Directorate of Soil Survey, East Pakistan
Soil Survey Project of Pakistan

CONFIDENTIAL
FOR OFFICIAL USE
ONLY

RECONNAISSANCE SOIL SURVEY

NOAKHALI DISTRICT
AND
CHANDPUR, SADAR NORTH AND SADAR SOUTH
SUBDIVISIONS OF COMILLA DISTRICT

1965 - 66

SUMMARY OF AGRICULTURAL DEVELOPMENT POSSIBILITIES

Project of the Government of Pakistan
assisted by the United Nations Development Programme
and the Food and Agriculture Organization
of the United Nations

Preliminary edition
Dacca, 1967

Directorate of Soil Survey, East Pakistan,
Soil Survey Project of Pakistan

RECONNAISSANCE SOIL SURVEY

NOAKHALI DISTRICT

AND

CHANDPUR, SADAR NORTH AND SADAR SOUTH

SUBDIVISIONS OF COMILLA DISTRICT

1965-66

SUMMARY OF AGRICULTURAL

DEVELOPMENT POSSIBILITIES

Supplement to the reports on the Reconnaissance Soil Surveys of Sadar North and South Subdivisions, Comilla District (1966), and of Noakhali District and Chandpur Subdivision of Comilla District (1967).

Preliminary edition

Dacca, 1967

LEGEND

Irrigation for 1 or 2 transplanted kharif rice crops and a dry-land rabi crop per year. Part suitable for irrigated boro. Well suited for dry-land crops (sugarcane, bananas, oilseeds, etc) if pump drained.

Irrigation for dry-land rabi crops on ridges and boro in basins. Pump drainage needed for improved kharif crops.

Irrigation for boro on 40-80 percent of land.

Coastal Embankment and tidal-sluice drainage for improved kharif rice crops.

Improved forestry on highland. Small-scale irrigation for 1 or 2 transplanted rice crops in valleys.

Crop production impossible or uncertain because of risk of river erosion or damage from storm surges.

C. Comilla

Ch. Chandpur

M. Maijdi Court

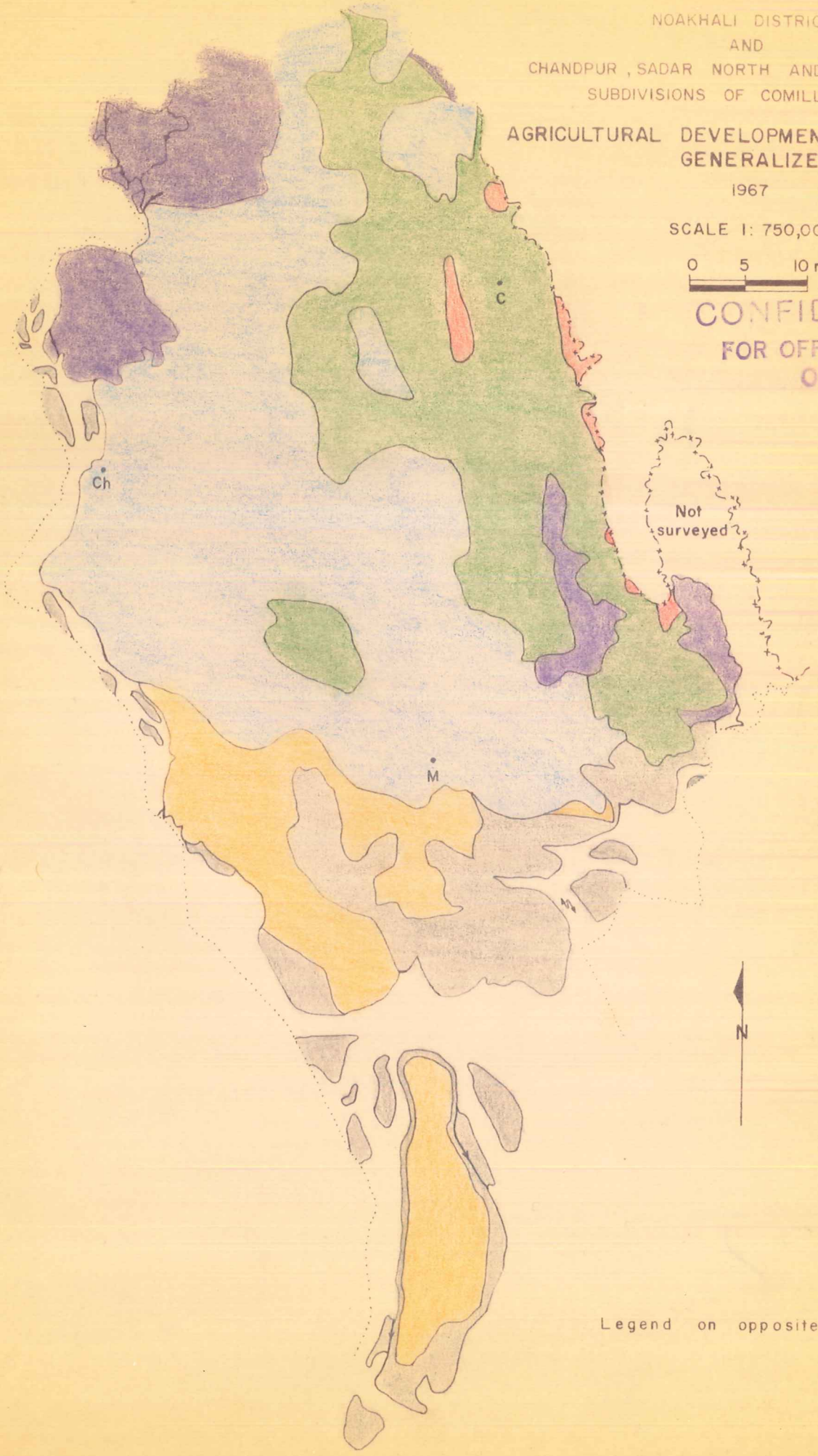
NOAKHALI DISTRICT
AND
CHANDPUR, SADAR NORTH AND SADAR SOUTH
SUBDIVISIONS OF COMILLA DISTRICT

AGRICULTURAL DEVELOPMENT POSSIBILITIES GENERALIZED

1967

SCALE 1: 750,000

0 5 10 miles



Legend on opposite page

PREFACE

This report presents a summary statement of agricultural development possibilities in Noakhali District and Chandpur, Sadar North and Sadar South Subdivisions of Comilla District. It is based on interpretation of data collected during the reconnaissance soil surveys carried out in this area in 1965-66. The report is designed to assist high-level planners in framing agricultural development policy for this area and in estimating possible increases in crop production under various forms of agricultural development. The scope of the report is indicated in the table of contents.

Special attention has been paid to indicating areas suitable for cultivation of IRRI and other improved transplanted rice varieties and for crops such as oilseeds and sugarcane. A table shows the approximate acreage of different kinds of land occurring in each unit shown on the map at the back of the report. Explanatory notes list suggested crops and crop rotations for each of these different kinds of land.

The maps in this report must be regarded as indicative only, pointing out broad areas suitable for particular forms of development. They are not intended for use at the executive planning level. Executive planners and extension workers will find information of the kind they need in the main reports on the reconnaissance soil surveys of these areas. However, the reconnaissance nature of these surveys should be kept in mind. Reconnaissance surveys provide a short-cut to development mainly in the sense that they provide a realistic basis for the selection of priorities. They in no way diminish the need for detailed surveys to be carried out for detailed planning and advisory work within areas selected for development.

This report limits itself to the consideration of requirements and suitability of land for irrigation, drainage or cultivation of particular crops. Consideration of such factors as engineering feasibility, availability of irrigation water, marketing of produce and socio-economic features of the area is beyond the scope of this report. These factors will require separate study.

CONTENTS

TABLES

MAPS

NOAKHALI DISTRICT
AND
CHANDPUR, SADAR NORTH AND SADAR SOUTH SUBDIVISIONS
OF COMILLA DISTRICT

MAIN FEATURES OF THE ENVIRONMENT

Area. 3,588 square miles (approximately 2,300,000 acres). (The surveyed area excludes 118 square miles of Parshuram and Chhagalnaiya thanas in the south-east of Noakhali District).

Population. Approximately 5,430,000 (1961 Census).

Rainfall. Annual average: Chandpur 77 inches; Comilla 100 inches; Noakhali 117 inches. Rainfall mainly occurs May-October.

Evaporation. Annual average: about 48 inches (Comilla and Noakhali).

Excess rainfall over evaporation in monsoon season ranges from 30 inches at Chandpur to about 70 inches at Noakhali.

Excess evaporation over rainfall in dry season: 10-12 inches.

Geology. Old Brahmaputra sediments (probably estuarine) occupy more than 40 percent, Meghna river sediments about 15 percent and young Meghna tidal sediments about 30 percent. Minor river floodplain sediments, young piedmont outwash deposits and older piedmont and folded Tertiary sediments each occupy less than 5 percent.

Relief. Floodplain areas comprise almost level to very gently undulating broad low ridges and basins. Piedmont areas are very gently sloping. Hills in Tertiary deposits are mainly less than 100 feet high, but have steep slopes.

Soils. Silt loams and silty clay loams predominate on floodplain ridges and in some basins, but clays occur extensively in most basins. Soils in the south of the Noakhali mainland and in Hatiya are often slightly to moderately saline. Almost all soils are seasonally

flooded but become droughty in the dry season. Hill soils are mainly deep, brown to red, sandy loams to clay loams. Associated piedmont soils range from sandy loams to clays.

Hydrology. Floodplain areas are flooded for 3-6 months in the monsoon season. Depths range from less than 3 feet in the east to more than 10 feet in the north-west. In the south, flooding is subject to tidal fluctuation, but water is mainly fresh during the monsoon season. River water in the south is saline in the dry season.

Dry-season flow in the minor rivers is almost negligible as a source of irrigation water. Dry-season flow in the lower Meghna is probably more than 200,000 cusecs, but large-scale extraction of water for irrigation would need to be considered in relation to Province-wide demands from the same Brahmaputra-Ganges source.

Information on groundwater supplies needs thorough investigation.

Present land use. About 30 percent is triple cropped, 25 percent double cropped and 15 percent single cropped. About 10 percent, mainly new river deposits in the lower Meghna, is uncropped. Settlements and water occupy almost 20 percent.

Broadcast aman, usually sown mixed with aus, is the major crop over almost 40 percent of the area, mainly in the west. Transplanted aman is the major crop over about one-third of the area, mainly in the east and south. North of the saline area, it is usually preceded by aus or jute. In the saline south, it is usually the only crop grown. There are small, but increasing, areas of boro, mainly in the east of Comilla District. Chillies, pulses and oilseeds are widely grown in the rabi season.

Present limitations. Major factors limiting agricultural production are:

- limited use of fertilizers, improved crop varieties, pest/disease control measures and irrigation;
- uncertainty of rainfall at the time for sowing aus, jute and broadcast aman, for transplanting aman and in October-November for keeping transplanted aman fields flooded;
- deep flooding of much of the area, accompanied by sudden rise of flood-levels in basin sites;
- dry-season salinity of large areas in the south of Noakhali;
- insufficient dry-season rainfall or moisture storage in most soils for production of high-yielding rabi crops (without irrigation);
- slow drainage of many basin sites early in the dry season, preventing cultivation of rabi crops;
- exposure of the southern part of the area to cyclones and accompanying storm surges;
- risk of river erosion of land adjoining the lower Meghna channels.

MAIN FEATURES OF AGRICULTURAL DEVELOPMENT POTENTIAL

Fertilizers

1. Balanced use of fertilizers is the prime need for increasing crop production on almost all soils.

Cropping possibilities

2. About 400,000 acres are presently well suited for cultivation of IRRI and other improved transplanted rice varieties in the kharif season. This area could be greatly expanded if pump drainage and irrigation were provided.
3. More than 500,000 acres are well suited for boro cultivation if adequate irrigation can be provided.
4. About 600,000 acres are presently well suited for irrigated dry-land rabi crops such as groundnuts, potatoes, vegetables, maize, wheat and other cereals. The area suitable for long-term dry-land crops (such as bananas, sugarcane, maize, wheat, tobacco and possibly long-staple cotton) would be greatly expanded if pump drainage and irrigation were provided.
5. Continuous rice cultivation (aus - aman - boro) under irrigation is strongly disrecommended because of adverse effects of continuous waterlogging on the soil and increased hazard of crop disease under these conditions. Rotations are required which will allow the soil to dry out for at least a short period each year.

   Possible annual rotations on highland and medium highland, or in flood-protected areas, are: transplanted aus - transplanted aman - short-term dry-land rabi crop; transplanted aman - boro - short-term dry-land crop or fallow; transplanted aus - wheat or other long-term rabi crops. Jute could be substituted for aus in the above rotations on suitable soils.

Crop production would have to be arranged in blocks for some of these rotations: adjoining fields could not be used for irrigated boro and dry-land rabi crops, nor for early-sown wheat and irrigated transplanted aman.

Irrigation

6. After fertilizers, irrigation is the next most important improvement that could be provided. Land and soils over almost the whole area are well suited for irrigation.

7. Investigations are urgently needed to determine availability of river and groundwater resources throughout the area, including the saline areas in the south. Where suitable groundwater supplies exist, irrigation from large or small tube-wells might be more practical than by way of large-scale canal schemes. Canals would probably not need lining, except locally near the eastern hills and on parts of the Middle Meghna, Gumti and Dakatia river floodplains.

Flood protection and drainage

8. Comilla and Noakhali Districts provide the largest single expanse of floodplain land in East Pakistan that is apparently well suited for development by means of pump drainage. Assistance from tidal sluice drainage might be possible in the south. Feasibility studies are needed to confirm this. These studies should take into account the drainage requirements of the whole of 'mainland' Noakhali and Comilla (including Brahmanbaria Subdivision, not yet surveyed) so that a comprehensive drainage scheme for this essentially uniform tract of land might be prepared.

The middle Meghna floodplain (Homna, Daudkandi, Matlab thanas) might have to be excluded from this development because of possible

adverse hydrological consequences elsewhere along the Meghna and lower Dhaleswari rivers if overland flood-flow across this area were prevented. Areas near to the lower Meghna would have to be excluded because of the constant risk that river erosion might breach the embankments and damage pump installations.

9. Controlled drainage would make it possible to grow sugarcane, bananas, maize, oilseeds, vegetables and other dry-land crops extensively on ridge soils. Transplanted rice varieties could be grown extensively on depression soils in any season of the year. Where drainage might be provided, it would be essential to provide irrigation at the same time.

10. The introduction of large-scale drainage would involve drastic changes in present cropping patterns. Farmers presently growing aus, jute and transplanted aman on shallowly-flooded ridge soils might be unable to grow these crops satisfactorily, or only with heavy irrigation, after lowering of flood-levels. Pilot studies, demonstration farms and careful extension work would be needed to persuade farmers to cultivate dry-land crops more suitable for the changed conditions on such land.

11. Because of the ridge and basin topography, subsidiary bunds and drains may be needed at intervals on the slopes between ridges and basin centres to regulate water-levels in transplanted rice fields during periods of heavy rainfall. It may not be practical to maintain shallow flooding depths in the deepest basin centres.

Reclamation of saline land

12. Increased crop production on saline land in the south, including Hatiya island, depends on effective means being provided of preventing periodic flooding by saline tidal water. The Coastal Embankment Project is designed to prevent normal tidal flooding and exclude all except the highest cyclonic storm surges.

13. With the provision of a system of open field drains connected with tidal sluices in the embankments, monsoon rainfall should be adequate to leach out salts from the soils within a very few years. Monsoon rainfall is adequate for aus, jute and transplanted aman to be grown on most soils, together with short-term dry-land rabi crops, once salts are leached from the soils. It is not known at present whether irrigation could be provided from deep tube-wells that might make crop yields more certain.

14. Because of the constant hazard of river erosion destroying embankments alongside the Meghna channels, it might be advisable to provide secondary embankments within the main outer embankments so that a breach in one part, either by river erosion or by over-topping during cyclonic storm surges, does not cause damage throughout the whole of the main polder. In effect, the secondary embankments would provide subsidiary polders within each main polder. They could also serve as roads.

Hill areas

15. Small hill areas in the east could most suitably be used for production of fuelwood, poles and bamboo. Some areas might be suitable for fruit trees. With small-scale irrigation, valley soils could produce one or two transplanted rice crops per year.

Further investigations required

16. The statements made in the preceding paragraphs are based on interpretation of information collected during the reconnaissance soil surveys of this area in 1965 and 1966. An intensive programme of fertilizer, irrigation and other agronomic investigations, together with appropriate hydrological investigations, is needed to confirm and amplify these findings in terms of feasibility and economic benefits.

Suggested development priorities

Short-term

17. Intensification of agricultural extension effort to promote use of fertilizers, plant protection measures, improved crop varieties, improved ploughs, etc.

18. Survey and exploitation of surface water supplies that could be used immediately for irrigation of boro. Low-lift pumps along the Meghna might provide immediate benefits to large areas of basin soils in map unit 6.

19. Promotion of small-scale irrigation from surface-water supplies or shallow wells to maintain flooding of transplanted aman fields in October and November. Traditional hand-operated devices or low-lift pumps might be used for this purpose. Large areas of medium highland in the east of Comilla District would benefit from this simple improvement, especially if improved rice varieties were cultivated.

20. Promotion of small-scale irrigation of cultivable highland and flood-plain ridge soils by means of hand-operated tube-wells, open wells or Persian wheels in areas where local information already exists that groundwater is available within easy reach of the ground-surface. With appropriate use of fertilizers, etc, the cost of such installations might be covered within the first year if crops such as bananas, potatoes or early rabi vegetables were grown. Other suitable crops would be wheat, oilseeds, tobacco and sugarcane on appropriate land and soils.

Long-term

21. Survey of groundwater resources throughout the area, including the saline south.

22. Long-term fertilizer and other agronomic trials on the major soils of the area. These should be under both rain-fed and irrigated conditions. Water consumptive use studies are needed on the major soils that might be irrigated.

23. Feasibility studies for large-scale development of irrigation from rivers and/or by tube-wells. Selection of priorities might be:

(i) map units 1, 2 and 7a;

(ii) map units 3, 4, 5, 6 and 7b;

(iii) others cultivable areas.

24. Feasibility studies for flood protection and pump drainage development. Order of priority might be as listed in paragraph 23.

25. Investigations to ascertain the depth and frequency of drains required to remove or limit soil salinity within areas protected by the Coastal Embankment.

26. Feasibility studies for provision of subsidiary polders in Coastal Embankment areas susceptible to river erosion or storm-surge damage: (see paragraph 14 above).

27. Detailed soil and topographical surveys of areas selected for irrigation or drainage development as a basis for planning water distribution and drainage layouts.

28. Routine detailed soil surveys of all agricultural land as a basis for improved farm planning and agricultural extension work. Priorities for survey might be in the order listed in paragraph 23, but taking into account possible prior needs resulting from implementation of recommendations in paragraph 27.

DETAILED STATEMENT OF AGRICULTURAL DEVELOPMENT POSSIBILITIES

Introduction

Table A gives the approximate area of each kind of land (Land Capability subclass) included in each unit shown on the 1:250,000-scale Agricultural Development Possibilities map at the end of this report.

Possible crops and crop rotations under various forms of land development are given below for each of the Land Capability subclasses shown in Table A. Alternatives are given wherever possible.

The crops and crop rotations indicated are suggestions only and are not exhaustive. Improvements in agronomic experience in the area, advances in agricultural technology and changes in economic conditions may lead to changes in cropping possibilities within the area in the future.

Most of the units shown on the Agricultural Development Possibilities map include various kinds of land. It would require detailed surveys and large-scale maps to show these individually. On the present map, related kinds of land are grouped together into what are called 'associations', i.e. kinds of land that are naturally associated with each other in particular landscapes. Thus, most units in floodplain areas have a very gently undulating landscape consisting of a series of broad low ridges separated by slightly lower basin land between them. Because of differences in drainage, the land on the ridges usually has different agricultural use and potential from that in the associated depressions. This has been taken into account in assessing development possibilities within each unit. The different proportions of such land in each unit are indicated in the map legend and in Table A.

These proportions, being based on reconnaissance survey techniques, are probably reliable to within about 10 percent over each unit as a whole, but proportions may vary by more than this amount in different parts of each unit. The areas quoted are gross. The net area that might be improved by irrigation and other techniques will be smaller than the area given because of local topographical factors and the needs of land for other development purposes. None-the-less, the areas and proportions given can be regarded as adequate for purposes of high-level planning. More detailed surveys will be required in areas where more detailed information is required.

The information given below should be read in conjunction with the Land Capability and Soils chapters of the individual reconnaissance soil survey reports on Comilla Sadar North and South Subdivisions and Noakhali District and Chandpur Subdivision of Comilla District.

Explanation of terms used

In the descriptions below, 'highland' refers to land lying above normal flood level. 'Medium highland' is subject to shallow seasonal flooding, usually less than 3 feet deep at its peak. 'Medium lowland' is seasonally flooded up to 3-6 feet deep. 'Lowland' is seasonally flooded more than 6 feet deep.

'Kharif' crops are grown in the monsoon season. 'Rabi' crops are grown in the dry season.

'Perennial dry-land crops' include sugarcane, bananas, fruit trees and pineapples.

'Annual dry-land crops' include groundnuts and other oilseeds, wheat, barley, maize, millet, potatoes, tobacco, chillies, legumes and vegetables. 'Short-term dry-land crops' include mustard, sesamum, fodder legumes, fodder cereals and some vegetables.

'Wet-land crops' include rice and jute. Transplanted rices can be grown in the kharif season on suitable medium highland and some level highland soils. On more deeply flooded soils, transplanted rice can only be grown, if at all, in the rabi season (as a boro crop).

Table A gives estimated areas of each land capability subclass found within each unit on the Agricultural Development Possibilities map included with the present report. Symbols such as IIW, IIIWr, etc, indicate land capability subclasses. These are fully defined in the main reports on these surveys. Briefly, the numerals I to V indicate Land Capability classes, from very good to very poor land; the capital letters D and W indicate respectively whether the land is above normal flood level or is seasonally flooded; and the small letters indicate subclasses with various kinds of limitations.

Class I (very good) land has no or very slight limitations for highly productive agricultural use throughout the year.

Class II (good) land has slight limitations for such use, but these can easily be overcome by appropriate management techniques.

Class III (moderate) land has moderate limitations, the nature of which is indicated in the subclass designation. More management effort or expenditure is required to make such land highly productive throughout the year.

Class IV (poor) land has severe limitations, the nature of which is indicated in the subclass designation. It may not be economic to bring such land to a high state of productivity throughout the year, but improved management may make it possible to produce one high-yielding crop during part of the year.

Class V (very poor) land has very severe limitations. It is regarded as unsuitable for productive agricultural use.

Subclass designations are as follows:-

d - droughtiness limitation.

e - limitation due to risk of soil erosion.

r - irregular relief interfering with provision of irrigation or drainage.

s - limitation due to soil salinity.

w - wetness limitation for dry-land crops: in the monsoon season for 'D' land; in the dry season for 'W' land.

x - limitation caused by risk of loss of land by river erosion or burial of land and crops by new alluvial deposits. Also includes risk of crop loss and salinization of soils by periodic cyclonic storm surges.

z - limitation caused by risk of crop loss by rapid rise of flood-levels or on-rush of flood-water.

Agricultural development possibilities of Land Capability subclasses

IW. With irrigation

Aus or jute - transplanted aman - short-term dry-land rabi crop.

Aus or jute - long-term dry-land rabi crop or vegetables.

With irrigation and pump drainage

Perennial dry-land crops.

Rotations of 2 or more annual dry-land crops.

IIDw. With irrigation

Aus or jute - long-term dry-land rabi crop or vegetables.

Aus or jute - transplanted aman - short-term dry-land rabi crop.

With field drains and irrigation

Perennial crops.

Rotations of 2 or more annual dry-land crops.

N.B. Land near streams may need protection from flash floods. Drainage of this land would be improved if adjoining floodplain land were pump drained.

IIW. With irrigation

Transplanted aus - transplanted aman - short-term dry-land rabi crop (on medium highland).

Aus or jute - long-term rabi crop (except on basin clays, mainly in map unit 2).

Transplanted aman - boro (on medium highland clays, mainly in unit 2).

Boro - broadcast aman (on medium lowland basin soils).

With irrigation and pump drainage

Perennial dry-land crops.

Rotations of 2 or more annual dry-land crops.

Rotation of jute or one kharif transplanted rice crop with a long-term dry-land rabi crop (especially on basin soils).

Transplanted aus or aman - boro (especially on basin soils).

IIIDr. With small-scale irrigation

Perennial dry-land crops.

Rotation of kharif and rabi vegetables.

Aus or jute - rabi vegetables.

N.B. This land comprises small man-made platforms often used for betelnut cultivation. Crops suggested are alternatives for introduction where betelnut palms have been killed by disease. Bananas, betelvine (pan), tobacco, potatoes and vegetables are suitable for the conditions. Unless surrounding land is pump drained, platforms

need regular addition of tank silt to maintain height above flood-level.

IIIWd. With irrigation

Improved dry-land rabi crops and early sowing of kharif wet-land crops.

Boro, possibly followed by broadcast aman, on basin soils.

With irrigation and pump drainage

Perennial dry-land crops on ridge soils.

Rotations of 2 or more annual dry-land crops on ridge soils.

Rotation of jute or one kharif transplanted rice crop with a long-term dry-land rabi crop on ridge soils.

Transplanted aus - transplanted aman - short-term dry-land rabi crop on basin soils, (except in basin centres).

Boro - broadcast aman on basin soils.

N.B. Flood protection and pump drainage may be expensive. They need feasibility study. Improved ploughs and better bullocks or tractors needed for proper cultivation of basin clays.

IIIWr. As IW, but small-scale irrigation methods needed because of irregular relief. Most of this land also needs protection from flash floods. Without this, irrigation could best be used on dry-land rabi crops, especially vegetables.

IIIWs. With embankment and tidal-sluice drainage

Aus - transplanted aman - short-term rabi crop.

Aus or jute - early dry-land rabi crop (e.g. millet, chillies, pulses, possibly groundnuts).

With irrigation in addition (where feasible)

As IW.

N.B. After embankment and provision of field drains leading to sluices, salts would quickly be washed out by monsoon rainfall. Without irrigation, yields of aus, jute and transplanted aman would occasionally be affected by drought, and only drought-tolerant rabi crops could be grown.

IIIWw. With irrigation

Boro, possibly followed by broadcast aman.

With irrigation and pump drainage

Transplanted aus - transplanted aman - short-term dry-land crop (except in basin centres).

Boro - broadcast aman.

Aus or jute - long-term dry-land rabi crop (with complete drainage).

Perennial or annual dry-land crops (with complete drainage).

N.B. This land is best suited for producing irrigated boro. Flood protection and pump drainage so that transplanted kharif rice crops could safely be grown may be expensive and possibly impractical in basin centres. Feasibility needs study.

IIIWx. Similar to IIIWs, but less affected by salt. Embankment of areas adjoining lower Meghna estuary problematical because of constant hazard of river erosion and exposure to damage by cyclonic storm surges.

IIIWz. With irrigation

Improved dry-land rabi crops and early sowing of aus, jute or broadcast aman.

With flood protection in addition

As IW.

IVDe. Improved forestry (for poles, fuelwood).

Possibly perennial tree crops.

N.B. Steep slopes or clay soils provide serious hazard of erosion unless a complete cover of vegetation is maintained.

IVWd. (Includes two kinds of land: heavy basin clays in units 2, 7 and 10; sandy ridge soils in unit 7).

With irrigation

Boro on basin clays.

Boro - transplanted aus or transplanted aman on medium highland olays on basin margins.

Rabi vegetables, potatoes, sweet potatoes, etc, on sands with frequent irrigation.

With irrigation and pump drainage

Boro - transplanted aus or transplanted aman on basin clays, except in basin centres.

Boro in basin centres.

Possibly sugarcane with complete drainage control on medium highland soils near Comilla.

Rabi vegetables, etc, on sands.

N.B. Flood protection and pump drainage of deeply flooded basin clays and sands may not be economic. Feasibility needs study. Irrigation of sands may also not be economic. Improved ploughs and better bullocks or tractors are needed for proper cultivation of basin clays.

IVWw. As basin clays in IVWd, but less irrigation water needed. Limited flood protection against early flash floods may be needed for boro in depression sites.

IVWx. With fertilizers

Improved transplanted aman.

N.B. Most of this land is saline. Exposure to river erosion and cyclonic storm surges makes reclamation by embankment impractical. On river charland north of Chandpur, small-scale irrigation of dry-land rabi crops for early sowing of aus, jute and broadcast aman might be possible.

IVWz. With irrigation

Boro.

With flood protection and pump drainage in addition

Boro - transplanted aus or transplanted aman.

Aus or jute - long-term dry-land rabi crop.

Aus - transplanted aman - short-term dry-land rabi crop.

N.B. Feasibility of flood protection needs study.

VDe. Improved forestry.

VWx. Little or no crop production possible because of severe risk of river erosion and/or tidal flooding by salt water.

Table A. Agricultural Development Possibilities associations: areas and proportions.

Land Capability subclass	Agricultural Development Possibilities association and approximate area (thousand acres) of included Land Capability subclasses 1	2	3	4	5	6	7	8a	8b	9	10	11	Urban, water	Total
Dry-land														
IIDw	4	3	–	–	–	–	–	–	–	–	<1	–	–	7
IIIDr	–	–	1	–	18	27	–	–	–	–	–	–	–	47
IVDe	–	<1	–	–	<1	–	–	–	–	–	8	–	–	9
VDe	–	<1	–	–	<1	–	–	–	–	–	4	–	–	4
Wet-land														
IW	80	2	102	–	9	–	–	2	1	–	–	–	–	196
IIW	15	50	126	85	302	31	30	1	6	–	1	–	–	648
IIIWd	–	–	–	–	40	–	52	–	–	–	2	–	–	94
IIIWr	–	–	–	–	1	–	–	4	–	–	–	–	–	5
IIIWs	–	–	<1	11	5	–	–	–	10	198	–	10	–	234
IIIWw	–	2	2	3	162	3	19	–	7	12	<1	–	–	210
IIIWx	–	–	–	–	–	–	–	–	–	57	–	–	–	57
IIIWz	1	–	–	–	<1	–	–	–	4	–	–	–	–	6
IVWd	–	18	–	–	6	–	25	–	–	–	2	–	–	51
IVWw	–	–	–	–	–	–	–	–	2	–	<1	–	–	2
IVWx	–	–	–	–	–	–	–	–	–	25	–	26	–	51
IVWz	–	–	–	–	–	–	–	–	3	–	–	–	–	3
VWx	–	–	–	–	–	–	–	–	–	<1	–	182	–	182
Homesteads water	20	13	66	27	153	19	17	3	5	53	<1	13	99	490
Total*	121	88	297	127	697	79	144	10	38	346	18	230	99	2,296
Percentage of area	5	4	13	5.5	30.5	3.5	6	0.5	2	15	1	10	4	100

* Any discrepancy occurring between total given and the sum of the figures in the subclass or association is due to rounding off of areas of subclasses within the associations to the nearest 1,000 acres.

Table B. Correlation of Agricultural Development Possibilities associations with Soil and Land Capability associations in Comilla and Noakhali-Chandpur reconnaissance soil survey reports

Agricultural Development Possibilities association	Comilla Sadar North and South report	Noakhali-Chandpur report
	Soil associations	
1	8, 9, 25, Part of 20	2, 34
2	4, 5, 6, 7, 10, 26	Not represented
3	21, 23, 24. Part of 20	3, 4, 5a, 19
4	Not represented	20, 30, 33. Part of soil association 31 included in Land Capability association 2.
5	11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 27	5b, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25
6	Not represented	26, 27
7	28, 29, 30, 31, 32	16, 17, 18
8a	33	Not represented
8b	34, 35	35, 36
9	Not represented	Parts of soil associations 28a, 28b, 29a, 29b, 31, 32a included in Land Capability associations 8 and 9.
10	1, 2, 3	1
11	Not represented	Mud and charland. Parts of soil associations 28b, 28c, 29a, 29b, 31, 32a, 32b included in Land Capability associations 12 and 13.
	Land Capability associations	
1	3b. Part of 1	Part of 1, 2
2	4. Parts of 2, 3a, 9	Not represented
3	Parts of 1, 2	Parts of 1, 2
4	Not represented	Parts of 2, 3
5	6b. Part of 3a	5. Parts of 2, 3, 6
6	Not represented	4
7	6a, 7	Parts of 3, 6
8a	5	Not represented
8b	6c	7, 11
9	Not represented	8, 9
10	8. Part of 9	10
11	Not represented	12, 13