the Madhupur Tract, an area of uplifted old alluvium, some 30 km. wide, which divides the North Central region in a north-south direction, approximately in the centre, with elevations from 7 to 10 meters above the adjacent flood plain.

While the Region is one of generally low relief, the micro-topography shows considerable variation through such man-made features as embanked roadways, railway embankments, raised house lot plots. These modifications to the natural topography influence the natural flooding and drainage characteristics of the region.

1.2 Land Resources

1.2.1 Agro-Ecological Regions (Zones)

Figure I.1.2 shows the nine agro-ecological regions occurring in the North Central Region, together with the 18 sub-regions into which they are divided. Some of the agro-ecological regions and sub-regions extend outside the study region (the agro-ecological zone numbering system used is that used in the national report of FAO).

Four physiographic units occupy the greater part of the North Central Region:

- The Young Brahmaputra and Jamuna floodplains (agro-ecological regions 7 and 8)
- The Old Brahmaputra floodplain (9);
- The Ganges river floodplain (10 and 12b);
- The Madhupur Tract (28);

Arial beel, the Middle Meghna River floodplain and the Old Meghna estuarine floodplain occupy small areas in the south.

The agro-ecological regions can be divided in 2 distinct areas:

i) The Madhupur Tract (AEZ 28), an old alluvium outcrop situated in the centre of the NCR is raised above the floodplain. The Madhupur Tract is closely dissected by valleys with some level upland areas.

ii) The floodplain areas consisting of a pattern of recent alluvium river plains of the main rivers surrounding the NCR:

- the Jamuna Floodplain, both Active (AEZ.7) and Young (AEZ.8), which occur in the North Western and Southern areas,

Figure I.1.1

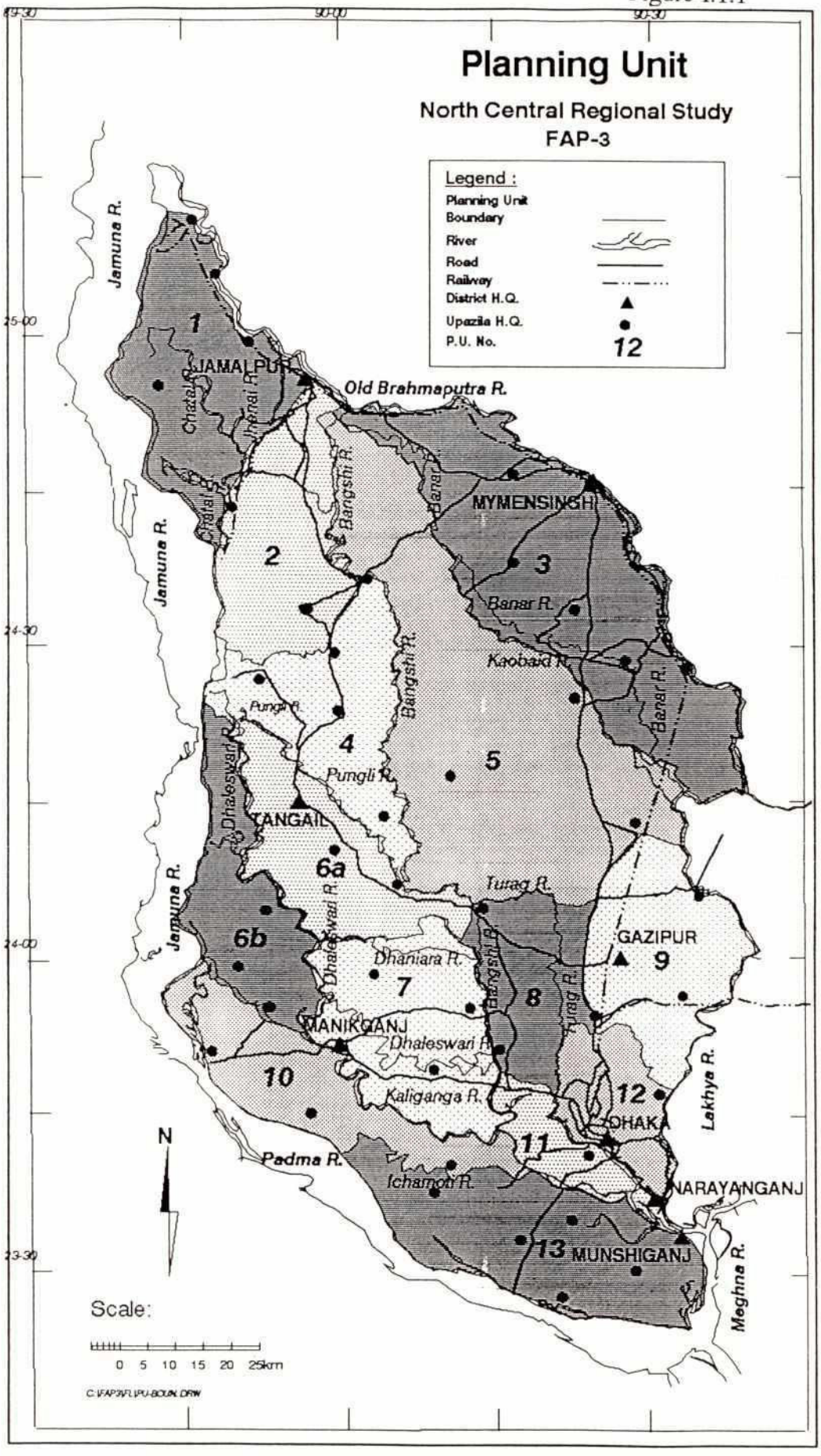

Planning Unit
North Central Regional Study
FAP-3
Legend :
Planning Unit Boundary
River
Road
Railway
District H.Q.
Upazila H.Q.
P.U. No.
12
Jamuna R.
JAMALPUR
Old Brahmaputra R.
Chatal
Jhenai R.
Bangshi R.
Banar
MYMENSINGH
Banar R.
Kaobaid R.
Pungli R.
TANGAIL
Dhaleswari R.
Turag R.
GAZIPUR
Dhaniara R.
MANIKGANJ
Kaliganga R.
DHAKA
Lakhya R.
Padma R.
Ichamoti R.
NARAYANGANJ
MUNSHIGANJ
Meghna R.
N
Scale:
0 5 10 15 20 25km

Figure: 1.1.2

AGRO-ECOLOGICAL CLASSIFICATION LEGEND

A. Stable Flood Plain

1 Ridges

A1 Predominantly High / Medium Highlands
Inundation land type F0 to F1
Predominantly Texture family: loamy
Agroecological regions and sub regions
Ridges in 8a, 8b, 8c, 8d, 9a, 9b, 9c, 9d, 9e, 12b, 16, 19f

2. Basins Predominantly Medium Highlands to Medium Lowlands

A2a Medium High and Medium Lowlands
Predominantly Inundation land types: F1 to F2
Predominantly Texture family: loamy to clayey
Agroecological regions and sub regions:
Basins in 8a, 8b, 8c, 9b, 19g

A2b Medium High to Lowlands
Predominantly inundation land types F2 to F3
Predominantly Texture family: clayey and loamy
Agroecological regions and sub regions:
Basins in 8d, 9c, 9d, 9e, 12b, 16, 19f

A2c Predominantly low lands
Predominantly Inundation land types F2 to F4
Predominantly Texture family: clayey
Agroecological regions and sub regions
15

3. Basins Depresions

A3 Predominantly Medium and low lands
Predominantly Inundation land types F2 to F4
Predominantly Texture family: clayey
Agroecological regions and sub regions:
Basins Depresions in 8a, 8b, 8c, 8d, 9a, 9b, 9c, 9d, 9e, 12b, 15, 16, 19f, 19g

B. Active Flood Plain

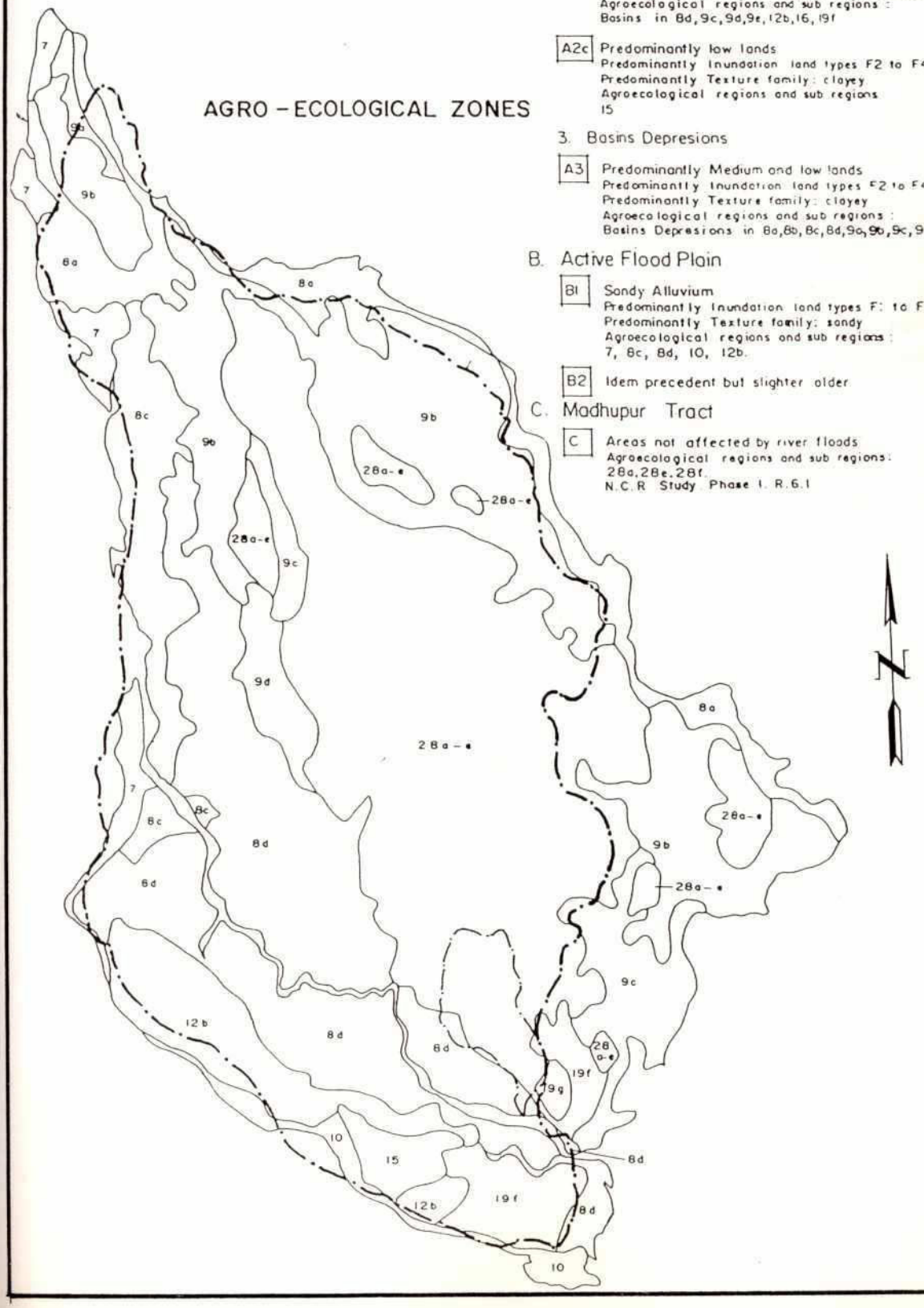
B1 Sandy Alluvium
Predominantly Inundation land types F1 to F3
Predominantly Texture family: sandy
Agroecological regions and sub regions:
7, 8c, 8d, 10, 12b.

B2 Idem precedent but slighter older

C. Madhupur Tract

C Areas not affected by river floods
Agroecological regions and sub regions:
28a, 28e, 28f.
N.C.R Study Phase I. R.6.1

AGRO-ECOLOGICAL ZONES



- the Old Brahmaputra Floodplain, (AEZ.9) in the Northern and Eastern areas with a small area bordering the Western side of the Madhupur Tract.
- the Old Ganges River Floodplain, the Old Meghna estuarine Floodplain and the Active Ganges Floodplain covering small areas in the South.

The Floodplains have a very gently undulating relief comprising broad and narrow ridges and depressions. Differences in elevation between adjoining sides and depressions range from 1-3 meters. The relief generally is more irregular on active floodplains and on young floodplain land close to river channels.

1.2.2 Soils

The Region's soils often occur in complex patterns, most valleys probably have at least 5 different soil series within their boundaries. Furthermore, most soil series are divided into two or more soil phases have different soil depth phases and different depth of flooding phases, and show a considerable variability in soil fertility.

Floodplain soil types are closely related to their position on the relief. Floodplain soils comprise a pattern of sandy to loamy soils in the higher parts of the floodplain ridges grading into clay in adjoining basins. Southern floodplains are more clayey. (Table I.1.1). With the exception of the higher ridges most of the floodplains are inundated by accumulated rainwater in June, July and by additional silty river water near the rivers in August, September. Permeability is good in the sandy and loamy ridge soils, and are not puddled for transplanted rice crops. Basin soils have a low permeability (see Table I.1.2).

The moisture retention capacity is moderate in most loamy soils, low in sandy and clayey soils and in most soils is puddled for transplanted rice. Some basin and deep silty soils are kept wet during all or most of the dry season by capillary rise of moisture. Iron toxicity may occur in these soils. Organic matter content is generally low. Most soils are slightly acid to neutral in reaction with a moderate acidity in the Old Brahmaputra Floodplain. Floodplains are generally classified as good agricultural land.

The Madhupur Tract Soils are underlain by Madhupur clay with differences in depth, drainage and degrees of weathering. Most soils, both deep and shallow, are well to moderately well drained. They are strongly acid, low in organic matter and have a low moisture retention capacity. Fertility is variable, most moderate to low. Iron toxicity may occur in valleys which stay wet during all or most of the dry season. The Madhupur Tract can be classified as moderate agricultural land, except the shallow red and brown soils which have a low potential for both agriculture as well as forestry.

Zinc and sulphur deficiencies are reported to be increasing in both floodplain and Madhupur Tract soils. Active Floodplains are prone to river bank erosion along the main rivers and their distributaries. For more detailed information on soils, reference is made to the reconnaissance soil surveys of the relevant districts (revised editions) available at the Soil Resources Development Institute (SRDI), Farmgate, Dhaka.

12

TABLE I.1.1

Proportions (%) of Depth-of-flooding Land Types[1/] and soil Textural Families in Agro-Ecological Zones

Region/ Subregion	Depth-of-Flooding land type[1/]				Settlement+Water[2/]	Soil Textural family[3/]		
	F0	F1	F2	F3		Sandy	Loamy	Clayey
7	13	29	20	8	30	19	51	1
8a	27	37	26	1	9	10	77	4
8b	35	32	14	2	16	4	72	8
8c	34	44	9	2	11	1	82	6
8d	19	28	22	19	12	5	61	21
9a	76	11	3	0	10	6	81	3
9b	33	38	16	3	10	1	46	42
9c	25	35	25	5	10	0	42	48
9d	26	25	31	9	9	0	37	54
9e	10	15	31	34	10	1	31	58
10	20	25	18	4	33	5	54	8
12b	16	17	36	18	11	1	37	53
15	0	0	13	73	14	0	7	79
19f	11	21	29	22	17	5	49	29
28a-c	62	11	8	9	10	0	12	78
28f	43	29	3	5	20	0	14	66

Note: 1. Depth of flooding categories used relate to a normal flood year where:-

F0 includes Highland (above normal flood level) and Medium Highland flooded up to 30 cm.

F1 includes Medium Highland flooded up to 30-90 cm.

F2 includes Medium Lowland flooded up to 90-180 cm.

F3 includes Lowland flooded up to > 180 cm.

2. % Figures related to land under settlements or permanently flooded.

3. Texture is that of the subsoil, approximately the layer between 20-50 cm.

Sandy includes sands and loamy sands.

Loamy includes textures between sandy loam and silty clay loam.

Clayey includes sandy clays, silty clays and clays.

Source: NCRS 1990

TABLE I.1.2

Proportions (%) of Inundation Categories and Permeability of Soils in the NCR

District	FO[1]		F1		F2		F3	Settlement + Water[1]	Total	
	P[2]	I[3]	P	I	P	I	I		P	I
Dhaka	14.0	4.0	7.2	12.9	1.9	10.9	25.7	23.4	23.1	53.5
Gazipur	43.1	8.4	12.9	4.7	0.3	8.3	12.7	9.6	56.3	34.1
Manikganj	8.8	3.4	9.0	15.7	2.3	26.6	19.4	14.8	20.1	65.1
Munshiganj	8.0	0.8	10.0	5.6	7.0	12.4	39.6	16.6	25.1	58.4
Narayanganj	16.9	0.8	11.6	10.5	3.4	11.8	31.2	13.8	31.9	54.3
Jamalpur	19.2	3.5	27.0	22.6	8.9	8.9	0.3	9.6	55.1	35.3
Mymensingh	32.4	5.8	22.5	18.5	1.0	11.3	3.6	4.9	55.9	39.2
Tangail	23.0	2.7	21.6	15.5	2.8	14.9	6.8	12.9	47.4	39.7
Total NCR	**23.0**	**4.1**	**17.1**	**14.2**	**3.1**	**13.2**	**12.8**	**12.5**	**43.2**	**44.3**

Note: 1. F0-F3 Depth of flooding land type etc. see Table I.1.1
P Permeable
I Impermeable

Source: MPO, 1990

1.2.3 Land Capability

Land capability and crop suitability is determined mainly by the depth and duration of seasonal flooding, soil permeability and whether irrigation is available or not. Other important criteria are soil moisture holding capacity, the risk of crop loss by floods (mainly on active floodplains and in basin centres), and proximity to markets for cash crops such as fruit and vegetables. Soil fertility is not a constraint on crop suitability in the NCR, nutrient deficiencies induced by low-input farming or intensive cropping are easily corrected by the use of appropriate fertilizer or manures. Salinity is also not a constraint in the NCR.

Table I.2.11 shows the main cropping patterns associated with different depth-of-flooding lands types, soil permeability classes and presence or absence of irrigation. Cropping patterns are complex because of the complexity of the relief, the drainage and the soil patterns on which they depend.

Rice is the principal crop grown, both in the rainy season and in the dry season. This reflects both environmental conditions and consumer's food preference. In the rainy season, on most kinds of land and soils, rice is the crop best adapted to the seasonal flooding, heavy rainfall and humid atmospheric conditions. In the dry season, farmers deliberately select the relatively heavier basin and valley soils, best suited for rice cultivation, when installing irrigation equipment; and, because of the strong consumer preference for rice, irrigated rice cultivation often extends on to adjoining permeable loamy soils which, in principle, would be better suited for growing dryland "rabi" crops such as wheat.

Dryland crops are best adapted to permeable floodplain ridge soils and deep, red, upland soils on the Madhupur Tract; (shallow yellow and brown Madhupur Tract soils are poorly suited for cultivation and mainly remain under forest or forest scrub). Jute is well adapted to permeable floodplain soils, while tree crops, sugarcane and rainy-season vegetables can be grown, usually without irrigation, on permeable floodplain and Madhupur Tract soils lying above normal flood-level. Dryland "rabi" crops such as pulses, oilseeds and wheat are widely grown without irrigation on F0, F1 and F2 land; with irrigation, potatoes, vegetables and spices become more important. Groundnuts, sweet potatoes and two minor cereals (cheena and kaon) are grown in the dry season on active floodplain land.

High yielding varieties (HYVs) of rice are widely grown on clay soils and on loamy soils that can be made less permeable by puddling. HYV aman are usually grown on F0 land. HYV aus can be grown on F0 and F1 land. By now, HYVs of aus and aman generally are grown without irrigation, in which case only one HYV crop (aus or aman) can be grown on F0-F3 land where irrigation is available, except in basin centres subject to early flooding. In basin centres, local boro varieties that can be harvested in April are grown.

Soil and climatic conditions are widely suitable for double or triple cropping patterns. Permeable soils on floodplain ridges and deep, upland soils on the Madhupur Tract generally are used for aus (sometimes jute or mesta) followed by a dryland "rabi" crop, both under rainfed and irrigated conditions. Impermeable soils (including puddled loamy soils) are mainly used for rainfed transplanted aus or irrigated boro, followed by transplanted aman; (soils puddled for transplanting paddy are poorly suited for a following dryland crop). On rainfed F2 land, aus and deepwater aman are commonly broadcast sown together, and are followed by dryland "rabi" crops. With irrigation, F2 land is used for boro paddy, partly preceded by mustard (not irrigated) and partly followed by transplanted deepwater aman. F3 land is mainly used for deepwater aman and is partly followed by "rabi" pulses or mustard. Irrigated F3 land generally produces a single crop of boro paddy. A single dryland "rabi" crop is usually grown on cultivated active floodplain land.

The net cultivated area (NCA) of the North Central Region consists of an estimated 31% Highland, 36% Medium Highland, 19% medium Lowland and 14% Low land (not including settlements and waterbodies).

CHAPTER 2
AGRICULTURE

2.1 General

The agricultural situation in the North Central Region has been described in the Reconnaissance Survey Phase I (NCRS 1990) covering the period, 1985-86 to 1989-90. During the present Phase II the collection of data and the assessment has been updated by a more detailed survey including the Districts in the study area, the Thanas and sometimes even Unions, paying attention to new developments and expected changes in cropping patterns and farming systems.

In the floodplains of the NCR, cropping patterns are to a great extent determined by the seasonal floods, i.e., the date when inundations start and end, the depths of inundation at peak levels and the risk of damage to crops due to early and late (flash) floods. Cropping systems and management practices are adapted to the local flood regimes and to the availability of irrigation water.

In most of the Madhupur Tract, with permeable soils and limitations of droughtiness, crop production is concentrated in the Kharif-I and Kharif-II season, except in areas where crops are irrigated.

With the introduction and rapid expansion of tubewell irrigation in the NCR, especially in the floodplain areas, and to a less extent in the Madhupur Tract, cropping patterns have changed, the use of HYV's have increased and rice production has risen considerably.

In 1990-91 an estimated 829,078 Ha of the study area has been cultivated, the so-called net cultivated area (NCA). This is 73% of the gross area. Out of this NCA 323,835 Ha (39% of the NCA) has been irrigated. The total area planted to crops amounts to 1,576,347 Ha which is equivalent to a cropping intensity of 188%, ranging from 109% in planning unit Nr.11 to 218% in planning unit Nr.2 (see Table 2.1). The main crop in the study area is rice. An estimated 1,070,625 Ha were harvested in 1990-91, being 129% of the NCA or 68% of all crops planted. The total rice production is 2,919,619 Tons of paddy (1,950,000 Tons of rice).

The farmers grow a wide variety of crops, which are broadly classified according to the growing seasons into 3 groups:

- Rabi crops grown during the rabi season, a dry season which covers the period from November to February and which is characterized by scanty or no rainfall, low temperatures and clear skies. Crop environment during this season is very favourable for high yields, because of high solar radiation, low humidity and wide variations between day and night temperatures. However crops are restricted to areas with adequate soil moisture. Rabi crops are sown in the winter and harvested in the spring or early summer.

- Kharif-I and Kharif-II crops grown during the kharif season, which is the main cropping season. Kharif starts in March and ends in October/November. It is characterized by a monsoon climate with high rainfall and high temperatures. The crop environment during this season is less favourable for high yields because of the uneven distribution of rainfall, variable flooding depths, low solar

radiation, high temperatures and high humidity. Rice is the predominant crop during the kharif season. Based on crop adaptability and crop culture this season has been divided into Kharif-I (March-June) and Kharif-II (July-October); so Kharif crops are grown in spring or summer season and harvested in late summer or early winter. A crop calendar showing the crops in the North Central Region is presented in Figure I.2.1.

TABLE I.2.1

Estimated Land Utilization in the NCR according to Planning Units

Planning Unit	Gross Area	NCA	% of NCA	Irrigated Area	% of NCA	Cropped Area	Cropping Intensity
1	89352	70009	78	39197	56	147524	211
2	73963	59850	83	36150	60	130715	218
3	172391	127979	75	40472	32	241622	189
4	76171	58420	76	29082	51	121066	207
5	212466	121318	57	42600	35	203803	168
6	114393	95880	86	40640	42	200550	209
7	90091	67238	73	23243	35	130690	194
8	46066	27192	59	12719	46	46620	171
9	78939	57757	73	22528	39	102304	177
10	67188	48255	72	13094	27	90540	188
11	24986	18564	67	5683	30	20480	109
13	101486	76616	76	18427	24	140433	183
Total	**1147489**	**829078**	**73**	**323835**	**39**	**1576347**	**188**

Note : Area in Hectare; Cropping Intensity in percentage

Source: BBS, DAE adjusted from thana boundaries by proportion during CS 1992.

2.2 Crops

2.2.1 Rice

In the study area rice is the most important crop and is grown throughout the year. Special adapted varieties have been developed for each growing season under rainfed, irrigated or flooded conditions by the Bangladesh Rice Research Institute (BRRI) in close co-operation with the International Rice Research Institute (IRRI). The varieties are also adapted to the preference of the rice growers and the consumers.

A number of high yielding varieties (HYV) of rice have been recommended by the National Seed Board for cultivation during different rice growing seasons in Bangladesh. A table presenting agronomic characteristics of some HYV rice varieties is shown in Annex-I.2.1.

Among the different groups of rice "aus" is grown during the Kharif-I season, "T Aman" (transplanted aman) during the Kharif-II season and "B Aman" (deep water aman) requires both Kharif seasons to mature. All three groups of rice are rainfed cultivated. During the rabi-season irrigated "Boro" rice is grown. Estimated total production of paddy is given in Table I.2.2.

Figure I.2.1

CROP CALENDAR OF EXISTING CROPS IN THE NCR

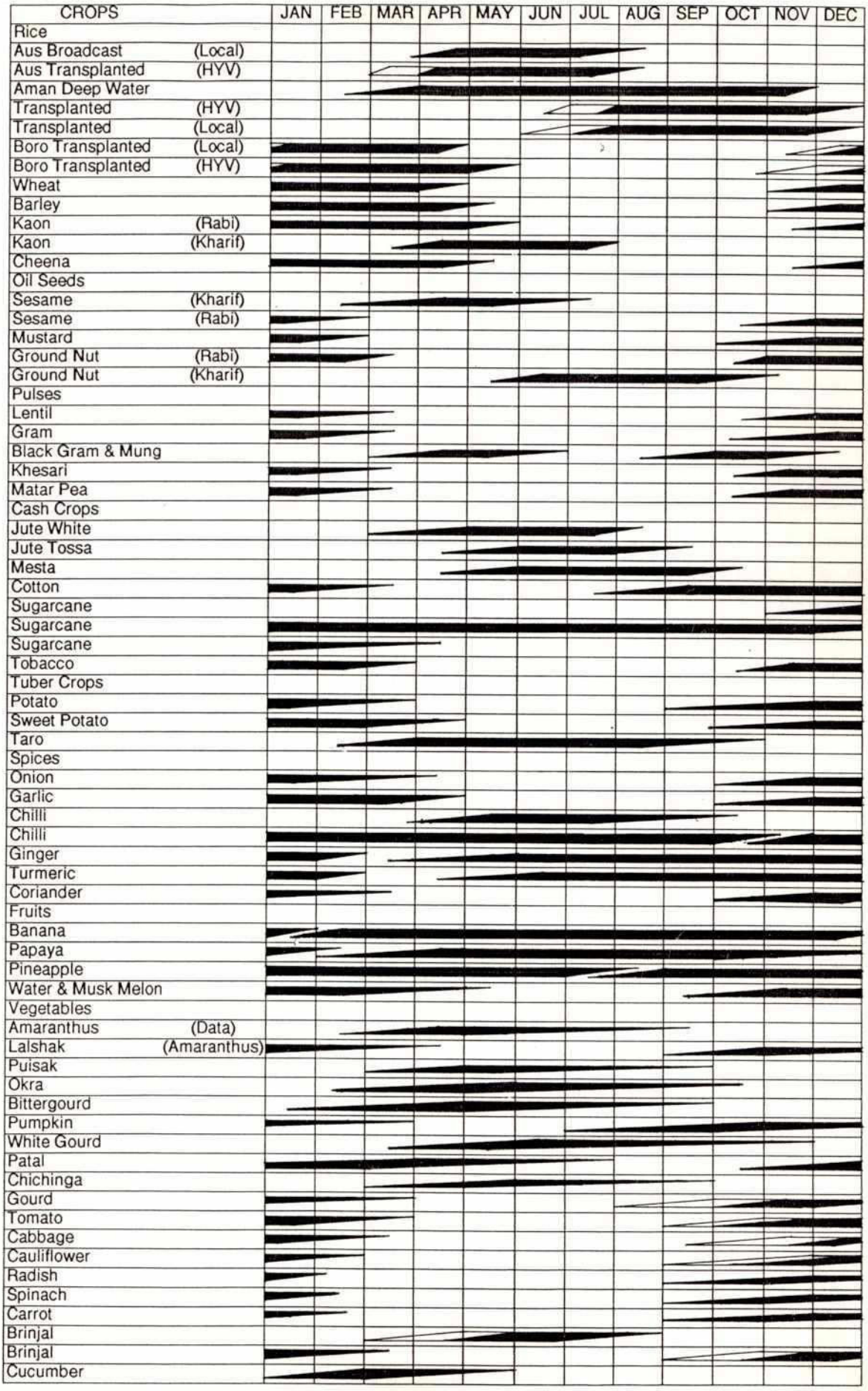


TABLE I.2.2
Estimated Production of Paddy in the North Central Region(1986/87-1990/91)

Crop	1986-87 (t)	1987-88 (t)	1988-89 (t)	1989-90 (t)	1990-91 (t)
Aus	499,500	460,800	478,900	437,300	443,600
T.Aman	681,600	627,800	410,200	809,400	868,200
Deep Water Aman	312,900	222,600	21,400	228,400	216,500
Boro	1,137,200	1,239,400	1,469,500	1,550,600	1,391,300
Total	**2,631,200**	**2,550,600**	**2,380,000**	**3,025,700**	**2,919,600**

Source : Consultants best estimates using BBS and DAE data checked in the field where possible

23% of the Aus area is planted to HYV's, 56% to T.Aman and 94% to Boro. Although HYV B.Aman has not yet been released. 4 improved varieties have been tested, so far, with promising results. The release of these varieties can be expected in the very near future.

Table I.2.3 gives the areas and production of the different local and HYV's of rice in the three growing seasons. The table shows that 47% of the total rice production is produced during the rabi season, occupying an area of 41% of the NCA, that 58% of the NCA is planted to rice during the rainy season (flood season) of which 21% is planted to Deep Water Aman (D.W.Aman) and 37% in areas which are flood free or only shallowly flooded. The most productive crop, the HYV Boro planted to 30% of the total rice area, has been producing 46% of the total rice production, 51% of the total area has been planted to HYV's producing 72% of the total production.

TABLE I.2.3
Proportional Area and Production per Rice Crop in 1990-1991

Rice Crop	% of NCA	% of total rice area		Total	% of total rice prod.		Total
		Loc.Var.	HYV		Loc.Var.	HYV	
Kharif-II							
B.Aman	21	16	0	16	8	0	8
Local T.Aman	16	13	0	13	10	0	10
HYV T.Aman	21	0	16	16	0	20	20
Sub-Total : Kharif-II	**58**	**29**	**16**	**45**	**18**	**20**	**38**
Kharif-I							
Local Aus	23	18	0	18	9	0	9
HYV Aus	7	0	5	5	0	6	6
Sub-Total : Kharif-I	**30**	**18**	**5**	**23**	**9**	**6**	**15**
Rabi							
Local Boro	2	2	0	2	1	0	1
HYV Boro	39	0	30	30	0	46	46
Sub-Total : Rabi	**41**	**2**	**30**	**32**	**1**	**46**	**47**
Total NCR 1990-1991	**129**	**49**	**51**	**100**	**28**	**72**	**100**

Source: CS 1992

In the 1990-91 season the area planted to boro rice decreased after a steady rise of 35% since 1987. The area planted to aus rice on the contrary showed some increase after a downward trend since 1987, see Table I.2.4. A possible reason for this might be the increase of fuel prices at the end of 1990 and the fear for scarcity of fuel during the Gulf crisis. In the 1990-91 season farmers might have decided to shift to the so-called "braus", planted as late HYV boro or early aus at the beginning of March. By doing so they saved on fuel costs for irrigation before the onset of the rains. The fallow period after boro rice in the mid-Kharif-I season, which has only a few crop options is then shifted to the rabi season, offering possibilities to grow a third crop as pulses, oil seeds or vegetables after the aman crop. If this new development in cropping pattern gives a better economic result, it is likely that the decrease in the total area planted to boro will continue, especially in the highland(F0) and medium highland (F1) areas.

TABLE I.2.4

Area of Boro and Aus crop, 1986-1991

Year	Boro (%)	Aus (%)
1986-87	100	100
1987-88	111	92
1988-89	127	87
1989-90	135	73
1990-91	125	83

Source : CS 1992

Another development is the increased practise of transplanting deepwater aman, mainly in Tangail district (planning units 2,4 & 6). Usually deepwater aman is broadcast in March/April in deepflooded areas (F2 & F3). By transplanting seedlings of 45-60 days old in May/June farmers can grow a deepwater aman crop after harvesting of boro. No ploughing is practised, due to the soft soil after irrigated Boro. Seedlings raised in seed beds or splits from established plants are used for this purpose. Tillering will be less, compared with broadcasted aman, so farmers plant closely with 2-3 transplants per hill. Only less deeply flooded areas are used for this practice. Deepwater aman varieties are photosensitive, so flowering of the broadcasted and the transplanted deepwater aman will be at the same period in September, early October. Data supplied by DAE showed hardly any difference in yield between broadcasted and transplanted deepwater aman.

This transplanting practice started in the late 70's. The rice-farming systems research section of BRRI started trials in 1990 in the vicinity of Mirzapur with transplanting deep water aman in areas flooded not deeper than 210 cm. Some of the trial plots have net enclosures and are stocked with fingerlings of carps. Last year 440 kg of fish has been harvested per Ha. Other results are not yet known. Research work and field trials are being carried out at present by BRRI on fish culture in rice fields, and it is recommended that this practice is studied further during feasibility studies.

Rice crop yields by planning units are given in Table I.2.5 and for area and production in Table I.2.6.

TABLE I.2.5

Rice Crops Average Yield (Tons/Ha) in 1990-91

Planning Units	D.W. Aman	Local T.Aman	HYV T.Aman	Local Aus	HYV Aus	Local Boro	HYV Boro
1	1.44	1.99	3.24	1.35	2.48	2.79	4.96
2	1.14	1.93	3.24	1.34	2.58	2.10	3.44
3	1.85	2.04	3.45	1.52	3.25	2.24	4.14
4	1.04	2.16	3.75	1.28	2.27	1.43	3.01
5	1.17	2.17	3.65	1.43	3.00	2.04	3.53
6	1.17	2.38	3.54	1.23	2.38	1.59	3.23
7	1.24	1.96	3.57	0.91	2.01	2.06	4.71
8	1.39	1.86	3.39	1.46	3.47	2.15	4.59
9	2.03	1.82	3.32	2.01	3.46	2.18	4.22
10	1.20	1.61	2.96	0.89	2.38	1.98	4.98
11	1.61	1.80	3.29	1.81	2.85	1.91	4.72
12	2.11	1.61	3.76	1.39	2.88	1.96	4.14
13	1.24	1.58	3.48	1.86	3.58	2.02	5.03
Total NCR	**1.24**	**2.06**	**3.45**	**1.36**	**3.12**	**2.14**	**4.01**

Source: CS 1992, Consultants best estimates using BBS and DAE data checked in the field where possible

TABLE I.2.6

Rice Crop area and production per Planning Unit (Hectares and Ton of Paddy)

Planning Unit	B.Aman		Local T.Aman		HYV T.Aman		Local Aus		HYV Aus		Local Boro		HYV Boro		Total Rice	
	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)
1	1015	1460	18775	37331	23118	74872	8249	11157	1129	2802	2329	6506	38689	220008	93305	354136
2	9309	15457	12605	24360	20994	66709	8294	11076	1346	3476	1124	2364	35689	125882	89362	249325
3	200	371	50005	102004	50453	174165	35148	53270	29612	96329	4349	9726	40508	167790	210276	603654
4	24194	25538	7256	15681	7823	29879	10698	13641	1320	3651	934	1340	29218	88009	81442	177740
5	2669	3363	30473	66206	40377	147706	33338	47801	11936	35771	3062	6260	39399	149572	161254	456679
6	40733	47794	6012	14323	2804	9940	26967	33301	3175	7565	774	1235	40787	136449	121253	250607
7	27471	34167	2170	4249	1714	6117	26906	24446	619	1242	621	1278	22801	107354	82302	178854
8	529	733	1611	2998	6093	20657	2515	3676	1583	5486	1371	2955	11583	53199	25285	89705
9	6492	13152	4052	7366	16512	54813	8886	17893	5830	20179	1575	3429	24458	103116	67804	219948
10	24784	29844	147	237	63	186	13482	12063	53	127	1111	2196	12268	61105	51907	105757
11	3438	5533	318	573	758	2496	1603	2909	282	806	373	713	5570	26284	12342	39314
12	2454	5176	261	419	930	3492	793	1099	468	1348	208	409	3050	12641	8164	24584
13	27422	33932	174	274	341	1185	15881	29542	836	2989	1844	3720	19431	97675	65929	169316
Total NCR	**170710**	**216520**	**133859**	**276021**	**171980**	**592217**	**192760**	**261874**	**58189**	**181771**	**19675**	**42131**	**323451**	**1349084**	**1070625**	**2919619**

Source : CS 1992

2.2.2. Other Crops

Crops other than rice cover 59% of the NCA,mostly planted during Kharif-I and Rabi seasons. The main crops are jute, wheat, oilseeds, vegetables, pulses, spices and sugarcane. The areas around Dhaka are known for the production of vegetables, potatoes and sugarcane (for chewing purposes). Production of pineapples, bananas, papaya and jackfruit is locally important in areas of the Madhupur Tract (planning units 5, 8 & 9) and in some parts of planning unit 3.

Jute: has been grown for fibre. The NCR being situated in the Brahmaputra alluvial tract produces superior quality jute. This is due to the availability of plenty of good quality water for retting of jute and for washing of fibres. Jute sticks however are becoming more important and are extensively used by farmers households for fuel proposes, for fencing and house building materials. Until 1989-90 the area planted to jute had been declining (see Table I.2.7) due to low market price of fibre as compared to rice, however the value ratio of jute fibre to jute sticks has been changed from 3 to 1 in 1987-88 to 2 to 1 in 1990-91. This, together with an apparent increase in demand for jute as fuel (which is resulting in an increased demand for jute sticks), may be the reason why the area planted to jute increased during 1990-91. Jute will remain an important crop in future cropping patterns.

TABLE I.2.7

Area (Hectare) of Jute in the North Central Region 1985-86 - 1990-91

District	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991
Jamalpur	26,140	20,094	13,766	12,831	12,000	18,205
Mymensingh	10,628	8,350	8,885	7,253	7,236	9,750
Tangail	43,740	24,490	22,275	22,072	19,386	28,968
Gazipur	4,702	6,156	4,090	4,455	2,529	5,708
Dhaka	12,089	6,561	4,303	6,257	5,536	7,288
Manikganj	5,265	5,535	6,987	5,102	5,088	6,065
Narayanganj	4,734	4,603	4,535	3,483	1,073	1823
Munshiganj	15,005	10,602	6,648	7,777	7,018	7,672
Total	**122,305**	**86,393**	**71,491**	**69,232**	**59,866**	**85,479**

Source : CS 1992

Wheat is the second largest cereal crop next to rice. Wheat acreage and production increased sharply during the late seventies, however, due to farmers preference to HYV boro cultivation under irrigation and due to other constraints in wheat cultivation, the area has declined in NCR from a total of 95749 Ha in 1985-86 to 59,601 Ha in 1990-91 (Table I.2.8). A number of HYVs wheat have been developed and released by the Bangladesh Agricultural Research Institute (BARI). These are more tolerant to diseases and insect pests and have the yield potential of 3.0 to 4.2 Tons per hectare under irrigated condition and that of 2.1 to 3.3 Tons per hectare under non-irrigated condition.

TABLE I.2.8

Area (Hectare) of Wheat in the North Central Region 1986-87 - 1990-91

District	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991
Jamalpur	15,764	14,641	7,813	6,048	7,537
Mymensingh	7,318	7,561	5,188	6,351	5,898
Tangail	30,476	29,129	23,935	23,835	19,803
Gazipur	2,936	2,754	3,037	2,204	2,365
Dhaka	6,433	6,984	7,968	7,508	7,007
Manikganj	15,621	13,022	14,328	12,541	13,183
Narayanganj	8,497	11,623	5,850	1,056	573
Munshiganj	8,704	8,400	8,007	3,438	3,235
Total	**95,749**	**94,114**	**76,126**	**63,021**	**59,601**

Source : CS 1992

Sugarcane is grown on a large variety of soils from the highlands of Gazipur and Mymensingh to young and active flood plains of Jamalpur, Manikganj and Munshiganj. Canes are cultivated either for crushing in the sugar mills or (due to the irregular collection of sugarcane by the mill and the long supply lines to the mill) for making molasses. Some varieties are grown for chewing purposes. In the soils of the char lands which has very low water holding capacity and where dry season boro cultivation by irrigation or growing of other rabi crops is not economical, sugarcane cultivation is done, in spite of the fact that the plants suffer from drought in dry season and from floods in July/August. Present yield of canes is 55-60 Tons per hectare with a sugar percentage of 8-10. Despite high price of canes fixed by the sugar mills the farmers prefer selling of canes to the molasses makers.

Mustard is the major oil seed crop. Being a short duration crop its well suited to in the existing cropping patterns of NCR, and the area under mustard has increased during the last few years. This is due to a shortage of cooking oils and the increased possibility of growing an irrigated boro rice after a crop of mustard. Improved varieties if properly cultivated yield 1.0 to 2.0 Tons of mustard per hectare as compared to local varieties (0.8 Tons/Ha). **Sesame** and **groundnut** are also cultivated in the region for production of edible oils.

Potato is the most important vegetable crop (Table I.2.9), and its statistics are presently separately from other vegetables. Nearly 63% of the total potato area is in Munshiganj and the yield is much higher in Munshiganj compared to other districts of NCR. For preservation and marketing of potatoes 40 cold storage units operate in Munshiganj with a storage capacity of 106,000 Tons. The yield varies from 25 to 30 Tons per hectare in Munshiganj to 10 Tons on the marginal lands of Jamalpur, Tangail and Manikganj.

TABLE I.2.9

Area (Hectare) of Potato in the North Central Region

District	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991
Jamalpur	2,155	1,326	1,774	1,411	1,959	2,454
Mymensingh	2,292	1,444	1,466	1,366	2,164	1,542
Tangail	3,645	3,502	6,318	5,194	4,226	3,861
Gazipur	688	672	1,247	688	808	798
Dhaka	1,140	1,691	1,594	1,611	1,498	1,226
Manikganj	1,550	1,568	1,573	1,567	1,677	1,833
Narayanganj	2,308	2,274	2,369	2,474	1,741	1,801
Munshiganj	18,369	20,081	20,855	18,212	21,409	22,812
Total	**32,147**	**32,558**	**37,196**	**32,523**	**35,482**	**36,327**

Source : CS 1992

Pulses are the cheapest source of protein for the people of NCR. There is a huge demand for pulses in the region, but due to low yield of the varieties grown in the dry season, the area and production have declined.

Maize is usually cultivated in the young flood plains of NCR. It can be grown in both rabi and kharif seasons. The lack of marketing possibilities has limited the expansion of maize production.

Millets (Cheena, Kaon) are grown on comparatively poor sandy soils of the char lands. These are considered as disaster crops and are adapted to a wide range of agro-ecological environments.

The average yields of crops other than rice, are given in Table I.2.10 by planning units, and some details about major crops in the North Central Region are included in Annex-I.2.2 and Annex I.2.3.

25

TABLE I.2.10

Other Crops Average Yield (Tons/Ha) in 1990-1991

Planning Unit	Wheat	Jute	Potato	Sugarcane	Pulses	oil seeds	Onion
1	2.20	1.60	14.90	76.50	0.90	0.50	6.00
2	1.90	1.70	13.50	51.30	0.80	0.80	7.80
3	1.80	1.60	10.30	45.20	0.60	0.70	6.20
4	1.90	1.70	12.90	59.40	0.80	0.70	8.10
5	1.90	1.50	11.60	50.10	0.80	0.80	7.20
6	1.90	1.40	11.60	54.60	0.80	0.80	7.50
7	1.80	1.40	12.70	55.60	0.90	0.50	3.90
8	2.10	1.60	14.00	49.90	0.80	0.70	6.50
9	1.50	1.80	12.40	48.20	0.70	0.70	11.40
10	1.70	1.40	16.20	33.50	0.90	0.60	3.90
11	1.90	1.60	25.40	41.00	0.80	0.70	6.50
12	1.40	1.60	23.80	44.10	0.70	0.90	10.90
13	1.50	1.50	29.90	44.30	0.90	0.80	5.10
Total NCR	**1.90**	**1.60**	**24.10**	**55.40**	**0.80**	**0.70**	**5.40**

Source : CS 1992

2.3 Cropping Patterns and Land Use

A cropping pattern is an arrangement of crops within a cropping year and is largely determined by factors such as soils, water levels (land type), food demand, irrigation possibilities, available inputs and market expectations. Rice being the major crop, dominates the cropping patterns of the NCR especially since the rapid extension of irrigation.

Depending on land type, soils and irrigation availability, rice cropping may be single, double or even triple. Double rice cropping in the study area is practised in highlands, medium highlands and irrigated medium low-lands. Triple rice cropping is practised occasionally in highland areas. In medium lowlands and in some lowlands mixed cropping of Aus and B.aman (deep water aman) is common practice, followed by other crops. In deeply flooded lands single cropping of B.aman in the Kharif season and boro in rabi season is practised.

The non-rice crops are generally grown as a sequential with rice. Most of the non-rice crops are dry land crops, although some crops like jute (white-type), millets (kaon) and sugarcane can tolerate some degree of submergence at later stages of growth. Jute is grown in the Kharif-I season, competing with aus for land and is considered a substitute crop for aus in cropping patterns. The rabi season crops included in the cropping patterns may be early, middle or late depending on land types, recession of floods, and dates of harvest of preceding crops.

In rainfed, dryland areas the growing of tolerant, short duration crops has been an important feature. Although high crop yields have been difficult to obtain, traditional cropping patterns do exhibit a high degree of stability. Another feature is mixed cropping and inter-cropping of annual crops. These practices provide farmers with opportunities of

harvesting different crops from the same land, increasing total land productivity, and maintaining and improving soil fertility through the use of legumes and jute. The most important dryland crops are aus, jute, millets, vegetables, potatoes, wheat, mustard and sugarcane. The cultivation of pulses has been decreasing rapidly. The acreage of wheat has been receding because of the increase of boro-rice cultivation, while jute is decreasing due to low market prices.

In the present cropping pattern as shown in Table I.2.11 only some major crops are included and should not be regarded as a guideline or even an average of the existing cropping system. The number of crops which are cultivated in the NCR is more than 50. However, the predominance of the rice crops in all the existing cropping patterns is uniform. T.aman crops are cultivated in the F0 and F1 flood categories where there is less risk of flooding in normal years, while deep water aman is planted in F2 and F3 areas, Aus in the F0-F2 flood categories, and some mixed with D.W.aman in F3 areas. Boro is only planted, when irrigation is available or in depressions following receding water.

2.4 Inputs

Seeds, fertilizer, irrigation equipment and pesticides are essential agricultural inputs for the rapid diffusion of HYVs in the country. The procurement and distribution of pesticides and irrigation equipment is mainly in the private sector. The Bangladesh Agricultural Development Corporation (BADC) on the other hand is responsible for procurement, multiplication and distribution of seeds. BADC has been the sole agent for fertilizer distribution up to 1989-90. Distribution and marketing has been privatized since in March 1989.

2.4.1 Fertilizers

In Bangladesh UREA, TSP and MP and some ZINC and SULPHUR are used. UREA accounts for over 70%, of the total fertilizer, TSP 23% and MP 4%. The remaining 6% is covered by ZINC and GYPSUM.

In recent years fertilizer sales in the NCR increased rapidly, the rate of increase in the second half of the current decade being faster than the previous rate. This faster rate of growth is claimed to be a result of the privatisation of fertilizer distribution. BIDS studies revealed that during the last 2-3 years fertilizer prices came down due to improvement in its distribution where the wholesalers had a significant contribution. According to data published by BADC the quantity of fertilizer distributed in the NCR has more than doubled since 1981-82, (UREA 231%, TSP 144% and MP 173%). The sale of UREA alone increased by 20% between 1988-89 and 1989-90, see Table I.2.12.

With the rapid increase of area planted to HYVs the use of fertilizers can be expected to rise steadily. Since March, 1989 private dealers have been allowed to take fertilizer directly from the factories and the ports at the same price as BADC. BADC as a state organization is bound to fixed prices and doesn't have the opportunity to fluctuate prices according to supply and demand. The distribution costs of such a huge overstaffed organization are much higher (Tk.550/Ton) than that of private dealers/wholesalers.

Almost all farmers apply fertilizer in boro (MV) irrespective of their size of farm. Minor crops (millets, sweet potato, groundnuts) and spices are little fertilized. In Jamalpur district jute receives a good amount of farmyard manures, whose applications in all other areas are almost absent. Farmers are not fully aware of the recommended rates. In some areas UREA applications are higher than the recommended rates and the MP is lower.

TABLE I.2.11

Present Cropping Patterns[1/]

	F0 = Highland < 30cm	F1 = Medium Highland < 30-90 cm	F2=Medium Low Land<90-180cm	F3 = Low Land <180-270 cm
Single Cropped	***Rainfed:*** T.Aman Aus Fruits Sugarcane Groundnut	***Rainfed:*** T.Aman Aus Jute Sugarcane	***Rainfed:*** D.W.Aman Aus B.Aman+Aus Millet Jute	***Rainfed:*** D.W.Aman Jute Millet Groundnut Rabi Crops
	Irrigated: Boro-HYV	***Irrigated:*** Boro - HYV	***Irrigated:*** Boro (HYV)	***Irrigated:*** Boro (HYV) Boro (Local)
Double Cropped	***Rainfed:*** Aus/Jute-T.Aman Aus/Jute-Rabi Crops T.Aman-Rabi Crops	***Rainfed:*** Aus/Jute-T.Aman Jute/Aus-Rabi Crops T.Aman-Rabi Crops	***Rainfed:*** Aus/Jute-Rabi Crops D.W.Aman-Rabi Crops	***Rainfed:*** Jute/Aus & Aman-Rabi Crops Boro(Local-Vegetables
	Irrigated: Boro(HYV)-T.Aman (HYV)	***Irrigated:*** Boro(HYV)-T.Aman(HYV)	***Irrigated:*** Mustard-Boro (HYV) Aus/Jute-Boro (HYV) Aus + Aman - Boro Local	***Irrigated:*** Mustard-Boro (Local-HYV)
Triple Cropped	***Rainfed:*** T.Aman-Rabi-Summer Vegetables	***Rainfed:*** Aus/T.Aman (Local/HYV)-Rabi Crops T.Aman-Rabi Crops-Jute	***Rainfed:*** Aus/Jute-Rabi-Crops	***Rainfed:***
	Irrigated: T.Aman-Pulses (HYV)/Mustard-Boro(HYV) T.Aman (HYV)-Vegetables-Boro(HYV)	***Irrigated:*** T.Aman-Pulses/Mustard-Boro(HYV) T.Aman-vegetables-Boro(HYV)	***Irrigated:*** Boro-Mustard-Summer Vegetables	***Irrigated:***

Note: [1/] The area and extent of cropping patterns and of land type is given for each PU in Annex I.2.4

Source : CS 1992

2.4.2 Pesticides

Application of pesticides are concentrated in HYVs. The major difficulty in the use of pesticides is their selection, appropriate to affected crops and diseases. In the rural markets pesticides are not generally available, and farmers procure them from thana market centres or important nearby markets. Major pesticides are Furadan, Dithane, Dimecron, Diazinon and Malathion.

2.4.3 Irrigation

In the NCR modern irrigation coverage is 92% of total irrigated area, leaving only 8% to manual irrigation, (by hand tubewells, swing baskets and doons). Surface irrigation by LLPs have a share of less than 12% of the modern irrigated area and it is declining, DTWs are irrigating 31% and STWs 49% (see Table I.2.13).

The recent achievements in irrigation coverage are quite satisfactory in the NCR having an irrigation intensity of about 39%; the highest being in Jamalpur. Mymensingh, Manikganj, and Munshiganj have the lowest level of irrigation intensity of less than 30% due to larger share of sandy to sandy-loam soils (see Table I.2.13).

BADC, BWDB and private firms are responsible for procurement and distribution of the irrigation equipment. BADC has been responsible for distribution and installation of DTWs up to the end of 1990 after which date it was privatized. In the case of STWs private dealers are primarily taking care of their sales. Adequate attention is not paid to their repair and maintenance.

Owners of STWs and LLPs decide the price of water. In the case of DTWs price is usually fixed through group discussions between owners and users. The common system of pricing in the region is the sharing of harvested produce in the fields, particularly in STW areas. For DTWs sometimes cash payments inclusive of fuel costs and machine rentals are charged. The prevalent crop-sharing arrangement in Tangail and Jamalpur is to pay one-fourth of the produce and sometimes it is raised to one-third in the sandy-loam soil where irrigation requirement is higher. The per hectare price to STW-water in boro (MV) in a season is roughly Tk.6,000/= under crop-sharing system and it comes down to about Tk. 4,000/= when paid in cash.

The average irrigated area by STW, DTW and LLP is 4, 20 and 11 hectares respectively.

TABLE I.2.12

Fertilizer Distribution in the NCR 1981-82 to 1989-90 (tonnes)

Districts	Years								
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-89	1987-88	1988-89	1989-90
UREA									
Greater Dhaka	52364	58889	67626	72723	96222	78522	99992	99809	119770
Jamalpur	17398	22128	26840	30171	32135	35051	40221	42900	51480
Mymensingh	9420	13678	14434	20180	17385	19937	19991	15660	18792
Tangail	22537	29211	29831	33088	26017	35467	26935	37826	45391
Total Area	**101719**	**123906**	**138731**	**156162**	**171759**	**168977**	**187139**	**196195**	**235433**
TSP									
Greater Dhaka	29453	27313	35471	34174	35269	26208	33144	47604	48407
Jamalpur	6407	6517	9375	10381	9166	10148	11206	10868	13303
Mymensingh	2377	3046	4077	5603	3444	3536	5224	4434	4271
Tangail	12869	14137	15249	14204	12714	13725	14075	14460	7853
Total NCR	**51106**	**51013**	**64172**	**64362**	**60593**	**53617**	**63649**	**77366**	**73834**
MP									
Greater Dhaka	4261	3721	4770	5602	7246	2977	8449	7261	5668
Jamalpur	1013	1246	1745	1454	1550	2141	1754	2209	3187
Mymensingh	264	390	369	534	413	1043	1033	920	1191
Tangail	2222	2808	3277	2980	2351	2511	3108	3119	3380
Total NCR	**7760**	**8165**	**10161**	**10570**	**11560**	**8672**	**14344**	**13509**	**13426**
ZINC									
Greater Dhaka	77	17	69	85	77	130	109	119	183
Jamalpur	22	25	16	30	21	34	24	34	61
Mymensingh	5	24	7	23	6	31	23	1	53
Tangail	22	24	19	58	23	56	34	72	134
Total NCR	**126**	**90**	**111**	**196**	**127**	**251**	**190**	**226**	**431**
GYPSUM									
Greater Dhaka	-	113	80	105	163	98	40	307	214
Jamalpur	-	9	131	87	127	111	43	565	1653
Mymensingh	-	7	15	74	83	96	10	283	440
Tangail	-	21	79	206	79	197	16	349	222
Total NCR	-	**150**	**305**	**472**	**452**	**502**	**109**	**1504**	**2529**
TOTAL FERTILIZER DISTRIBUTION									
Greater Dhaka	86155	90053	108016	112689	138977	107935	141734	155100	174242
Jamalpur	24840	29925	38107	42123	42999	47485	53248	56576	69684
Mymensingh	12066	17145	18902	26414	21331	24643	26281	21298	24747
Tangail	37650	46201	48455	50536	41184	51956	44168	55826	56980
Total NCR	**160711**	**183324**	**213480**	**231762**	**244491**	**232019**	**265431**	**288800**	**325653**

Source: Monthly Fertilizer Newsletters, BADC

TABLE I.2.13

Area (Ha) Irrigated by Different Methods in the NCR 1990-91

District	DTW			STW			LLP			Others	Total	% of cult
	No.	Area	Command Area	No.	Area	Command Area	No.	Area	Command Area	Area	Area	Area
Jamalpur	589	14,654	24.9	10198	43177	4.2	98	1017	10.4	8002	66850	56.6
Tangail	1493	30,936	20.7	19,048	82,971	4.4	363	2636	7.3	3290	119833	47.0
Mymensingh	1449	27484	19.0	1072	4,488	4.2	593	3,485	5.9	10.186	45,643	29.4
Gazipur	1012	18861	18.6	1.448	7,151	4.9	1077	15,047	14.0	1,296	42355	32.5
Dhaka	445	7972	17.9	3,356	14,142	4.2	463	7,370	15.9	894	30,378	36.2
Manikganj	406	7745	19.1	3,596	14753	4.1	108	1,337	12.4	1,425	25,260	26.3
Munshiganj	18	390	217	1,522	7,895	5.2	478	5,659	11.8	1,993	15,937	26.2
Narayanganj	86	1,850	21.5	183	1,310	7.2	229	5440	23.8	3,436	12,036	49.9
Total	**5498**	**109,892**	**200**	**40,423**	**175,887**	**4.4**	**3409**	**41991**	**12.3**	**30,522**	**358,292**	**43.2**

Source : CS 1992

2.4.4 Labour Use

Agriculture in Bangladesh is still traditional where human labour and bullock power are widely used. Use of power tillers and tractors by common farmers is still sporadic, but increasingly in Munshiganj power tillers are used in land preparation for potato. Farmers in addition to the use of their family labour, also hire-in labour.

Hired labourers are of three categories:

i) Permanent or attached labour to a family for a season or a year

ii) Casual hired labour - contracted on a day to day basis; and

iii) Contract labour, who either individually or in a group takes specific jobs under contract. Casual labour is the principal class of wage labour in our study area. They are paid on a daily basis mostly in cash plus food (2-3 times a day).

In the case of contract work either cash or kind is paid. Kind payment is observed in the harvest of boro paddy. Wages vary from Tk. 25 - Tk. 50 per day with or without food depending on seasons. There are in and out labour migrations in all the areas of the NCR. The main factors to migration are availability of work and higher wages.

2.4.5 Draught Power and Land Preparation

Animal power use is quite common in agricultural operations. Their predominant use is in land preparation, threshing of crops and in transportation. Farmers sometimes use their cows as draught power. They also hire-in or exchange draught power either on a daily basis or under contract. The draft power requirements for each crop are detailed in the agricultural economics section, SR X, Section 3.3, Tables X.3.4 to X.3.7.

Land preparation for growing of crops is done by bullock driven wooden ploughs. The draught animals in the country are short statured and weak. One pair of bullocks can plough 35 decimals of land in a day. To prepare land for seeding or transplanting, 4-6 ploughings are necessary.

The present supply of draught animals cannot cope with an increased demand in case of higher cropping intensity. (See also I.3.1 Livestock). Inputs used to grow one Ha of rice are listed in Table I.2.14.

The cost of hiring a bullock pair for a day, usually of around 5 hours is about Tk.50 in Tangail and Jamalpur. In Trishal Thana of Mymensingh District land is ploughed under contract @ Tk. 50 for 6.5 decimals i.e, Tk. 2,000 per hectare. Cost of land preparation generally varies from Tk. 1,500 to Tk. 3,000. The power tiller use is increasing. Its costs range between Tk. 2,000 to Tk. 3,800 per hectare. Two ploughings are done by a tiller for the preparation of soil. See also Tables X.3.4 to X.3.7 of SR X

TABLE I.2.14

Inputs used to Grow 1 ha of Rice (1987)

Labour in Man-day	Local Aus	B.Aman	HYV Aus/Boro	T.Aman (Local)	HYV Aman
Land preparation	35	35	41	39	38
Sowing, transplanting, levelling	14	28	42	29	33
Weeding, intercultural operation	54	42	58	19	36
Harvesting	33	29	40	28	33
Threshing	16	15	22	17	19
Total	**152**	**149**	**203**	**132**	**159**
Labour use in '79-'81	138	128	217	131	180
Labour days per Ton of paddy	90	74	40	50	45
Fertilizer use (1987)					
Urea	34	33	185	60	151
TSP	20	16	103	29	96
MP	3	6	32	7	21
Total	**57**	**55**	**320**	**96**	**268**
% of farms using fertilizer	46	39	96	85	98
Use of pesticides (Tk/Ha)	77	65	359	41	252
Seed (Kg/Ha)	80	80	60/80	60	60
Animal draught power(pair days per Ha)	48	42	43	45	45
Irrigation (Ha) (1991)			4500		775
(1987)			3628		620

Source : BIDS/IRRI Differential impact of MVB rice Technology October 1990.

37

2.4.6 Credit

Credit to finance inputs at the right time and right quantities has become an essential facility for most farmers, especially when growing HYVs. In Bangladesh there are 2 main sources of rural credit - the institutional, such as private and nationalized banks and the non-institutional, being money lenders, friends and relatives.

The institutional agricultural credit issue is extensively described in SRX.6 Institutional Support under the heading "Agricultural Credit".

Non-institutional credit is prevalent in both rural and urban areas. About 65%[1)] of the total credit needs are met by non-institutional sources because of the relative ease of access compared to the institutional credit. The landless and marginal farmers prefer this form of credit, because of equity problems which are rather easy for medium and large farmers.

2.5 Marketing of Agricultural Produce

2.5.1. Marketing

Agricultural marketing in Bangladesh is predominantly an individual business. Traders individually or in groups participate from exporting to domestic marketing to maintain a minimum price at farm level. State procurement of paddy/rice and wheat are done in the harvesting seasons. There are corporations in the country which are involved in the trading of some selected cash crops, namely jute, cotton, tobacco and sugarcane. These are :

i) Bangladesh Jute Corporation,
ii) Bangladesh Jute Mills Corporation,
iii) Food and Allied Industries Corporation,
(iv) Cotton Development Board of the Ministry of Agriculture and
v) Bangladesh Tobacco Company Limited.

They procure from growers through agents at prevailing market prices. Monopoly control appears to have been exercised in the procurement of tobacco and sugarcane by the respective corporations/firms.

Farmers in the NCR like all others in the country dispose of their produces in the local markets which generally sit once or twice a week. The special characteristic of rice marketing in the country is that almost all producers - big and small sell during the harvest seasons and a significant number of them, specially the small ones, buy back in the off-season even at a higher price. Rich producers sometimes sell their surpluses at their homesteads. Such transactions take place at the time of bulk sale of paddy and jute.

In the marketing of agricultural commodities generally four categories of middlemen are involved at different levels of marketing channels. These intermediaries are commonly known as Faria, Bepari, Paikar (wholesaler) and Aratdars. Farias are small traders operating in local markets. They procure directly from growers and sell to Beparis on the same day or the next market day in nearby important markets. Beparis normally participate in the important local

---

1 GOB/World Bank Agricultural Credit Review, 1983.

markets better communicated to wholesale markets and processing centres. In the wholesale or secondary markets aratdars operate. These Aratdars provide storage of their commodities to (paikars) wholesalers. The Aratdars instead get commissions from the Beparies. They also finance Beparis.

Available information show that rice and jute marketings in local markets are competitive. But sometimes in the harvest seasons prices fall sharply because of tacit understanding among the traders or cash constraints on their parts. Strikes in the capital city and neighbouring towns also affect rural marketing adversely. This is more damaging to perishable products.

In times of shortage, rice deficits in rural areas are met from the supplies in surplus districts of Sherpur, Sylhet, Dinajpur and Rajshahi. The principal means of transport are trucks and in the wet season boats are also widely used. The state procurement in our study areas is almost absent except in good aman harvest years when state procurement centres are opened in Jamalpur and Mymensingh like all other surplus producing areas. These centres procure paddy and rice from the growers as well as traders at the declared fixed prices. The large-scale purchases by the Government appear to have favourable impact on maintaining floor prices of paddy.

2.5.2 Prices

The input-output price relationships are the principal determinants of crop production particularly for commercial farmers. In subsistence agriculture prices may sometimes appear to be unimportant but studies show that farmers are responsive. Field visits and discussions with the farmers suggest that their cash income is very much effected by price fluctuations, specially the sharp fall in prices during the harvest seasons. Prices are thus a matter of concern both to small and larger producers and the land allocations to different crops are influenced by prevailing market prices. The NCRS field enquiries have been limited to the prices of rice, the principal crop in the country. Prices used as the basis for the economic analysis are given in SR X.3.

There are seasonal fluctuations in prices of paddy. Paddy prices decline in the harvest months and rise in the off-seasons or during the pre-harvest months, with price movements in the NCR generally following the country's average patterns. The lowest prices are normally found in the months of May and December when Boro and Aman paddy are harvested respectively. Price falls are steeper in May with the larger supply of Boro paddy in the region. In normal years boro production in the NCR accounts for about 46% of the total rice production (as opposed to only 25% in the country). The share of Boro paddy in the NCR during the devastating flood years like 1988 increased to over 60%. In the pre-harvest months of March and April (in Boro season) and October (in Aman season) maximum price rise is experienced. The above reported price movements are however, not uniform in all the years. Deviations depend on the production situation and the state participation in the Public Foodgrains Distribution System (PFDS).

Floodplain storage in the NCR managed by the Ministry of Food includes 52 Local Storage Depots (LSD) and 2 Central Storage Depots (CSD). Location, capacity and actual stock position per January 01, 1992 are mentioned in Table I.2.15.

Farmgate price of aman paddy is the highest, followed by boro. The usual price difference between aman and boro is around 5 percent and almost the same between boro and aus paddy. The price differences (at present) between local and HYVs are marginal, but the price of Pajam rice is found to be always higher than other rice, except fine ones. In the earlier years of the introduction of HYVs, prices of HYVs were lower because of their larger size and perceived poor taste but with the passage of time rural people have become accustomed to it.

35

TABLE I.2.15
Foodgrain Storage in the NCR

District	Thana	Village	Capacity in Ton		Total	Stock position as of 01.01.92			
			L.S.D.*	C.S.D.**		Rice	Paddy	Wheat	Total
Jamalpur	Jamalpur Sadar	Sinjani	6400						
	Jamalpur Sadar	Piyarpur	500						
	Sarishabari	Sarishabari	3000						
	Dewanganj	Dewanganj	2000						
	Madarganj	Baliajuri	1500						
	Melandaha	Melandaha	1000						
	Islampur	Islampur	1000						
	Sub-Total		**15400**	--	**15400**	**3859**	**8**	**4511**	**8378**
Tangail	Tangail Sadar	Tangail	2000						
	Tangail Sadar	Biswashbetka	7750						
	Tangail Sadar	Karatia	1386						
	Mirzapur	Mirzapur	2500						
	Kalihati	Kalihati	1500						
	Gopalpur	Gopalpur	2000						
	Madhupur	Madhupur	3000						
	Madhupur	Dhanbari	2500						
	Nagarpur	Nagarpur	2000						
	Basail	Basail	1750						
	Ghatail	Ghatail	2000						
	Bhuapur	Bhuapur	2250						
	Shakipur	Shakipur	2750						
	Sub-Total		**33386**	--	**33386**	**3215**	--	**10083**	**13298**
Mymensingh	Mymensingh Sadar	--	--	27560					
	Trisal	Dhanikhola	2000						
	Fulbaria	Fulbaria	1000						
	Fulbaria	Naghla	500						
	Gaffargaon	Goyespur	1000						
	Gaffargaon	Dalla	1000						
	Muktagacha	Muktagacha	1000						
	Bhaluka	Bhaluka	500						
	Sub-Total		**7000**	**27560**	**34560**	**1845**	**315**	**1100**	**3260**
Gazipur	Gazipur Sadar	Joydepur	2500						
	Kapasia	Kapasia	2500						
	Kaliganj	Mansurpur	1000						
	Sreepur	Sreepur	2000						
	Kaliakair	Kaliakair	1000						
	Sub-Total		**9000**	-	**9000**	**1166**	-	**2966**	**4132**
Dhaka	Dhaka			43450					
	Savar	Savar	1500						
	Dhamrai	Dhamrai	2000						
	Keraniganj	Konakhali	1000						
	Nawabganj	Kalakopa	1000						
	Dohar	Narisha	1000						
	Sub-Total		**6500**	**43450**	**49950**	**12026**	-	**8448**	**20474**
Manikganj	Manikganj Sadar	Manikganj	4500						
	Manikganj Sadar	Batirtek	1500						
	Saturia	Saturia	750						
	Ghior	Ghior	1500						
	Shivalaya	Uthali	1500						
	Daulatpur	Daulatpur	1000						
	Harirampur	Jhitka	1500						
	Singair	Singair	1500						
	Sub-Total		**13750**	-	**13750**	**2186**	-	**3204**	**5390**
Munshiganj	Munshiganj Sadar	Mirkadim	5500						
	Gazaria	Katakhali	1500						
	Serajdikhan	Rasulpur	2500	-					
	Serajdikhan	Sayedpur	1000						
	Lauhajang	Lauhajang	1500						
	Sreenagar	Sreenagar	1000						
	Tongibari	Tongibari	1000						
	Sub-Total		**14000**		**14000**	**3352**	-	**4968**	**8320**
	TOTAL NCR		**99036**	**71010**	**170046**	**27649**	**323**	**35280**	**63252**

No. of LSD* = Local Storage Depot = 52
No. of CSD** = Central Storage Depot = 2

Source : Ministry of Food, January 1992

2.6 Constraints to Agricultural Production

The low growth rate and even stagnation in agricultural production in the NCR can be attributed to several problems, as described below :

2.6.1 Floods

Normal seasonal floods are regarded by the farmers as a blessing, depositing silt and recharging the water table. The depths of these floods vary from year to year. Occasionally high early floods and late floods from the Jamuna and the Old Brahmaputra occur (estimated to occur to some degree, approximately every 3 to 5 years). These are damaging to crops in the floodplain such as aus, deep water and transplanted aman and even sometimes boro, and crops like jute and early rabi-crops, estimates of flood damage are made in SR X.2. These floods sometimes bury good agricultural land with thick layers of raw new alluvium, silting-up drainage channels and eroding riverbanks. Heavy pre-monsoon rainfall sometimes causes flashfloods which damage crops, and even homesteads. In the NCR the most affected areas are :

Mymensingh District : Gaffargaon, Bhaluka, Trishal and Mymensingh Sadar Thanas.
Tangail District : Ghatail, Shakipur, Basail and Mirzapur Thana.
Gazipur District : Kaliakair and Joydevpur Thana.

The rivers in these areas, such as the Bangshi, Banar, Sutia, Shila, etc., flood their riverside after heavy local rainfall. (150-175mm in 24 hours, which happens occasionally - June 1987; and June, July and September 1988). Some rivers have become silted up and river beds are now is same places used for boro and late T.aman rice-cultivation.

The increasing use of high speed engine powered country boats, the so-called"shallows", has lately causing damage to river banks, especially along the Bangsi-river, to such an extend that rivers are silting up and can no longer be used for water communication for the major part of the year.

2.6.2 Drainage

Besides flooding, the silted-up rivers are inhibiting proper drainage. Substantial areas are poorly drained, due to the low overall gradient and lack of maintenance of drainage channels. The areas most affected are:

Tangail District : West of the Madhupur Tract, except the areas bordering the Jamuna river.
Mymensingh District: The area bordering the Old Brahmaputra river and the Shila, Sutia and Khairo rivers.

Widespread drainage problems are caused by manmade obstructions like roads and embankments without proper drainage facilities.

2.6.3 Soils

Heavy clay soils are not easy to cultivate, especially basin soils which are creating problems. Soils on ridge tops in Jamalpur and the northern part of Tangail Districts have a low-moisture holding capacity which leads to drought problems in years with little rainfall. The same problem occurs in some areas in the Madhupur Tract with additional low natural fertility of upland soils and grey valley soils, (deficient in K,Zn and S.) and P-fixation in red soils. Puddled topsoil and strong ploughpan in soils used for transplanted aman cultivation prevents or restricts the cultivation of dryland rabi crops.

37

2.6.4 Irrigation

The rapid diffusion of tubewell irrigation in recent years has covered most of the suitable land in the NCR. Future development of irrigated agriculture is only feasible in areas which are being protected against floods and provided with proper drainage possibilities. Groundwater supply seems to be sufficient in the NCR except in areas in Mymensingh District, the Madhupur Tract and the area North of Dhaka. The Terms of Reference for this Study did not allow for a full assessment of irrigation potential, however irrigation has been identified as an important aspect of the future analysis, see Section 6.5.5 of the Main Report.

2.6.5 Inputs

The availability of inputs like fertilizers, pesticides and irrigation equipment has improved considerably since the distribution and marketing of these commodities has been privatized. Sufficient and timely supply of high quality seeds however sometimes remains a problem.

2.6.6 Institutional Constraints

Institutional constraints regarding the functioning of the agricultural extension service and agricultural research institutions and the failure to transmit the research results to farmers are extensively dealt with in SRX.6 "Institutional Support".

2.6.7 Other Constraints

Some additional constraints are mentioned below:

- More than 70% of the farmers are so-called marginal (<0.25 ha of land) or small (<0.40 ha of land). Almost all of them are illiterate and hire themselves out as labourers. These farmers have very little contact with research and extension staff. Resources like credit through normal channels are not available to assist them to generate additional income from agricultural activities. Prices for inputs like fertilizers and pesticides are too high to afford, reducing their yields. Reduction of input prices and provision of credit facilities could offer possibilities to produce more and so improve their standard of living.
- In char lands on the Active Brahmaputra-Jamuna Floodplains frequent changes in river channels and formation of new lands are creating uncertainty about the land ownership. Backward socio-economic conditions prevail which are not helped by the large (and absentee) landowners.
- Share cropping (20% of the cultivated land is under share cropping) offers neither security of tenure nor a fair share of their produce to the share croppers.
- Heavy pressure of population has led to a shrinking of land/man ratio which cannot help them generate surplus for investment.
- In some areas farmers lack security needed to invest in technology due to floods and drainage problems.

2.7 Agricultural Development Potentials

2.7.1. Land Suitability Potential

The tropical monsoon climate favours production of a wide range of crops in the North Central Region. The farmers work hard and are very resourceful. They have learned how best to live in difficult conditions, while producing rice and other crops for domestic requirements and for local markets. The floodplain consist of deep moderately fertile soils. Rice production in the NCR actually meets the requirements of the local rural and urban population, excluding the city of Dhaka.

Soils in the NCR in general are already used intensively. Cropping intensities in the Jamuna floodplain are high. In planning units 1,2,4 and 6 they are well above 200% and detailed survey unionwise in these planning units shows even higher cropping intensities. Potentials decrease progressively southward on floodplain land and is lower in planning units 7,10,11 and 13. Planning units No.5, 8,9 and 12 on the Madhupur Tract have a low potential for improvement compared with floodplain areas, as have active flood-plains. In planning unit no.3 agricultural development possibilities are limited due to drainage constraints.

F0 and F1 land has the highest agricultural potential, especially on the Old Brahmaputra Floodplain in PU 1,2 and 4. On such land two transplanted rice crops can be grown every year on impermeable soil (including puddled loamy soils), two HYVs on F0 and one local and one HYV on F1. F0 and F1 lands with permeable soils (including deep red clays on the Madhupur Tract) are suitable for a wide range of dry land cash crops, especially with irrigation: fruits and vegetables year-round on F0 land, rabi vegetables, potato, species, wheat etc. on F1 land. The main development requirements for F0 and F1 land are :

- Supplementary irrigation to make transplanted aman production more secure.
- Provision of irrigation on permeable ridge soils and on deep Madhupur Tract upland soils, especially to increase production of dryland cash crops.
- Reduction of peak flood-levels, where it is feasible, to enable HYV aman to be grown more extensively and securely on F1 land; such flood control would also benefit aus and jute cultivation in agro-ecological zones 8 and 12.

F2 and F3 lands generally have a lower potential than F0 and F1 lands. Development opportunities in the monsoon season are restricted by the depth of flooding and by the risk of crop damage by untimely or high floods. The greatest opportunities for increased production exist in the dry season, especially with irrigation. The main development requirements are:

- Expansion of irrigation of lands not presently irrigated (mainly in PU 6,7,11,10 and 13) in order to grow HYV boro on impermeable soils and dryland rabi crops on some relatively higher, permeable soils;
- Improvement of drainage in basin centre, where it is feasible, to enable HYV boro to be grown more extensively and reliably on irrigated basin land;
- Controlled flooding, where it is feasible, to enable aus, jute and deepwater aman to be grown securely; controlled flooding would also enable deepwater aman to be transplanted more reliably after the harvesting of boro;
- Protection of land close to river channels from burial by sandy alluvium during high floods, where it is feasible.

39

2.7.2 Agricultural Potential

If current research yields represent crop productivity potentials, average yields have reached only about 35% of the potential, except for Boro and T.aman rice. The better farmers using HYVs and recommended inputs have attained yields of 200% of the national average. (See tables I.2.16 and I.2.17). If technology would have been fully utilized with the current cropped and irrigated area, the NCR could meet food requirements, including rice, for the entire region to the year 2000 when population is expected to reach approx. 21,500,000 including Dhaka city. Crop diversification into high yielding food crops such as maize, potatoes, improved oil seeds and pulses offers a great potential. Optimizing the use of land and water by cultivating more suitable and profitable crops will increase productivity. Possibilities to extend the total irrigated area considerably are however, limited.

To a certain extent there is still some scope for extension of irrigation in the lowland areas, provided there is flood protection or controlled flooding. The World Bank with its DTW II project is active in Mymensingh, Manikganj, Munshiganj and Dhaka Districts. The use of shallow tubewells (STW) offers a more flexible and quick possibility for a rapid extension of irrigation.

TABLE I.2.16

Yields of Selected Crops that Researchers and Better Farmers have Obtained in Bangladesh using the Current Best HYV and Recommended Husbandry Practices.

Crop	Yields in Mt/Ha		
	Research Level	Better Farmer Level	Farmer 50% Input Level
Rice - Boro (HYV) Paddy	6.5	6.5	4.3
Rice - Aus (Local) Paddy	2.0	1.6	1.0
Rice - Aus (HYV) Paddy	4.5	3.6	2.3
Rice - T.Aman (Local) Paddy	3.5	3.5	2.3
Rice - T.Aman (HYV) Paddy	5.0	5.0	3.3
Rice - B.Aman (Local) Paddy	2.5	2.0	1.3
Wheat	5.5	5.0	3.0
Jute	3.0	2.4	1.2
Rabi Maize	8.0	6.4	2.6
Kharif Maize	4.5	3.6	1.5
Soybeans	2.5	2.0	0.8
Lentil	2.5	2.0	1.0
Mungbean, black gram, cowpea	2.0	1.6	0.7
White potato[1/]	35.0	28.0	15.0
Groundnut	3.0	2.4	1.5
Maize fodder (DM)	3.4	2.2	1.1
Legume fodder (DM)	2.0	1.3	0.7
Mustard	2.5	2.0	1.0
Sesame	1.5	1.2	0.6

Note : 1. Yield as fresh weight

Source: CS 1992 based on Estimates by BARI and BRRI

TABLE I.2.17

Estimated Yield Gap for Selected Crops between National Average Yields and Yields Obtained by Better Farmers using HYVs and Recommended Husbandry

Crop	Yields in MT/Ha x 1,000		
	Better Farmer Level[1]	National Average 1983-1986[2]	Yield Gap
Rice - Boro (HYV) Paddy	6.5	4.0	2.5
Rice - Aus (Local) Paddy	1.6	1.2	0.4
Rice - Aus (HYV) Paddy	3.6	2.9	0.7
Rice - T.Aman (HYV) Paddy	5.0	3.0	2.0
Rice - B. Aman (local) Paddy	2.0	1.5	0.5
Wheat (HYV)	5.0	2.2	2.8
Jute	2.4	1.5	0.9
Rabi Maize	6.4	0.8	5.6
Pulses	1.6	0.7	0.8
White Potato [3]	28.0	10.4	17.6
Mustard	2.0	0.7	1.3
Sesame	1.2	0.6	0.6

Note : 1. Estimates by BARI and BRRI
2. Statistical Year Book of Bangladesh, 1987
3. Yield as fresh weight

Controlled flooding, improved drainage and protection of agricultural land from flash floods will provide possibilities for higher production levels per Ha. through controlled and shorter inundation periods, decreased sand deposits, combined with better farming methods, higher resource investment in inputs, the use of HYV's and the extension of the growing period (increase of number of growing months).

Possibilities to improve agricultural development are mainly dependent on the diffusion of new improved varieties, improved soil and crop management, efficient use of available water resources, and that flood control and improved drainage is provided.

Newly improved varieties are developed at the Agricultural Research Institutes like BARI, BRRI, BJRI and other research institutes and introduced to farmers through the Agricultural Extension Services. These varieties are adapted to the local growing conditions and the preference of the consumers in Bangladesh. Special emphasis has been laid on the improvement of crops like rice, wheat, millets, mustard, pulses, potato, sugarcane, jute, sweet potato, groundnut, sesame, cotton and vegetables.

Improved soil and crop management will raise the production capacity of the farms, through techniques such as:

- Timely planting to make optimum use of the available growing season.
- Increased and more efficient fertilizer applications following the recommendation of the Research Institutes.

- Use of manure/mulch to increase the organic matter content and to improve the moisture holding capacity of the soil.
- Better land preparation.
- Levelling of fields to prevent waterlogging after heavy rainfall.
- Making field-drains to speed up drying after floods and to protect dryland crops from waterlogging.
- Raised platforms, beds and ridges in flood prone area for the cultivation of cash crops like banana, betel leaf, vegetables and spices.
- Efficient use of pesticides and integrated plant protection.
- Promoting dibble and line sowing and transplanting of aus and deepwater aman paddy.

Efficient use of water resources can maximize the outputs of the farmers fields, through measures such as:

- Channel lining and field levelling.
- Rotational irrigation.
- Round the clock pump operation.
- Growing dryland rabi crops and/or direct seeded aus/jute instead of HYV boro paddy on land with soils with a high permeability.
- Provide additional DTWs, STWs, LLPs and HTWs in present rainfed areas if the groundwater availability permits. -HTWs and STWs are most appropriate in areas of irregular relief and complex soil patterns.
- Double lifting of water into higher lands.
- In areas which are prone to erosion and floods it sometimes is worthwhile to use HYWs to supplement residual soil moisture for rabi crops.

2.7.3 Yield Predictions

This Study does not concentrate on yield projections and/or linkage with production costs, as changes in yields for individual varieties will not occur as a result of project interventions and to include such an analysis would lead to uncertainties in the economic analysis.

However as background information it is noted that national yield figures have been increasing by some 1 to 2% per year on average (BBS 1991). The figures presented in Annex I.2.20 indicate that considerable year to year variations can be expected on these general trends, although the overall trend is still as per the national figures. This aspect is discussed further in SR X.4.

2.8 Possible Impacts of Controlled Flooding and Improved Drainage

If protection against flash floods and high early and late foods is provided and drainage impediments can be eliminated a further increase of production can be attained.

The production capacity per ha is increasing with the extension of the growing period. For example: an inundation with a duration of 5 months reduces the growing period to 7 months. If the inundation period can be shortened by an improved drainage system, the growing period will increase. This will make it possible for farmers to plant earlier and to harvest on time. Longer duration varieties of crops with a higher yield potential can be used or an additional crop can be grown.

With higher crop security farmers are inclined to invest more on inputs like fertilizers and irrigation. Each month of extension of the growing period will result in at least 10% increase of the total production per ha.
Improved water management can be expected to have the following impacts (see Table 2.18:-

2.8.1 Rainfed Agriculture

- Land which becomes F0 or F1 land will be planted to Aus or Jute followed by T.Aman, sometimes succeeded by rabi crops.
- There will be a shift from local T.Aman to HYV T.Aman due to improved flood security.
- Improved flood security (preventing flash floods) and delayed inundation will result in a shift form B.Aus to T.Aus.
- The area of transplanted Deep Water Aman will increase in the F1 and the less deeply flooded of the F2 lands.
- On F2 land mixed aus and broadcasted aman will be grown or jute followed by rabi crops.
- In F3 areas broadcasted aman will remain the only crop to be grown in some areas to be followed by rabi crops.
- In some planning units (No. 1,2,4,6 and 7) sugarcane will remain an important crop in the future cropping patterns on F0, F1 and sometimes F2 lands.

2.8.2 Irrigated agriculture

- F0 and F1 and will be planted to boro HYV, "braus" HYV or aus HYV followed by T.Aman (HYV) and sometimes mustard/pulses.
- F2 land boro HYV will be followed by Deepwater aman.
- On F3 land only Local or HYV-Boro will be grown, occasionally, preceded by a short duration rabi crop.

2.8.3 Other Impacts

- A possible increase in cropping intensity will effect availability of draught animal supply for timely land preparation, use of 2 wheel power tillers will increase.
- Increasing population will create bigger demand for products like:
- fish, encouraging aquaculture.
- vegetables and fruits, increasing the use of F0 land for market gardening.
- milk, meat and eggs, resulting in an expanded number of dairy and chicken units on F0 land near the big towns and cities.
- sugarcane for chewing purposes.
- Increase of irrigation facilities resulting in an extension of the boro HYV area and a decrease of the area planted to aus.
- Increasing demand for rice due to growing population will force the farmers to optimize the use of soils suitable for Deepwater Aman cultivation.

TABLE I.2.18
Future Cropping Patterns

	F0 <30cm	F1 <30-90 cm	F2 <90-180 cm	F3 <180-270 cm
Single Cropped	***Rainfed:*** T.Aman (HYV) Aus (HYV) Sugarcane Vegetables Rabi Crops Fruitrees/Annual Crops	***Rainfed:*** T.Aman (HYV/Local) Aus (Local/HYV) Sugarcane Jute Vegetables	***Rainfed:*** T.Aman (Local) D.W.Aman (TR) Jute Aus (Local/HYV) Sugarcane	***Rainfed:*** D.W.Aman (TR+B) Aus (Local) Jute etc.
	Irrigated: Boro (HYV)	***Irrigated:*** Boro (HYV)	***Irrigated:*** Boro (HYV)	***Irrigated:*** Boro (HYV+Local)
Double Cropped	***Rainfed:*** T.Aman HYV-Rabi Aus (HYV Local)-T.Aman (HYV)	***Rainfed:*** Jute/Aus (Local/HYV)-T.Aman (HYV/Local) T.Aman (HYV/Local)-Rabi Crops	***Rainfed:*** Aus (Local/HYV)-T.Aman (Local) T.Aman (Local)-Rabi Crops D.W.Aman (TR)-Rabi Crops Aus/B.Aman-Rabi Crops	***Rainfed:*** Aus (Local)-Rabi Crops D.W.Aman (TR+B)-Rabi Crops
	Irrigated: Boro (HYV)-T.Aman(HYV)	***Irrigated:*** Boro(HYV)-T.Aman(Local/HYV)	***Irrigated:*** Boro(HYV)-D.W.Aman(TR)	***Irrigated:*** Boro (HYV/Local)-Rabi Crops
Triple Cropped	***Rainfed:*** T.Aman(HYV)-Rabi Crops-Summer Vegetables	***Rainfed:*** Aus(Local/HYV)-T.Aman(Local/HYV)-Rabi Crops T.Aman(Local/HYV)-Rabi Crops-Vegetables	***Rainfed:*** Aus (Local/HYV)-T.Aman(Local)-Rabi Crops T.Aman(Local)-Rabi Crops-Vegetables	***Rainfed:***
	Irrigated: Boro (HYV)-T.Aman(HYV)-Rabi Crops	***Irrigated:*** Boro(HYV)-T.Aman (Local/HYV)-Rabi Crops	***Irrigated:*** Boro-Summer Vegetables-Rabi Crops	***Irrigated:***

Source : CS 1992

CHAPTER 3
LIVESTOCK AND FORESTRY

3.1 Livestock

Most of the livestock in the NCR are kept on small farms. It is an integral part of the farming system, in spite of the fact that land is not available for grazing and scarcity of animal feed. The animals live almost entirely on the by-products of crops grown for human consumption. As straw of HYV of rice crops is less palatable than the straw of local varieties and the straw-grain ratio is 1:1 and 2:1 respectively, the shift from local to HYV-rice is causing fodder shortages to cattle. The situation is more critical in the rainy season and to the animals which are used for draught purposes. Weeds from crop fields and water hyacinth are the common green fodders. Cattle perform the vital task of land preparation. The quality and stamina of animals used in the farm for land preparation and threshing are therefore very poor especially on smaller farms.

Availability of draught animals in the NCR is not adequate, with exception of some areas in Tangail district. The estimated number of draught animals is 1,350,000, (675,000 draught animal pairs). In the peak land preparation season of March/April, (the end of the dry season, when farmers are preparing for aus, D.W.aman and Jute) this number is not sufficient to cover the peaks in demand for animal traction. As a result some fields are being cultivated at less than optimal levels and some are not timely prepared for sowing. The production sequence will be interrupted and the target of multiple crops may not be achieved unless the present situation is improved. The tendency however is that the decrease in quantity and quality of draught animals will continue. To cope with the growing demand for traction the use of 2 wheel tractors will increase as already can be observed in Munshiganj District. In this densely populated area the number of 2 wheel tractors has been doubled within one year and stood in July 1991 at more than 1000 units. One can envisage that this development will continue in the very near future, starting with the areas which are densely populated and especially in those areas where market gardening is on the increase,i.e., near the bigger towns and cities and along the main roads.

A new development is the growing number of farms, where dairy cows are kept, using the zero-grazing system. In this system fodder is collected and fed to the dairy cattle confined to a stable. In Munshiganj, Narayanganj, Dhaka, Tangail and Gazipur an increasing number of farmers cultivate fodder grasses along roadsides and embankments and in swampy fields not suitable for other crops.

Approximately 300 private dairy farms, having 5-40 milk cows, are now in operation around Dhaka marketing their milk mainly through their own channels. This is certainly a development which will expand in the near future. The total number of dairy cows in the NCR is estimated at 750,000 heads, of which only 150,000 heads are producing milk, the remainder being dry.

Sheep, goat and poultry are raised by most rural households. These animals live off farm residues and on scavenging, providing meat, eggs and skins. Mutton and chicken meat fetch higher market prices compared to beef. Some farmers rear ducks and pigeons. The intensity of goat and sheep is high in Tangail followed by Gazipur and Dhaka. This may be due to more grazing areas in the flood free highland on the Madhupur Tract in Tangail, Gazipur and Dhaka. Low lying flood affected districts like Narayanganj, Manikganj and Munshiganj have a higher number of ducks per Ha compared to the other districts. The total number of poultry is estimated at more than 9 (nine) million birds.

The number of poultry farms in the NCR is on the increase. A poultry farm has a minimum of 100 birds. In the NCR the numbers of poultry farms is estimated at 1288 units by the end of 1991. Of these number more than 1000 units are operating in Dhaka and neighbouring districts, supplying boilers and eggs for the growing number of consumers.

In co-operation with NGO's the Extension Services of the Livestock Department is organizing poultry development programmes in villages in Manikganj District. In this programme landless people and women are involved in chicken rearing and chicken vaccination activities. Plans have been developed to extend these programmes to Tangail District.

Number and averages per Ha of livestock and bird in the NCR are included in Tables I.3.1 and I.3.2. The Directorate of Livestock Services is the principal government organization responsible for the development of livestock and birds in the districts of the NCR. At thana level there are a veterinary surgeon and livestock extension officers. However these outfits are not efficiently equipped to cope with the real problems faced by the farmers, such as outbreaks of diseases, timely artificial insemination, the availability of drugs, semen, etc.

For the overall improvement of cattle and poultry there are a Livestock Research Institute and a Cattle Breeding and Improvement Centre at Savar, Dhaka District.

Finally the number of animals and birds which perished during the 1987 and 1988 floods are included in Table I.3.3.

TABLE I.3.1

Livestock and Animal Production per Planning Unit

Planning Unit	Number of animals					Animal Production				
	Cattle	Goats	Sheep	Fowl	Ducks	Milk	Beef	Mutton	Chicken	Eggs
1	172925	87986	8517	905090	117445	5188	1902	367	920	20451
2	204372	81437	28536	533069	92955	6131	2248	418	563	12520
3	373413	110784	9814	1362715	151972	11202	4108	458	1363	30294
4	188014	68290	17413	475075	58011	5640	2068	326	480	10662
5	388478	174103	23247	1020932	146702	11654	4273	750	1051	23353
6	335336	94413	28706	692191	101621	10060	3689	468	714	15876
7	202699	66023	14040	825746	97914	6081	2230	304	831	18473
8	81784	30216	9822	202416	54073	2454	900	152	231	5130
9	186379	95505	23748	767266	158255	5591	2050	453	833	18510
10	104690	41302	5364	465912	95458	3141	1152	177	505	11227
11	68262	28863	3065	233604	47828	2048	751	121	253	5629
12	43099	18334	2465	193278	46663	1293	474	79	216	4799
13	274926	60134	8929	1061908	144488	8248	3024	262	1086	24128
Total NCR	**2624377**	**957390**	**183665**	**8739201**	**1313384**	**78731**	**28868**	**4336**	**9047**	**201052**

Source : CS 1992

TABLE I.3.2

Number of Livestock and Poultry per Hectare of the Gross Area of NCR Districts 1990-91

District	Cattle	Goat	Sheep	Fowls	Ducks
Tangail	2.61	0.99	0.26	5.34	0.85
Jamalpur	1.59	0.72	0.08	7.00	0.81
Mymensingh	1.87	0.54	0.05	6.91	0.76
Gazipur	1.76	1.00	0.17	7.32	1.21
Dhaka	1.92	0.81	0.15	5.78	1.19
Manikganj	1.62	0.53	0.08	8.18	1.20
Munshiganj	2.68	0.30	0.07	10.80	1.17
Narayanganj	2.13	0.55	0.16	9.05	2.18
Average	**2.06**	**0.77**	**0.14**	**6.88**	**1.00**

Source : CS 1992

TABLE I.3.3

Number of Animals and Birds Lost in 1987 and 1988 Floods

District	1987		1988	
	Animals	Birds	Animals	Birds
Jamalpur	1989	18715	9012	8078
Mymensingh	115	2530	1455	13180
Tangail	36	1581	3568	8169
Gazipur	275	250	591	5258
Dhaka	2685	NA	3470	38687
Manikganj	45	600	8987	54270
Narayaganj	500	10035	1338	5868
Munshiganj	474	750	8641	37758
All Areas	**6119**	**34461**	**37062**	**171268**

Source : Department of Livestock, Government of Bangladesh, Farmgate, Dhaka, 1990.

47

3.2 Forestry

Reliable data on the area covered by forests in the NCR are not available. The data recorded by BBS do not agree with the information given by the District/Divisional Forest Officer. As an example BBS thana-statistics concerning forest areas in Harirampur, Daulatpur and Manikganj thana in Manikganj district cover 32.9%, 29.8% and 26.4% of the total area of respective thanas. There is virtually no forest in Manikganj District. On the Madhupur Tract BBS-figures shows 61% of Fulbaria thana under forest, whereas figures provided by the Forest Office in Mymensingh shows only 6.4% at present.

Declared forest areas exist in Tangail, Mymensingh, Gazipur and in parts of Jamalpur and Dhaka districts. The main declared forest areas are located in the following thanas:

-	Shakipur	(Tangail)	45.7% of the total area
-	Madhupur	(Tangail)	38.4% of the total area
-	Bhaluka	(Mymensingh)	26.7% of the total area
-	Kaliakair	(Gazipur)	26.4% of the total area
-	Sripur	(Gazipur)	21.7% of the total area
-	Gazipur	(Gazipur)	21.4% of the total area
-	Ghatail	(Tangail)	19.6% of the total area

The parts of Madhupur Tract that extend in Savar (Dhaka District), Kaliganj and Kapasia (Gazipur District) and Muktagacha (Mymensingh District) have reserve forests, but, due to the increasing population pressure along with the expansion of habitat and industry, the forest land in the NCR is diminishing very fast. Forest trees are felled randomly and the programme of afforestation is meagre.

For forest plantation, the Department of Forestry has taken up woodlot and agro-forestry programmes. In addition there are thana afforestation and nursery development projects. Thana nurseries and nurseries of the Forest Department raise seedlings for public sale and for institutional and strip plantations along roadside, railway lines and embankments.

In agro-forestry the soil between seedlings is cultivated for growing crops like rice, pineapple and vegetables. In the Madhupur Tract large forest areas are (inter) - planted to pineapples. In June/July hundreds of tons of pineapple are transported to Dhaka and other big cities from Madhupur and Muktagacha. According to the Dept. of Agriculture Extension in Tangail about 53,000 Tons of pineapples were harvested from the Tangail area of the Madhupur Tract in 1991.

Close spacing is practised in woodlot plantation. A plantation programme of Tangail Forest Department is given in Table I.3.4 :

TABLE I.3.4

A Plantation Programme of Tangail Forest Department

Thana	Area (Ha) under woodlot plantation		Area (Ha) under agro-forestry	
	1989-90	1990-91	1989-90	1990-91
Madhupur	384	430	38	36
Shakipur	293	384	29	52
Ghatail	113	213	32	53
Mirzapur	48	182	36	61
Total	**848**	**1209**	**135**	**202**

Source : TFD 1992

Sal (Shorea robusta), locally known as "gazari" is the principal forest tree in the area. Apart from this sal tree, Eucalyptus and Acacia spec. are the main trees used in the ongoing afforestation programmes.

A list of forest and roadside trees propagated by Forestry measures in the NCR is given in Table I.3.5.

Since the forested area in the NCR in the near future will virtually be wiped out by the demand for fuel wood and timber to serve the growing population, it is recommended to concentrate more on special programmes on homestead and roadside plantations of trees. It is suggested to include the plantation of trees suitable for wetlands in such programmes.

49

TABLE I.3.5

Some Roadside and Forest Trees Propagated by Forestry Nurseries in the NCR

Sl.No.	English name	Vernacular name	Botanical name
01.	Australian Acacia	Akashmani	Acacia Auricoliformis
02.	Arjun	Arjun	Termenalia arjuna
03.	Bamboo	Bansh	Bambusa spp.
04.	Bakul	Bakul	--
05.	Banyan	Bat	--
06.	Cassia	Sonalu	Cassia fistula
07.	Champaka	Champa	Michaelia Champaka
08.	Deb Daru	Debdaru	Polyalthia longifolia
09.	Eucalyptus	Eucalyptus	Eucalyptus camaldulensis
10.	--	Gab	Diospyros peregrina
11.	--	Gamari	--
12.	Gold Mohr.	Krishna	Poinciana pulcherrina
13.	--	--	Delonix regia
14.	Ipil ipil	Ipil ipil	Leucaena Leuneocephala
15.	Jambulane	Jam	Syzium komini
16.	Jarul	Jarul	Lagerstroemia flosreginae
17.	--	Kadam	Anthocephalus cadamba
18.	Kapok	Shimul	Salmalia malabarica
19.	Mahogany	Mehogini	Swietenia mehogini
20.	Neem	Neem	Asadiracta indica
21.	Palash	Palash	Butea prondosa
22.	--	Pituli	Trewia nudiflora
23.	Raintree	Raintree	Samania saman
24.	Sal	Gazari, Sal	Shorea robusta
25.	Satim	Satim, Satan	--
26.	Sissoo	Shishu	Dalbergia sissoo
27.	--	Sheora	Streblus asper
28.	Teak	Segun	Tectona grandis
29.	Tamarind	Letul	Tamarindus indicus
30.	Common Cane	Bet	Calamus viminalis

Source : TFD 1992

Supporting Report - I
Land Resources & Agriculture
Annexes

ANNEX I
LAND USE STUDY OF THE NORTH CENTRAL REGION

PREFACE

Experience Gained from the Interpretation made of Land Use using Satellite Imagery

General

The following Annex refers to an exercise that was carried out to interpret satellite imagery for Land Use assessments in the North Central Regional Study. The Annex describes the exercise and the Land Use maps prepared are to be found in a separate map folder, submitted separately from this Report. As is described below certain difficulties appeared in carrying out the interpretation and it is not recommended that the maps should be used as a substantive reference for future studies.

Difficulties have appeared when preparing the interpretation of the SPOT images taken at the end of the rainy season 1990. An earlier, more successful, exercise had been carried out as part of the Reconnaissance Phase of the Study using dry season imagery, however conditions in the rainy season are such that it was not possible to obtain cloud free coverage of the region except at differing dates and late in the season.

Dry Season Coverage

During the dry season the quality of images was very good and it was possible to differentiate the various types of crops, boro rice being a predominant crop on 90 to 95% of cropped areas, with 1 to 10% being mostly devoted to vegetables. Furthermore, as all these crops are irrigated there is a good contrast between cropped and non cropped areas. The interpretation by the Consultants of images taken in the dry season of 1990 may thus be considered a success. It is considered that it has given the cropped areas to an adequate degree of accuracy to be of use in checking the published cropped area statistics.

This was specifically useful when addressing the irrigated areas in the northern part of the North Central Region, which have increased quickly in the last few years. Among other benefits it has helped in verifying the irrigated areas in the Jamalpur Priority Project Area (FAP 3.1).

Monsoon Season Coverage

The operation in the monsoon season was carried out on an experimental basis. The satellite imagery was also used as general information for general use in the Regional Study and specifically for assessment of the hydrological characteristics of the flooded areas and in the preparation of the mathematical model of the regional rivers. The intention of the land use exercise was to see whether such a technique could be used to cross-check the statistics on areas where Aman rice is grown.

The following observations are made:-

a) Unfortunately due to cloud coverage (and mist), it was necessary to group together images taken over almost 7 weeks (from October 21st to December 7th 1990) so as to get an overall coverage of the North Central Region. The original instruction to SPOT Image in Toulouse was to obtain monsoon season coverage before October 15th (end of October at the very latest), as the harvesting time of Aman rice starts between October 10th and 20th. Images of such dates, however were not available because of meteorological conditions.

b) The images were taken in October-December 1990, but the Consultants did not begin their assignment until March 8th 1991 (there was a 6 month delay in the contract approval). It was not possible, therefore to carry out ground truthing in the same season. The Consultants did carry out ground truthing, but this had to be done one year later in the period October-November 1991.

At this time transects were selected in typical areas, with the Study's Agronomist being in charge of field controls. Even then it was not possible to visit all the proposed sites, due to heavy rain in October 1991 and corresponding flooding. In Bangladesh the farmer adjusts his cropping system to the flood conditions, and thus the cropping varies significantly from year to year, depending on the flood conditions. It can be seen that images at a specific time, only reflect the conditions which were prevailing at that time, and cropping season. It is to be expected that there will be difficulty in verifying a previous years imagery, and this has proven to be the case.

c) The quality of the images was poor, but this reflects the post monsoon climatic conditions. In some places the cloud coverage was still high even in early November. Fortunately, most of the cloud coverage problems at that time were on the Madhupur Tract areas which were not so important for interpretation of the important rice cropping areas. Mist, however, was widespread in half of the pictures, and this was disturbing to the quality of the images, and may have led to some confusion between land use categories.

d) Another problem encountered was that substantial areas remained flooded, and the distinction between deep water aman rice and open water bodies with aquatic vegetation was very difficult to ascertain. It is suspected that deep water aman areas have been overestimated in the analysis. It is also very difficult to distinguish the local aman rice from the deep water aman rice, as the reflectance is more or less the same, however the depth of water for local Aman is less than that for Deep Water Aman, and it is believed that with good, current, ground truthing the distinction could have been made.

Conclusions

- The interpretation of satellite images at the end of the rainy season was very difficult, and the areas of Aman rice (even grouping together Local and HYV varieties) are probably underestimated. The Consultants believe that the areas classified as Deep Water Aman are overestimated and include some open water areas with aquatic vegetation, plus some local aman in rather deep flood conditions.

- The poor quality of the images taken in that period is a factor which limits the interpretation accuracy.

- The ground truthing has to take place in the same season as that when the images are taken. Ground truthing is considered essential to obtain a good accuracy in interpretation.

- The satellite image interpretation is considered very useful, when carried out in the dry season (as was done in the Reconnaissance Study), forming a valuable cross check on the agricultural statistics, specifically on irrigated areas.

AGRONOMIC CHARACTERISTICS OF SOME RECOMMENDED HYV - RICE VARIETIES

Variety	Recommended Season	Optimum Planning Time	Spacing	Seedling age (Days)	Seedling Height (cm)	Plant Height (cm)	Duration (days)	Yield ton/ha Paddy)	Remarks
B.R.1	T.Aus Boro	15.04 - 15.05 01.01 - 15.02	20 x 15 25 x 15	20 - 25 40 - 45	20 - 24 14 - 16	80 - 90 75 - 85	115 - 120 145 - 150	4.0 - 4.5 4.5 - 5.5	Selection from IRRI-cross most disease tolerant aus-variety
B.R.2	Boro	01.01 - 15.02	25 x 15	40 - 45	17 - 18	100 - 150	150- 160	5.0 - 5.5	Selection from IRRI-CROSS
B.R.3	T.Aus	15.04 - 15.05	20 x 15	25 - 30	18 - 20	95 - 100	125 - 130	4.0 - 5.0	
B.R.4	T.Aman	15.07 - 31.07	25 x 15	30 - 35	30 - 32	120 - 125	140 - 145	5.0 - 5.5	Photoperiod insensitive, most disease tolerant, not suitable for late planting
B.R.5	T.Aman	15.07 - 15.08	25 x 15	30 - 35	20 - 25	110 - 130	145 - 150	2.5 - 3.0	Strongly photoperiod sensitive, fine quality rice
B.R.6	Boro	01.01 - 15.02	25 x 15	40 - 45	13 - 14	95 - 100	135 - 140	3.5 - 4.5	Also known as IR - 28
B.R.7	Boro	10.01 - 15.02	25 x 15	40 - 45	14 - 15	100 - 125	135 - 155	4.0 - 4.5	Selection from IRRI - cross
B.R.8	Boro	01.01 - 15.02	25 x 15	40 - 45	15 - 16	110 - 125	155 - 160	5.0 - 5.5	
B.R.9	T.Aus Boro	15.04 - 15.05 01.01 - 15.02	20 x 15 25 x 15	20 - 25 40 - 45	30 - 35 13 - 15	115 - 130 110 - 120	115 - 120 150 - 155	4.0 - 4.5 5.0 - 5.5	
B.R.10	T.Aman	15.07 - 15.08	25 x 15	30 - 35	35 - 40	120 - 125	145 - 150	5.0 - 6.0	Photoperiod insensitive, can be planted upto August 30 with 40-45 days old seedlings.
B.R.11	T.Aman	15.07 - 15.08	25 x 15	30 - 35	30 - 35	120 - 125	140 - 145	5.5 - 6.0	Most popular T.Aman-variety, tolerant to submerge upto 7 days in clear water, photoperiod insensitive.
B.R.12	Boro	01.01 - 15.02	25 x 15	40 - 45	11 - 12	80 - 85	160 - 165	4.5 - 5.5	Photoperiod insensitive, most disease tolerant.
B.R.14	T.Aus Boro	15.04 - 15.05 01.01 - 15.02	25 x 15 25 x 15	20 - 25 40 - 45	30 - 35 18 - 20	115 - 120 100 - 105	120 - 125 155 - 160	4.0 - 5.0 5.0 - 6.0	Most disease tolerant,often grown as T.Aman by farmers(not recommended),because duration shorter than other varieties.
B.R.15	T.Aus	15.04 - 15.05	20 x 15	20 - 25	20 - 25	95 - 100	120 - 125	4.0 - 5.0	Selection from IRRI-cross,not popular with farmers, duration too long, most disease tolerant.
	Boro	01.01 - 15.02	25 x 15	40 - 45	13 - 14	80 - 85	150 - 160	5.0 - 5.5	

B.R.16	T.Aus Boro	15.04 - 15.05 01.01 - 15.02	20 x 15 25 x 15	20 - 25 40 - 45	20 - 25 13 - 14	100 - 105 85 - 90	125 - 130 160 - 165	4.0 - 5.0 5.0 - 6.0	Not popular with farmers, duration too long, selection from IRRI-cross, most disease tolerant.
B.R.17	Boro	15.12 - 15.01	25 x 15	40 - 45	25 - 30	110 - 130	150 - 155	5.0 - 5.5	Selection from Indonesian cross special for Haor - areas and river basins.
B.R.18	Boro	15.12 - 15.01	25 x 15	40 - 45	20 - 25	100 - 115	165 - 170	5.0 - 5.5	Selection from Indonesian cross special for Haor - areas and river basins.
B.R.19	Boro	15.12 - 15.01	25 x 15	40 - 45	20 - 25	105 - 115	160 - 165	5.0 - 5.5	Selection from Indonesian cross special for Haor - areas and river basins.
B.R.20	B.Aus	25.03 - 30.04	20 x 5 in line		--	110 - 120	110 - 115	3.0 - 3.5	Recommended for rainfed upland cultivation
			sown/dibbling						
B.R.21	B.Aus	25.03 - 30.04	20 x 5 in line		--	90 - 100	95 - 105	2.5 - 3.0	Recommended for rainfed upland cultivation
			sown/dibbling						
B.R.22	T.Aman	15.07 - 30.08	25 x 15	30 - 35	30 - 35	110 - 115	155 - 160	4.5 - 5.5	Strongly photoperiod sensitive, can be used for late planting up to Sept.30 with higher aged seedlings
B.R.23	T.Aman	15.07 - 30.08	25 x 15	30 - 35	35 - 40	115 - 120	155 - 160	4.5 - 5.5	Strongly photoperiod sensitive, can be used for late planting up to Sept.30 with higher aged seedlings
To be released soon:									
B.R-1867-20-1-4	T.Aman	15.07 - 30.08					130 - 135		Photoperiod sensitive, early maturing, suitable for late planting up to September 15.
B.R.425-189-6-2-1-1	T.Aman	15.07 - 30.08					160 - 165		Improved"payam",suitable for early planting tolerant to blast, seeds don't shatter.
B.R-802-118-3-1	Boro	15.12 - 15.01				115 - 120	160 - 165		Replacing BR.3 (As boro-variety) plant height 20 cm higher
B.R-224-2,8-2-5	D.W.Aman						240	2.0 - 2.5	Can stand 2,50m flood depth.(F3) straw production 10,000 kg/ha.
B.R-308-8-2-4	D.W.Aman						240	2.0 - 2.5	Can stand 2,50m flood depth.(F3) straw production 10,000 kg/ha.

Sources : *1. Diferential impact of modern rice technology, working paper No.1 BIDS, Dhaka 1989,*
2. Personal contacts with breeding division of BRRI.

LIST OF RECOMMENDED VARIETIES OF SOME AGRICULTURE CROPS

Crops		Description		
JUTE				
White Jute (C.capsularis)				
C.C. - 45	:	Photoinsensitive.	Height 4.0 meter.	Yield potential 5.16t/ha.
CVE - 3	:	Duration 105-110 days.	Height 4.0 meter.	Yield potential 4.51t/ha.
CVL - 1	:	Duration 125-135 days.	Height 4.0 meter.	Yield potential 5.16t/Ha.
DI54 -	:	Duration 120-125 days.	Height 3.5 meter.	Yield potential 4.89t/Ha.
Tossa Jute (C.olitorius)				
0 - 4	:	Suitable for high lands. Duration 130-135 days. Height 4-4.2 meter. Yield potential 4.5t/Ha.		
0 - 9897	:	Photoinsensitive. During 120 days. Height 4.5 meter. Yield potential 4.6t/Ha.		
Mesta (H.Sabdariffa)				
S - 24	:	Drought tolerant. Height 5.8 meter. Yield potential 4.54t/Ha.		
SUGARCANE				
ISD - 1/53	:	Growing period 14 months. Tolerant to water logging. Resistant to red rot, smut, red stripe and wilt. Sugar recovery 9.75%. Yield 60-80 Tons/Ha.		
ISD - 2/54	:	Duration 15 months. Good tillering habit, Resistant to red rot, smut, and wilt. Sugar recovery percent is 9,44. Yield 62-90 Tons/Ha.		
ISD - 16	:	Duration 14 months. Good for molasses. Tolerant to mosaic and white leaf disease and stem borer. Sugar recovery percent 10-20. Yield potential 82-119 Tons/Ha.		
ISD - 17	:	Duration 14 months. Good milling capacity. Tolerant to white leaf, red rot, mosaic and stem borer. Sugar recovery 10%. Yield potential 80-115 Tons/Ha.		
I - 112/67	:	Duration 15.5 months. Resistant to red rot, smut, red stripe and wilt. Sugar recovery 11.73%.		
L - Jaba - C	:	Duration 15 months. Resistant to red rot, red stripe and wilt. Sugar recovery 9.70%. Yield 60-90 Tons/Ha.		
WHEAT				
Kanchan	:	Released in 1983. Duration 106-112 days. Yield potential with irrigation 3500-4400 Kg/Ha, without irrigation 2200-2800 Kg/Ha.		
Akbar	:	Released in 1983. Duration 103-108 days. Yield with irrigation 3500-4200 Kg/Ha, without irrigation 2200-2800 Kg/Ha.		
Barkat	:	Released in 1983. Duration 105-113 days. Yield with irrigation 3400-3800 Kg/Ha, without irrigation 2100-2800 Kg/Ha.		
Aghrani	:	Released in 1987. Duration 103-107 days. Suitable variety for late planting. Yield with irrigation 3400-3800 Kg/Ha, without irrigation 2100-2600 Kg/Ha.		
Ananda	:	Released in 1983. Duration 103-108 days. Yield by irrigation 3400-3800, without irrigation 2100-2600 Kg/Ha.		

Sonalika : Approved in 1973. Duration 100-104 days. Yield 3200-3400 Kg/Ha, without irrigation 2250-2700 Kg/Ha.

Pavan : Approved in 1979. Duration 112-117 days. Yield with irrigation 3670-4220 Kg/Ha. Suitable for early planting.

OIL SEEDS (Mustard)

Sonali Sarisha-SS.75 Height 90-105cm. Duration 90-100 days. Yield potential - 1800-2000 Kg/Ha. Oil content 44%.

Kalyania (T.S-72) Height 75-90cm. Duration 75-85 days. Yield potential-1450-1650. Oil content 41-42%.

Tori - 7 Height 60-75cm. Duration 70-80 days. Yield potential 1000-1100 Kg/Ha. Oil content 40-41%.

Rai - 5 Height 120-135cm. Duration 90-100 days. Yield potential 1000-1200 Kg/Ha. Oil content 40%.

GROUND NUT

		Rabi	Kharif
Dhaka -1 :	Maijchar Badam		
	Duration	130-140 days	120-130 days
	Height	30-35 cm	35-40 cm.
	Yield (Kg/ha)	1850-2030	1660-1850
	Oil Content	48-50%	48-50%
D.G.2 - Basanti Badam			
	Duration	145-155 days	130-140 days
	Height	25-30 cm.	30-35 cm.
	Yield (Kg/Ha)	2030-2220	1850-2030
	Oil Content	48-50%	48-50%
DM - 1			
	Duration	130-140 days	110-120 days
	Height	7.5-10 cm.	10-15 cm.
	Yield (Kg/Ha)	1850-2030	2030-2220
	Oil Content	48-50%	48-50%

Sesame

Til - 58077 Recommended by BARI in 1987

Til - 6 Recommended by BARI in 1987

Sweet Potato

Kamala Sundari Recommended by BARI in 1986

Tripti Recommended by BARI in 1986

Daulatpuri Recommended by BARI in 1988

Taro

Bilast (Mukhi Kachu) Recommended by BARI

Latiraj (Pani Kuchu) Recommended by BARI

Source : BARI, - Joydebpur, Jute Research Institute, - Dhaka, Sugar Research Institute, Iswardi, Pabna

Some Details About Major Crops in the NCR

a. Jute

Two types of jute, white and tossa, are cultivated in NCR for commercial production of fibre. White jute *(Corchorus capsularis)* is grown on medium low to highland, while tossa jute *(Corchorus olitorius)* is a medium high to highland crop. Mesta *(Hibiscus sabdariffa)* varieties are grown on poorer soil. Land which is suitable for aus and aman rice are also suitable for jute.

Last week of March to mid April is the recommended sowing time for white jute, while third week of April to mid May is ideal for sowing of tossa. Jute varieties are sensitive to day-lengths. Mesta is sown between mid April and mid May. Growing jute earlier than the recommended time leads to premature flowering, stunted growth and low yield. It also çannot be grown in winter for commercial production of fibre. Photoinsensitive varieties ((cc-45, 0=9897) of jute have been released that could be planted in February/early March without the risk of early flowering.

Jute is obtained from the bark of the plants. The crop can, therefore, be harvested at any stage of maturity between 80 and 120 days. Plants that are harvested in August at average flowering to early fruit stage (120-130 days) produce higher yield and good quality fibre. Early harvest will reduce yield. In the flood prone low lands of Jamalpur, Tangail, Munshiganj, Manikganj, Dhaka and Narayanganj white jute is harvested in June. In some medium low to highlands the farmers harvest jute early in order to release lands for T.Aman. Jute for seed is harvested in October-November.

In the rice based cropping pattern jute plays an important role. Rice land is rotated with jute. The farmers believe that growing of deep rooted jute after a few rice cultivations improves fertility of the soil. Leaves of jute that fall on the ground adds organic matter to the soil.

Jute is a cash crop to farmers. It is the main foreign exchange earning crop of Bangladesh. The districts of NCR (Brahmaputra alluvium tract) although producing superior quality jute, the area under jute has rapidly declined during from 1985 to 1990. (Table-I.2.6) due to low prices. But have picked up again in 1990-91. The farmers grow a small crop of jute for fibre and for sticks. One hectare of jute has the potential of yielding 4 Tons of fibre and 8 Tons of sticks. Jute sticks are extensively used for making walls and fences. It is also the main source of fuel in the villages.

For extraction of good quality fibre there should be plenty of water close to jute fields. Slow flowing water is ideal for retting of jute. Bundles of plants (3-4 m long) are stepped in water of the canals, rivers, beels, roadside ditches or in the standing flood water on the field. It has been found that for retting of green plants of 1 acre about 27000 liters of water is necessary. For complete retting the plants are to be kept in water for 18-21 days. Stagnant water enhances the retting processes but it lowers the quality of fibre. Low quality jute has no local or export market. In the years of low rainfall, and low flood, farmers fact scarcity of retting water. Jute farmers therefore welcome annual flooding of the fields, but the high floods of 1987 and 1988 have been detrimental.

b. Sugarcane

Sugarcane is grown on a large variety of soil types. From flood free (F0) highlands of Gazipur and Mymensingh, the soil of which is heavy (Madhupur soil tract), to young and active flood plains of Jamalpur, Manikganj and Munshignaj, are cultivated for sugarcane. Canes are grown either for supplying to sugar mills or for making gur

(molasses) by bullock and power crushers. Some varieties are grown in the alluvium soils of Dhaka, Munshiganj, Narayanganj and Manikganj for chewing purpose. Soils of the char lands (sandy to sandy loam) has very low water holding capacity. In these soils, dry season boro cultivation by irrigation or growing of other rabi crops- wheat, mustard, potato, etc. is not economical. The farmers, therefore, go for long duration (12-15 months) sugarcane cultivation, inspite of the fact that the plants, in many areas of NCR, suffer from drought in January to March and from flood in July - August. The farmers are adopting the practics of growing one or two crops of potato, vegetables, maize, onion, mustard, pulses, and coriander in between the rows (1m wide) after the first few months of planting canes.

Recommended time of planting is between October and November, but the farmers continue planting of sets upto February, March. Very little is irrigated. The present yield is 55-60 Tons of cane per hectare with a sugar percent of 8-10. The yield and quality would be improved if only two irrigations in February, March could be given. Plough furrow method of planting (10-15cm deep) sets are followed. Ratooning is not a widely accepted practice.

Harvesting canes for sugar mills or for gur making commences from October and it continues upto April. The mill zone growers sometimes incur losses due to non-lifting of canes in time. Delayed harvesting lowers the yield due to drying up of the canes in the field, reduces the sugar percentages, and deprives the farmers from growing a crop after harvesting. The farmers wrap/twist the dry trash (leaves) round the clumps in such a manner that each column turn to a tied up bundle leaving the green tops free for photosynthesis. The method prevents the loss from lodging and reduces drying up to some extent.

To make the canes of the mill zone available to the mills in the crushing season, the cane price has been raised. The price is very high, Tk.40 per mound in the mill zone i.e., approximately Tk. 1 per kilo or Tk. 1 per cane disregarding sugar content. It should, therefore, be a profitable crop to farmers. The farmers of the NCR when interviewed opined that gur (molasses) making or selling canes to gur makers is more profitable than growing canes for sugar mills. The chewing varieties sell at a premium price in the urban areas.

Modern varieties of sugarcane which are high yielding, superior in sugar content and more tolerant to major insect pests and diseases have been developed and released by the research institute. The varieties are: ISD-1/53,ISD-2/54,ISD-16,ISD-17,I-112/67 and L-Jaba C.

c. Wheat

Wheat is the second largest food or cereal crop next to rice. It is cultivated in the rabi season. As the flood water recedes, the farmers start ploughing the lands (medium low to medium high) for rabi crops (wheat, mustard, pulses, boro) cultivation. Farmers choice of wheat cultivation depends on the price and availability of seed, time of releasing land after flood, rainfall of October - November, price and demand of rice, etc. If rain stops early farmers plant mustard but in case of unfavorable weather if they fail to sow mustard. the next choice is wheat. When irrigation is made available, the farmers give up wheat cultivation and plant boro rice, except on the light textured premeable soils.

The sowing time for wheat is very short. It is recommended that seeds to be sown between second week of November and first week of December. Delayed sowing reduces yield and grain quality. In late sown crop high temperature and high rainfall at the end of February or in early March, when the plants are at enthuses stage, may cause sterility of the florets resulting in grain shriveling and very low yield as was found by the mission in the field.

With the introduction of HYV seeds in 1975, alongwith the expansion of irrigation facilities and the use of fertilizers, the area of wheat in Bangladesh increased many folds from 1975 to 1980. However, due to farmers preference to HYV boro cultivation by irrigation and due to other constraints in wheat cultivation, the area under wheat has declined in NCR from a total of 95.749 ha to 59.601 Ha. during the last 5 years (Table I.2.7). The per unit yield of grain has also dropped. It may be due to the use of old degenerated varieties (Sonalika), shifting of its cultivation to marginal lands and/or non-use of irrigation and balanced doses of fertilizers.

HYV Sonalika which was introduced in 1975 is still largely cultivated by the farmers of NCR despite its low yield and less tolerance to insect pests and diseases as compared to the newly released varieties of the Research Institute. To replace Sonalika several improved varieties, namely Kanchan, Akbar, Aghrani, Barkat, and Ananda have been recommended. Growing period of these varieties are between 103 and 112 days. They are more tolerant to pests and diseases and have the yield potential of 3.0 to 4.2 Tons per hectare under irrigated condition and that of 2.1 to 3.3 Tons per hectare under non-irrigated condition as compared to 1.8 to 2.4 Tons for Sonalika. Kanchan and Aghrani can be planted later than Sonalika.

To the farmers boro rice cultivation is more paying if irrigation facilities are available. The net return from boro rice cultivation is about Tk.4929 per Ha. as compared to Tk. 1981 from wheat in 1988. Difficulties in threshing of wheat, rapid loss of seed viability in the bins, deterioration of grain quality if rain or cloudy days prevail at harvest time, destruction of crop in the field by rodents, lower market price and low yield, are some of the constraints that have contributed to the reduction of wheat area in NCR.

d. Mustard

In the rabi season (October-March) mustard is extensively cultivated in NCR. It is the major oil seed crop. Oil is extracted either by traditional bullock powered presses or by electric powered expellers. Mustard cakes are used as cattle feed. Varieties of the two types of mustard, tori *(Brassica campestris)* and Rai *(B.Juncea)* are grown in the area.

Low, medium low to highlands are cultivated with mustard. Being a short duration crop (75-100 days) it has been well adjusted in the existing cropping patterns. The growing time is from October to mid February.

Improved varieties of mustard (Sonalika Sarisha-SS-75, Kalyania-T.S.-72, Sampad - MP-12, Tori-7, Rai-5) have been developed by the Bangladesh Agriculture Research Institute. These varieties, if properly cultivated, yield 1.0 to 2.0 Tons of mustard per hectare as compared to local varieties (0.8 Tons/Ha).

Sesame and groundnut are also cultivated for cooking oil production. Soybean growing is at its initial stage.

e. Potato

Potato is the most important vegetable crop of the country. It is grown during in the rabi-season (October-March) of the year. A large concentration of potato cultivation is on the F1 and F2 lands of Munshiganj. Nearly 63% of the total potato area of the NCR is in Munshiganj (Table I.2.8). Per unit yield is also much higher in Munshiganj as compared to other places of NCR. For preservation of potatoes a large number of cold storage is in operation. In Munshiganj alone there are 40 cold storage having the capacity of storing 104900 Tons a year. The farmers avail the facilities for storing (March to November) of potatoes that would used for seed next season. The cold storage owners charge Tk.2,000 per Ton of potatoes.

The crop is rotated with jute, rice and vegetables. Potato can be grown as an intercrop in between the rows of sugarcane. The lands remain submerged for 2-3 months during the rainy season commencing from June-July. To the farmer flooding is beneficial, because it improves soil fertility by silt deposits and it destroys many of the soil pests and diseases. They believe that the potato area of Munshiganj may shrink if the natural/normal flooding of the soil is restricted or controlled by any means.

Seed potatoes are planted from October to mid November. HYV potatoes were introduced a few years back. Cardinal, Diamant, Patrones, Multa, Morini, Rigo are some of the varieties that are being grown in the region. The local varieties are low yielding, but they are preferred by the consumers. In the early market local potatoes may fetch good prices. Seed potatoes of HYVs are now produced locally in the farms and by the contract growers of BADC.

Sufficient quantity of potato is produced in the region despite the presence of various constraints, viz., loss of crops by the outbreak of late blight, damage of plants by hailstorms in February-March, high cost of seed potatoes as was experienced in 1989, high price of pesticides and lower sale price of the produce at harvest time (1991). Besides, frequent power failure, and the floods of 1987 and 1988 damaged huge quantities of stored potatoes.

To meet the food shortage of the country potato can play a vital role. The yield varies from 25 to 30 Tons per hectare in Munshiganj to 10 Tons on the marginal lands of Jamalpur, Tangail and Manikganj. There is a scope for increasing the yield and quality of potato in the NCR by judicious application of fertilizers and by providing irrigation once or twice during the growing season.

f. Some Minor Crops

Pulses (Lentil, Chickpea, Mungbean, Blackgram, Pea, Khesari) are the most common and the cheapest source of protein for the rural people of the NCR. Rice and dal (Pulses) is considered as a balanced diet. Broken pulses, residues and wastes at crushing, dry plants are used as the concentrated cattle feed. Cows grazing on green plants of black gram and khesari produce more milk and maintain better health. The fertility of a soil is improved if a crop of pulses is grown.

There is a huge demand of pulses in the country, but due to low yields, the area and production of pulses are declining. Extension of boro cultivation, cultivation of wheat, mustard and potato in the fields, which were previously under pulses, forced the cultivation of pulses on poorer lands.

Lentil, chickpea, pea, and khesari are grown in the Rabi season, Mungbean and black gram are short duration crops (60-70 days); they can be cultivated in rabi and kharif seasons. In a cropping pattern pulses can be fitted in as a third crop. Pulses can also be grown as a mixed crop with Mustard and wheat; as an intercrop in sugarcane and maize; as a relay crop in deep water aman rice.

Maize is usually cultivated in the young flood plains of the NCR. It grows well in the F2 and F1 types of land in the rabi season and in F0/F1 of Mymensingh, Gazipur and Dhaka in the kharif season. Lack of marketing possibilities, has limited the expansion of maize production. The yield (5-7 Tons per hectare) is higher than aus; it is not severely attacked by insects and diseases; its leaves and stalks are used as fodder.

In the flood prone areas of NCR maize can be cultivated. The production can be increased if the marketing could be ensured.

Millet, such as cheena Proso millet *(Panicum miliaceum)* and kaon/foxtail millet *(Setaria italica)* are grown on comparatively poor sandy soils of the char lands. These are considered as disaster crops and are adapted to a wide range of agro-ecological environment. In areas with limited water supply millets give a reasonable and reliable harvest. Between the two, kaon has a better market value. It is grown as a mixed crop with aus or seame; as a border crop in aus, or as a lone crop in the young flood plains of NCR by small farmers. Millets are grown in situation where there is a risk of famine.

62

Annex I.2.4

Land Resources and Agricultural Characteristics of Planning Units Nrs.1-11 & 13.

63

P.U.1

Land Resources :	Active Jamuna Flood Plain	± 20%	
	Young Jamuna Flood Plain	± 45%	
	Old Brahmaputra Flood Plain	± 35%	
Soils :	Silt loam, silty clay loam, sandy loam, clay. Active Jamuna Flood Plain area near Jamuna, Southern Chatal and the Northern Old Brahmaputra rivers are facing river erosion problems and problems with fresh deposits of sand and silt.		
Floods :	About 25% of the area is flooded in normal years. Only the areas near the Jamuna and the Chatal rivers are moderately flooded. Risk of sudden flash floods on the active Jamuna Flood Plain. There are some small water bodies on the area N.W. of Melandaha on the Old Brahmaputra Flood Plain (± 5% of the area).		
Land Types :	Highland	24%	
	Medium Highland	55%	
	Medium Lowland	21%	
	Lowland	negligible	
Agriculture 1990-91 :	Agricultural area(cultivated)	70,009 Ha	= 78% of gross area
	Irrigated area	39,197 Ha	= 56% of NCA
	Cropped area	147,524 Ha	= 211% Cropping intensity
	Potential increase irrigation	10 - 15%	(Active Floodplain and part of Highland Area are less suitable)

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Sugarcane/Spices/Jute/Aus/D.W.Aman/Fruittrees
Double cropped	Boro - T.Aman Aus/Jute - Boro D.W.Aman - Boro	Aus/Jute - T.Aman Sugarcane-Vegetables (mixed) T.Aman - Rabi crops
Triple cropped	Boro - Summer Vegetable - T.Aman Boro-T.Aman-Mustard	Summer Vegetables-T.Aman-Winter Vegetables/Chilli Aus-T.Aman-Winter Vegetables, Aus/Jute-T.Aman-Potato

	Area (Ha)					Production (Ton)				
Crops	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	% of rice Production
T.Aman	23118	55	18775	45	41893	59.8	74872	37331	112203	37.0
Boro	34085	93	2392	7	36477	52.1	169201	6506	175707	57.9
Aus	1129	12	8249	88	9378	13.3	2802	11157	13959	4.6
B.Aman	--	--	1015	100	1015	1.4	--	1460	1460	0.5
Total Rice	58332	66	30431	34	88700	126.6	246875	57467	303329	100
Jute					10922	15.6			17830	
Wheat					4949	7.1			11036	
Mustard					3053	4.4			1582	
Other crops					39900	57.0				

Limitations : Some local drainage problems. Flash floods in early rainy season (June, July) River erosion in Active Flood Plain areas. Sand deposits due to floods.

69

P.U.2

Land Resources :	Young Jamuna Flood plain, Western part		± 60%
	Old Brahmaputra Floodplain, Eastern part		± 35%
	Older Jamuna Floodplain, Middle part South		± 5%
Soils :	Silty clay loam, some areas with a firm subsoil (plastic) especially in the area South of Jamalpur and North of Ghatail.		
Floods :	Mainly rain water floods, in basins floods from 4-6 months at a depth of 6-12 feet, east of Gopalpur, 4-10 months. About 40% of the cultivated area is flooded every year.		
Land Types :	Highland		30%
	Medium Highland		49%
	Medium Lowland		17%
	Lowland		4%
Agriculture 1990-91 :	Agricultural area (cultivated)	=	59,850 Ha = 83% of gross area
	Irrigated area	=	36,150 Ha = 60% of NCA
	Cropped area	=	130,715 Ha = 218% cropping intensity.
	Potential increase irrigation		± 10%

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Aus/Aman
Double cropped	Aus/Jute-Boro	Aus/D.W.Aman/Jute-Wheat/Potato/Rabi crops
Triple cropped	Aus/Jute-T.Aman-Boro, Mustard/Vegetables-T.Aman-Boro	Aus/Jute-T.Aman-Rabi crops

	Area (Ha)					Production (Ton)				% of rice Production
Crops	HYV	%	Local	%	Total	%of NCA	HYV	Local	Total	
T.Aman	20,994	62	12,605	38	33,599	56.1	66,709	24,360	91,069	36.6
Boro	35,689	97	1,124	3	36,813	61.5	125,882	2,364	128,246	51.3
Aus	1,346	14	8,294	86	9,640	16.1	3,476	11,076	14,552	5.9
D.W.Aman	--	--	9,309	100	9,309	15.6	--	15,457	15,457	6.2
Total Rice	58,029	65	31,332	35	89,361	149.3	196,067	53,257	249,325	100.0
Jute					7,961	13.0			13,271	
Wheat					3,513	6.0			6,523	
Mustard					3,434	6.0			2,765	
Other crops					17,655	44.7				

Limitation : Major limitation is drainage. This involves major system of rivers as well as local drainage impediments as river banks, roads etc.

65

P.U.3

Land Resources	:	Young Brahmaputra Flood Plain.Small area along Brahmaputra	±15%
		Old Brahmaputra Flood Plain	±80%
		Madhupur Tract	± 5%
Soils	:	Silt loam, silty clay loam, silty clay, clay loam, clay,	
Floods	:	River valleys and depressions can be flooded during rainy season. Floods only from rainwater, 50% of area might be flooded for 1-2 weeks. Numerous beels and khals used for drainage purposes. Flash floods, early and late, are occurring.	
Land Types	:	Highland	27%
		Medium Highland	51%
		Medium Lowland	20%
		Lowland	2%
Agriculture 1990-91	:	Agricultural area (cultivated)	= 127,979 Ha 75% of gross area
		Irrigated area	= 40,472 Ha 32% of NCA
		Cropped area	= 241,622 Ha 189% cropping intensity
		Potential increase of irrigated area limited	Due to limited groundwater recharge

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Aus/Jute, T-Aman, Vegetable,Spices
Double cropped	Boro - T.Aman, Jute/Aus-Boro	Aus/Jute-T.Aman Aus/Jute-Rabi crops, T.Aman-Rabi crops
Triple cropped	Aus/Jute-T.Aman-Boro, T.Aman-Vegetables-Boro	Aus/Jute-T.Aman-Vegetables/Wheat/Spices

Crops	Area (Ha)					Production (Ton)				% of rice Production
	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	
T.Aman	50453	50	50005	50	100,458	78	174,165	102,004	276,169	46.0
Boro	40,508	90	4,349	10	44,857	35	167,790	9,726	177,516	29.0
Aus	29,612	46	35,148	54	64,760	51	96,329	53,270	149,599	25.0
D.W.Aman	--		200	100	200	0.2	--	371	371	0.1
Total Rice	120,573	57	89,702	43	210,276	164	438,284	165,371	603,654	100.0
Jute					9,285	7			14,815	
Wheat					5,732	4			10,323	
Mustard					1,637	1			1,073	
Other crops					14,692	12				

Limitation : Drainage of rainwater, rivers and khals are silted and even used to grow crops (boro). Major drainage problems in SE area.

66

P.U.4

Land Resources :	Madhupur Tract	± 15%
	Young Jamuna Floodplain Western part	± 15%
	Older Jamuna Floodplain middle part (M to S.)	± 20%
	Old Brahmaputra Floodplain Eastern part	± 50%
Soils :	Silty clay to clay, silty loam to silty loam. Some areas with very firm subsoil (plastic), S.E. area around Basail and the Bangsi valley east of Ghatail (east of the outcrops of the Madhupur Tract), recent sand deposits up to 2m thick.	
Floods :	Mainly rainwater floods with some river water flood risk in the area near Bhuapur. Flood depth 6-14 feet during 4-6 month in the S.E. area, 6-12 feet during 4-6 month is Bangsi valley local basins flooded 1/2 month - 4 months. About 70% of the cultivated area is flooded every year.	
Land Types :	Hfghland	25%
	Medium Highland	40%
	Medium Lowland	27%
	Lowland	8%
Agriculture :	Agricultural area (cultivated)	58,420 Ha = 76% of gross area
1990-91	Irrigated area	29,082 Ha = 50% of NCA
	Cropped area	121,066 Ha = 207% cropping intensity
	Potential increase of irrigation	15-20%

Cropping pattern	Irrigated	Non-Irrigated
Single	Boro	Vegetable/fruits/Aus+D.W.Aman/Jute
Double	T.Aman-Boro	Aus/Jute-T.Aman
	Aus/Jute-Boro	Aus/Jute-Rabi crops
	Aus+D.W.Aman-Boro	Aus/D.W.Aman-Rabi crops
		Aus/Jute-T.Aman-Rabi crops
Triple cropped	T.Aman-Mustard/Vegetables-Boro	Summer Vegetables-T.Aman-Rabi crops

	Area(Ha)					Production (Ton)				% of rice production
Crops	HYV	%	Local	%	Total	% of	HYV	Local	Total	
T.Aman	7823	52	7,256	48	15,079	25.8	29,879	15,681	45,560	25.6
Boro	29,218	97	934	3	30,152	51.6	88,009	1,340	89,349	50.3
Aus	1,320	11	10,698	89	12,018	20.6	3,651	13,641	17,292	9.7
D.W.Aman	--	--	24,194	100	24,194	41.4	--	25,538	25,538	14.3
Total Rice	38,361	47	43,082	53	81,443	139.4	121,539	56,201	177,740	100.0
Jute					6,742	11.0			11,577	
Wheat					4,536	8.0			8,695	
Mustard					7,155	12.0			5,305	
Other crops					21,380	36.6				

Limitations : River floods in western part near Bhuapur. Floods in Bangsi valley. Drainage constraints.

67

P.U.5

Land Resources :

Madhupur Tract	95%
Old Brahmaputra Flood Plain	5%

Soils : Highland soils clay/clay loam; valleys and depressions, silt clay loam/clay.

Narrow valleys ± 30% and broad valleys ± 10% of the gross area, low soil fertility, some zinc deficiency and iron toxicity in the lower parts of valleys, which are deeply flooded and which stay wet for all or major part of the dry season.

Risks for erosion in areas with steep slopes.
Waterlogging in many parts of the highlands, poor drainage.
Prone to draughtiness during the dry season in most of the highlands and some valleys.

Floods : Narrow valleys flooded 1-3 feet during the rainy season.
Broad valleys seasonally flooded deeper than 6 feet.
Some valleys in the S.E. of the area have a high flood risk. About 20% of the area is flooded every year for approximate 6 weeks.

Land Types :

Highland	57%
Medium Highland	30%
Medium Lowland	9%
Lowland	4%

Agriculture *1990-91* :

Agricultural area (cultivated)	121,318 Ha = 57% of gross area
Irrigated area	42,600 Ha = 35% of NCA.
Cropped area	203,803 Ha = 168% cropping intensity

Potential increase of irrigation limited due to undulating land.

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Pineapples/Sugarcane/Fruittrees/Aus/T.Aman
Double cropped	T.Aman-Boro, Aus/Jute-D.W.Aman-Boro	Aus/Jute/Vegetables-T.Aman/Winter Vegetables
Triple cropped	Vegetables-T.Aman-Boro	Aus/Jute/Vegetables-T.Aman-Rabi crops

	Area(Ha)					Production (Ton)				
Crops	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	% of rice production
T.Aman	40,377	57	30,473	43	70,850	58.4	147.706	66,206	213,992	49.6
Boro	39,399	93	3,062	7	42,461	35.0	149,572	6,260	155,832	36.1
Aus	11,936	26	33,338	74	45,274	37.3	35,771	47,801	83,572	13.5
D.W.Aman	--	--	2,669	100	2,669	2.2	--	3,363	3,363	0.8
Total Rice	91,712	57	69,542	43	161,254	132.9	333,049	123,630	456,679	100.0
Jute					1,203	1.0			1,925	
Wheat					3,847	3.2			6,925	
Mustard					1,109	0.9			665	
Other crops					36,400	30.0				

Limitations : Poor drainage and waterlogging on highlands.
Droughtiness during the dry season.
Flash floods in narrow valleys in the S.E. area

Remarks : Fruittrees, mainly jackfruit, are planted scattered around homesteads and as boundaries in farm plots. Forest area under forest is very limited. Major part of the forest area is used for homesteads and crops as pineapples, fruittrees, sugarcane, etc.

P.U.6

Land Resources	:	Active Jamuna Floodplain, Western part	± 15%
		Young Jamuna Floodplain, middle part	± 25%
		Older Jamuna Floodplain, Eastern + Southern Part	± 60%
Soils	:	Silt loam to silty clay loam, Silty and sandy on the Active Jamuna Floodplain, with slightly higher sand deposits locally.	
Floods	:	Flood water moves rapidly over the land during river floods in the Active Jamuna Floodplain. The numerous basins are flooded during 4-7 months moderately deep to very deep. About 80% of the cultivated land is flooded every year.	
Land Types	:	Highland	15%
		Medium Highland	48%
		Medium Lowland	29%
		Lowland	8%
Agriculture 1990-91	:	Agricultural area (cultivated)	95,880 Ha = 86% of gross area
		Irrigated area	40,640 Ha = 42% NCA
		Cropped area	200,550 Ha = 209% cropping intensity

Cropping pattern	irrigated	Non-Irrigated
Single cropped	Boro	Aus/Aman/Millet
Double cropped	Aus/Jute-Boro,D.W.Aman-Boro	Aus/D.W.Aman/Jute-Rabi crops Aus+D.W.Aman (Mixed)
Triple cropped	Aus/Jute-T.Aman-Boro T.Aman-Mustard/Vegetables-Boro	Aus/Jute-T.Aman-Mustard/Rabi crops

	Area(Ha)					Production (Ton)				% of rice production
Crops	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	
T.Aman	2,804	32	6,012	68	8,816	9.2	9,940	14,323	24,263	9.7
Boro	40,787	98	774	2	41,561	43.3	136,449	1,235	137,684	54.9
Aus	3,175	11	26,967	89	30,142	31.4	7,565	33,301	40,866	16.3
D.W.Aman	--	--	40,733	100	40,733	42.5	--	47,794	47,794	19.1
Total Rice	46,766	39	74,486	61	121,253	126.4	153,954	96,653	250,607	100.0
Jute					13,076	13.6			18,918	
Wheat					10,429	10.9			19,669	
Mustard					10,841	11.3			8,954	
Other crops					44,872	46.8				

Limitations : River floods from Jamuna/Dhaleswari in Western part. Rain water floods in the rest of the area. Impeded drainage in S.E. of the area and local drainage problems caused by roads, embankments raised river banks etc.

P.U.6a

Land Resources	:	Young Jamuna Floodplain	± 20%
		Older Jamuna Floodplain	± 80%
Soils	:	Silty loam to silty clay loam.	
Floods	:	Numerous basins and depressions are flooded for 4 to 7 months. About 80-90% of the cultivated area is seasonally flooded every year.	
Land Types	:	Highland	14%
		Medium Highland	45%
		Medium Lowland	31%
		Lowland	10%
Agriculture 1990-91	:	Agricultural area(cultivated)	51,880 Ha = 86% of gross area
		Irrigated area	25,500 Ha = 49% of the NCA
		Cropped area	111,500 Ha = 215% Cropping intensity
		Potential increase irrigation	± 20%

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Aus/Aman/Millet
Double cropped	Aus/Jute - Boro D.W.Aman - Boro	Aus/D.W.Aman/Jute - Rabi crops Aus + D.W.Aman (Mixed)
Triple cropped	Aus/Jute - T.Aman - Boro T.Aman - Mustard/Vegetables - Boro	Aus/Jute - T.Aman - Mustard/Rabi crops

Crops	Area (Ha)						Production (Ton)			% of rice Production
	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	
T.Aman	1,576	30	3,703	70	5,279	10.2	5,580	8,810	14,390	9.7
Boro	24,663	98	460	2	25,123	48.4	82,620	730	83,350	56.1
Aus	2,144	12	15,496	88	17,640	34.0	5,100	19,060	24,160	16.2
D.W.Aman	--	--	22,911	100	22,911	44.2	--	26,800	26,800	18.0
Total Rice	27,383	39	43,570	61	70,953	136.8	93,300	55,400	1,48,700	100.0
Jute	9,253					17.8			13,324	
Wheat	6,362					12.3			11,979	
Mustard	5,240					10.1			4,658	
Other crops	19,692					38.0				

Limitations : Floods by accumulated rainwater in the basins and depressions in May/June. River floods in July/August. Impeded damage in S.E. of the area and local drainage problems caused by roads, embankments, raised river banks etc.

P.U.6b

Land Resources :	Active Jamuna Floodplain		± 50%
	Young Jamuna Floodplain		± 50%
Soils :	Silty and sandy in the Active Jamuna Floodplain. Silty loam and silty sandy loam in the Young Jamuna Floodplain.		
Floods :	Seasonal river floods are moving rapidly over the so-called "Char" lands in the Active Jamuna Floodplain.		
	Numerous basins and depressions on the Young Jamuna Floodplain are flooded for 3 to 5 months every year.		
Land Types :	Highland		16%
	Medium Highland		57%
	Medium Lowland		24%
	Lowland		7%
Agriculture 1990-91 :	Agricultural area (cultivated)	=	44,000 Ha = 86% of gross area
	Irrigated area	=	16,500 Ha = 38% of the NCA
	Cropped area	=	89,000 Ha = 202% cropping intensity.
	Potential increase irrigation		± 5%

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Sugarcane/Aus/Aman/Millet
Double cropped	Aus/Jute - Boro D.W.Aman - Boro	Aus/D.W.Aman/Jute - Rabi crops Aus + D.W.Aman (mixed)
Triple cropped	Aus/Jute - T.Aman - Boro, T.Aman-Mustard/Vegetables-Boro	Aus/Jute-T.Aman-Mustard/Rabi crops

	Area (Ha)						Production (Ton)			% of rice Production
Crops	HYV	%	Local	%	Total	%of NCA	HYV	Local	Total	
T.Aman	1,228	35	2,309	65	3,537	8.4	4,360	5,513	9,873	10.2
Boro	16,124	98	314	2	16,438	38.6	53,829	505	54,334	56.2
Aus	1,031	8	11,471	92	12,502	29.6	2,465	9,141	11,606	11.9
D.W.Aman	--		17,822	100	17,822	42.1	--	20,994	20,994	21.7
Total Rice	18,383	37	31,916	63	50,299	118.7	60,654	36,153	96,807	100.0
Jute					3,823	8.7			5,594	
Wheat					4,067	9.2			7,690	
Mustard					5,189	10.0			4,296	
Other crops					25,622	55.4				

Limitation : River floods from the Jamuna and Dhaleswari rivers. River bank erosion in the sandy areas along the main rivers.

P.U.7

71

Land Resources :

Young Jamuna Flood Plain	± 95%
Active Jamuna Flood Plain	± 5%

along side left and right banks of the Dhaleswari river

Soils : Active Flood Plain: silty and sandy with some silt loam, silty clay, silty clay loam, light soils. Young Jamuna Flood Plain: loam, clay, heavy soils.

Floods : Ridges are 3-6 feet flooded by river water, basins 5-15 feet up to 6 months. About 80% of the cultivated area is flooded every year.

Land Types :

High Land	12%
Medium Highland	39%
Medium Lowland	27%
Low Land	22%

Agriculture *1990-91* :

Agricultural area (cultivated)	67,238 Ha = 73% of gross area
Irrigated area	23,243 Ha = 35% of NCA
Cropped area	130,690 Ha = 194% cropping intensity
Potential increase irrigation	20 - 25%

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Aus/Jute/D.W.Aman
Double cropped	Aus/Jute-Boro D.W.Aman-Boro	Aus/Jute-Mustard Aus/Jute/D.W.Aman-Wheat/Rabi crops
Triple cropped	D.W.Aman-Mustard-Boro/Vegetables	Aus/Jute/D.W.Aman-Mustard-Rabi crops

Crops	Area(Ha) HYV	%	Local	%	Total	Production (Ha) % of NCA	HYV	Local	Total	% of rice production
T.Aman	1,714	44	2,170	56	3,884	5.8	6,117	4,249	10,366	5.8
Boro	22,801	97	621	2	23,422	34.8	107,354	1,278	108,632	60.9
Aus	619	2	26,906	98	27,525	40.9	1,242	24,446	25,688	14.3
D.W.Aman	--	31	27,471	100	27,473	40.9	--	34,167	34,167	19.0
Total rice	25,134		57,168	69	82,302	122.4	114,713	64,140	178,853	100
Jute					6,925	10.3			9,938	
Wheat					10,886	16.2			19,554	
Mustard					13,022	19.3			6,098	
Other crops					17,555	26.1				

Limitation : Major limitation: deep river flooding, river bank erosion along Dhaleswari.

Remark : Soil moisture in dry season is quite high in most of the area. Irrigation need is less, compared with PU 2, 4 and 6.

P.U.8

Land Resources : Madhupur Tract ± 100%

Soils : Generally clay high land soils, and silty clay/loam valley soils
± 60% - high land and 20% narrow valleys and 20% broad valleys.
Low to moderate soil fertility, lower parts of the broad valleys may have some zinc deficiency or iron toxicity, especially on irrigated land. Poor drainage in some parts of the highlands, water logging, droughtiness in dry season.

Floods : Narrow valleys flooded 1-4 feet during rainy season, broad valleys up to 6 feet, lower Turag valley 8 to more than 15 feet. 30 - 40% of the area is flooded for about 3-4 months.

Land Types :

High Land	54%
Medium High Land	19%
Medium Low Land	16%
Low Land	11%

Agriculture 1990-91 :

Agricultural area(cultivated)	27,192 Ha = 59% of gross area
Irrigated area	12,719 Ha = 46% of NCA
Cropped area	46,620 Ha = 171% cropping intensity
Potential increase of irrigation limited to	10% due to undulating land and limited ground water availability.

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Fruittrees/Sugarcane/Aus/T.Aman/Vegetables
Double cropped	T.Aman-Boro, D.W.Aman-Boro	Aus/Jute-T.Aman/Summer Vegetables,T.Aman-Winter Vegetables/Rabi crops
Triple cropped	Vegetables-T.Aman-Boro	Jute/Aus/Vegetable-T.Aman-Rabi crops

Crops	Area (Ha) HYV	%	Local	%	Total	Production (Ton) % of NCA	HYV	Local	Total	% of rice production
T.Aman	6,093	79	1,611	21	7,704	28.3	20,657	2,998	23,655	26.4
Boro	11,583	89	1,371	11	12,954	47.6	53,199	2,955	56,154	62.6
Aus	1,583	39	2,515	61	4,098	15.1	5,486	3,676	9,162	10.2
D.W.Aman	--	--	529	100	529	2.0	--	733	733	0.8
Total Rice	19,259	76	6,026	24	25,285	93.0	79,342	10,362	89,704	
Jute					1,406	5.2			2,261	
Wheat					869	3.2			1,787	
Mustard					1,778	6.5			1,170	
Other crops					17,282	63.6				

Limitations : No major limitations, some local drainage problems in lower areas, water logging.

Remark : Forest area under forest is limited. Most of the area is used for homesteads, fruittrees, crops like sugarcane, etc.

73

P.U. 9

Land Resources :

Madhupur Tract	90%
Old Brahmaputra Flood Plain	10%

Soils : Friable clay on the highlands; clay, silty clay, silty clay loam, silty loam in the valleys and on right bank of Lakhya river.
Valleys occupy 35-40% of the area, some zinc deficiency and risk for iron toxicity in deep flooded valleys. Low fertility.

Floods : Narrow and higher parts of the valleys flooded 1-3 feet, lower parts 3-6 feet, some valleys 5-15 feet ± 25 - 30% of the area remains flooded for 3 to 4 ½ months.

Land Types :

High Land	54%
Medium High Land	19%
Medium Low Land	12%
Low Land	15%

Agriculture 1990-91 :

Agricultural area (cultivated)	57,757 Ha = 73%
Irrigated area	22,528 Ha = 39% of NCA
Cropped area	102,304 Ha = 177% cropping intensity

Potential increase of irrigation is limited due to undulating land and reduced groundwater availability.

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Fruittrees/Sugarcane/Pineapple/Aus/T.Aman
Double cropped	T.Aman-Boro, D.W.Aman/Aus/Jute-Boro	Aus/Jute-T.Aman Aus/Summer Vegetables-T.Aman/Winter Vegetables/Rabi crops
Triple cropped	Vegetables-T.Aman-Boro	Jute/Aus/Vegetables-T.Aman-Rabi crops

	Area (Ha)					Production (Ton)				
Crops	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	% of rice production
T.Aman	16,512	79	4,052	21	20,564	35.6	54,813	7,366	62,179	28
Boro	24,458	94	1,575	6	26,033	45.1	103,116	3,429	106,545	49
Aus	5,830	40	8,886	60	14,716	25.5	20,179	17,893	38,072	17
D.W.Aman	--	--	6,492	100	6,492	11.2	178,108	13,152	13,152	6
Total Rice	46,800	69	21,005	31	67,804	117.4		41,840	219,948	
Jute					3,071	5.3			5,390	
Wheat					864	1.5			1,283	
Mustard					1,145	2.0			790	
Other crops					29,420	50.1				

Limitations : No major limitations, some local drainage problems in valleys.

Remarks : Forest area actually under forest is limited. Most of the area is used for homesteads, fruittrees and crops like sugarcane, pineapples, etc.

P.U.10

Land Resources	:	Eastern Ganges Flood Plain	100%
Soils	:	Silt loam, silty, clay, loamy clay	
Floods	:	Seasonal flooding by river water 2-5 feet on the highest ridges, more than 10 feet in the lower basins/depressions for 4 to 6 months. About 90% of the area is flooded every year.	
Land Types	:	High Land	9%
		Medium High Land	21%
		Medium Low Land	40%
		Low Land	30%
Agriculture 1990-91	:	Agricultural area (cultivated)	48,255 Ha = 72% of the gross area
		Irrigated area	13,094 Ha = 27% of NCA
		Cropped area	90,540 Ha = 188% cropping intensity
		Potential increase of irrigated area	± 40% if flood protection is provided

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Sugarcane/Rabi crops
Double cropped	B.W.Aman/Aus/Jute-Boro	D.W.Aman/Aus/Jute-Rabi crops
Triple cropped	D.W.Aman-Mustard/Pulses-Boro	D.W.Aman/Aus/Jute-Mustard/Pulses-Rabi crops Winter Vegetables/Rabi crops-Aus-Summer Vegetables

Crops	Area (ha)					Production (Ton)				% of rice production
	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	
T.Aman	62	30	147	70	209	0.4	186	237	423	0.4
Boro	12,268	92	1,111	8	13,379	27.7	61,105	2,196	63,301	59.9
Aus	53	--	13,482	100	13,535	28.0	127	12,063	12,190	11.5
D.W.Aman	--	--	24,784	100	24,784	51.4	--	29,844	29,844	28.2
Total Rice	12,383	24	39,524	76	51,906	107.5	61,418	44,340	105,757	100.0
Jute					2,424	5.1			3,304	
Wheat					5,014	10.4			8,772	
Mustard					5,308	11.0			3,119	
Other crops					25,888	53.6				

Limitations : Flooding during a long time of the year without any possibility to drain.

75

P.U.11

Land Resoures	:	Young Jamuna Flood Plain	± 90%
		Old Meghna Flood plain	± 10%, most eastern area
Soils	:	Silty clay/loam, isolated some loam, sand and lime, heavy texture, possible iron toxicity in soil which stays wet during dry season (deep flooded areas). On river sides: silt loam, silty clay or clay.	
Floods	:	Broad ridges flooded 5-10 feet, basins upto 15 feet during 4 to 6 months, deep flooded areas stay wet part or all of the dry season. About 85-90% of the cultivated area is flooded every year.	
Land Types	:	High Land	12%
		Medium High Land	24%
		Medium Low Land	22%
		Low Land	42%
Agriculture 1990-91	:	Agricultural area/cultivated)	= 18,564 Ha = 67%
		Irrigated area	= 5,683 Ha = 31%
		Cropped area	= 20,408 Ha = 109% cropped intensity
		Potential increase of irrigation ± 10 - 20% if flood protection is provided	

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Sugarcane/Rabi crops
Double cropped	D.W.Aman/Aus/Jute-Boro	Aus/D.W.Aman-Jute-Rabi crops
Triple cropped	Boro-Vegetables-T.Aman	Summer Vegetables-T.Aman-Winter Vegetables

Crops	Area(Ha) HYV	%	Local	%	Total	Production (Ton) % of NCA	HYV	Local	Total	% of rice production
T.Aman	758	57	318	43	1,076	5.8	2,496	573	3,069	7.0
Boro	5,570	94	373	6	5,943	31.9	26,284	713	31,419	71.8
Aus	282	15	1,603	85	1,885	10.2	806	2,909	3,715	8.5
D.W.Aman	--	--	3,438	100	3,438	18.4	--	5,533	5,533	12.7
Total Rice	6,610	54	5,732	46	12,342	66.5	29,586	9,728	43,736	100.0
Jute					1,399	7.5			2,197	
Wheat					584	0.3			1,092	
Mustard					1,373	7.4			993	
Other crops					4,710	25.4				

Limitation : Seasonally deep flooding is major constraint.

Remarks : North East area of Keranigranj is urban area, rapidly expanding. Many brick fields are operating on agricultural land.

P.U.13

Land Resources :

Active Ganges Floodplain	± 10%
Arial Beel	± 20%
Low Ganges Flood Plain	± 10%
Old Meghna Flood Plain	± 35%
Young Jamuna Flood Plain	± 25%

Soils : Silt Loam - silty clay loam - clay - silty clay.
Arial beel : heavy texture. Raised platforms (man made) in the area of Munshiganj, Tongibari and Keraniganj.

Soil toxicity risk in areas which stay wet during dry season. River bank erosion in south and east of the area.

Floods : Seasonal flooding 3-5 feet on the high river banks and ridges 10-15 feet in the flood plain. Raised platforms mostly above normal flood level. Inundated area ± 85%, for about 4-6 months.

Arial beel flooded 10-20 feet with some areas flooded during dry season.

Land Types :

High Land	11%
Medium High Land	22%
Medium Low Land	24%
Low Land	43%

Agriculture 1990-91 :

Agricultural area (cultivated)	76,616 Ha = 76% of gross area
Irrigated area (most L.L.Ps)	18,427 Ha = 24% of NCA
Cropped area	140,433 Ha = 183% of NCA

Potential increase of irrigation ± 10-20%, due to flood hazards in the Lowland areas.

Cropping pattern	Irrigated	Non-Irrigated
Single cropped	Boro	Potato/Pulses/Spices/Wheat/Vegetables
Double cropped	Aus/D.W.Aman-Boro Aus/Jute/Aus + D.W.Aman-Boro	Aus/D.W.Aman/Jute-Potato & other Rabi crops.
Triple cropped	Boro - D.W.Aman-Pulses/Mustard/Vegetables	Mustard-Vegetables-Potato/Rabi crops

	Area (Ha)						Production (Ton)			% of rice production
Crops	HYV	%	Local	%	Total	% of NCA	HYV	Local	Total	
T.Aman	341	66	174	34	514	0.7	1,185	274	1,459	0.9
Boro	19,431	91	1,843	9	21,276	27.8	97,675	3,720	101,395	59.9
Aus	836	5	15,881	95	16,717	21.8	2,989	29,542	32,531	19.2
D.W.Aman	--	--	27,422	100	27,422	35.8	--	33,932	33,932	20.0
Total Rice	20,608	31	45,320	69	65,928	86.1	101,849	67,468	169,316	100.0
Jute					7,750	10.1			11,472	
Wheat					4,051	5.2			6,113	
Mustard					4,896	6.4			3,687	
Other crops					57,808	75.5				

Remarks : P.U.13 is the main supplier of potatoes and vegetables for the Dhaka market. Area of potatoes in 1990/91 has been 24,000 HA.

Limitations : Seasonal flooding without drainage possibilities.

Area (Ha) and Production (Paddy in Ton) of Boro Rice in NCR Districts

District	1989-90						1990-91					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	55942	246790	4128	8671	60070	255461	57075	279834	3751	9376	60826	289210
Tangail	119986	523478	3862	6161	123848	529639	117065	350129	2781	4260	119846	354389
Mymensingh	46899	186800	5329	10633	52228	197433	45068	183736	4905	10917	49973	194653
Gazipur	42094	169829	2363	3860	44457	173689	42358	188594	1898	3996	44256	192590
Dhaka	29416	124648	2482	4486	31898	129134	30149	154696	1968	4250	32117	158946
Manikganj	23988	113151	1195	2252	25183	115403	23937	115613	1320	2382	25257	117995
Narayanganj	8272	35025	624	1029	8896	36054	8568	34956	530	1029	9098	35985
Munshiganj	15290	69624	1338	2595	16628	72219	15072	74922	1195	2321	16267	77243
Total	341887	1469345	21321	39687	363208	1509032	339292	1382480	18348	38531	357640	1421011
Yield(Ton/Ha)		4.30		1.86		4.15		4.07		2.10		3.97

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	18907 (93.0)	85374	1414 (7.0)	3233	20321	88607	19665 (95.1)	92124	1010 (4.9)	2542	20675	94666
Sharishabari	9090 (90.0)	44024	1010 (10.0)	2076	10100	46100	9211 (91.9)	46095	808 (8.1)	1869	10019	47964
Melandah	12904 (94.6)	55450	735 (5.4)	1392	13639	56842	12651 (95.0)	64568	663 (5.0)	1692	13314	66260
Islampur	5948 (92.4)	23875	486 (7.6)	975	6434	24850	5869 (91.2)	28143	565 (8.8)	1373	6434	29516
Dewanganj	1727 (97.1)	7518	51 (2.9)	117	1778	7635	1389 (97.1)	6366	42 (2.9)	115	1431	6481
Madarganj	7366 (94.4)	30549	432 (5.6)	878	7798	31427	8290 (92.6)	42538	663 (7.4)	1785	8953	44323
Total	55942 (93.1)	246790	4128 (6.9)	8671	60070	255461	57075 (93.8)	279834	3751 (6.2)	9376	60826	289210
Yield(Ton/Ha)		4.41		2.10		4.25		4.90		2.50		4.75

Note : Figures within parentheses are percentages of total Boro Rice

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Tangail District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	8261 (98.8)	35798	101 (1.2)	183	8362	35981	8243 (98.6)	26601	113 (1.4)	129	8356	26730
Basail	8425 (98.0)	35768	172 (2.0)	324	8597	36092	8765 (97.7)	28605	208 (2.3)	251	8973	28856
Ghatail	15101 (95.9)	65898	640 (4.1)	1266	15741	67164	15608 (97.5)	42584	404 (2.5)	580	16012	43164
Kalihati	12411 (95.5)	53769	586 (4.5)	1076	12997	54845	13138 (96.9)	40185	424 (3.1)	560	13562	40745
Nagarpur	11514 (99.7)	53360	40 (0.3)	74	11554	53434	8121 (99.5)	25729	40 (0.5)	55	8161	25784
Gopalpur	16054 (94.0)	70772	1020 (6.0)	191	17074	70963	16488 (99.5)	43612	81 (0.5)	90	16569	43702
Mirzapur	14785 (98.8)	65019	185 (1.2)	371	14970	65390	15636 (98.6)	46847	227 (1.4)	497	15863	47344
Madhupur	14366 (96.9)	63422	465 (3.1)	1041	14831	64463	13185 (96.1)	42409	533 (3.9)	891	13718	43300
Bhuapur	4826 (92.8)	21645	374 (7.2)	990	5200	22635	4760 (91.8)	15654	428 (8.2)	748	5188	16402
Shakipur	7648 (98.0)	29262	158 (2.0)	384	7806	29646	6828 (97.1)	18418	206 (2.9)	293	7034	18711
Delduar	6595 (98.2)	28765	121 (1.8)	261	6716	29026	6293 (98.2)	19485	117 (1.8)	166	6410	19651
Total	**119986** (96.9)	**523478**	**3862** (3.2)	**6161**	**123848**	**529639**	**117065** (97.7)	**350129**	**2781** (2.3)	**4260**	**119846**	**354389**
Yield(Ton/Ha)		4.36		1.60		4.28		2.99		1.53		2.96

Note : Figures within parentheses are percentages of total Boro Area

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	5068 (93.0)	22626	382 (7.0)	708	5450	23334	4708 (91.4)	19821	439 (8.6)	1009	5147	20830
Muktagacha	7549 (91.4)	29969	703 (8.6)	1526	8252	31495	7769 (89.1)	30939	949 (10.9)	2256	8718	33195
Fulbaria	8282 (88.0)	34492	1131 (12.0)	1581	9413	36073	7636 (91.3)	32834	727 (8.7)	1770	8363	34604
Trisal	7771 (87.7)	27571	1089 (12.3)	2139	8860	29710	7365 (89.9)	28943	824 (10.1)	2089	8189	31032
Bhaluka	9122 (93.9)	34373	586 (6.1)	1154	9708	35527	8385 (93.2)	34286	606 (6.8)	1328	8991	35614
Gafargaon	9107 (86.3)	37769	1438 (13.7)	3525	10545	41294	9205 (87.1)	36913	1360 (12.0)	2465	10565	39378
Total	**46899** (89.8)	**186800**	**5329** (10.2)	**10633**	**52228**	**197433**	**45068** (90.2)	**183736**	**4905** (9.8)	**10917**	**49973**	**194653**
Yield(Ton/Ha)		3.98		2.00		3.78		4.08		2.23		3.90

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	12483 (97.5)	47797	323 (2.5)	576	12806	48373	12307 (98.4)	55865	202 (1.6)	506	12509	56371
Kaliakair	7372 (97.3)	30874	202 (2.7)	337	7574	31211	7569 (95.9)	33779	326 (4.1)	675	7895	34454
Kaliganj	6524 (88.0)	28473	889 (12.0)	1434	7413	29907	7500 (94.9)	32453	400 (5.2)	922	7900	33375
Kapasia	6625 (91.1)	29190	646 (8.9)	1008	7271	30198	7032 (90.7)	34272	720 (9.3)	1393	7752	35665
Sreepur	9090 (96.8)	33495	303 (3.2)	505	9393	34000	7950 (97.0)	32225	250 (3.0)	500	8200	32725
Total	**42094** (94.7)	**169829**	**2363** (5.3)	**3860**	**44457**	**173689**	**42358** (95.7)	**188594**	**1898** (4.3)	**3996**	**44256**	**192590**
Yield(Ton/Ha)		4.03		1.63		3.91		4.45		2.11		4.35

Note : Figures within parentheses are percentages of total Boro Area

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	2929 (87.1)	13900	432 (12.9)	749	3361	14649	3343 (93.7)	20514	222 (6.3)	398	3565	20912
Nababganj	5482 (84.6)	27538	995 (15.4)	1702	6477	29240	6617 (88.5)	36600	853 (11.5)	2006	7470	38606
Dohar	1636 (81.7)	7520	365 (18.3)	675	2001	8195	2141 (86.2)	10496	340 (13.8)	629	2481	11125
Savar	9067 (94.1)	35906	569 (5.9)	1158	9636	37064	8582 (95.3)	42180	420 (4.7)	955	9002	43135
Dhamrai	10302 (98.8)	39784	121 (1.2)	202	10423	39986	9466 (98.6)	44906	133 (1.4)	262	9599	45168
Total	**29416** (92.2)	**124648**	**2482** (7.8)	**4486**	**31898**	**129134**	**30149** (93.8)	**154696**	**1968** (6.2)	**4250**	**32117**	**158946**
Yield(Ton/Ha)		4.24		1.81		4.05		5.13		2.16		4.95

Note : Figures within parentheses are percentages of total Boro Area

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	687 (70.8)	3173	283 (29.2)	418	970	3591	654 (68.6)	3024	299 (31.4)	415	953	3439
Tongibari	1234 (89.8)	6498	140 (10.2)	271	1374	6769	1167 (94.5)	5713	68 (5.5)	125	1235	5838
Srinagar	8120 (94.5)	39765	473 (5.5)	1180	8593	40945	7804 (96.3)	39658	296 (3.7)	849	8100	40507
Sirajdikhan	2837 (95.9)	11274	121 (4.1)	280	2958	11554	2951 (92.1)	14997	251 (7.9)	464	3202	15461
Lohajang	2412 (88.2)	8914	321 (11.8)	446	2733	9360	2496 (89.9)	11530	281 (10.1)	468	2777	11998
Total	15290 (91.9)	69624	1338 (8.1)	2595	16628	72219	15072 (92.6)	74922	1195 (7.4)	2321	16267	77243
Yield(Ton/Ha)		4.55		1.94		4.34		4.97		1.94		4.75

Note : Figures within parentheses are percentages of total Boro Area

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	4975 (98.8)	22065	60 (1.2)	86	5035	22151	4542 (97.8)	20430	104 (2.2)	165	4646	20595
Singair	3903 (97.0)	18687	121 (3.0)	280	4024	18967	4792 (96.8)	24594	159 (3.2)	383	4951	24977
Saturia	3171 (99.2)	13014	26 (0.8)	32	3197	13046	2592 (98.9)	12779	28 (1.1)	47	2620	12826
Ghior	3436 (97.9)	17190	75 (2.1)	173	3511	17363	3045 (97.5)	15377	77 (2.5)	156	3122	15533
Daulatpur	3130 (91.2)	15447	303 (8.8)	560	3433	16007	3409 (91.7)	15949	307 (8.8)	496	3716	16445
Shibalaya	2586 (96.8)	12190	85 (3.2)	114	2671	12304	2804 (88.4)	13342	369 (11.6)	659	3173	14001
Harirampur	2787 (84.1)	14558	525 (15.9)	1007	3312	15565	2753 (90.9)	13142	276 (9.1)	476	3029	13618
Total	**23988** (95.3)	**113151**	**1195** (4.7)	**2252**	**25183**	**115403**	**23937** (94.8)	**115613**	**1320** (5.2)	**2382**	**25257**	**117995**
Yield(Ton/Ha)		4.72		1.88		4.58		4.83		1.80		4.67

Note : Figures within parentheses are percentages of total Boro area

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of Boro Rice Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	2788	10458	349	519	3137	10977	2654	11461	228	457	2882	11918
	(88.9)		(11.1)				(92.1)		(7.9)			
Rupganj (54%)	5484	24567	275	510	5759	25077	5914	23495	302	572	6216	24067
	(95.2)		(4.8)				(95.1)		(4.9)			
Total	8272	35025	624	1029	8896	36054	8568	34956	530	1029	9098	35985
	(93.0)		(7.0)				(94.2)		(5.8)			
Yield(Ton/Ha)		4.23		1.65		4.05		4.08		1.94		3.96

Note : Figures within parentheses are percentages of total Boro area

C:\123\AGRL\BRICE-AL.WK1

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice in NCR Districts.

District	1989–90						1990–91					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	39291	149706	36668	75282	75959	224988	46020	154959	31840	65354	77860	220313
Tangail	30832	104038	36671	69476	67503	173514	38238	137784	33740	76290	71978	214074
Mymensingh	58222	204971	59709	123173	117931	328144	55614	188962	59324	118533	114938	307495
Gazipur	34339	154649	10099	23011	44438	177660	34995	159621	10239	25963	45234	185584
Dhaka	3543	12818	1191	2421	4734	15239	3280	10330	2280	4289	5560	14619
Manikganj	175	658	378	707	553	1365	515	1888	846	1557	1361	3445
Narayanganj	2235	8447	382	679	2617	9126	2460	8681	571	946	3031	9627
Munshiganj	26	111	27	80	53	191	49	106	28	53	77	159
Total	168663	635398	145125	294829	313788	930227	181171	662331	138868	292985	320039	955316
Yield(Ton/Ha)		3.77		2.03		2.96		3.66		2.11		2.98

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	17776 (59.2)	64000	12249 (40.8)	22740	30025	86740	22301 (67.5)	79488	10702 (32.5)	23841	33003	103329
Sharisabari	6666 (48.5)	28184	7070 (51.4)	15348	13736	43532	6060 (52.6)	19822	5454 (47.4)	10954	11514	30776
Melandaha	7716 (55.8)	31548	6109 (44.2)	12852	13825	44400	9882 (67.0)	33168	4888 (33.0)	9057	14770	42225
Islampur	3940 (56.5)	15647	3033 (43.4)	6126	6973	21773	4080 (61.0)	12117	2614 (39.0)	4221	6694	16338
Dewanganj	466 (23.2)	1597	1541 (76.8)	2822	2007	4419	425 (23.1)	1373	1413 (76.9)	2931	1838	4304
Madarganj	2727 (29.0)	8730	6666 (71.0)	15394	9393	24124	3272 (32.6)	8991	6769 (67.4)	14350	10041	23341
Total	**39291 (51.7)**	**149706**	**36668 (48.3)**	**75282**	**75959**	**224988**	**46020 (59.1)**	**154959**	**31840 (40.9)**	**65354**	**77860**	**220313**
Yield(Ton/Ha)		3.81		2.05		2.96		3.37		2.05		2.83

Note : Figures within parentheses are percentages of total T.Aman area

C:\123\AGRL\AMAN-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Tangail District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	161 (20.0)	576	646 (80.0)	1221	807	1797	242 (15.7)	849	1293 (84.3)	2505	1535	3354
Basail	5 (13.5)	16	32 (86.4)	47	37	63	20 (3.4)	67	565 (96.6)	1200	585	1267
Ghatail	5131 (42.3)	16861	6989 (57.6)	11153	12120	28014	6666 (51.5)	25690	6262 (48.5)	13578	12928	39268
Kalihati	848 (21.0)	2000	3192 (79.0)	5171	4040	7171	2596 (58.6)	9618	1828 (41.4)	3916	4424	13534
Nagarpur	404 (12.5)	1118	2828 (87.5)	3818	3232	4936	202 (20.0)	897	809 (80.0)	2167	1011	3064
Gopalpur	4938 (54.9)	16352	4060 (45.1)	8223	8998	24575	6100 (58.8)	16081	4271 (41.2)	6565	10371	22646
Mirzapur	3323 (72.7)	13311	1248 (27.3)	2318	4571	15629	2933 (63.1)	10279	1715 (36.9)	5407	4648	15686
Madhupur	9324 (64.3)	30905	5179 (35.7)	9615	14503	40520	12387 (80.7)	43326	2954 (19.3)	6547	15341	49873
Bhuapur	957 (21.3)	3557	3545 (78.7)	6677	4502	10234	822 (19.2)	3076	3446 (80.8)	7267	4268	10343
Shakipur	5656 (40.5)	19086	8306 (59.5)	20186	13962	39272	6145 (42.9)	27469	8169 (57.1)	21504	14314	48973
Delduar	85 (11.6)	256	646 (88.3)	1047	731	1303	125 (4.8)	432	2428 (95.2)	5634	2553	6066
Total	30832 (45.7)	104038	36671 (54.3)	69476	67503	173514	38238 (53.1)	137784	33740 (46.9)	76290	71978	214074
Yield(Ton/Ha)		3.37		1.89		2.57		3.60		2.26		2.97

Note : Figures within parentheses are percentages of total T.Aman area

C:\123\AGRL\AMAN-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	5987 (42.5)	23828	8096 (57.5)	16834	14083	40662	5478 (39.6)	26330	8339 (60.4)	17455	13817	43785
Muktagacha	11191 (54.2)	38186	9466 (45.8)	20033	20657	58219	10504 (52.0)	35100	9696 (48.0)	19823	20200	54923
Fulbaria	9292 (44.0)	31988	11817 (56.0)	25703	21109	57691	8161 (38.0)	24240	13332 (62.0)	25245	21493	49485
Trisal	10435 (52.4)	35625	9488 (47.6)	19275	19923	54900	9534 (50.7)	27966	9252 (49.3)	17072	18786	45038
Bhaluka	8581 (45.8)	30314	10142 (54.1)	21465	18723	51779	9211 (48.9)	30438	9615 (51.1)	17493	18826	47931
Gafargaon	12736 (54.3)	45030	10700 (45.6)	19863	23436	64893	12726 (58.3)	44888	9090 (41.7)	21445	21816	66333
Total	**58222** (49.4)	**204971**	**59709** (50.6)	**123173**	**117931**	**328144**	**55614** (48.4)	**188962**	**59324** (51.6)	**118533**	**114938**	**307495**
Yield(Ton/Ha)		3.52		2.06		2.78		3.40		2.00		2.68

Note : Figures within parentheses are percentages of total T.Aman area

C:\123\AGRL\AMAN-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	13130 (87.3)	59547	1899 (12.7)	4326	15029	63873	12992 (85.6)	51664	.2181 (14.4)	4795	15173	56459
Kaliakair	1858 (65.7)	8077	969 (34.2)	2209	2827	10286	3088 (72.8)	12156	1153 (27.2)	2698	4241	14854
Kaliganj	3394 (84.8)	14706	606 (15.2)	1381	4000	16087	3636 (85.7)	22234	606 (14.3)	1687	4242	23921
Kapasia	7595 (72.6)	34761	2868 (27.4)	6535	10463	41296	7288 (77.0)	26599	2174 (23.0)	4255	9462	30854
Sripur	8362 (69.0)	37558	3757 (31.0)	8560	12119	46118	7991 (65.9)	46968	4125 (34.1)	12528	12116	59496
Total	**34339** (77.3)	**154649**	**10099** (22.7)	**23011**	**44438**	**177660**	**34995** (77.3)	**159621**	**10239** (22.7)	**25963**	**45234**	**185584**
Yield(Ton/Ha)		4.50		2.28		4.00		4.56		2.54		4.10

Note : Figures within parentheses are percentages of total T.Aman area

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Dhaka Dist

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	25 (55.6)	62	20 (44.4)	45	45	107	16 (14.7)	51	93 (85.3)	180	109	231
Nababganj	42 (89.2)	105	5 (10.8)	10	47	115	28 (42.4)	75	38 (57.6)	61	66	136
Dohar	1 (25.0)	3	3 (75.0)	4	4	7	18 (22.8)	46	61 (77.2)	90	79	136
Savar	2202 (84.8)	8425	396 (15.2)	823	2598	9248	2428 (74.3)	7158	842 (25.7)	1579	3270	8737
Dhamrai	1273 (62.4)	4223	767 (37.6)	1539	2040	5762	790 (38.8)	3000	1246 (61.2)	2379	2036	5379
Total	**3543** (74.8)	**12818**	**1191** (25.1)	**2421**	**4734**	**15239**	**3280** (59.0)	**10330**	**2280** (41.0)	**4289**	**5560**	**14619**
Yield(Ton/Ha)		3.62		2.03		3.22		3.15		1.88		2.63

Note : Figures within parentheses are percentages of total T.Aman area

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	32 (41.0)	114	46 (59.0)	86	78	200	99 (23.5)	288	323 (76.5)	505	422	793
Singair	11 (33.3)	21	22 (66.7)	22	33	43	107 (41.5)	447	151 (58.5)	281	258	728
Saturia	131 (31.6)	518	283 (68.4)	549	414	1067	275 (47.3)	1041	307 (52.7)	657	582	1698
Ghior	1 (16.7)	4	5 (83.3)	9	6	13	18 (56.2)	55	14 (43.8)	27	32	82
Daulatpur	0	0	20 (100)	37	20	37	16 (23.9)	57	51 (76.1)	87	67	144
Shibalaya	0.4 (0)	1	2 (100)	4	2	5	0	0	0	0	0	0
Hairampur	0	0	0	0	0	0	0	0	0	0	0	0
Total	**175.4 (31.6)**	**658**	**378 (68.4)**	**707**	**553**	**1365**	**515 (37.8)**	**1888**	**846 (62.2)**	**1557**	**1361**	**3445**
Yield(Ton/Ha)		3.75		1.87		2.47		3.67		1.84		2.53

Note : Figures within parentheses are percentages of total T.Aman area

C:\123\AGRI\AMAN-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	0	0	0	0	0	0	0	0	0	0	0	0
Tongibari	0	0	0	0	0	0	0	0	0	0	0	0
Srinagar	26 (49.1)	111	27 (50.9)	80	53	191	49 (63.6)	106	28 (36.1)	53	77	159
Sirajdikhan	0	0	0	0	0	0	0	0	0	0	0	0
Lohajang	0	0	0	0	0	0	0	0	0	0	0	0
Total	**26** (49.1)	**111**	**27** (50.9)	**80**	**53**	**191**	**49** (63.6)	**106**	**28** (36.1)	**53**	**77**	**159**
Yield(Ton/Ha)		4.3		3.0		3.6		2.2		1.9		2.1

Note : Figures within parentheses are percentages of total T.Aman area

Area (Ha) and Production (Paddy in Ton) of T.Aman Rice Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	HYV/LIV		Local		Total		HYV/LIV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	1725	6691	81	120	1806	6811	1505	5412	362	557	1867	5969
	(95.5)		(4.6)				(80.6)		(19.4)			
Rupganj	510	1756	301	559	811	2315	955	3269	209	389	1164	3658
	(62.9)		(37.1)				(82.0)		(18.0)			
Total	2235	8447	382	679	2617	9126	2460	8681	571	946	3031	9627
	(85.4)		(14.6)				(81.2)		(18.8)			
Yield(Ton/Ha)		3.78		1.78		3.49		3.53		1.66		3.18

Note : Figures within parentheses are percentages of total T.Aman area

C:\123\AGRL\AMAN-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of Aus Rice in NCR Districts.

District	1989–90						1990–91					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	3759	10224	18429	24638	22188	34862	3223	8208	18513	24619	21736	32827
Tangail	10452	19006	54583	50805	65035	69811	8364	20048	54724	72050	63088	92098
Mymensingh	30301	97084	37741	61624	68042	158708	34639	113256	42069	65273	76708	178529
Gazipur	4363	15105	16483	29188	20846	44293	10975	36095	17041	29522	28016	65617
Dhaka	4320	13920	17976	25210	22296	39130	867	1883	15184	14868	16051	16751
Manikganj	261	606	40291	48777	40552	49383	234	556	39062	34553	39296	35109
Narayanganj	464	1437	2315	3286	2779	4723	1239	3696	2083	2845	3322	6541
Munshiganj	643	2546	9623	20145	10266	22691	827	3058	12860	27768	13687	30826
Total	54563	159928	197441	263673	252004	423601	60368	186800	201536	271498	261904	458298
Yield(Ton/Ha)		2.93		1.34		1.68		3.09		1.35		1.75

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	2747 (20.1	7614	10948 (79.9	15172	13695	22786	2101 (17.4)	5446	9979 (82.6	12906	12080	18352
Sharisabari	384 (21.4)	1028	1414 (78.6)	2155	1798	3183	404 (20.0)	1045	1616 (80.0)	2370	2020	3415
Melandaha	202 (13.6)	457	1293 (86.4)	1672	1495	2129	198 (12.6)	482	1374 (87.4)	1853	1572	2335
Islampur	92 (4.0	306	2232 (96.	2475	2324	2781	129 (6.9)	312	1746 (93.1	1995	1875	2307
Dewanganj	152 (9.9)	281	1391 (90.1)	1462	1543	1743	229 (11.9)	555	1697 (88.1)	2390	1926	2945
Madarganj	182 (13.7)	538	1151 (86.3)	1702	1333	2240	162 (7.2)	368	2101 (92.8)	3105	2263	3473
Total	**3759 (17.0)**	**10224**	**18429 (83.0)**	**24638**	**22188**	**34862**	**3223 (14.8)**	**8208**	**18513 (85.2)**	**24619**	**21736**	**32827**
Yield(Ton/Ha)		2.72		1.34		1.57		2.54		1.32		1.51

Note : Figures within parentheses are percentages of total Aus area

C:\123\AGRL\AUS-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Tangail District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	2384 (3.1)	3427	10282 (96.9	9054	12666	12481	2484 (22.5)	5418	8565 (77.5	9540	11049	14958
Basail	533 (13.4)	715	3466 (86.6)	3641	3999	4356	416 (20.5)	1110	1616 (79.5)	2400	2032	3510
Ghatail	2222 (20.4)	4664	8686 (79.6)	8600	10908	13264	1414 (14.9)	4003	8080 (85.1)	10063	9494	14066
Kalihati	202 (8.6	246	2161 (91.	1819	2363	2065	81 (2.3)	192	3543 (97.7	3970	3624	4162
Nagarpur	485 (10.8)	567	4040 (89.2)	2454	4525	3021	375 (7.2)	1113	4873 (92.8)	6579	5248	7692
Gopalpur	222 (9.8)	400	2040 (90.2	1858	2262	2258	169 (8.5)	436	1829 (91.5	2579	1998	3015
Mirzapur	525 (7.1)	1370	6868 (92.9)	6645	7393	8015	225 (3.2)	990	6840 (96.8)	14220	7065	15210
Madhupur	1240 (37.6)	2372	2060 (62.4)	2284	3300	4656	717 (16.5)	1755	3652 (83.5)	4500	4369	6255
Bhuapur	124 (3.1	176	3931 (96.	3244	4055	3420	101 (2.8)	288	3525 (97.2	4842	3626	5130
Shakipur	2424 (25.7)	4942	7009 (74.3)	7981	9433	12923	2303 (22.2)	4554	8080 (77.8)	8727	10383	13281
Delduar	91 (2.2)	127	4040 (97.8)	3225	4131	3352	79 (1.9)	189	4121 (98.1)	4630	4200	4819
Total	**10452** (16.0)	**19006**	**54583** (84.0)	**50805**	**65035**	**69811**	**8364** (13.2)	**20048**	**54724** (86.7)	**72050**	**63088**	**92098**
Yield(Ton/Ha)		1.82		0.93		1.07		2.40		1.32		1.46

Note : Figures within parentheses are percentages of total Aus area

C:\123\AGRL\AUS-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	2616 (25.6)	9000	7614 (74.4	11590	10230	20590	3539 (36.5)	11376	6172 (63.5	8867	9711	20243
Muktagacha	4238 (34.8)	11948	7959 (65.2)	13002	12197	24950	4636 (39.4)	14333	7143 (60.6)	11430	11779	25763
Fulbaria	7274 (60.0)	24077	4848 (40.0)	12060	12122	36137	8355 (50.8)	29282	8080 (49.2)	14760	16435	44042
Trisal	4599 (53.5)	14808	3988 (46.	5922	8587	20730	7793 (49.1)	24479	8100 (50.9	10466	15893	34945
Bhaluka	6262 (43.7)	20693	8080 (56.3)	13200	14342	33893	3563 (29.4)	11325	8565 (70.6)	13259	12128	24584
Gafargaon	5312 (50.3)	16558	5252 (49.7	5850	10564	22408	6753 (62.7)	22461	4009 (37.3	6491	10762	28952
Total	**30301** (44.6)	**97084**	**37741** (55.4)	**61624**	**68042**	**158708**	**34639** (45.2)	**113256**	**42069** (54.8)	**65273**	**76708**	**178529**
Yield(Ton/Ha)		3.20		1.63		2.33		3.27		1.55		2.33

Note : Figures within parentheses are percentages of total Aus area

C:\123\AGRL\AUS-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	1414 (22.6	5235	4848 (77.4	9205	6262	14440	3587 (40.4)	12427	5308 (59.6	9564	8895	21991
Kaliakair	121 (5.4)	436	2141 (94.6)	4066	2262	4502	131 (7.1)	510	1720 (92.9)	3099	1851	3609
Kaliganj	808 (22.2	2838	2828 (77.8)	4833	3636	7671	3232 (75.3)	10750	1058 (24.7)	1761	4290	12511
Kapasia	808 (33.	2224	1616 (66.	2455	2424	4679	1520 (50.6)	4425	1481 (49.4	2668	3001	7093
Sripur	1212 (19.	4372	5050 (80.6)	8629	6262	13001	2505 (25.1)	7983	7474 (74.9)	12430	9979	20413
Total	**4363** (21.0	**15105**	**16483** (79.0)	**29188**	**20846**	**44293**	**10975** (39.2)	**36095**	**17041** (60.8)	**29522**	**28016**	**65617**
Yield(Ton/Ha)		3.46		1.77		2.12		3.29		1.73		2.34

Note : Figures within parentheses are percentages of total Aus area

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	220 (14.6	734	1297 (85.4	1725	1517	2459	20 (2.5)	63	775 (97.5	1358	795	1421
Nababganj	305 (5.3)	1083	5474 (94.7)	7232	5779	8315	34 (0.8)	87	4479 (99.2)	5339	4513	5426
Dohar	2 (0.1)	4	2315 (99.9)	3742	2317	3746	6 (0.3)	12	2206 (99.7)	2270	2212	2282
Savar	1056 (43.2	2869	1388 (56.	2115	2444	4984	464 (23.4)	1211	1523 (76.	1921	1987	3132
Dhamrai	2737 (26.8	9230	7502 (73.2)	10396	10239	19626	343 (5.3)	510	6201 (94.7)	3980	6544	4490
Total	**4320** (19.	**13920**	**17976** (80.6)	**25210**	22296	**39130**	**867** (5.4)	**1883**	**15184** (94.6)	**14868**	**16051**	**16751**
Yield(Ton/Ha)		3.22		1.40		1.76		2.17		0.98		1.04

Note : Figures within parentheses are percentages of total Aus area

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	81 (2.2)	336	3636 (97.8	8566	3717	8902	89 (2.4)	369	3749 (97.6	9352	3838	9721
Tangibari	162 (9.2)	448	1616 (90.8)	1942	1778	2390	76 (3.1)	232	2424 (96.9)	4702	2500	4934
Srinagar	0	0	1184 (100)	1641	1184	1641	12 (0.4)	51	2949 (99.6)	4905	2961	4956
Sirajdikhan	279 (13.	1275	1866 (87.	5433	2145	6708	493 (18.6)	1641	2165 (81.4	5101	2658	6742
Lohajang	121 (8.4	487	1321 (91.6)	2563	1442	3050	157 (9.1)	765	1573 (90.9)	3708	1730	4473
Total	**643** (6.3)	**2546**	**9623** (93.7)	**20145**	**10266**	**22691**	**827** (6.1)	**3058**	**12860** (93.9)	**27768**	**13687**	**30826**
Yield(Ton/Ha)		3.96		2.09		2.21		3.70		2.16		2.25

Note : Figures within parentheses are percentages of total Aus area

Area (Ha) and Production (Paddy in Ton) of Aus Rice Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	52 (0.7)	104	7434 (99.3	7517	7486	7621	26 (0.4)	51	7679 (99.6	5754	7705	5805
Singair	182 (2.0)	445	9100 (98.0)	12163	9282	12608	141 (1.8)	352	8140 (98.2)	9026	8281	9378
Saturia	0	0	6186 (100)	9341	6186	9341	54 (0.9)	146	6425 (99.1)	5936	6479	6082
Ghior	18 (0.9)	38	2020 (99.	1950	2038	1988	0	0	3434 (100	2871	3434	2871
Daulatpur	0	0	12524 (100)	13888	12524	13888	4 (0.1)	7	10580 (99.9)	7938	10584	7945
Shibalaya	6 (0.4)	14	1613 (99.	1913	1619	1927	9 (0.6)	0	1511 (99.	1487	1520	1487
Harirampur	3 (0.3)	5	1414 (99.	2005	1417	2010	0	0	1293 (100	1541	1293	1541
Total	261 (0.7)	606	40291 (99.3)	48777	40552	49383	234 (0.6)	556	39062 (99.4)	34553	39296	35109
Yield(Ton/Ha)		2.32		1.21		1.22		2.38		0.88		0.89

Note : Figures within parentheses are percentages of total Aus area

Area (Ha) and Production (paddy in Ton) of Aus Rice Crop in Narayangaj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Narayanganj	24 (2.3)	54	1018 (97.7)	1581	1042	1635	471 (36.8)	1248	810 (63.2)	1159	1281	2407
Rupganj	440 (25.3)	1383	1297 (74.7)	1705	1737	3088	768 (37.6)	2448	1273 (62.4)	1686	2041	4134
Total	**464** (16.7)	**1437**	**2315** (83.3)	**3286**	2779	**4723**	**1239** (37.3)	**3696**	**2083** (62.7)	**2845**	3322	**6541**
Yield(Ton/Ha)		3.10		1.42		1.70		2.98		1.37		1.97

Note : Figures within parentheses are percentages of totl Aus area.

C:\123\AGRL\AUS-ALL.WK1

Area (Ha) and Production (Paddy in Ton) of D.W Aman Rice in NCR Districts.

District	1989–90						1990–91					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	0	0	2472	4888	2472	4888	0	0	1909	3031	1909	3031
Tangail	0	0	76575	113570	76575	113570	0	0	74801	83320	74801	83320
Mymensingh	0	0	0	0	0	0	0	0	0	0	0	0
Gazipur	0	0	809	1349	809	1349	0	0	635	1104	635	1104
Dhaka	0	0	20893	24014	20893	24014	0	0	17650	23036	17650	23036
Manikganj	0	0	51406	69516	51406	69516	0	0	53402	65556	53402	65556
Narayanganj	0	0	9893	18910	9893	18910	0	0	9893	18910	7620	15980
Munshiganj	0	0	20403	29472	20403	29472	0	0	23767	29429	23767	29429
Total	**0**	**0**	182451	261719	182451	261719	**0**	**0**	182057	224386	179784	221456
Yield(Ton/Ha)				1.43		1.43				1.23		1.23

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Paddy in Ton) of D.W.Aman Rice Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	Broadcast		Transplant		Total		Broadcast		Transplant		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	2062 (96.6)	4068	73 (3.4)	173	2135	4241	1961 (87.5)	3243	279 (12.5)	662	2240	3905
Nababganj	8348 (100)	10042	0	0	8348	10042	6496 (98.2)	7393	115 (1.8)	287	6611	7680
Dohar	2680 (100)	2996	0	0	2680	2996	2353 (100)	3061	0	0	2353	3061
Savar	511 (100)	666	0	0	511	666	612 (100)	899	0	0	612	899
Dhamrai	7017 (97.2)	5789	202 (2.8)	280	7219	6069	4824 (82.7)	6090	1010 (17.3)	1401	5834	7491 0
Total	**20618** (98.7)	**23561**	**275** (1.3)	**453**	20893	**24014**	**16246** (92.0)	**20686**	**1404** (8.0)	**2350**	**17650**	**23036**
Yield(Ton/Ha)		1.14		1.65		1.15		1.27		1.67		1.31

Note : Figures within parentheses are percentages of total D.W.Aman area

C:\123\AGRL\DW-AMAN.WK1

Area (Ha) and Production (Paddy in Ton) of D.W.Aman Rice Crop in Tangail District

Upazila	1989–1990						1990–1991					
	Broadcast		Transplant		Total		Broadcast		Transplant		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	12160 (81.1)	22170	2828 (18.9)	5727	14988	27897	6868 (63.0)	8306	4040 (37.0)	5680	10908	13986
Basail	975 (47.2)	1333	1091 (52.8)	1914	2066	3247	962 (18.3)	952	4290 (81.7)	4885	5252	5837
Ghatail	6343 (56.6)	7983	4848 (43.4)	6970	11191	14953	4727 (43.3)	5468	6181 (56.7)	8032	10908	13500
Kalihati	1103 (14.3)	1339	6626 (85.7)	10134	7729	11473	6102 (46.6)	4762	7149 (53.4)	7078	13251	11840
Nagarpur	4040 (37.1)	4635	6868 (62.9)	8808	10908	13443	4040 (51.0)	4407	3886 (49.0)	4618	7926	9025
Gopalpur	202 (3.9)	273	5050 (96.1)	9171	5252	9444	566 (8.6)	560	6017 (91.4)	6903	6583	7463
Mirzapur	6464 (61.5)	6981	4040 (38.5)	4908	10504	11889	4646 (61.8)	4565	2876 (38.2)	3200	7522	7765
Madhupur	0	0	808 (100)	1473	808	1473	0	0	20 (100)	24	20	24
Bhuapur	2949 (64.6)	3285	1616 (35.4)	2073	4565	5358	2949 (61.9)	2777	1818 (38.1)	2025	4767	4802
Shakipur	767 (76.0)	1035	242 (24.0)	523	1009	1558	404 (75.8)	481	129 (24.2)	192	533	673
Delduar	2909 (38.5)	4054	4646 (61.5)	8781	7555	12835	2909 (40.8)	3180	4222 (59.2)	5225	7131	8405
Total	**37912 (49.5)**	**53088**	**38663 (50.5)**	**60482**	**76575**	**113570**	**34173 (45.7)**	**35458**	**40628 (54.3)**	**47862**	**74801**	**83320**
Yield(Ton/Ha)		1.39		1.50		1.48		1.04		1.18		1.11

Note : Figures within parentheses are percentages of total D.W.Aman area

Area (Ha) and Production (Paddy in Ton) of D.W.Aman Rice Crop

District: Jamalpur

Upazila	1989–1990			1990–1991		
	Area	Prod	Yield(Ton/Ha)	Area	Prod	Yield(Ton/Ha)
Jamalpur	566	1050	1.86	799	1482	1.85
Sharisabari	162	351	2.17	100	144	1.44
Melandaha	606	1140	1.88	249	292	1.17
Islampur	919	1911	2.08	512	679	1.33
Dewanganj	187	376	2.01	168	290	1.73
Madarganj	32	60	1.88	81	144	1.78
Total	2472	4888	1.98	1909	3031	1.59

District: Gazipur

Gazipur	162	270	1.67	121	195	1.61
Kaliakair	162	270	1.67	90	111	1.23
Kaliganj	202	337	1.67	141	236	1.67
Kapasia	162	270	1.67	121	217	1.79
Sripur	121	202	1.67	162	345	2.13
Total	**809**	**1349**	**1.67**	**635**	**1104**	**1.74**

District : Manikganj

Manikanj	6727	6712	1.00	8860	10826	1.22
Singair	6656	9525	1.43	6654	8597	1.29
Saturia	6439	7138	1.11	7735	9419	1.22
Ghoir	6274	10431	1.66	4733	6115	1.29
Daulatpur	8928	9745	1.09	8888	10449	1.18
Shibalaya	7292	10854	1.49	7555	8423	1.11
Harirampur	9090	15111	1.66	8977	11727	1.31
Total	51406	69516	1.35	53402	65556	1.23

District : Munshiganj

Munshiganj	6585	12168	1.85	6060	8777	1.45
Tongibari	4040	5599	1.39	4444	5120	1.15
Srinagar	1520	1402	0.92	3838	3594	0.94
Sirajdikhan	4141	5739	1.39	5296	6360	1.20
Lohajang	4117	4564	1.11	4129	5578	1.35
Total	20403	29472	1.44	23767	29429	1.24

District : Narayangaj

Narayanganj	2171	4144	1.91	1525	3295	2.16
Rupganj	7722	14766	1.91	6095	12685	2.08
Total	**9893**	**18910**	**1.91**	**7620**	**15980**	**2.10**

C:\123\AGRL\DW-AMAN2

Area (Ha) and Production (Ton) of Jute in NCR Districts.

District	1989–90						1990–91					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	5154	7759	6846	10772	12000	18531	9419	14051	8786	15394	18205	29445
Tangail	11596	18697	7790	14878	19386	33575	18171	26754	10797	18986	28968	45740
Mymensingh	5131	7354	2105	3814	7236	11168	7214	10741	2536	4534	9750	15275
Gazipur	1219	1962	1310	2543	2529	4505	3344	3597	2364	3477	5708	7074
Dhaka	3315	5085	2221	4338	5536	9423	4998	6510	2290	3786	7288	10296
Manikganj	3481	4683	1607	2421	5088	7104	4760	6953	1305	2195	6065	9148
Narayanganj	611	1097	462	946	1073	2043	1127	1795	696	1144	1823	2939
Munshiganj	6258	7210	760	1312	7018	8522	6579	9422	1093	1777	7672	11199
Total	**36765**	**53847**	**23101**	**41024**	**59866**	**94871**	**55612**	**79823**	**29867**	**51293**	**85479**	**131116**
Yield(Ton/Ha)		1.46		1.78		1.58		1.44		1.72		1.53

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Ton) of Jute Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	1818	2618	2505	4058	4323	6676	2707	3959	2545	4238	5252	8197
Sharisabari	889	1440	1131	2036	2020	3476	2141	3170	2020	3727	4161	6897
Melandaha	606	941	1252	1896	1858	2837	1616	2182	1656	2460	3272	4642
Islampur	906	1696	538	918	1444	2614	1050	1541	919	1654	1969	3195
Dewanganj	127	191	127	235	254	426	255	378	212	346	467	724
Madarganj	808	873	1293	1629	2101	2502	1650	2821	1434	2969	3084	5790
Total :	**5154 (42.9)**	**7759**	**6846 (57.1)**	**10772**	**12000**	**18531**	**9419 (51.7)**	**14051**	**8786 (48.3)**	**15394**	**18205**	**29445**
Yield (Ton/ha)		1.51		1.57		1.54		1.49		1.75		1.62

Note : Figures within parentheses are percentage of total Jute area

C:\123\AGRL\JUTE-ALL.WK1

Area (Ha) and Production (Ton) of Jute Crop in Tangail District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	1616	2327	606	982	2222	3309	2262	3054	1212	1854	3474	4908
Basail	545	1031	343	757	888	1788	1434	2582	444	880	1878	3462
Ghatail	1212	1964	1212	2400	2424	4364	1798	2670	1414	2558	3212	5228
Kalihati	1555	2800	556	1219	2111	4019	1818	3007	969	1920	2787	4927
Nagarpur	1212	2182	606	1200	1818	3382	2050	2398	848	1222	2898	3620
Gopalpur	626	1029	687	1298	1313	2327	1171	1957	1232	2290	2403	4247
Mirzapur	1212	1636	808	1455	2020	3091	2080	2996	1018	1741	3098	4737
Madhupur	909	1329	1221	2253	2130	3582	1507	2204	1225	2206	2732	4410
Bhuapur	1267	2052	929	1694	2196	3746	1656	2505	949	1846	2605	4351
Shakipur	242	349	202	364	444	713	420	643	274	465	694	1108
Delduar	1200	1998	620	1256	1820	3254	1975	2738	1212	2004	3187	4742
Total :	**11596 (59.8)**	**18697**	**7790 (40.2)**	**14878**	**19386**	**33575**	**18171 (62.7)**	**26754**	**10797 (37.3)**	**18986**	**28968**	**45740**
Yield (Ton/ha)		1.61		1.91		1.73		1.47		1.76		1.58

Note : Figures within parentheses are percentage of total Jute area

Area (Ha) and Production (Ton) of Jute Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	848	1337	448	888	1296	2225	1173	1822	514	1018	1687	2840
Muktagacha	1010	1509	606	1077	1616	2586	1329	1974	731	1316	2060	3290
Fulbaria	525	922	283	573	808	1495	808	1313	323	582	1131	1895
Trisal	566	764	182	327	748	1091	1065	1437	206	315	1271	1752
Bhaluka	808	1091	323	524	1131	1615	1138	1439	431	587	1569	2026
Gafargaon	1374	1731	263	425	1637	2156	1701	2756	331	716	2032	3472
Total :	**5131 (70.9)**	**7354**	**2105 (29.1)**	**3814**	**7236**	**11168**	**7214 (74.0)**	**10741**	**2536 (26.0)**	**4534**	**9750**	**15275**
Yield (Ton/ha)		1.43		1.81		1.54		1.49		1.79		1.57

Note : Figures within parentheses are percentage of total Jute area

Area (Ha) and Production (Ton) of Jute Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	170	275	113	236	283	511	198	307	181	327	379	634
Kaliakair	283	534	339	764	622	1298	727	1130	263	474	990	1604
Kaliganj	223	402	286	618	509	1020	1050	879	767	803	1817	1682
Kapasia	200	233	370	525	570	758	1052	788	547	778	1599	1566
Sripur	343	518	202	400	545	918	317	493	606	1095	923	1588
Total :	1219 (48.2)	1962	1310 (51.8)	2543	2529	4505	3344 (58.6)	3597	2364 (41.4)	3477	5708	7074
Yield (Ton/ha)		1.61		1.94		1.78		1.08		1.47		1.24

Note : Figures within parentheses are percentages of total Jute area

C:\123\AGRL\JUTE-ALL.WK1

Area (Ha) and Production (Ton) of Jute Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	646	1111	384	781	1030	1892	642	1020	212	360	854	1380
Nababganj	606	846	258	384	864	1230	618	798	214	334	832	1132
Dohar	116	159	40	59	156	218	446	800	107	222	553	1022
Savar	493	809	529	1024	1022	1833	767	1165	505	841	1272	2006
Dhamrai	1454	2160	1010	2090	2464	4250	2525	2727	1252	2029	3777	4756
Total :	**3315**	**5085**	**2221**	**4338**	**5536**	**9423**	**4998**	**6510**	**2290**	**3786**	**7288**	**10296**
	(59.9)		(40.1)				(68.5)		(31.5)			
Yield (Ton/ha)		1.53		1.95		1.70		1.30		1.65		1.41

Note : Figures within parentheses are percentages of total Jute area

Area (Ha) and Production (Ton) of Jute Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	545	663	279	377	824	1040	668	842	292	421	960	1263
Singair	596	805	210	284	806	1089	586	975	202	400	788	1375
Saturia	606	955	462	834	1068	1789	876	1606	291	595	1167	2201
Ghior	151	205	121	177	272	382	484	653	131	178	615	831
Daulatpur	1212	1638	404	573	1616	2211	1717	2318	242	371	1959	2689
Shibalay	169	190	119	160	288	350	243	350	111	181	354	531
Harirampur	202	227	12	16	214	243	186	209	36	49	222	258
Total :	**3481** (68.4)	**4683**	**1607** (31.6)	**2421**	**5088**	**7104**	**4760** (78.5)	**6953**	**1305** (21.5)	**2195**	**6065**	**9148**
Yield (Ton/ha)		1.35		1.51		1.40		1.46		1.68		1.51

Note : Figures within parentheses are percentages of total Jute area

Area (Ha) and Production (Ton) of Jute Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	3232	5182	81	162	3313	5344	3232	4945	162	291	3394	5236
Tongibari	444	744	121	224	565	968	1212	1527	287	490	1499	2017
Srinagar	705	344	186	308	891	652	808	1091	202	309	1010	1400
Sirajdikhan	961	534	291	524	1252	1058	808	1018	323	494	1131	1512
Lohajang	916	406	81	94	997	500	519	841	119	193	638	1034
Total :	**6258**	**7210**	**760**	**1312**	**7018**	**8522**	**6579**	**9422**	**1093**	**1777**	**7672**	**11199**
	(89.2)		(10.8)				(85.7)	(1.43)	(14.2)			
Yield (Ton/ha)		1.15		1.73		1.21		1.43		1.63		1.46

Note : Figures within parentheses are percentages of total Jute area

Area (Ha) and Production (Ton) of Jute Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	White		Tossa		Total		White		Tossa		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	247	443	46	104	293	547	420	661	85	152	505	813
Rupganj	364	654	416	842	780	1496	707	1134	611	992	1318	2126
Total :	**611**	**1097**	**462**	**946**	**1073**	**2043**	**1127**	**1795**	**696**	**1144**	**1823**	**2939**
	(56.9)		(43.1)				(61.8)		(38.2)			
Yield (Ton/ha)		1.80		2.05		1.90		1.59		1.64		1.61

Note : Figures within parentheses are percentages of total Jute area

Area (Ha) and Production (Ton) of Wheat in NCR Districts.

District	1989–90						1990–91					
	Irrigtd.		Non–Irrig.		Total		Irrigtd.		Non–Irrig.		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	2022	3628	4026	6527	6048	10155	3609	8985	3928	6916	7537	15901
Tangail	5813	10407	18022	25153	23835	35560	2115	4662	17688	32667	19803	37329
Mymensingh	1895	3660	4456	5348	6351	9008	1643	3518	4255	7053	5898	10571
Gazipur	0	0	2204	4049	2204	4049	0	0	2365	4284	2365	4284
Dhaka	0	0	7548	10835	7548	10835	0	0	7007	12751	7007	12751
Manikganj	50	105	12491	19198	12541	19303	23	62	13160	23550	13183	23612
Narayanganj	40	78	1016	1291	1056	1369	37	54	536	751	573	805
Munshiganj	0	0	3438	3890	3438	3890	0	0	3235	4705	3235	4705
Total	9820	17878	53201	76291	63021	94169	7427	17281	52174	92677	59601	109958
Yield(Ton/Ha)		1.82		1.43		1.49		2.33		1.78		1.84

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Ton) of Wheat Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	808	1634	970	1608	1778	3242	889	1870	1091	1822	1980	3692
Sharisabari	154	326	331	490	485	816	244	569	665	1103	909	1672
Melandaha	509	423	655	717	1164	1140	993	2636	527	1047	1520	3683
Islampur	420	931	553	870	973	1801	716	1684	591	901	1307	2585
Dewanganj	85	208	305	603	390	811	102	252	305	559	407	811
Madarganj	46	106	1212	2239	1258	2345	665	1974	749	1484	1414	3458
Total :	**2022 (33.5)**	**3628**	**4026 (66.5)**	**6527**	**6048**	**10155**	**3609 (47.9)**	**8985**	**3928 (52.1)**	**6916**	**7537**	**15901**
Yield (Ton/ha)		1.79		1.62		1.67		2.49		1.76		2.11

Note : Figures within parentheses are percentages of total Wheat area

C:\123\AGRL\AG\WHET.WK1

Area (Ha) and Production (Ton) of Wheat Crop in Tangail District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	61	73	3495	5038	3556	5111	61	124	3777	6375	3838	6499
Basail	20	42	1192	1770	1212	1812	20	45	1293	2560	1313	2605
Ghatail	1252	2918	768	1192	2020	4110	606	1340	1212	1914	1818	3254
Kalihati	202	327	2060	2848	2262	3175	0	0	2068	4342	2068	4342
Nagarpur	606	1272	2161	2802	2767	4074	375	852	1645	3257	2020	4109
Gopalpur	869	1615	1222	1644	2091	3259	258	558	953	1859	1211	2417
Mirzapur	2	4	1588	2288	1590	2292	5	12	1611	3308	1616	3320
Madhupur	2262	3289	1434	1545	3696	4834	656	1448	1162	1803	1818	3251
Bhuapur	202	304	1636	1802	1838	2106	0	0	1879	3080	1879	3080
Shakipur	216	389	42	69	258	458	84	159	118	207	202	366
Delduar	121	174	2424	4155	2545	4329	50	124	1970	3962	2020	4086
Total :	**5813 (24.4)**	**10407**	**18022 (75.6)**	**25153**	**23835**	**35560**	**2115 (10.7)**	**4662**	**17688 (89.3)**	**32667**	**19803**	**37329**
Yield (Ton/ha)		1.79		1.39		1.54		2.20		1.84		1.88

Note : Figures within parentheses are percentages of total Wheat area

Area (Ha) and Production (Ton) of Wheat Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	121	238	515	623	636	861	121	285	536	952	657	1237
Muktagacha	380	835	697	949	1077	1784	368	767	602	984	970	1751
Fulbaria	404	800	808	800	1212	1600	404	865	767	1227	1171	2092
Trisal	343	592	525	427	868	1019	182	369	566	836	748	1205
Bhaluka	283	525	214	265	497	790	154	298	77	97	231	395
Gafargaon	364	670	1697	2284	2061	2954	414	934	1707	2957	2121	3891
Total :	**1895 (29.8)**	**3660**	**4456 (70.2)**	**5348**	**6351**	**9008**	**1643 (27.9)**	**3518**	**4255 (72.1)**	**7053**	**5898**	**10571**
Yield (Ton/ha)		1.93		1.20		1.42		2.14		1.66		1.79

Note : Figures within parentheses are percentages of total Wheat area

C:\123\AGRL\AG\WHET.WK1

Area (Ha) and Production (Ton) of Wheat Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	0	0	323	487	323	487	0	0	343	726	343	726
Kaliakair	0	0	786	1712	786	1712	0	0	668	1232	668	1232
Kaliganj	0	0	85	204	85	204	0	0	162	299	162	299
Kapasia	0	0	222	379	222	379	0	0	524	918	524	918
Sripur	0	0	788	1267	788	1267	0	0	668	1109	668	1109
Total :	**0**	**0**	**2204**	**4049**	**2204**	**4049**	**0**	**0**	**2365**	**4284**	**2365**	**4284**
Yield (Ton/ha)				1.84		1.84				1.81		1.81

Note : Figures within parentheses are percentages of total Wheat area

C:\123\AGRL\AG\WHET.WK1

Area (Ha) and Production (Ton) of Wheat Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	0	0	913	1687	913	1687	0	0	350	688	350	688
Nababganj	0	0	1010	1035	1010	1035	0	0	1042	1733	1042	1733
Dohar	0	0	515	723	515	723	0	0	485	820	485	820
Savar	0	0	1050	1970	1050	1970	0	0	848	1677	848	1677
Dhamrai	0	0	4060	5420	4060	5420	0	0	4282	7833	4282	7833
Total :	**0**	**0**	**7548**	**10835**	**7548**	**10835**	**0**	**0**	**7007**	**12751**	**7007**	**12751**
Yield (Ton/ha)				1.44		1.44				1.82		1.82

Note : Figures within parentheses are percentages of total Wheat area

Area (Ha) and Production (Ton) of Wheat Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	8	15	2435	4106	2443	4121	14	34	2701	5240	2715	5274
Singair	20	37	2707	4126	2727	4163	0	0	2832	4841	2832	4841
Saturia	10	31	1414	2547	1424	2578	8	26	1604	3037	1612	3063
Ghior	0	0	1087	1406	1087	1406	1	2	879	1543	880	1545
Daulatpur	10	18	2010	2414	2020	2432	0	0	2040	3582	2040	3582
Shibalay	0	0	1305	2049	1305	2049	0	0	1503	2425	1503	2425
Harirampur	2	4	1533	2550	1535	2554	0	0	1601	2882	1601	2882
Total :	**50**	**105**	**12491**	**19198**	**12541**	**19303**	**23**	**62**	**13160**	**23550**	**13183**	**23612**
	(0.4)		**(99.6)**				**(0.2)**		**(99.8)**			
Yield (Ton/ha)		2.1		1.53		1.54		2.69		1.79		1.79

Note : Figures within parentheses are percentages of total Wheat area

C:\123\AGRL\AG\WHET.WK1

123

Area (Ha) and Production (Ton) of Wheat Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	0	0	353	438	353	438	0	0	160	240	160	240
Rupganj	40	78	663	853	703	931	37	54	376	511	413	565
Total :	**40**	**78**	**1016**	**1291**	**1056**	**1369**	**37**	**54**	**536**	**751**	**573**	**805**
Yield (Ton/ha)		1.95		1.27		1.30		1.46		1.40		1.40

Note : Figures within parentheses are percentages of total Wheat area

Area (Ha) and Production (Ton) of Wheat Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	Irrigated		Non–Irrigated		Total		Irrigated		Non–Irrigated		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	0	0	1172	1732	1172	1732	0	0	808	1204	808	1204
Tongibari	0	0	583	623	583	623	0	0	142	243	142	243
Srinagar	0	0	606	783	606	783	0	0	389	725	389	725
Sirajdikhan	0	0	458	635	458	635	0	0	361	534	361	534
Lohajang	0	0	619	117	619	117	0	0	1535	1999	1535	1999
Total :	**0**	**0**	**3438**	**3890**	**3438**	**3890**	**0**	**0**	**3235**	**4705**	**3235**	**4705**
Yield (Ton/ha)				1.13		1.13				1.45		1.45

Note : Figures within parentheses are percentages of total Wheat area

126

Area (Ha) and Production (Ton) of Sugarcane Crop in Jamalpur District

Annex I.2.11a

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Jamalpur	606	31266	845	
Sharisabari	60	2631	77	
Melandaha	667	52700	766	
Islampur	3018	240607	1702	
Dewanganj	382	24633	480	
Madarganj	115	5301	20	
Total :	**4848**	**357138**	**3890**	
Yield (Ton/ha)		73.6		

Area (Ha) and Production (Ton) of Sugarcane Crop in Tangail District

Annex I.2.11b

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Tangail	1050	62060	1071	
Basail	141	8527	263	
Ghatail	93	7845	101	
Kalihati	101	5909	230	
Nagarpur	485	26305	454	
Gopalpur	61	3654	68	
Mirzapur	388	17315	429	
Madhupur	81	4000	562	
Bhuapur	182	7760	141	
Shakipur	121	5182	75	
Delduar	994	53207	1050	
Total :	**3697**	**201764**	**4444**	
Yield (Ton/ha)		54.5		

C:\123\AGRL\AG-SUGAR.WK1

127

Area (Ha) and Production (Ton) of Sugarcane Crop in Mymensingh District

Annex I.2.11c

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Mymensingh	18	574	17	
Muktagacha	24	1140	28	
Fulbaria	1410	55840	1309	
Trisal	32	600	44	
Bhaluka	1616	96400	2036	
Gafargaon	141	6300	141	
Total :	**3241**	**160854**	**3575**	
Yield (Ton/ha)		49.63		

Area (Ha) and Production (Ton) of Sugarcane Crop in Gazipur District

Annex I.2.11d

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Gazipur	101	5500	100	
Kaliakair	26	1138	87	
Kaliganj	162	4625	134	
Kapasia	809	14725	389	
Sripur	2646	121175	2020	
Total :	**3744**	**147163**	**2730**	
Yield (Ton/ha)		39.31		

C:\123\AGRL\AG-SUGAR.WK1

128

Area (Ha) and Production (Ton) of Sugarcane Crop in Dhaka District

Annex I.2.11e

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Keraniganj	14	648	0	
Nababganj	304	13554	227	
Dohar	73	3276	139	
Savar	87	3870	101	
Dhamrai	323	14400	292	
Total :	**801**	**35748**	**759**	
Yield (Ton/ha)		44.60		

Area (Ha) and Production (Ton) of Sugarcane Crop in Manikganj District

Annex I.2.11f

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Manikganj	634	13593	646	
Singair	2424	155400	2424	
Saturia	75	2587	140	
Ghior	81	4440	55	
Daulatpur	151	3857	242	
Shibalay	56	2098	86	
Harirampur	56	1533	103	
Total :	**3477**	**183508**	**3696**	
Yield (Ton/ha)		52.78		

C:\123\AGRL\AG-SUGAR.WK1

129

Area (ha) and Production(Ton) of Sugarcane crop in Narayanganj District

Annex I.2.11g

	1989–1990		1990–1991	
Upazila	Area	Prod.	Area	Prod.
Narayanganj	44	1980	129	
Rupganj	121	5250	153	
Total	165	7230	282	
Yield (Ton/ha)		43.82		

Area (Ha) and Production (Ton) of Sugarcane Crop in Munshiganj District

Annex I.2.11h

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Munshiganj	111	8212	80	
Tongibari	141	8492	81	
Srinagar	102	1983	176	
Sirajdikhan	136	3396	131	
Lohajang	42	1325	44	
Total :	**532**	**23408**	**512**	
Yield (Ton/ha)		44.00		

C:\123\AGRL\AG-SUGAR.WK1

130

Area (Ha) and Production (Ton) of Potato in NCR Districts.

District	1989–90						1990–91					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Jamalpur	1177	18360	782	6133	1959	24493	1583	25486	871	8814	2454	34300
Tangail	1676	27816	2550	24184	4226	52000	1730	27551	2131	20885	3861	48436
Mymensingh	681	5604	1483	10751	2164	16355	422	6457	1120	8978	1542	15435
Gazipur	485	4500	323	2249	808	6749	298	4871	500	4113	798	8984
Dhaka	937	15069	561	3584	1498	18653	818	12361	408	3392	1226	15753
Manikganj	1169	16986	508	3955	1677	20941	1272	18407	561	3846	1833	22253
Narayanganj	1741	33940	0	0	1741	33940	1801	42333	0	0	1801	42333
Munshiganj	21409	457059	0	0	21409	457059	22812	687191	0	0	22812	687191
Total	**29275**	**579334**	**6207**	**50856**	**35482**	**630190**	**30736**	**824657**	**5591**	**50028**	**36327**	**874685**
Yield(Ton/Ha)		19.79		8.19		17.76		26.83		8.95		24.08

C:\123\AGRL\PADY-NCR

Area (Ha) and Production (Ton) of Potato Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	323	4180	101	653	424	4833	485	6360	141	945	626	7305
Sharisabari	222	3695	242	1847	464	5542	273	4238	199	1623	472	5861
Melandaha	154	2240	71	535	225	2775	209	3686	130	1207	339	4893
Islampur	226	3859	155	1359	381	5218	264	5368	123	1254	387	6622
Dewanganj	10	131	11	59	21	190	12	169	13	107	25	276
Madarganj	242	4255	202	1680	444	5935	340	5665	265	3678	605	9343
Total :	**1177 (60.1)**	**18360**	**782 (39.9)**	**6133**	**1959**	**24493**	**1583 (64.5)**	**25486**	**871 (35.5)**	**8814**	**2454**	**34300**
Yield (Ton/ha)		15.60		7.84		12.50		16.10		10.12		13.97

Note : Figures within parentheses are percentages of total Potato area

C:\123\AGRL\AGPOTATO.WK1

Area (Ha) and Production (Ton) of Potato Crop in Tangail District

Upazila	1989-1990						1990-1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	242	3273	263	1773	505	5046	303	4384	404	3117	707	7501
Basail	109	1708	194	1902	303	3610	111	1655	186	2003	297	3658
Ghatail	162	3127	111	1007	273	4134	50	822	101	1004	151	1826
Kalihati	214	3296	141	1184	355	4480	222	3342	174	1564	396	4906
Nagarpur	101	1364	152	1091	253	2455	162	2545	125	1127	287	3672
Gopalpur	232	3852	459	4350	691	8202	225	4043	146	1444	371	5487
Mirzapur	218	4791	335	4105	553	8896	250	3730	395	3810	645	7540
Madhupur	91	1188	202	1545	293	2733	141	2163	148	1401	289	3564
Bhuapur	162	3054	121	1418	283	4472	145	2962	129	1609	274	4571
Shakipur	24	412	97	1126	121	1538	81	1200	40	403	121	1603
Delduar	121	1751	475	4683	596	6434	40	705	283	3403	323	4108
Total :	**1676 (39.6)**	**27816**	**2550 (60.4)**	**24184**	**4226**	**52000**	**1730 (44.8)**	**27551**	**2131 (55.2)**	**20885**	**3861**	**48436**
Yield (Ton/ha)		16.60		9.48		12.30		15.93		9.80		12.54

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Potato Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	85	1344	145	1188	230	2532	54	907	126	1106	180	2013
Muktagacha	81	1120	242	1650	323	2770	81	1300	210	1929	291	3229
Fulbaria	91	1462	242	1848	333	3310	81	1200	283	2100	364	3300
Trisal	51	754	141	857	192	1611	61	825	141	1120	202	1945
Bhaluka	30	487	97	740	127	1227	32	448	85	591	117	1039
Gafargaon	343	437	616	4468	959	4905	113	1777	275	2132	388	3909
Total :	**681 (31.5)**	**5604**	**1483 (68.5)**	**10751**	**2164**	**16355**	422 **(27.4)**	**6457**	**1120 (72.6)**	**8978**	**1542**	**15435**
Yield (Ton/ha)		8.23		7.25		7.55		15.30		8.02		10.00

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Potato Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	101	937	40	281	141	1218	150	1933	134	1256	284	3189
Kaliakair	141	1312	101	703	242	2015	75	1389	165	1371	240	2760
Kaliganj	101	938	61	422	162	1360	28	525	49	358	77	883
Kapasia	61	563	81	562	142	1125	40	957	52	446	92	1403
Sripur	81	750	40	281	121	1031	5	67	100	682	105	749
Total :	**485** (60.0)	**4500**	**323** (40.0)	**2249**	**808**	**6749**	**298** (37.4)	**4871**	**500** (62.6)	**4113**	**798**	**8984**
Yield (Ton/ha)		9.28		6.96		8.35		16.35		8.23		11.26

Note : Figures within parentheses are percentages of total Potato area

C:\123\AGRL\AGPOTATO.WK1

Area (Ha) and Production (Ton) of Potato Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	161	2248	310	1734	471	3982	91	1596	197	1732	288	3328
Nababganj	179	2908	29	175	208	3083	172	2555	31	264	203	2819
Dohar	26	364	31	172	57	536	22	306	22	134	44	440
Savar	117	1739	24	155	141	1894	130	2151	11	118	141	2269
Dhamrai	454	7810	167	1348	621	9158	403	5753	147	1144	550	6897
Total :	**937** (62.5)	**15069**	**561** (37.5)	**3584**	**1498**	**18653**	**818** (66.7)	**12361**	**408** (33.3)	**3392**	**1226**	**15753**
Yield (Ton/ha)		16.08		6.38		12.45		15.11		8.31		12.84

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Potato Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	582	8149	94	701	676	8850	444	6323	121	784	565	7107
Singair	162	2090	121	896	283	2986	222	3901	141	1045	363	4946
Saturia	120	2079	61	675	181	2754	185	2479	59	400	244	2879
Ghior	120	1718	40	392	160	2110	119	1536	78	652	197	2188
Daulatpur	42	588	113	627	155	1215	135	1863	91	487	226	2350
Shibalay	68	1154	41	274	109	1428	63	1048	27	193	90	1241
Harirampur	75	1208	38	390	113	1598	104	1257	44	285	148	1542
Total :	**1169 (69.7)**	**16986**	**508 (30.3)**	**3955**	**1677**	**20941**	**1272 (69.4)**	**18407**	**561 (30.6)**	**3846**	**1833**	**22253**
Yield (Ton/ha)		14.53		7.78		12.48		14.47		6.85		12.14

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Potato Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	1618	32040	0	0	1618	32040	1700	40803	0	0	1700	40803
Rupganj	123	1900	0	0	123	1900	101	1530	0	0	101	1530
Total :	**1741**	**33940**	**0**	**0**	**1741**	**33940**	**1801**	**42333**	**0**	**0**	**1801**	**42333**
Yield (Ton/ha)		19.49				19.49		23.51				23.51

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Potato Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	6141	141844	0	0	6141	141844	6885	222660	0	0	6885	222660
Tangibari	5252	116461	0	0	5252	116461	5454	156227	0	0	5454	156227
Srinagar	1939	37626	0	0	1939	37626	1972	57209	0	0	1972	57209
Sirajdikhan	5432	115429	0	0	5432	115429	5857	165599	0	0	5857	165599
Lohajang	2645	45699	0	0	2645	45699	2644	85496	0	0	2644	85496
Total :	**21409**	**457059**	**0**	**0**	**21409**	**457059**	**22812**	**687191**	**0**	**0**	**22812**	**687191**
Yield (Ton/ha)		21.34				21.34		30.12				30.12

Note : Figures within parentheses are percentages of total Potato area

Area (Ha) and Production (Ton) of Mustard Crop in Jamalpur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	323	298	889	575	1212	873	202	275	1091	1012	1293	1287
Sharisabari	81	82	727	604	808	686	61	64	594	441	655	505
Melandaha	87	96	747	587	834	683	51	66	475	450	526	516
Islampur	55	61	670	494	725	555	56	57	775	500	831	557
Dewanganj	2	2	72	73	74	75	34	37	170	140	204	177
Madarganj	61	84	1046	773	1107	857	81	120	3375	1429	3456	1549
Total :	**609 (12.8)**	**623**	**4151 (87.2)**	**3106**	**4760**	**3729**	**485 (7.0)**	**619**	**6480 (93.0)**	**3972**	**6965**	**4591**
Yield (Ton/ha)		1.02		0.75		0.78		1.28		0.61		0.66

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

139

Area (Ha) and Production (Ton) of Mustard Crop in Tangail District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	101	109	3454	2487	3555	2596	97	121	3686	3641	3783	3762
Basail	81	84	3555	2936	3636	3020	50	57	3191	2736	3241	2793
Ghatail	404	445	3481	2820	3885	3265	141	174	1677	1290	1818	1464
Kalihati	14	19	3218	2606	3232	2625	109	93	3680	2219	3789	2312
Nagarpur	101	136	1818	1473	1919	1609	606	545	801	577	1407	1122
Gopalpur	460	414	1667	1275	2127	1689	187	199	1700	1378	1887	1577
Mirzapur	104	65	2809	1264	2913	1329	250	315	3067	2229	3317	2544
Madhupur	291	78	949	171	1240	249	384	415	392	351	776	766
Bhuapur	81	72	1899	1316	1980	1388	81	87	1818	1391	1899	1478
Shakipur	18	13	847	534	865	547	14	16	195	153	209	169
Delduar	253	289	1955	1562	2208	1851	121	109	910	573	1031	682
Total :	**1908 (6.9)**	**1724**	**25652 (93.1)**	**18444**	**27560**	**20168**	2040 **(8.8)**	2131	**21117 (91.2)**	**16538**	**23157**	**18669**
Yield (Ton/ha)		0.90		0.72		0.73		1.04		0.78		0.81

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

Area (Ha) and Production (Ton) of Mustard Crop in Mymensingh District

Area (Ha) and Production (Ton) of Mustard Crop in Mymensingh District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	49	43	206	122	255	165	42	34	182	101	224	135
Muktagacha	81	96	489	399	570	495	87	118	525	390	612	508
Fulbaria	97	79	430	266	527	345	133	109	283	140	416	249
Trisal	49	36	111	52	160	88	32	24	71	35	103	59
Bhaluka	121	99	606	375	727	474	23	15	160	71	183	86
Gafargaon	20	15	81	44	101	59	19	14	91	71	110	85
Total :	**417 (17.8)**	**368**	**1923 (82.2)**	**1258**	**2340**	**1626**	336 **(20.4)**	**314**	**1312 (79.6)**	**808**	**1648**	**1122**
Yield (Ton/ha)		0.88		0.65		0.69		0.93		0.62		0.68

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

Area (Ha) and Production (Ton) of Mustard Crop in Gazipur District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	311	292	194	144	505	436	449	373	344	222	793	595
Kaliakair	374	370	626	465	1000	835	466	429	750	552	1216	981
Kaliganj	194	181	121	90	315	271	182	101	162	60	344	161
Kapasia	162	151	149	111	311	262	200	240	169	125	369	365
Sripur	152	141	323	240	475	381	203	168	202	132	405	300
Total :	**1193 (45.8)**	**1135**	**1413 (54.2)**	**1050**	**2606**	**2185**	**1500 (48.0)**	**1311**	**1627 (52.0)**	**1091**	**3127**	**2402**
Yield (Ton/ha)		0.95		0.74		0.83		0.87		0.67		0.77

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

Area (Ha) and Production (Ton) of Mustard Crop in Dhaka District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	130	130	1254	869	1384	999	81	69	576	379	657	448
Nababganj	127	135	656	485	783	620	150	97	1149	321	1299	418
Dohar	149	154	757	595	906	749	141	95	671	403	812	498
Savar	351	380	968	771	1319	1151	291	215	1406	835	1697	1050
Dhamrai	157	160	6286	5150	6443	5310	159	101	5536	2481	5695	2582
Total :	**914**	**959**	**9921**	**7870**	**10835**	**8829**	**822**	**577**	**9338**	**4419**	**10160**	**4996**
	(8.5)		**(91.5)**				**(8.0)**		**(92.0)**			
Yield (Ton/ha)		1.05		0.79		0.81		0.70		0.47		0.49

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

143

Area (Ha) and Production (Ton) of Mustard Crop in Manikganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	181	192	3761	3041	3942	3233	161	105	2949	1499	3110	1604
Singair	40	30	3030	1680	3070	1710	40	21	2424	784	2464	805
Saturia	164	203	1290	953	1454	1156	61	48	2222	1250	2283	1298
Ghior	148	164	1242	1147	1390	1311	117	76	949	526	1066	602
Daulatpur	16	18	2226	1645	2242	1663	76	63	2189	1539	2265	1602
Shibalay	33	39	1818	1663	1851	1702	20	21	1524	1068	1544	1089
Harirampur	121	134	1616	1344	1737	1478	19	12	1212	700	1231	712
Total :	**703**	**780**	**14983**	**11473**	**15686**	**12253**	**494**	**346**	**13469**	**7366**	**13963**	**7712**
	(4.5)		**(95.5)**				**(3.6)**		**(96.4)**			
Yield (Ton/ha)		1.10		0.76		0.78		0.69		0.54		0.55

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

144

Area (Ha) and Production (Ton) of Mustard Crop in Narayanganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	927	1033	0	0	927	1033	1467	1351	40	37	1507	1388
Rupganj	137	133	271	161	408	294	130	109	290	158	420	267
Total :	**1064** (79.7)	**1166**	**271** (20.3)	**161**	**1335**	**1327**	**1597** (82.8)	**1460**	**330** (17.2)	**195**	**1927**	**1655**
Yield (Ton/ha)		1.09		0.59		0.99		0.91		0.59		0.86

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

Area (Ha) and Production (Ton) of Mustard Crop in Munshiganj District

Upazila	1989–1990						1990–1991					
	HYV		Local		Total		HYV		Local		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	162	179	1494	1519	1656	1698	105	116	1052	973	1157	1089
Tangibari	323	418	121	123	444	541	242	269	81	67	323	336
Srinagar	162	134	849	705	1010	839	87	80	454	378	541	458
Sirajdikhan	216	279	381	492	597	771	363	201	282	104	645	305
Lohajang	214	217	296	246	510	463	627	637	241	179	868	816
Total :	**1077 (25.5)**	**1227**	**3141 (74.5)**	**3085**	**4217**	**4312**	**1424 (40.3)**	**1303**	**2110 (59.7)**	**1701**	**3534**	**3004**
Yield (Ton/ha)		1.14		0.98		1.02		0.92		0.81		0.85

Note : Figures within parentheses are percentages of total Mustard area

C:\123\AGRL\MUSTARD.WK1

1996

Area (Ha) and Production (Ton) of Pulses Crop in Jamalpur District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Jamalpur	40	22	0	0	20	13	40	33	20	15	120	83	40	30	30	28	20	12	40	40	30	30	160	140
Sharisabari	20	17	0	0	20	24	81	82	16	18	137	141	43	30	8	6	61	61	71	35	25	22	208	154
Melandaha	22	15	0	0	36	27	174	192	6	4	238	238	48	34	15	12	13	10	54	33	12	9	142	98
Islampur	20	14	0	0	92	84	118	98	8	7	238	203	48	45	53	39	121	89	158	206	21	16	401	395
Dewanganj	10	9	0	0	13	8	41	34	30	22	94	73	13	9	1	1	12	11	52	78	17	16	95	115
Madarganj	8	6	0	0	4	3	8	9	4	3	24	21	20	15	0	0	20	14	28	35	20	15	88	79
Total :	120 (14.1)	83	0	0	185 (21.7)	159	462 (54.3)	448	84 (9.9)	69	851	759	212 (19.4)	163	107 (9.8)	86	247 (22.6)	197	403 (36.8)	427	125 (11.4)	108	1094	981
Yield (Ton/ha)		0.69				0.86		0.97		0.82		0.89		0.77		0.80		0.80		1.06		0.86		0.90

Note : Figures within parentheses are percentages of total Pulses area

C:\123\AGRL\PULSES.WK1

Area (Ha) and Production (Ton) of Pulses Crop in Tangail District

Area (Ha) and Production (Ton) of Pulses Crop in Tangail District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Tangail	242	109	0	0	0	0	485	349	20	15	747	473	586	398	0	0	242	305	202	145	18	14	1048	862
Basail	202	175	0	0	0	0	85	63	24	22	311	260	275	243	0	0	137	162	14	13	12	12	438	430
Ghatail	73	52	0	0	0	0	303	177	8	5	384	234	20	15	0	0	20	18	1616	1258	4	4	1660	1295
Kalihati	162	122	0	0	0	0	190	154	12	10	364	286	113	89	0	0	275	309	212	134	28	23	628	555
Nagarpur	81	51	0	0	0	0	1927	867	24	18	2032	936	266	191	0	0	469	422	172	78	61	49	968	740
Gopalpur	20	12	0	0	0	0	61	82	8	5	89	99	8	6	0	0	10	9	28	36	2	2	48	53
Mirzapur	81	58	0	0	0	0	81	50	8	4	170	112	195	147	0	0	285	270	205	182	37	28	722	627
Madhupur	20	11	0	0	0	0	162	72	0	0	182	83	16	7	0	0	0	0	141	92	4	4	161	103
Bhuapur	91	69	0	0	0	0	566	439	81	43	738	551	121	89	0	0	606	559	654	496	89	69	1470	1213
Shakipur	12	9	0	0	0	0	408	303	0	0	420	312	4	3	0	0	10	9	613	552	2	2	629	566
Delduar	87	69	0	0	0	0	404	272	16	13	507	354	162	151	0	0	208	234	293	198	24	23	687	606
Total :	1071 (18.0)	737	0	0	0	0	4672 (78.6)	2828	201 (3.4)	135	5944	3700	1766 (20.9)	1339	0	0	2262 (26.7)	2297	4150 (49.1)	3184	281 (3.3)	230	8459	7050
Yield (Ton/ha)		0.69						0.61		0.67		0.62		0.76				1.02		0.77		0.82		0.83

Note : Figures within parentheses are percentages of total Pulses area

148

Area (Ha) and Production (Ton) of Pulses Crop in Mymensingh District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Mymensingh	121	75	0	0	73	63	160	119	36	27	390	284	121	100	0	0	121	63	267	119	61	27	570	309
Muktagacha	91	68	0	0	61	49	48	30	69	48	269	195	91	68	0	0	61	50	48	30	69	48	269	196
Fulbaria	67	42	0	0	21	16	91	68	33	24	212	150	67	42	0	0	21	16	91	68	33	24	212	150
Trisal	76	57	0	0	23	16	81	66	36	32	216	171	76	57	0	0	23	16	81	66	36	32	216	171
Bhaluka	14	9	0	0	6	5	141	105	5	4	166	123	14	9	0	0	6	5	141	105	5	4	166	123
Gafargaon	121	66	0	0	81	50	71	39	61	38	334	193	121	66	0	0	81	50	71	39	61	38	334	193
Total :	**490** (30.9)	**317**	**0**	**0**	**265** (16.7)	**199**	**592** (37.3)	**427**	**240** (15.1)	**173**	**1587**	**1116**	**490** (27.7)	**342**	**0**	**0**	**313** (17.7)	**200**	**699** (39.6)	**427**	**265** (15.0)	**173**	**1767**	**1142**
Yield (Ton/ha)		0.65				0.75		0.72		0.72		0.70		0.70				0.64		0.61		0.65		0.65

Note : Figures within parentheses are percentages of total Pulses area

C:\123\AGRL\PULSES.WK1

Area (Ha) and Production (Ton) of Pulses Crop in Gazipur District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Gazipur	4	3	20	22	4	5	20	24	8	12	56	66	400	284	200	116	400	336	200	143	0	0	1200	879
Kaliakair	8	6	28	29	6	8	61	67	16	22	119	132	300	213	100	58	300	201	100	71	0	0	800	543
Kaliganj	2	2	14	16	121	134	8	9	24	31	169	192	400	284	200	116	400	306	200	143	0	0	1200	849
Kapasia	10	6	40	41	101	107	81	90	28	40	260	284	500	355	300	175	500	383	300	215	0	0	1600	1128
Sripur	12	7	20	19	12	13	73	87	12	18	129	144	400	284	210	122	400	306	200	143	0	0	1210	855
Total :	36 (5.0)	24	122 (16.6)	127	244 (33.2)	267	243 (33.2)	277	88 (12.0)	123	733	818	2000 (33.3)	1420	1010 (16.8)	587	2000 (33.3)	1532	1000 (16.6)	715	0	0	6010	4254
Yield (Ton/ha)		0.67		1.04		1.09		1.14		1.40		1.12		0.71		0.58		0.77		0.72				0.71

Note : Figures within parentheses are percentages of total Pulses area

C:\123\AGRL\PULSES.WK1

Area (Ha) and Production (Ton) of Pulses Crop in Dhaka District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Keraniganj	65	42	20	14	242	168	81	52	26	17	434	293	105	80	0	0	214	183	0	0	17	13	336	276
Nababganj	537	347	32	21	2484	1818	419	290	131	93	3603	2569	197	148	0	0	2713	2381	265	140	86	58	3261	2727
Dohar	156	129	32	21	194	138	230	160	36	28	648	476	137	107	20	16	196	195	178	140	32	28	563	486
Savar	109	76	29	20	81	60	156	120	28	23	403	299	162	118	0	0	96	130	81	71	18	21	357	340
Dhamrai	343	254	28	21	424	313	1163	858	40	30	1998	1476	560	471	40	35	1030	1325	336	299	47	46	2013	2176
Total :	**1210** (17.0)	**848**	**141** (2.0)	**97**	**3425** (48.3)	**2497**	**2049** (29.0)	**1480**	**261** (3.7)	**191**	**7086**	**5113**	**1161** (17.8)	**924**	**60** (1.0)	**51**	**4249** (65.0)	**4214**	**860** (13.2)	**650**	**200** (3.0)	**166**	**6530**	**6005**
Yield (Ton/ha)		0.70		0.69		0.73		0.72		0.73		0.72		0.80		0.85		0.99		0.76		0.83		0.92

Note : Figures within parentheses are percentages of total Pulses area

Area (Ha) and Production (Ton) of Pulses Crop in Manikganj District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Manikganj	652	422	0	0	1726	956	707	457	147	108	3232	1943	667	462	0	0	1818	2000	223	103	121	89	2829	2654
Singair	606	392	0	0	202	112	121	72	20	15	949	591	646	477	0	0	81	60	20	16	10	8	757	561
Saturia	123	79	0	0	248	137	808	448	26	19	1205	683	203	125	0	0	1212	1220	337	250	29	15	1781	1610
Ghior	38	25	0	0	555	359	366	220	20	15	979	619	102	71	0	0	1155	1300	303	195	36	23	1596	1589
Daulatpur	121	78	0	0	485	313	2020	1119	8	6	2634	1516	77	57	0	0	606	500	808	375	20	19	1511	951
Shibalay	121	78	0	0	915	549	329	212	63	46	1428	885	75	62	0	0	921	850	292	162	29	26	1317	1100
Harirampur	141	91	0	0	1232	796	263	158	61	45	1697	1090	77	74	0	0	2501	2080	101	56	22	21	2701	2231
Total :	1802 (14.9)	1165	0	0	5363 (44.2)	3222	4614 (38.1)	2686	345 (2.8)	254	12124	7327	1847 (14.8)	1328	0	0	8294 (66.4)	8010	2084 (16.7)	1157	267 (2.1)	201	12492	10696
Yield (Ton/ha)		0.65				0.60		0.58		0.74		0.60		0.72		0.00		0.97		0.56		0.75		0.86

Note : Figures within parentheses are percentages of total Pulses area

Area (Ha) and Production (Ton) of Pulses Crop in Narayanganj District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Narayanganj	46	30	8	5	18	13	32	12	0	0	104	60	25	19	6	2	4	4	5	4	0	0	40	29
Rupganj	151	120	16	12	54	50	101	100	0	0	322	282	214	137	12	8	31	29	38	36	0	0	295	210
Total :	**197** (46.3)	**150**	**24** (5.6)	**17**	**72** (16.9)	**63**	**133** (31.2)	**112**	**0**	**0**	**426**	**342**	**239** (71.4)	**156**	**18** (5.4)	**10**	**35** (10.4)	**33**	**43** (12.8)	**40**	**0**	**0**	**335**	**239**
Yield (Ton/ha)		0.76		0.71		0.88		0.84				0.80		0.65		0.56		0.94		0.93				0.71

Note : Figures within parentheses are percentages of total Pulses area

Area (Ha) and Production (Ton) of Pulses Crop in Munshiganj District

Upazila	1989–1990												1990–1991											
	Lentil		Mung		Khesari		Mash		Gram		Total		Lentil		Mung		Khesari		Mash		Gram		Total	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Munshiganj	22	25	0	0	20	20	202	224	16	18	260	287	20	20	0	0	36	40	10	10	33	31	99	101
Tongibari	20	19	0	0	8	10	182	202	4	4	214	235	2	2	0	0	2	2	4	4	0	0	8	8
Srinagar	121	78	0	0	162	90	311	201	17	8	611	377	48	40	0	0	95	88	36	37	9	7	188	172
Sirajdikhan	99	137	0	0	91	92	364	672	48	36	602	937	57	53	0	0	37	37	0	0	10	8	104	98
Lohajang	323	358	0	0	263	291	283	340	24	20	893	1009	332	276	0	0	518	526	151	153	33	28	1034	983
Total :	**585** (22.7)	**617**	**0**	**0**	**544** (21.1)	**503**	**1342** (52.0)	**1639**	**109** (4.2)	**86**	**2580**	**2845**	**459** (32.0)	**391**	**0**	**0**	**688** (48.0)	**693**	**201** (14.0)	**204**	**85** (6.0)	**74**	**1433**	**1362**
Yield (Ton/ha)		1.05				0.92		1.22		0.79		1.10		0.85				1.01		1.01		0.87		0.95

Note : Figures within parentheses are percentages of total Pulses area

Annex I.2.14h

155

Area (Ha) and Production (Ton) of Onion Crop in Jamalpur District

Annex I.2.15a

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Jamalpur	NA	NA	40	300
Sharisabari	NA	NA	120	745
Melandaha	NA	NA	78	485
Islampur	NA	NA	142	949
Dewanganj	NA	NA	13	49
Madarganj	NA	NA	30	81
Total :	**NA**	**NA**	**423**	**2609**
Yield (Ton/ha)				6.17

Area (Ha) and Production (Ton) of Onion Crop in Tangail District

Annex I.2.15b

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Tangail	107	867	323	3145
Basail	34	247	55	470
Ghatail	12	125	4	36
Kalihati	53	368	41	281
Nagarpur	61	459	20	136
Gopalpur	28	229	91	777
Mirzapur	12	93	4	48
Madhupur	48	523	8	76
Bhuapur	48	240	65	584
Shakipur	8	59	2	18
Delduar	40	215	28	188
Total :	**451**	**3425**	**641**	**5759**
Yield (Ton/ha)		7.59		8.98

C:\123\AGRL\PULSES.WK1

C:\123\AGRL\AG-ONION.WK1

156

Area (Ha) and Production (Ton) of Onion Crop in Mymensingh District

Annex I.2.15c

Upazila	1989–1990		1990–1991	
	Area	Prod	Area	Prod
Mymensingh	73	1008	73	540
Muktagacha	81	1126	40	100
Fulbaria	117	757	222	1200
Trisal	35	266	61	400
Bhaluka	14	89	141	1200
Gafargaon	83	727	121	800
Total :	**403**	**3973**	**658**	**4240**
Yield (Ton/ha)		9.85		6.44

Area (Ha) and Production (Ton) of Onion Crop in Gazipur District

Annex I.2.15d

Upazila	1989–1990		1990–1991	
	Area	Prod	Area	Prod
Gazipur	12	62	8	37
Kaliakair	14	72	12	62
Kaliganj	11	68	10	60
Kapasia	18	101	16	97
Sripur	10	51	6	28
Total :	**65**	**354**	**52**	**284**
Yield (Ton/ha)		5.45		5.46

C:\123\AGRL\AG-ONION.WK1

157

Area (Ha) and Production (Ton) of Onion Crop in Dhaka District

Annex I.2.15e

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Keraniganj	16	160	18	162
Nababganj	12	105	12	95
Dohar	8	70	10	80
Savar	10	75	11	84
Dhamrai	20	150	21	156
Total :	**66**	**560**	**72**	**577**
Yield (Ton/ha)		8.48		8.01

Area (Ha) and Production (Ton) of Onion Crop in Manikganj District

Annex I.2.15f

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Manikganj	172	634	200	739
Singair	40	149	162	597
Saturia	57	212	97	359
Ghior	584	2427	626	2314
Daulatpur	95	350	105	388
Shibalay	1612	5957	1404	5189
Harirampur	1737	8025	1406	5850
Total :	**4297**	**17754**	**4000**	**15436**
Yield (Ton/ha)		4.13		3.86

C:\123\AGRL\AG-ONION.WK1

156

Area (Ha) and Production (Ton) of Onion Crop in Narayanganj District

Annex I.2.15g

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Narayanganj	101	745	30	225
Rupganj	240	2796	198	2375
Total :	**341**	**3541**	**228**	**2600**
Yield (Ton/ha)		10.38		11.40

Area (Ha) and Production (Ton) of Onion Crop in Munshiganj District

Annex I.2.15h

	1989–1990		1990–1991	
Upazila	Area	Prod	Area	Prod
Munshiganj	8	58	12	90
Tongibari	14	77	10	58
Srinagar	0	0	0	0
Sirajdikhan	109	403	105	339
Lohajang	59	792	53	679
Total :	**190**	**1330**	**180**	**1166**
Yield (Ton/ha)		7.00		6.48

C:\123\AGRL\AG-ONION.WK1

Area (Ha) and Production (paddy in Ton) of Rice crops in NCR Districts 1989–1990

	Boro		T.Aman		Aus		DW Aman		Total		Paddy yield
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	(Ton/Ha)
Jamalpur	60070	255458	75959	224988	22188	34862	2472	4888	160689	520196	3.24
Tangail	123848	529639	67503	173514	65035	69811	76575	113570	332961	886534	2.66
Mymensingh	52228	197433	117931	328144	68042	158708	0	0	238201	684285	2.87
Gazipur	44457	173689	44438	177660	20846	44293	809	1349	110550	396991	3.59
Dhaka	31898	129134	4734	15239	22296	39130	20893	24014	79821	207517	2.60
Manikganj	25183	115403	553	1365	40552	49383	51406	69516	117694	235667	2.00
Narayanganj	8896	36054	2617	9126	2780	4129	9893	18910	24186	68219	2.82
Munshiganj	16628	72219	53	191	10266	22691	20403	29472	47350	124573	2.63
Total	**363208**	**1509029**	**313788**	**930227**	**252005**	**423007**	**182451**	**261719**	**1111452**	**3123982**	**2.81**
Yield (Ton/Ha)		4.15		2.96		1.68		1.43		2.81	

C:\123\AGRL\RICE2909.WK1

159

Area (Ha) and Production (paddy in Ton) of Rice crops in NCR Districts 1990–1991

	Boro		T.Aman		Aus		DW Aman		Total		Paddy yield
District	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	(Ton/Ha)
Jamalpur	60826	289210	77860	220317	21736	32827	1909	3031	162331	545385	3.36
Tangail	119846	354389	71978	214074	63088	92098	74801	83320	329713	743881	2.26
Mymensingh	49973	194653	114938	307495	76708	178529	0	0	241619	680677	2.82
Gazipur	44256	192590	45234	185584	28016	65617	635	1104	118141	444895	3.77
Dhaka	32117	158946	5560	14619	16051	16751	17650	23036	71378	213352	2.99
Manikganj	25257	117995	1361	3445	39296	35109	53402	65556	119316	222105	1.86
Narayanganj	9098	35985	3031	9627	3320	6541	7620	15980	23069	68133	2.95
Munshiganj	16267	77243	77	159	13687	30826	23767	29429	53798	137657	2.56
Total	357640	1421011	320039	955320	261902	458298	179784	221456	1119365	3056085	2.73
Yield (Ton/Ha)		3.97		2.99		1.75		1.23		2.73	

Area (Ha) of HYV & Local Rice crops in the Districts of NCR 1989–1990

	Boro			T.Aman			Aus		DW Aman		Total		Gross Rice
District	HYV	LIV	Local	HYV	LIV	Local	HYV	Local	HYV+LIV	Local	HYV+LIV	Local	Area
Jamalpur	53614	2328	4128	33541	5750	36668	3759	18429	0	2472	98992	61697	160689
	(89)	(4)	(7)	(44)	(8)	(48)	(17)	(83)			(62)	(38)	
Tangail	114343	5643	3862	22955	7877	36671	10452	54583	0	76575	161270	171691	332961
	(92)	(5)	(3)	(34)	(12)	(54)	(16)	(84)			(48)	(52)	
Mymensingh	33721	13178	5329	32205	26017	59709	30301	37741	0	0	135422	102779	238201
	(65)	(25)	(10)	(27)	(22)	(51)	(45)	(55)			(57)	(43)	
Gazipur	37106	4988	2363	26179	8160	10099	4363	16483	0	809	80796	29754	110550
	(84)	(11)	(5)	(59)	(18)	(23)	(21)	(79)			(73)	(27)	
Dhaka	29416	0	2482	2780	763	1191	4320	17976	0	20893	37279	42542	79821
	(92)		(8)	(59)	(16)	(25)	(21)	(88)			(47)	(53)	
Manikganj	22130	1858	1195	159	16	378	261	40291	0	51406	24424	93270	117694
	(88)	(7)	(5)	(29)	(3)	(68)	(6)	(94)			(21)	(79)	
Narayanganj	7044	1228	624	1673	562	382	464	2315	0	9893	10971	13214	24185
	(79)	(14)	(7)	(64)	(21)	(15)	(17)	(83)			(45)	(55)	
Munshiganj	15290	0	1338	5	21	27	643	9623	0	20403	15959	31391	47350
	(92)		(8)	(9)	(40)	(51)	(6)	(94)			(34)	(66)	
Total	312664	29223	21321	119497	49166	145125	54563	197441	0	182451	565113	546338	1111451
	(86)	(8)	(6)	(38)	(16)	(46)	(21)	(79)		(100)	(51)	(49)	

Note : Figures within parentheses are percentages of total area.

c:\123\agr\rice2809

Area (Ha) of HYV & Local Rice crops in the Districts of NCR 1990–1991

	Boro			T.Aman			Aus		DW Aman		Total		Gross Rice
District	HYV	LIV	Local	HYV	LIV	Local	HYV	Local	HYV+LIV	Local	HYV+LIV	Local	Area
Jamalpur	54527	2548	3751	46020	0	31840	3223	18513	0	1909	106318	56013	162331
	(90)	(4)	(6)	(59)		(41)	(15)	(85)			(65)	(35)	
Tangail	112062	5003	2781	38238	0	33740	8364	54724	0	74801	163667	166046	329713
	(94)	(4)	(2)	(53)		(47)	(13.2)	(86.8)			(50)	(50)	
Mymensingh	33901	11167	4905	55614	0	59324	34639	42069	0	0	135321	106298	241619
	(68)	(22)	(10)	(48)		(52)	(45)	(55)			(56)	(44)	
Gazipur	36205	6153	1898	34995	0	10239	10975	17041	0	635	88328	29813	118141
	(82)	(14)	(4)	(77)		(23)	(39)	(61)			(75)	(25)	
Dhaka	30149	0	1968	2636	644	2280	867	15184	0	17650	34296	37082	71378
	(94)		(6)	(47)	(12)	(41)	(5)	(95)			(48)	(52)	
Manikganj	22560	1377	1320	515	0	846	234	39062	0	53402	24686	94630	119316
	(89)	(6)	(5)	(38)		(62)	(1)	(99)			(21)	(79)	
Narayanganj	7480	1088	530	1987	473	571	1239	2083	0	7620	12267	10804	23071
	(82)	(12)	(6)	(66)	(16)	(18)	(37)	(63)					
Munshiganj	15072	0	1195	49	0	28	827	12860	0	23767	15948	37850	53798
	(93)		(7)	(64)		(36)	(1)	(99)			(30)	(70)	
Total	**311956**	**27336**	**18348**	**180054**	**1117**	**138868**	**60368**	**201536**	**0**	**179784**	**580831**	**538536**	**1119367**
	(87)	(8)	(5)	(57)		(43)	(21)	(79)			(52)	(48)	

Note : Figures within parentheses are percentages of total area

c:\123\agri\rice2809

Average Yields (Kg/Ha) of Rice Crops in NCR Districts 1986/87 to 1990/91

	Deep water Aman					T. Aman					Boro					Aus				
District	86/87	87/88	88/89	89/90	90/91	86/87	87/88	88/89	89/90	90/91	86/87	87/88	88/89	89/90	90/91	86/87	87/88	88/89	89/90	90/91
Jamalpur	1700	1800	1000	1980	1590	2280	2250	1990	2570	2830	4200	4300	4300	4200	5400	1260	1530	1260	1570	1510
Mymensingh	0	0	1500	0	0	2290	2510	2480	2780	2670	4680	3800	4300	3780	3890	1800	2000	1710	2430	2320
Tangail	1400	1100	880	1480	1110	1725	1650	1500	2570	2970	4300	4400	4200	4270	2960	1260	1080	1350	1060	1460
Gazipur	1600	1560	1570	1670	1960	1990	1950	2140	3990	4100	3500	3400	4300	3900	4350	1710	1170	1710	2124	2343
Dhaka	1600	1300	0	1140	1270	1950	2130	1670	3220	3270	3875	3800	4200	4040	4940	900	960	1620	890	1040
Manikganj	1900	1200	0	1350	1230	2180	2200	1160	2460	2530	4400	4300	4200	4580	4000	1260	1440	1800	890	890
Narayanganj	1880	1200	1800	1910	2100	1425	1580	1800	3480	3170	3900	3900	3560	4050	3960	1210	1420	1430	1700	2020
Munshiganj	1700	1700	1600	1440	1240	2000	0	0	3600	2060	4000	4000	3900	4340	4740	1700	1990	1710	2210	2250

c:\123\agri\aver.ka.wk1

163

Utilization of Cultivated Land in Jamalpur District, 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Jamalpur	47833	20	5708 (14.5)	25504 (64.9)	8080 (20.6)	39292	82.1	80956	206
Sarishabari	26890	404	808 (4.4)	14140 (77.4)	3232 (18.2)	18180	67.6	38784	213
Melandaha	24206	24	2424 (11.6)	11716 (56.1)	6747 (32.3)	20887	86.3	46097	221
Islampur	24033	254	6565 (34.9)	8403 (44.7)	3839 (20.4)	18807	78.3	34888	186
Dewanganj	5814	59	852 (22.0)	1872 (48.3)	1152 (29.7)	3876	66.6	8052	208
Madarganj	23270	8	1414 (8.2)	10706 (62.3)	5062 (29.5)	17182	73.8	38012	221
Total	152046	769	17771 (15.0)	72341 (61.2)	28112 (23.8)	118224	77.8	246789	209

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

165

Utilization of Cultivated Land in Tangail District, 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Tangail	30113	6500	8213 (34.8)	8100 (34.3)	7288 (30.9)	23601	78.4	46277	196
Basail	15592	2224	3373 (25.1)	5814 (43.2)	4274 (31.7)	13461	86.3	27823	207
Ghatail	44989	3622	7474 (22.4)	14544 (43.7)	11290 (33.9)	33308	74.0	70432	211
Kalihati	29464	5704	3232 (13.6)	10268 (43.4)	10176 (43.0)	23676	80.3	54296	229
Nagarpur	25806	2460	8092 (34.7)	10897 (46.7)	4345 (18.6)	23334	90.4	42921	184
Gopalpur	22312	1038	446 (2.1)	11810 (55.5)	9009 (42.4)	21265	95.3	51093	240
Mirzapur	37233	2949	4266 (13.5)	17598 (55.8)	9681 (30.7)	31545	84.7	68505	217
Madhupur	51998	3121	7676 (21.8)	15511 (44.2)	11960 (34.0)	35147	67.6	74578	212
Bhuapur	21593	7109	848 (5.8)	4434 (30.7)	9184 (63.5)	14466	67.0	37268	258
Shakhipur	42905	9832	6181 (25.2)	11649 (47.6)	6666 (27.2)	24496	57.1	49477	202
Delduar	17754	2917	2193 (14.8)	7259 (49.0)	5361 (36.2)	14813	83.4	32794	221
Total	**339759**	**47476**	**51994** (20.1)	**117884** (45.5)	**89234** (34.4)	259112	76.2	**555464**	214

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

66

Utilization of Cultivated Land in Mymensingh District, 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Mymensingh	22650	524	2325 (12.3)	15421 (82.2)	1013 (5.5)	18759	82.8	36206	193
Muktagacha	31285	1059	4379 (20.2)	15705 (72.3)	1639 (7.5)	21723	69.4	40706	187
Fulbaria	34631	1113	4446 (16.1)	20960 (75.7)	2278 (8.2)	27684	79.9	53200	192
Trisal	32594	1683	4609 (16.9)	20475 (75.1)	2187 (8.0)	27271	83.7	52120	191
Bhaluka	44213	1281	9802 (34.7)	16755 (59.3)	1671 (6.0)	28228	63.8	48325	171
Gaffargaon	39818	1164	7884 (25.0)	21447 (68.0)	2191 (7.0)	31522	79.1	57351	182
Total	**205191**	**6824**	**33445 (21.5)**	**110763 (71.3)**	**10979 (7.2)**	**155187**	**75.6**	**287908**	**186**

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

167

Utilization of Cultivated Land in Gazipur District 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Gazipur	48195	5722	14041 (39.6)	15932 (45.0)	5500 (15.4)	35473	73.60	62405	176
Kaliakair	24608	3968	8480 (45.5)	6867 (36.8)	3293 (17.7)	18640	75.75	32093	172
Kaliganj	30891	2632	9500 (41.1)	10500 (45.4)	3100 (13.5)	23100	74.78	39800	172
Kapasia	36761	3320	11955 (45.2)	10550 (40.0)	3936 (14.8)	26441	71.93	44863	170
Sripur	34965	3441	11788 (44.4)	9954 (37.5)	4782 (18.1)	26524	75.86	46042	174
Total	175420	19083	55764 (42.8)	53803 (41.3)	20611 (15.9)	130178	74.21	225203	173

Note :Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

68

Utilization of Cultivated Land in Dhaka District 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Keraniganj	18358	81	6060 (45.5)	6060 (45.5)	1212 (9.0)	13332	72.6	21816	164
Nawabganj	28183	10	10431 (49.8)	7262 (34.7)	3232 (15.5)	20925	74.2	34651	166
Dohar	12257	16	2526 (24.2)	6841 (65.7)	1053 (10.1)	10420	85.0	19367	186
Savar	38874	305	8656 (50.4)	5892 (34.3)	2626 (15.3)	17174	44.2	28318	165
Dhamrai	30254	48	828 (3.8)	17950 (81.4)	3272 (14.8)	22050	72.9	46544	211
Total	**127926**	**460**	**28501 (34.0)**	**44005 (52.4)**	**11395 (13.6)**	**83901**	**65.6**	**150696**	**180**

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

169

Utilization of Cultivated land in Manikganj District 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Manikganj	19655	286	1475 (8.9)	10262 (61.7)	4888 (29.4)	16625	84.6	36663	221
Singair	21719	425	3030 (18.7)	11312 (70.0)	1818 (11.3)	16160	74.4	25654	159
Saturia	14163	347	2424 (22.6)	6684 (62.3)	1616 (15.1)	10724	75.7	20640	192
Ghior	14483	362	1945 (16.9)	8822 (76.8)	723 (6.3)	11490	79.3	21758	189
Dautalpur 1/	22495	483	2101 (13.2)	11514 (72.1)	2343 (14.7)	15958	70.9	32158	202
Shibalaya	17062	403	1693 (14.5)	8244 (70.4)	1770 (15.1)	11707	68.6	23391	200
Harirampur 2/	24900	502	4346 (32.3)	9008 (66.9)	105 (0.8)	13459	54.1	22677	168
Total:	134477	2808	17014 (17.7)	65846 (68.5)	13263 (13.8)	96123	71.5	182941	190

Note : Figures within parentheses are percentages of NCA

1) Erosion by Jamuna river
2) Erosion by Padma river

C:\123\AGRL\CULT-LAN.WK1

170

Utilization of Cultivated land in Narayanganj District 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Narayanganj	10213	0	969 (14.5)	3500 (52.3)	2216 (33.2)	6685	65.5	14617	219
Rupganj	23270	969	3232 (18.5)	11271 (64.6)	2949 (16.9)	17452	75.0	34621	198
Total:	**33483**	**969**	**4201 (17.4)**	**14771 (61.2)**	**5165 (21.4)**	**24137**	**72.1**	**49238**	**204**

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

171

Utilization of Cultivated land in Munshiganj District 1990–91

Upazila	Area in Hectare						% of Gross Area	Total Cropd. Area	Cropping Intensity (%)
	Gross	Fallow	Single Cropd.	Double Cropd.	Triple Cropd.	Net Cultivd. NCA			
Munshiganj	20685	7523	788 (6.5)	9181 (75.7)	2151 (17.8)	12120	58.6	25603	211
Tongibari	13283	443	2235 (18.5)	8712 (72.4)	1079 (9.0)	12026	90.5	22896	190
Srinagar	21719	3828	8005 (52.6)	5906 (38.8)	1300 (8.6)	15211	70.0	23717	156
Sirajdikhan	16067	60	2100 (17.5)	9776 (81.7)	90 (0.8)	11966	74.5	21922	183
Lohajang	14221	2788	545 (5.7)	8544 (90.0)	404 (4.3)	9493	66.8	18845	199
Total:	85975	14642	13673 (22.5)	42119 (69.2)	5024 (8.3)	60816	70.7	112983	186

Note : Figures within parentheses are percentages of NCA

C:\123\AGRL\CULT-LAN.WK1

Area (Ha) Irrigated by Different Methods in Jamalpur District

Upazila	1989–1990											1990–1991										
	DTW			STW			LLP			Others Area	Total Area Irrig	DTW			STW			LLP			Others Area	Total Area Irrig	% of Cult. Area
	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area			No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area			
Jamalpur	387	8080	20.9	2000	11433	5.7	57	606	10.6	202	20321	397	10503	26.5	1913	9160	4.8	44	528	12.0	3350	23541	59.7
Sharisabari	66	2121	32.1	1484	7252	4.9	24	262	10.9	464	10099	60	1638	27.3	1783	8332	4.7	20	215	10.8	769	10954	60.3
Melandaha	105	2426	23.1	2186	10738	4.9	25	186	7.4	283	13633	88	1673	19.0	3143	11883	3.8	28	209	7.5	1437	15202	72.8
Islmpur	28	433	15.5	1092	5348	4.9	11	111	10.1	541	6433	32	630	19.7	1225	4950	4.0	6	65	10.8	1128	6773	36.0
Dewanganj	3	102	34.0	168	1357	8.1	1	13	13.0	304	1776	2	43	21.5	136	633	4.7	0	0	0.0	747	1423	36.7
Madarganj	8	166	20.8	1968	7163	3.6	1	6	6.0	142	7477	10	167	16.7	1998	8219	4.1	0	0	0.0	571	8957	52.1
Total :	597	13328	22.3	8898	43291	4.9	119	1184	9.9	1936	59739	589	14654	24.9	10198	43177	4.2	98	1017	10.4	8002	66850	56.6

C:\123\AGRL\IRRIGALL.WK1

Annex I.2.22a

122

Area (Ha) Irrigated by Different Methods in Tangail District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Tangail	108	2574	23.8	1276	5670	4.4	6	109	18.2	8	8361	97	2221	22.9	1185	5766	4.9	5	70	14.0	300	8357	35.4
Basail	79	1345	17.0	1499	6064	4.0	62	1127	18.2	61	8597	74	1674	22.6	1539	6687	4.3	52	455	8.8	157	8973	66.7
Ghatail	201	3656	18.2	2831	10810	3.8	59	1049	17.8	226	15741	173	3223	18.6	2958	12369	4.2	47	268	5.7	151	16011	45.1
Kalihati	120	2009	16.7	2634	10507	4.0	16	291	18.2	191	12998	110	1956	17.8	2572	11091	4.3	26	163	6.3	352	13562	57.3
Nagarpur	39	1091	28.0	2350	9896	4.2	29	527	18.2	40	11554	35	691	19.7	1850	7171	3.9	6	19	0.0	279	8160	35.0
Gopalpur	169	4096	24.2	2250	12804	5.7	4	73	18.3	101	17074	124	2877	23.2	2689	13422	5.0	5	36	0.0	232	16567	77.9
Mirzapur	267	4757	17.8	1768	9274	5.2	48	728	15.2	211	14970	269	6520	24.2	1860	7953	4.3	84	837	0.0	552	15862	50.3
Madhupur	241	4751	19.7	1849	8203	4.4	40	721	18.0	1155	14830	225	4466	19.8	2110	8657	4.1	27	181	0.0	415	13719	39.0
Bhuapur	38	992	26.1	737	3756	5.1	3	55	18.3	397	5200	37	939	25.4	776	3710	4.8	2	8	0.0	522	5179	35.8
Shakipur	259	5027	19.4	531	1039	2.0	77	1586	20.6	159	7811	239	4280	17.9	536	2032	3.8	108	591	0.0	131	7034	28.7
Delduar	110	2222	20.2	959	4391	4.6	4	65	16.3	37	6715	110	2089	19.0	973	4113	4.2	1	8	0.0	199	6409	43.3
Total :	1631	32520	19.9	18684	82414	4.4	348	6331	18.2	2586	123851	1493	30936	20.7	19048	82971	4.4	363	2636	7.3	3290	119833	47.0

Area (Ha) Irrigated by Different Methods in Mymensingh District

Upazila	1989–1990											1990–1991											
	DTW			STW			LLP			Others Area	Total Area Irrig	DTW			STW			LLP			Others Area	Total Area Irrig	% of Cult. Area
	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area			No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area			
Mymensingh	128	4846	37.9	386	1939	5.0	9	78	8.7	1060	7923	126	2635	20.9	535	2121	4.0	21	130	6.2	482	5368	28.6
Muktagacha	291	7172	24.6	66	335	5.1	22	180	8.2	1695	9382	332	7606	22.9	101	457	4.5	12	97	8.1	555	8715	40.1
Fulbaria	280	6360	22.7	62	307	5.0	78	630	8.1	3207	10504	302	5420	17.9	90	450	5.0	57	389	6.8	1508	7767	28.1
Trisal	242	5022	20.8	17	84	4.9	75	606	8.1	3491	9203	231	3792	16.4	42	173	4.1	108	631	5.8	1832	6428	23.6
Bhaluka	170	3551	20.9	90	444	4.9	320	2515	7.9	2700	9210	170	2699	15.9	157	639	4.1	155	646	4.2	3984	7968	28.2
Gofargaon	327	7293	22.3	86	424	4.9	257	2101	8.2	1494	11312	288	5332	18.5	147	648	4.4	240	1592	6.6	1825	9397	29.8
Total :	1438	34244	23.8	707	3533	5.0	761	6110	8.0	13647	57534	1449	27484	19.0	1072	4488	4.2	593	3485	5.9	10186	45643	29.4

C:\123\AGRL\IRRIGALL.WK1

Annex I.2.22c

194

Area (Ha) Irrigated by Different Methods in Gazipur District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Gazipur	313	5702	18.2	36	180	5.0	173	1820	10.5	3	7705	263	6283	23.9	151	1055	7.0	241	4820	20.0	161	12319	34.7
Kaliakair	271	4937	18.2	224	1120	5.0	117	1230	10.5	4	7291	279	5050	18.1	286	1172	4.1	141	1273	9.0	437	7932	42.6
Kaliganj	125	2277	18.2	31	155	5.0	187	1967	10.5	2	4401	118	2124	18.0	26	116	4.5	262	2882	11.0	180	5302	23.0
Kapasia	1	18	18.0	141	705	5.0	127	1336	10.5	2	2061	29	580	20.0	773	3865	5.0	142	2871	20.2	201	7517	28.4
Sripur	273	4974	18.2	48	240	5.0	228	2398	10.5	3	7615	323	4824	14.9	212	943	4.4	291	3201	11.0	317	9285	35.0
Total :	983	17908	18.2	480	2400	5.0	832	8751	10.5	14	29073	1012	18861	18.6	1448	7151	4.9	1077	15047	14.0	1296	42355	32.5

Area (Ha) Irrigated by Different Methods in Dhaka District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Keraniganj	16	390	24.4	321	1686	5.3	71	975	13.7	39	3090	15	445	29.7	359	1690	4.7	78	1430	18.3	11	3576	26.8
Nababganj	0	0	0.0	1008	4887	4.8	86	1390	16.2	20	6297	2	42	21.0	1065	4753	4.5	73	2095	28.7	0	6890	32.9
Dohar	1	20	20.0	262	1624	6.2	10	161	16.1	0	1805	1	16	16.0	382	1902	5.0	16	223	13.9	0	2141	20.5
Savar	205	4866	23.7	135	545	4.0	188	3038	16.2	608	9057	225	4105	18.2	183	827	4.5	219	2792	12.7	673	8397	48.9
Dhamrai	221	4018	18.2	1300	5413	4.2	80	81	1.0	184	9696	202	3364	16.7	1367	4970	3.6	77	830	10.8	210	9374	42.5
Total :	443	9294	21.0	3026	14155	4.7	435	5645	13.0	851	29945	445	7972	17.9	3356	14142	4.2	463	7370	15.9	894	30378	36.2

Area (Ha) Irrigated by Different Methods in Manikganj District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Manikganj	116	2365	20.4	557	2120	3.8	35	342	9.8	225	5052	109	2020	18.5	466	2181	4.7	30	364	12.1	81	4646	27.9
Singair	71	1086	15.3	850	2747	3.2	23	186	8.1	169	4188	67	1043	15.6	884	3513	4.0	24	211	8.8	185	4952	30.6
Saturia	73	1349	18.5	548	1800	3.3	5	41	8.2	166	3356	63	932	14.8	518	1460	2.8	3	37	12.3	191	2620	24.4
Ghior	63	1490	23.7	403	1958	4.9	9	39	4.3	141	3628	67	1327	19.8	363	1748	4.8	3	18	6.0	29	3122	27.2
Daulatpur	18	423	23.5	797	2880	3.6	14	131	9.4	211	3645	22	533	24.2	704	2792	4.0	7	85	12.1	307	3717	23.3
Shibalaya	28	545	19.5	361	1750	4.8	21	212	10.1	205	2712	44	1066	24.2	359	1595	4.4	10	121	12.1	391	3173	26.5
Harirampur	23	565	24.6	256	1560	6.1	24	242	10.1	137	2504	34	824	24.2	302	1464	4.8	31	501	16.2	241	3030	22.5
Total :	392	7823	20.0	3772	14815	3.9	131	1193	9.1	1254	25085	406	7745	19.1	3596	14753	4.1	108	1337	12.4	1425	25260	26.3

C:\123\AGRL\IRRIGALL.WK1

Area (Ha) Irrigated by Different Methods in Narayanganj District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Narayanganj	2	20	10.0	35	283	8.1	37	404	10.9	2432	3139	1	30	30.0	48	210	4.4	35	500	14.3	1490	2230	33.3
Rupganj	64	1680	26.3	108	654	6.1	217	5537	25.5	2793	10664	85	1820	21.4	135	1100	8.1	194	4940	25.5	1946	9806	56.2
Total :	66	1700	25.8	143	937	6.6	254	5941	23.4	5225	13803	86	1850	21.5	183	1310	7.2	229	5440	23.8	3436	12036	49.9

* Plus Irrigation by tidal water = 1863 ha (Narayanganj 750 ha + Rupganj 1113 ha)

C:\123\AGRL\IRRIGALL.WK1

128

Area (Ha) Irrigated by Different Methods in Munshiganj District

	1989–1990											1990–1991											
	DTW			STW			LLP			Others	Total	DTW			STW			LLP			Others	Total	
Upazila	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	No.	Area	Comd. Area	No.	Area	Comd. Area	No.	Area	Comd. Area	Area	Area Irrig	% of Cult. Area
Munshiganj	1	20	20.0	30	159	5.3	88	576	6.5	216	971	1	20	20.0	15	66	4.4	108	829	7.7	57	972	8.0
Tongibari	0	0	0.0	201	829	4.1	49	391	8.0	154	1374	0	0	0.0	137	602	4.4	88	584	6.6	54	1240	10.3
Srinagar	9	291	32.3	459	2785	6.1	129	3070	23.8	265	6411	14	309	22.1	522	3350	6.4	133	2642	19.9	1807	8108	53.3
Sirajdikhan	0	0	0.0	355	2020	5.7	128	1357	10.6	0	3377	0	0	0.0	429	1796	4.2	121	1342	11.1	60	3198	26.7
Lohajang	1	18	18.0	376	2046	5.4	42	347	8.3	4	2415	3	61	20.3	419	2081	5.0	28	262	9.4	15	2419	25.5
Total :	11	329	29.9	1421	7839	5.5	436	5741	13.2	639	14548	18	390	21.7	1522	7895	5.2	478	5659	11.8	1993	15937	26.2

C:\123\AGRL\IRRIGALL.WK1

Annex I.3
Livestock and Poultry Numbers

187

Livestock and Poultry Numbers in NCR Districts 1990–91

District	Cattle	Goat	Sheep	Horse	Fowls	Ducks
Tangail	877545	333437	88113	NA	1795050	284660
	(32.5)	(33.4)	(46.8)		(19.7)	(21.5
Jamalpur	313331	142123	16240	120	1384315	160542
	(11.6)	(14.2)	(8.6)		(15.2)	(12.2)
Mymensingh	421839	121772	11600	824	1559394	172917
	(15.6)	(12.2)	(6.2)		(17.2)	(13.0)
Gazipur	304375	172472	28910	628	1267395	209869
	(11.3)	(17.3)	(15.4)		(13.9)	(15.8)
Dhaka	277700	116213	21885	NA	833003	172170
	(10.3)	(11.6)	(11.6)		(9.2)	(13.0)
Manikganj	217260	70853	10546	726	1096119	160736
	(8.1)	(7.1)	(5.6)		(12.0)	(12.1)
Munshiganj	215809	23986	5644	NA	870613	94734
	(8.0)	(2.4)	(3.0)		(9.6)	(7.1)
Narayanganj	68643	17900	5150	57	291300	70252
	(2.6)	(1.8)	(2.8)		(3.2)	(5.3)
Total	2696502	998756	188088	2355	9097189	1325880
	(100)	(100)	(100)		(100)	(100)

N.B: Figures in Parenthesis are percentages of total

Livestock and Poultry Numbers in Jamalpur District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Jamalpur	109570	35370	3550	0	320200	24520
Sharisabari	70874	32010	7302	0	288350	24480
Melandaha	50788	34600	826	90	352870	49425
Islampur	28133	18420	2160	30	155195	38626
Dewanganj	9676	7398	597	0	48870	3062
Madarganj	44290	14325	1805	0	218830	20430
Total	**313331**	**142123**	**16240**	**120**	**1384315**	**160543**

C:\123\AGRL\1201POUL.WK1

183

Livestock and Poultry Numbers in Tangail District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Tangail	81252	30000	10000	NA	190000	40500
Basail	42040	13252	1226	NA	137995	12682
Ghatail	105849	49868	7622	NA	263165	27687
Kalihati	91110	18000	16000	NA	212000	30000
Nagarpur	104900	8040	3730	NA	196850	12870
Gopalpur	88307	28475	7350	NA	185330	52262
Mirzapur	99109	53612	18394	NA	145536	24630
Madhupur	96511	51289	13765	NA	188144	48993
Bhuapur	31720	21681	7226	NA	91530	10536
Shakipur	84207	44720	1000	NA	114000	15000
Delduar	52540	14500	1800	NA	70500	9500
Total	**877545**	**333437**	**88113**	**NA**	**1795050**	**284660**

C:\123\AGRL\1201POUL.WK1

184

Livestock and Poultry Numbers in Mymensingh District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Mymensingh	51880	20356	2075	173	165330	16890
Muktagacha	62160	15315	2104	135	235123	22975
Fulbaria	73325	19000	2490	145	277880	19305
Trisal	65811	16710	2300	170	256500	20221
Bhaluka	62269	16615	2401	130	220301	23000
Gaffargaon	106394	33776	230	71	404260	70526
Total	**421839**	**121772**	**11600**	**824**	**1559394**	**172917**

C:\123\AGRL\1201POUL.WK1

185

Livestock and Poultry Numbers in Gazipur District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Gazipur	58352	23226	7580	88	212627	66212
Kaliakair	54965	23275	4580	70	145770	27540
Sirpur	62364	30604	585	375	366528	41348
Kapasia	70676	51351	3197	70	169780	14261
Kaliganj	58018	44016	12968	25	372690	60508
Total	**304375**	**172472**	**28910**	**628**	**1267395**	**209869**

C:\123\AGRL\1201POUL.WK1

186

Livestock and Poultry Numbers in Dhaka District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Keraniganj	42140	20314	1042	0	126420	25300
Nababganj	50936	22112	2093	0	152708	36100
Dohar	49171	23350	2513	0	147513	29500
Savar	60230	20213	8112	0	180693	36140
Dhamrai	75223	30224	8125	0	225669	45130
Total	**277700**	**116213**	**21885**	**0**	**833003**	**172170**

C:\123\AGRL\1201POUL.WK1

167

Livestock and Poultry Numbers in Manikganj District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Manikganj	59165	13302	2808	NA	339654	26910
Singair	31820	9650	530	NA	168205	8800
Saturia	30735	7623	1341	NA	142002	15124
Ghior	26480	8905	1771	NA	116592	20254
Daulatpur	24748	7724	2612	NA	117540	29136
Shibalaya	21875	11144	854	NA	101206	25921
Harirampur	22437	12505	630	NA	110920	34591
Total	**217260**	**70853**	**10546**	**726**	**1096119**	**160736**

C:\123\AGRL\1201POUL.WK1

188

Livestock and Poultry Numbers in Narayanganj District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Narayanganj	19755	5362	1030	0	78972	27898
Rupganj	48888	12538	4120	57	212328	42354
Total	**68643**	**17900**	**5150**	**57**	**291300**	**70252**

C:\125\AGRL\1201POUL.WK1

189

Livestock and Poultry Numbers in Munshiganj District, 1990–1991

Upazila	Cattle	Goat	Sheep	Horse	Fowl	Ducks
Munshiganj	70000	3062	427	0	165000	17000
Tongibari	28984	1343	500	0	198324	4412
Srinagar	39853	6883	1474	0	105624	17175
Shirajdikhan	34672	6715	1572	0	187512	26715
Louhajang	42300	5983	1671	0	214153	29432
Total	**215809**	**23986**	**5644**	**0**	**870613**	**94734**

C:\123\AGRL\1201POUL.WK1