A STUDY OF VILLAGE LANDS MADE DERELICT BY NON-AGRICULTURAL ACTIVITIES

FAO/UNDP Agricultural Development Adviser Project
(BGD/81/035)

Dacca, 1982

A SURVEY OF VILLAGE LANDS MADE DERELICT BY NON-AGRICULTURAL ACTIVITIES

Report prepared for the Government of Bangladesh

by

the Food and Agriculture Organization of the United Nations

based on the work of

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UNDP/FAO Agricultural Development Adviser Project

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SUMMARY OF FINDINGS

In view of the shortage of agricultural land in Bangladesh, a study was undertaken to assess the extent of village land made derelict by non-agricultural activities and to recommend on means of restoring derelict land to productive use.

1.1 The number of brickfields in Bangladesh is estimated at 2,500, consuming every year approximately 14.5 million cu.ft of soil.

1.2 The brickfields occoupy about 11,250 acres, of which about 2,500 acres have been excavated moderately deep to deep.

1.3 Generally, private brickfields are well maintained and neatly excavated. Contractors to the Government often excavate irregularly and haphazardly.

1.4 In the eastern part of Bangladesh (Comilla, Srimangal), as well as in the North (Tangail, Mymensingh) and around Bogra, shallow excavations prevail, while in the central and western parts (Dacca-Rajshahi) excoavations are predominantly deep to moderately deep.

1.5 The majority of brickfields is located on double cropped and sometimes even triple cropped land.

1.6 The only way of reclaiming dee_ borrow pits is to make them suitable for fish farming, if necessary by re-excavation. The excavated soil can be used for the embankment often needed in intensive fish farming.

2.1 Some 280 acres of abandoned brickfields were encountered along the main routes travelled. Only one brickfield was owned by a private owner; the rest had been operated by contractors to the public service. Private owners cannot afford to leave their sites abandoned.

2.2 Abandoned brickfields were found to be present on land of moderate and high agricultural potential (2 or 3 crops per year). Some of the land has not been used for 18 years.

2.3 Reclamation of a brickfield occupying 14.5 acres is estimated to require a maximum of 200 man months' work.

3.1 Cultivable waste in homestead areas is considered to be less than estimated in the 1977 Agricultural Census Report.

3.2 Much cow dung is used for fuel, while fast growing tree species for fire wood production are almost absent.

RECOMMENDATIONS

1.1 Bricks needed by the public sector should, wherever practical, be produced in existing brickfields.

1.2 In rural areas where no private brickfields are present, Government should acquire the land necessary for establishing a brickfield on a temporary basis only. Specifications, based on a survey, should be drawn up on how the contractor should excavate the site and restore it to productive condition at the end of his lease.

2.1 Abandoned brickfield sites could be made productive by informing former owners that they either can buy back the land at a nominal price or take it on lease.

2.2 Procedures should be simplified for former owners of abandoned sites who want to cultivate their previously owned lands.

2.3 If the farmers are not interested in the abandoned lands, the clearing should be initiated by Local Government through the Rural Works Programme or the Food for Work Programme. After restoration, the lands could be rented to landless people.

3.1 If land is required for the construction of buildings, it should not be acquired many years in advance. Land owners and lessees of sites acquired for construction purposes should not be allowed to leave cultivable land uncultivated; nor should they take land from farmers and then cultivate it by hired labour or by leasing it to third parties until construction starts.

3.2 If acquired land is leased to farmers, it should be for a period of 5 years or more. One year leases should be discouraged.

3.3 The Soils Institute should advise District Land Allocation Committees on land quality so that, where alternatives exist, only land of low agricultural quality is acquired for the construction of roads and buildings. Advice should also be given on possible uses for land after the excavation or dumping of soil material ceases.

3.4 The Soils Institute should bring up-to-date the recent survey of settlements and non-agricultural land use made by Serno as soon as new airphotos become available in 1982-83.

4.1 To counter waste in homestead areas, as well as in the use of cow dung for fuel, seedlings of suitable fast growing tree species for firewood should be supplied to the farmers free of charge.

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1. OBJECTIVES

The objective of the Consultant's mission was to assess, in selected areas of Bangladesh, the extent of village land made derelict by use for brick making and other non-agricultural uses, and to recommend practical means for restoring derelict land to productive use.

2. BACKGROUND

Recently, a study was undertaken to assess the rate of expansion of homestead land, based on a comparison of aerial photographs of 1952 and 1974 (Serno, 1981). The conclusion was reached that, in the seven rural Thanas studied, the homestead area had increased from 8.3-8.5 percent and tanks from 1.4 to 1.6 percent. That is, there had been a net expansion of 0.4 percent during the 20 years.

The Agricultural Census of Bangladesh 1977 (1981) gives a figure of 11.3 percent for the uncultivated area as a proportion of the total farm area. Compared with the 1960 Censu the uncultivated area had decreased by 1 lakh acres. The Report on Special Studies of Selected Industries in Bangladesh (Aliff International, 1981) calculated the homestead complex to be 11 percent of the total farm area. From the three sources mentioned, it appears that the figure for the 'uncultivated' area is about 11 percent.

Data presented at a Seminar on Integrated Rural Development (Aminul Islam, 1975) show that settlement and associated non-agricultural land amount to 14.8 percent, while permanent waterbodies occupy 9 percent (total 23.8 percent). The view of the Department of Architecture, Bangladesh University of Engineering and Technology, was that the 20 percent mark would soon be reached, and that measures must be taken to limit further expansion of settlement. The Consultant does not share this view, since no other supporting evidence was obtained to support the hypothesis.

The Consultant felt that adequate data were provided by the above studies to ensure a reasonable estimate for the homestead area. How the homestead area is used will be discussed later. Apart from human settlement, farmland is being encroached on for the use of brick making and the expansion of urban centres. Especially from 1970 onwards, the number of brickfields has increased rapidly, occupying and consuming more land due to increased building activities (Table 1).

Table 1. Annual compound growth rates in the construction sector (From draft Second Five Year Plan, 1980-1985)

Period	Annual Compound Growth Rate (%)
1973-1975	(-) 2.3
1975-78	7.8
1978-1980	17.8
1980-1985 (projected)	14.4

In 1981, the total number of brick burning units in the private sector was estimated to be 2,102 (Aliff International, 1981), producing 1,200 million bricks annually. In addition, some 400 million bricks are being produced by private contractors for the public sector like Roads and Highways Department, Public Works Department and Bangladesh Water Development Board. This probably brings the number of brickfields operative in 1981 close to 2,500, consuming every year about 145 million cu.ft of soil. Obviously, bricks are needed, and the demand will grow in the future, but use of the land should be such that the long-term productivity is least affected. Abandoned brickfields should therefore be left as economically productive sites.

Village tanks and ponds under good management can easily produce 12-18 maunds of fish (Brammer, 1975). Many of the tanks observed during fieldwork appeared to be derelict. Since derelict tanks also could be improved and then contribute to the country's need of protein, they were included in the assessment of derelict village land.

Another menace to farm land is the expansion of urban centres. Of course, expansion cannot be halted, but the quality of the farmland could be taken into account in planning urban expansion. Also, the pressure on the farmland could be reduced by using the land in such a way that the most economic use is made of it. That this is not always the case was frequently observed, especially around Government buildings.

3. PROGRAMME OF WORK PERFORMED

The Consultant arrived in Bangladesh on 21 January and departed on 12 March 1982.

As a start, a literature survey was carried out. Especially on brickfields, a number of relevant reports has been published recently. They will be quoted in the next section. Not much information was given, however, on the methods of excavation which determine to a great extent the possibilities of restoring the land's productivity. Neither were data available on the presence of abandoned brickfields. For this reason, field trips were undertaken to Comilla, Srimangal, Kushtia, Rajshahi, Bogra and Mymensingh. Apart from interviewing brickfield operators and farmers, estimates were made of the area under abandoned brickfields and the area of derelict tanks. Also, five of the seven thanas studied by Serno were visited to estimate the area of fallow land and to get an impression of the productivity of the homestead land.

In order to recommend on methods of restoring derelict brickfields to productive use, one abandoned brickfield was measured and a calculation was made of the number of man-months involved in such a reclamation operation. In Rajshahi, some time was spent to find out whether land acquired by the Government for construction of buildings was properly used.

In order to study waste of land in part of the Dacca town area, an analysis was carried out with the help of aerial photographs to determine the area not being used for construction purposes.

Originally, it had been intended to use airphotos for assessing the area occupied by brickfields. However, the most recent airphotos available were for 1974, while the majority of brickfields were of more recent dates. For this reason, it was decided not to make a detailed photo-analysis of selected areas. Fortunately, the study of brickfields made by Aliff (1981) had become available, which provided valuable up-to-date information on the number and area of brickfields.

Results of discussions with many people of different Departments and projects (as listed in section 5) greatly contributed to the final results of the mission.

4. FINDINGS AND CONCLUSIONS

4.1 Brickfields

4.1.1 Introduction. A detailed study on brickfields in Dacca District was conducted by F.M. Aziz (1979). Aliff International (1981) and Hussain (1982) collected data regarding the number and size of brickfields. According to Aziz, half of the brickfields in Dacca District is within urban areas. He estimated that about six acres of land are deeply excavated (average 25 ft) each year within urban and potential urban areas, and that about 70 percent of the brickfields procure their clay requirements through limited excavation (1-7 ft). He considered the latter beneficial to the farmer because, in that way, aman rice land was converted to boro rice land. For this reason, one of his main recommendations was that brickfield operators should be stopped from deep excavation and be encouraged to go for limited excavation. Aziz gave an average quarry size as 1 acre.

4.1.2 Optimum depth of excavation. The optimum depth of excavation should be defined as the depth of excavation that least affects the potential for food production. Frequently, boro rice production may be increased as a result of shallow excavation, by removing the somewhat coarser textured topsoil (usually silt loam or silty clay loam). However, other crops, especially rabi crops, will generally show a negative response to loss of topsoil.

Since farmers consider rice to be by far the most important crop, they will go for shallow excavation so long as they expect a higher yield. Rabi crops, however, are becoming more and more important, and one questions whether excavation of topsoil is wise in the long term.

On the other hand, deep excavation, although it decreases the farmland area, is not always harmful for food production. In urban and potential urban areas, deep excavation should be strongly discouraged. However, in rural areas, it can be argued that many bricks can be produced from a small area if deep excavations are made, provided that the sediments are suitable for brick making, and the borrow pit can later be transformed into a productive fish pond. Often, however, the deposits of suitable sediments are too shallow to allow a deep excavation to be made.

A moderately deep excavation can be harmful for food production since the borrow pit may contain some water during the dry season but not allow for a productive fish pond unless it is reexcavated. On the other hand, it may not be suitable for the production of rabi crops. From experience,

it is estimated that excavation below 5 ft usually makes crop production impossible, excavation between 3 and 5 ft can be harmful, while excavation to shallower depths is considered to be least harmful to crop production.

4.1.3 Area occupied by brickfields and depth and size of excavations. From data provided by Aziz (1979) and road counts, an estimate is given of the area excavated per depth class in 1981.

Depth of excavation (ft)	% of total	Area occupied (in acres)
1.5-3	40	660
3-5	20	165
5-8	20	100
8	20	45

Given the assumptions of section 4.1.2, about 225 (45 + 100 + 160/2) acres of agricultural land have been made unsuitable for agriculture due to excavation in 1981. If one further assumes that deep and very shallow excavations were less common in previous years, the maximum area of land made unsuitable for agriculture during the last 10 years reaches a figure of about 2500 acres. Of course, this is a very rough estimate, but it nevertheless indicates that the area is relatively small. Much larger is the area occupied by brickfields (storage and furnace). Aziz gives an average size of brickfields, excluding the quarry, in the Dacca District of 4.1 acres. Hussain (1982) gives a figure of 3.3 acres. The Consultant's findings indicate a slightly higher figure: 4.5 acres. These figures suggest that the total area occupied by brickfields is about 11,250 acres.

4.1.4 Methods of excavation. Methods of excavation encountered on field trips to Comilla-Srimangal, Kushtia-Rajshahi-Bogra and Mymensingh will be discussed separately below.

Dacca. Immediately around Dacca, brickfields are concentrated in areas with very deep loamy (silt loam-silty clay loam) floodplain sediments. During the monsoon season, this area is deeply flooded. Very deep excavations prevail in this area. Borrow pits up to 50 ft deep have been observed. Usually, fish can be found in the borrow pits after flooding. However, proper management is lacking.

The total number of private brickfields in Dacca District is estimated at 424 (Aliff, 1981). There are also four automatic brickfields. One such brickfield located in Sabhar was visited. Here Madhupur clay was mixed with

sandy loam (25%). So far, about 7 acres had been deeply excavated (± 20 ft). Since this area is of low agricultural potential, the operation is no menace to valuable farmland. Apart from the excavation, the brickfield occupied about 8 acres. Another 700 acres, it was said, belonged to the brickfield and was cultivated by sharecroppers.

Comilla-Srimangal. In the Comilla area, shallow excavations prevail. The reason is two-fold. Firstly, the farmers prefer to sell the topsoil, either so as to dispose of the loamy topsoil in order to make the soil more suitable for boro rice cultivation (where the topsoil is underlain by clay), or so as to lower the land to the flood-level so that moisture is more easily available to the crops. Secondly, it was often found that the subsoil proved too sandy or clayey to be suitable for brick making. In case the subsoil proved to be too sandy, usually 1½ ft of (silty) clay loam or silt loam was left to maintain the productivity. However, even if the loam deposits were thick, the farmer was not willing to sell more soil than he thought wise.

Only twice was a moderately deep excavation encountered in Comilla District. After checking, the operators appeared to be contractors to the Government (Roads and Highways Department). At one site, three brickfields were observed close together, one of them being run by a contractor, the other two being privately owned. The difference was striking. According to our informant, the land of the RHD site was acquired 16 years ago, but operation of the brickfield did not start until 1981.

Usually, private brickfield operators cannot afford to buy land from the farmers because of the high price (in return for relatively shallow suitable silt loam deposits). Close to Comilla, the price of farmland would come close to Tk 150,000 per acre.

The Deedar Cooperative in Comilla, located in the Chakla-Bharella soil association with a clayey subsoil, paid the farmers Tk 2500/acre for 1½ ft depth of topsoil. Commonly, farmers said they then spent Tk 1,500 on fertilizer and manure, after which they said they obtained a higher (rice) harvest than before.

One brickfield owner said he paid Tk 2000/acre for 1 ft of topsoil; another, Tk 5000/acre for 2 ft. The average is close to Tk 2000/acre/ft. In the Comilla area, the brickfields were located on the country's most productive soils. Due to good management and irrigation, farmers get high yields. Usually three (sometimes four) crops are grown in a year.

Comilla District has 130 brickfields (Aliff, 1981). The size of brickfields is smaller than in the rest of the country. It is estimated that about 500 acres of high potential farmland is occupied by brickfields.

In Sylhet District, as in Comilla District, shallow excavations prevail. Brickfield owners buy topsoil from farmers, who are eager to preserve the agricultural potential of their land. One brickfield practising deep excavation was observed near Srimangal. The owner said he had applied for a loan to enable him to stock the deeply excavated area (± 2 acres) with fish after completion of excavation. Often, the subsoil proved to be too clayey for brickmaking. The few brickfields observed occupied double cropped (aus-transplanted aman) land.

Dacca-Kushtia. Out of a total of 32 brickfields observed, only at two sites was the shallow excavation method applied. Especially around Faridpur, deep to very deep excavation (20 ft) prevailed. In Faridpur, a brickfield owner said that, due to the sandy texture of the topsoil (0-3 ft), he was requested by a farmer to transform part of his land into a fish pond, because he expected higher returns from fish farming than from arable farming.

Again, there was a significant difference in excavation depth of brickfields that operated on contracts for the Government (amongst others, the Bangladesh Water Development Board) and private owners. Usually, excavations of private owners were deeper and more neatly excavated because they were planning to transform them into productive fish ponds. On the other hand, contractors obviously had no such desire. Apart from being shallower (12-14 ft), the excavations were done more haphazardly, making possible re-excavation for fish farming very expensive. The area around Faridpur occupied by brickfields operated by contractors was said to be about 90 acres.

Between Magura and Kushtia, only a few brickfields were observed, since building activities were almost nil in this area. The main crops grown on the land surrounding the brickfields are transplanted aman and wheat.

Kushtia-Rajshahi. Along this road, brickfields with deep borrow pits containing water throughout the year were common. Usually, sandy loam was mixed with the clay loam or silty clay to prevent the bricks from cracking after moulding them. This is understandable, because the carbonate-rich Ganges sediments contain montmorillonite. Main crops are sugarcane and transplanted man, possibly followed by a rabi crop (tobacco). Shallow excavations were noticed, due either to the presence of a sandy subsoil

or shallow groundwater. One such example was a 10-acre RHD brickfield. Although the (shallow) excavated land was suitable for cultivation (boro rice), this was not done.

Rajshahi. Around Rajshahi, many firewood operated brickfields were observed. The kiln usually has the shape of a house or tower (bangla bhata), as opposed to the big kilns with transportable chimneys, as usually observed. It was said that, if only firewood is available, the bangla bhata gives better bricks. Usually, excavations are deep. That contractors also can do a good job was shown in the village of Balia. A well excavated pond was found, suitable without re-excavation for fish farming. In most cases, the soil material is mixed with 25 percent sandy loam or silt loam.

Bogra. Between Nator and Bogra, no operative brickfields were encountered. Around Bogra, on the Barind tract, Madhupur clay is used for brick making. To prevent cracking of the moulded bricks, 50% sandy loam (recent floodplain alluvium) is added. Only the coarser textured, weathered Madhupur clay is used. The subsoil (unweathered) is not considered to be suitable for brick making at all. Nor is it suitable for agriculture. Excavations are usually shallow and are hardly detrimental for the agricultural potential, considering the present land use. Topsoil excavation will certainly affect the yield of rabi crops. On the Barind tract around Bogra, only one crop is grown (transplanted aman). Under irrigation, two transplanted rice crops can be grown. Wheat was observed as well. However, irrigation is exceptional in this area. It should be encouraged.

Mymensingh. Along the Dacca-Tangail-Mymensingh road, the majority of brickfields procured their soil material by shallow excavation. They are especially concentrated in an area west of Joydebpur (Kunabari).

North of Tangail, a few brickfields with moderately deep to deep borrow pits were encountered. Brickfields in this area usually occupy very productive alluvial (silt loam) soils.

4.1.5 Discussion. Many deep excavations around Dacca are located in potential urban areas. Reclamation in terms of filling up the tanks would be very costly and generally not feasible. Aziz (1979) calculated a figure of Tk 18 lakh for filling a borrow pit occupying 1 acre and 28 ft deep. Using the tanks for intensive fish farming is the only possibility. In flooded areas, an embankment is necessary to prevent the stocked fish from escaping from the pond. The investment can also be high, but, under good management, the returns will be profitable (Aziz, 1979).

Deep borrow pits in rural areas should also be stocked with fish. However, the Consultant was told that a deep tank belonging to a large automatic brick factory (Sabhar) and excavated in Madhupur clay was not good for fish farming. Further research is needed to find out exactly why. Possible reasons are low pH and related deficiency in calcium, and the high iron content.

Part of the moderately deep excavations should also be re-excavated to make them suitable for intensive fish farming. The excavated soil could be used for the embankment. The reclamation of abandoned brickfields will be discussed in a later section.

In the case of Government owned brickfields, it should explicitly be stated in the contract that deep and moderately deep excavations should be made suitable for fish farming before the contractor leaves the site. Government departments concerned should examine the brickfield and specify how the contractor should carry out the excavation. Why this is necessary is shown in the next section. The fish ponds could be rented to interested parties, based on a long term renewable lease.

4.2 Abandoned brickfields

4.2.1 Introduction. Brickfields operated by contractors to the public sector are abandoned when the required number of bricks is made. Along the routes travelled, some 280 acres of abandoned brickfields lying uncultivated were observed. Most of the land could easily be reclaimed. Only one small abandoned brickfield was noticed which was owned by a private person. Obviously, private owners seldom abandon their brickfield and, if suitable soil is not available any more, it is bought from neighbouring farmers and, if necessary, transported by lorry to their site.

4.2.2 Findings. Abandoned brickfields are encountered throughout the country, even on the country's most productive lands. Not far from Comilla (at Kurpai), a recently abandoned brickfield of 16 acres was noticed, surrounded by irrigated land. A tubewell was present near the edge of the abandoned land. The new dereliot land could have been cleaned and reclaimed easily, and transferred into high potential agricultural land.

Between Srimangal and Comilla, an estimated 54 acres of abandoned brickfields were observed, all owned by RHD and abandoned between 1977 and 1981. Usually, the land is acquired many years before the operators start work. Of one RHD brickfield, which became operative only recently, it was said that the land had been acquired 15 years ago.

When driving on the Dacca-Kushtia-Rajshahi road, many abandoned brickfields were counted. The total estimate amounted to 153 acres, of which 3 acres had been occupied by a privately owned brickfield, and the rest by contractors to the public service.

One site about seven miles North of the Ganges, along the road to Nator, was abandoned in 1964. Part of the bricks still had the mark C and B which was used prior to 1963. The area, comprising about 25 acres of double cropped land (transplanted aman followed by a rabi crop, often tobacco), could easily be reclaimed.

Just north of Jhenaida, an even larger abandoned RHD brickfield (estimated size 30 acres) was observed. Part had been abandoned in 1965 and the rest in 1980. The area was unevenly excavated. Another 75 acres of abandoned brickfield land was observed along the Nator-Bogra and Bogra-Nagarbari roads.

Between Kaliakair and Mymensingh, the area of abandoned brickfields was estimated at about 30 acres. Just East of Tangail (Nagarjalpai), a large (15 acres) abandoned brickfield was observed which is described in detail in Appendix 2.

Along this road, also, some reclaimed brickfields were present. South of Mymensingh, on the road to Bhaluka, many reclaimed brickfields were observed on highly productive farm lands. According to the farmers, the time needed for the restoration of the land used for brick storage amounted to two man-months/acre. Reclamation of the kiln area takes more time and was often not yet finished.

Also, an abandoned brickfield taken on lease by the Government was visited. The farmers had cultivated their lands again, apart from the kiln site which was not yet returned to them. This example shows clearly that, if Government needs lands for the establishment of brickfields, food production is best served by temporary requisitioning in the form of a lease.

In Table 2, the year of abandoning the brickfields and the area made dereliot are given for brickfields encountered on field trips to Comilla-Srimangal, Rajshahi-Bogra and Mymensingh.

Table 2.

Year of abandoning	Area made dereliot (acres)
1964	25
1965	15
1974	54
1975	27
1977	23
1978	26
1979	5
1980	58
1981	44
1982	2

Obviously, there exist many more abandoned brickfields. A reliable estimate for the whole country is not available.

4.2.3 Discussion. It is disturbing to observe how much agricultural land can be damaged by a relatively few contractors. Contractors to the Government are not bound by specifications on how to excavate the land or on how to restore the site after excavation ends. Private owners cannot afford to handle their land in such a way.

Government generally acquires the land many years before brick manufacturing starts, obviously because of the rising prices of land. However, this practice should be abandoned, because the farmers cultivating the land will keep their investments low because they never know when the land will be taken over by contractors. This results in low crop returns. Apparently, the former owner can buy the land back for a nominal price from the Government when it is no longer required: (see Appendix 1). Probably, the farmers are not properly informed, and procedures for recovering the land are too complicated.

Therefore, Government should lease rather than acquire land (Appendix 1). After having finished brick production, the land should be levelled and the farmers compensated for loss of harvest and loss of soil. RHD officials stated that they abandoned such a system because it proved too costly, due to unfounded claims by farmers (Appendix 1).

Reclaiming the lands occupied by abandoned brickfields is technically feasible. The problem is, who should do it and what happens with the reclaimed land.

It is the Consultant's opinion that the best way of restoring the land is to return it to the farmers for a nominal price. As mentioned before, there are legal provisions to do so. The farmers would then clean, level and cultivate the land.

However, in the original transfer, as many as 40-50 farmers (or possibly more) may have been involved. Also, because many of the lands have been acquired a long time before brick manufacturing started, some of the former owners may have died in the meantime, which could give rise to ownership disputes.

If the farmers are not interested, or if there are ownership disputes that cannot be solved, the land could be reclaimed on the initiative of the local government under the Rural Works Programme or the Food for Work Programme. A calculation of the cost of reclamation of an abandoned brickfield in terms of man-months of labour involved is given in Appendix 2. After reclamation, the land could be rented to landless people.

In some places, contractors and private owners were observed to be operating within a close distance. Government should preferably commission the manufacturing of bricks to private brickfield owners. However, where this is not possible, the land necessary should be obtained on a temporary basis shortly before the operation starts.

4.3 Derelict tanks

4.3.1 Introduction. On field trips, many derelict tanks were observed to be either dry or completely covered with water hyacinth. Road counts were made, and ratios of clean and derelict tanks were calculated.

In Dacca, it was found out that Hoq and Grant (FAO Fisheries Advisory Project BGD/72/016) had carried out a statistical analysis of data collected on village tanks from 176 villages. Although road counts were continued, the Consultant's results are not given herein because they were similar to those given in the above paper for the areas visited. Hoq and Grant give a much more complete picture of the condition of village tanks in Bangladesh (Table 3). Also they mention whether or not the tanks are stocked with fish.

On these field trips, it was also noticed that much land was made derelict as a result of road construction.

Table 3. Ponds and tanks in Bangladesh

Code Number	DIVISION District	Reporting Thanas	Area and Number of Village Ponds & Tanks in 000's							
			Total		Used for Fish Culture		Ready to be used		Derelict	
			Acres	Number	Acres	Number	Acres	Number	Acres	Number
1.	CHITTAGONG	9/15	129	562	56	229	41	171	32	162
11	Chittagong	2/3	18	96	9	42	5	33	4	21
12	Hill Tracts	0/3	-	-	-	-	-	-	-	-
13	Comilla	2/3	36	213	18	96	9	52	9	65
14	Noakhali	3/3	34	129	16	49	9	36	9	44
15	Sylhet	2/3	41	124	13	42	18	50	10	32
2.	DACCA	10/11	57	255	9	40	11	42	37	173
21	Dacca	3/3	15	63	3	11	2	6	10	46
22	Faridpur	3/3	15	107	3	17	4	25	8	65
23	Mymensingh	2/3	22	60	3	11	4	9	15	40
24	Tangail	2/2	5	25	*	1	1	2	4	22
3.	KHULNA	12/13	84	644	36	229	26	155	22	260
31	Bakerganj	3/3	40	307	10	35	19	110	11	162
32	Jessore	3/3	14	80	8	48	1	6	5	26
33	Khulna	3/3	14	152	12	122	*	7	2	23
34	Kushtia	3/3	6	29	4	15	1	5	1	9
35	Patuakhali 1/	0/1	(10)	(76)	(2)	(9)	(5)	(27)	(3)	(40)
4.	RAJSHAHI	13/14	89	303	49	147	16	71	24	85
41	Bogra	2/3	10	38	3	9	2	8	5	21
42	Dinajpur	3/3	20	67	11	45	3	11	6	11
43	Pabna	2/2	7	15	1	1	1	1	5	13
44	Rajshahi	3/3	31	65	20	42	5	12	6	11
45	Rangpur	3/3	21	118	14	50	5	39	2	29
BANGLADESH		44/53	359	1764	150	645	94	439	115	680
Per Cent			100	100	42	36	26	25	32	39

* = less than 500 acres

1/ No information. Estimates made on basis of results from Bakerganj District.

Estimates based on the measurement of ponds and tanks in a sample of 176 villages in 44 Thanas of the 53 Thanas selected for the survey carried out during December 1978 and January 1979.

From Hoq and Grant (1979)

4.3.2 Findings and discussions. Hoq and Grant (1979) conclude that the total area occupied by tanks in Bangladesh is 3.59 lakh acres, of which 1.15 lakh acres (32%) are derelict. A total of 1.5 lakh acres is used for fish culture, while an additional 0.94 lakh acres could be used for this purpose without re-excavation. When compared with the area occupied and consumed by brick-fields (± 13,750 acres), it seems that attention should be focused on the improvement of village tanks. However, serious problems are created in this respect by ownership disputes.

Especially in Dacca District, the condition of the tanks is very poor. Almost 65 percent of the tanks are derelict; in Tangail, even 80 percent! In Bogra District, 50 percent of the village tanks appeared to be derelict.

Road-side ditches consume much land, especially in deeply flooded areas. Rather than one continuous ditch, one usually finds a string of discontinuous excavations on both sides of the road embankment. The area affected is sometimes as much as 10 metres at each side. Many of the ditches are not used productively.

An attempt was made to carry out road counts on derelict ditches, but it proved difficult since farmers were still in the process of removing water hyacinth and the subsequent planting of boro rice. Shallow ditches often are used as nursery sites for boro seedlings, moderately deep ditches are used for growing boro and the deep ditches for fish culture. However, it was clear that the area was not used optimally. Between Comilla and Dacca, the area of derelict road-side ditches was estimated to be at least 180 acres.

Obviously, as little productive land as possible should be used in road construction: (see section 4.5.3). Where possible, deep, narrow ditches should be excavated, so that less land will be affected and often a better use can be made of them, for instance as irrigation channels. Also, evaporation losses will decrease and more irrigation water will be available for the same storage capacity.

4.4 Land use in homestead areas

4.4.1 Introduction and findings. The 1977 Census Report gives the 'uncultivated' area (cultivable waste, homesteads, ponds, ditches, roads, forests) as 24.8 lakh acres. Out of this, 10.8 percent (or 2.69 lakh acres) is considered to be cultivable waste, while the balance is occupied by homesteads, ponds, etc.

Serno (1981) provided an estimate of the productive/non-productive land ratios (which also can be estimated from Table 4). From his data, it was calculated that, for the seven thanas studied, about 50 percent (weighted average) of the homestead area could be classified as unproductive, indicating the area occupied by houses, threshing floors, storage huts and fallow. When extrapolated over the total 'uncultivated' area of 24.8 lakh acres, the unproductive land would amount to 12.4 lakh acres.

According to the Agricultural Census Report, the cultivable waste is 10.8 percent, or 2.69 lakh acres. This figure is higher than would be expected from the scarce data provided in Table 4.

Aliff (1981) gives a total tree crown covered area for the homestead complex of 664,560 acres. This figure compares well with the figure that would be reached if the data given in Table 4 are used.

4.4.2 Discussion. Data in Table 4 are estimates for only 8 villages in Bangladesh. However, they seem to agree fairly well with data from other sources. The area occupied by fallow land varies greatly from one village to another. The highest value (20 percent) was recorded in Jaypur: there seemed to be no obvious reason for there being such a high level in a densely populated area close to Comilla town.

In the homestead area of the villages visited in Bahubal Thana, fallow land was negligible, just as in Dupchanchia Thana. In Mirpur Thana (Noapara-Boalbari village), the area of fallow land was relatively large, because the land has not been optimally cultivated since the departure of several Hindu families. In Kotubaria village, most of the fallow land consisted of graveyards.

Generally, the area of fallow land was between 0 and 10 percent, the average being considerably below 10 percent. For this reason, the figure given in the Agricultural Census Report (10.8%) cannot be confirmed.

The mango tree is the main supplier of firewood in the villages studied. In many areas, cow dung is the second most important source of fuel. Usually, only old mango trees were found to be being gradually converted to fuel. It was often observed that the farmers planted new trees. However, they never planted trees that could be used only for firewood.

Table 4. Land use of homestead areas

Thana/village	Land use proportions	Main trees	Main fuel sources
Bahubal Thana			
Subhratu village	25% Houses 40% Trees + bamboo + banana 35% Arable (+ tanks) (<5%) Fallow	1. Mango 2. Bamboo 3. Banana	Mango Cow dung
Jangalia village	25% Houses 45% Trees + bamboo + banana 30% Arable (+ tanks)	1. Bamboo 2. Mango 3. Jackfruit	Mango Cow dung
Comilla Thana			
Jaypur village	40% Houses 20% Trees + bamboo + banana 20% Arable (+ tanks) 20% Fallow (+ derelict tanks)	1. Mango 2. Banana 3. Date palm	Mango Cow dung
Chandina Thana			
Belaso village	65% Houses 20% Trees + bamboo + banana 10% Arable (+ tanks) 5% Fallow	1. Mango 2. Jackfruit 3. Bamboo	Rice straw Mango Cow dung
Badva Bazar Thana			
Chotokrishnadi village	70% Houses 10% Trees + bamboo + banana 15% Arable 5% Fallow	1. Mango 2. Coconut 3. Betelnut	Rice + wheat straw Jute sticks Korai (*Albizzia*)
Mirpur Thana (Kushtia)			
Noapara-Boalbari village	15% Houses 20% Trees + bamboo + banana 55% Arable (+ tanks) 10% Fallow	1. Bamboo 2. Banana 3. Mango	Rice straw Mango
Kotubaria village	25% Houses 30% Trees + bamboo + banana 35% Arable (+ tanks) 10% Fallow	1. Bamboo 2. Coconut 3. Banana + mango	Jute sticks Mango Cow dung
Dupchanchia Thana	40% Houses 45% Trees + bamboo + banana 15% Tanks (<5%) Fallow	1. Bamboo 2. Korai (*Albizzia*) 3. Mango	Mango Rice straw + bamboo leaves Korai

Note: Estimates were made by walking through the villages.

Because of the increasing demand for firewood, experiments should be carried out with fast growing species that occupy little space (like Eucalyptus sp.). Farmers are usually very eager to carry out experiments, and if the seedlings could be supplied free of charge, the production of firewood could increase. At the same time, cow dung could be made available for use on the fields that are commonly in need of more organic matter. In planting fast growing tree species, it should be kept in mind that they should not be planted as pure stands because of the vulnerability of pure stands to strong winds and diseases.

4.5 Land use in urban areas

4.5.1 Introduction. Some time was spent in trying to find out how the land in urban areas was used. Attention was focused on Rajshahi, Bogra and Dacca. In Bogra, the Rural Development Academy, Government College and the Cantonment area were visited. In Rajshahi, land use of the University and a few adjacent colleges was studied. For Dacca, the Consultant's counterpart separately made an analysis of two sample areas.

4.5.2 Findings and conclusions. The campus of Rajshahi University occupies 740 acres of land which formerly was double cropped land (mixed aus + aman followed by rabi crops and sugarcane). The present use of the camppus area was found to be as follows:

Roads, buildings and playing fields:	286 acres	
Botanical garden and research fields	29 "	
Railway station and graveyard	17 "	
Garden and kitchen gardens	94 "	
Unused lowlands and abandoned brickfields	35 "	
Agricultural Project	284 "	(244 acres cultivated and 40 acres of ponds).

Of the 286 acres of roads, buildings and playing fields, about 20 percent was found to be occupied by buildings and roads, leaving about 230 acres under playing fields.

The Agricultural Project, initiated in 1975, occupied 284 acres of land. Mixed aus + aman followed by sugarcane were the main crops. Rabi crops were not grown. Farmers cultivating the surrounding farm lands usually grow rabi crops as well. According to one employee who also owned farmland outside the Project area, the yields on the Agricultural Project were about half of what the farmers got. This was confirmed by Project officials. The profits per acre yielded about Tk 700 per acre. An average labour force of 125 daily labourers, paid Tk 10 per day, was employed. In addition, it was said that about 120 acres of abandoned brickfields had been reclaimed with tractors and levelling equipment, at a total cost of about Tk 1 lakh.

According to the Chief Engineer, the land was purchased for construction of buildings. The master plan indeed shows the area concerned occupied with buildings, but it is improbable that this will ever occur. The procedure for obtaining lands at a date when funds for construction of buildings have not been secured is highly questionable. If the Government requires land, it can be requisitioned at any time. As is shown in the Rajshahi University case, the purchase of land prior to the time of construction has resulted in a very substantial loss (more than 50 percent) in agricultural production and many angry farmers who were deprived of their lands.

At the Engineering College, teachers could obtain a lease from the College Authority on lands owned by the College. It seems questionable whether it is correct to supplement teachers' salaries in this way at the expense of the farmers. Generally, the land was found to be used well. At the Medical College and Hospital, crops were grown even in backyards. On the other hand, an excessive area of playing fields (± 13 acres) was observed.

In Habinagar village, Rajshahi, BWDB had destroyed the agricultural potential of 25 acres of double cropped land for the construction of a groyne in the river Ganges. The area had been unevenly excavated, making it difficult to use the site in future for any useful purpose.

The Bogra Cantonment area (1160 acres) formerly was mainly single cropped with transplanted aman, with some double cropped aus-transplanted aman land. Thirty percent of the land was now said to be under cultivation, for which farmers can take one-year leases. It appeared that the figure of 30 percent was too high; it probably is closer to 20 percent. An estimated 15 percent of the acquired area is occupied by buildings. If agricultural production is to be maximized, one-year leases should be replaced by renewable 5-year leases. No farmer will invest in the land if somebody else will reap the residual benefits.

The same comment applies to the Bogra Government College where the land not required by the College is rented to farmers on a yearly basis. The question remains: why was it necessary to acquire the lands at all? In this case, the land was purchased 20 years ago!

The Bogra Academy for Rural Development occupies 42 acres of land which formerly was single cropped transplanted aman land. Apart from the agricultural fields (18 acres), the site was not yet put to optimum use. Most of the buildings area consisted of lawns.

4.5.3 Discussion. Land should not be taken from the farmers many years before building and construction activities start. Taking land from farmers and then hiring labour to cultivate it (as at Rajshahi University) seems to be an altogether unacceptable practice. Also, renting out acquired land to farmers on an annual basis will undoubtedly lead to suboptimum crop production. In this case, renewable long-term (e.g. 5-year) leases should be considered.

District Land Allocation Committees chaired by the Deputy Commissioner should be properly informed about agricultural land values to ensure that the minimum amount of land is acquired and, if alternatives exist, then to take land of low agricultural quality. The Soil Resources and Development Institute and the Directorate of Agriculture (Extension & Management) have particular responsibilities in this respect.

Hussain (1982) states: "The planning process is one of dialogue: not planning 'for', but 'with' the people. Local bodies have the local knowledge of the requirements of the land for various purposes, and their recommendation has to be given full weight before a local official gives a final verdict."

This principle needs to be followed in all cases where it is proposed to acquire private land for public purposes, so that the public interest is genuinely taken into account.

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APPENDIX 1

Report on a discussion at the Roads and Highways Department, Dacca

Presently, there are just over 100 brickfields in operation owned by RHD, especially in rural areas where only few private brickfields exist. Formerly, most of the bricks were manufactured in RHD-owned brickfields. Now, about 90 percent of the bricks are produced by local brickfields. For instance, in Narsingdi, 24 private brickfields are working on Government contracts. Previously, the majority of bricks were made for RHD on permanent and temporary brickfields. The land necessary for the permanent brickfields was bought from the farmers at current prices, as stated in the transfer documents. However, this system put the farmer in a disadvantage because, when selling to private people, in addition to the amount stated in the documents, extra cash was paid in order to avoid taxation. If the Government requires the land, the farmer is forced to sell.

For temporary brickfields, the farmer receives a certain amount of money for the soil used and a compensation for the loss in income from the fields. Because farmers are said to claim more harvests than they actually grow, RHD has abandoned this system because it proved too costly.

In case of a permanently acquired brickfield, the former owner is entitled to buy the land back after the brickfield has become redundant for the same price which he initially received. However, this procedure was said to be a lengthy one and involved much expenditure as well. In this respect, the farmers could obtain, against payment, the service of certain persons to accelerate the procedure. Former owners also can take a lease on the land previously owned by them, once brick manufacturing has ceased, for only Tk 20 per acre. Because, originally, leases were for one year only, but farmers showed little interest. More interest arose when renewable 5-year leases were also made possible. In this case, it is more profitable for the farmer to clean and level the land. If the former owners are not interested, other farmers could apply for a lease. However, the Consultant considers that the presence of many unused abandoned brickfields shows that, apparently, this procedure also may prove complicated.

On temporary leased land, excavations usually do not exceed 5 ft in depth since RHD has to level the land before returning it to the farmer. On permanently acquired land, there are no restrictions for the contractor so far as excavation is concerned. Nor does he have to clean the land before abandoning

it. Usually, the stacks of old bricks in abandoned brickfields are those which do not meet the specifications set by RHD. In this case, the contractor could be sued to remove them. Alternatively, if Government is the owner, they could be moved and be used in future for road construction elsewhere.

APPENDIX 2

Estimated labour requirement for reclaiming an abandoned brickfield

The accompanying sketch map shows the land use in an abandoned brickfield just East of Tangail. The area occupied by each unit is given below.

Moderately deeply excavated (± 5 ft)	3.75 acres
Irregularly excavated (0-5 ft)	0.70 "
Fallow with some bricks	2.90 "
Fallow with some stacks of bricks	1.90 "
Kiln	1.75 "
Kiln surroundings	1.15 "
Brick storage	1.45 "
Arable land	0.90 "
Total area	14.50 acres

This Government-owned brickfield was abandoned in 1976. Bricks are imprinted WDC and MBC. An estimated number of 8 lakh bricks is still present on the site. During the monsoon season, the area is deeply flooded. On the higher parts of the adjoining land, mixed aus/aman followed by a rabi crop (often wheat) is grown; on the lower parts, boro rice if irrigation water is available.

It is proposed to reclaim the affected area in such a way that boro rice can be grown in the lower parts. This would involve the re-excavation of an irrigation tank in part of the excavated area (about 1 acre) to a depth of about 12 ft. With the excavated material, part of the borrow pits will be infilled by about 1-2 ft and an embankment about 3-8 ft high will be constructed: (see sketch map). The soil material around the kiln can be used for levelling the irregularly excavated area. Due to deep flooding, the tank will not be suitable for intensive fish farming, unless an embankment of about 10 ft high is constructed.

A calculation of the labour required to restore the site to productive use is given below.

Reclamation of two kilns: 2 X 40 man-months	80 man months
Excavation of borrow pit, 1 acre, 7 ft	100 " "
Cleaning fallow land and brick storage sites	
6.25 acres X 2 man month/acre	15 " "
Cleaning kiln surroundings	5 " "
Total labour required	200 man months

The calculation of the labour required to reclaim the kilns, fallow land and area used for storing of bricks was based on data supplied by farmers in the Mymensingh area who had had experience in reclaiming abandoned brickfields. For the excavation, the labour requirement was based on an average productivity of 100 cft/labourer/day, as deduced from data supplied by brickfield operators.

It is considered that the majority of abandoned brickfields encountered will need far less effort to reclaim than the example given here.