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**RESEARCH NOTE**

# Rural Land Use in the Brahmaputra Floodplain Environment, Assam: The Case of Muktapur Village

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# アッサム、ブラマプトラ氾濫原環境における農村の土地利用 ―ムクタプール村での事例

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**要旨**

アッサムのブラマプトラ氾濫原の農村地域における土地利用に関する経過とパターンは、この地域の生態的条件に対する人々の対応の伝統的特質を明らかに反映している。ムクタプール村の事例にしめされているように、村人の理解にもとづく世代を超えて発展してきた土地利用は、村人を取り巻く環境に対する人々の深い愛着を示している。したがって、農業技術において何らかの変化を導入しようとするならば、農業生態系の長期的な持続性に有効に関わっている、村人自身が育んできた知識や経験に対して適切な配慮がなされなければならない。小規模な土地所有と耕地の分散は、栽培作物の種類は農業実践に用いられる技術に影響を与えていることが知られている。このような問題意識から、本稿では、インド、アッサムのブラマプトラ谷の広域農業生態という視点から、この土地に住み続けたきた人々が居住する氾濫原の村の土地分類と土地利用のパターンに関する研究を試みた。

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**Abstract**

The processes and patterns of land use in the rural areas of the Brahmaputra floodplain, Assam clearly reflect the traditional nature of human response to the ecological settings of the area. The land classification evolved by the people through generations on the basis of their perception, as evident in the village Muktapur, indicates people's attachment with their immediate environment. Therefore, while taking any steps to bring about a change in the agricultural technology, proper care needs to be taken with regard to indigenous knowledge and experiences, which are effectively linked with the long-term sustainability of the agroecosystem. The small size of landholdings and scattering of plots are also found to influence the type of crops grown and the technology adopted in farming practices. Keeping all such points in view, this paper attempts to study the pattern of land classification and the utilization of land in a floodplain village inhabited by indigenous people within the broad agro-ecological framework of the Brahmaputra Valley, Assam, India.

## 1. Introduction

The Brahmaputra Valley in Assam with an area of 56,194 $km^2$ and a population of 22.65 million as per the 2001 census is one of the important river valleys of the world. Of the valley's total geographical area, 98.5 % is constituted by the rural areas supporting 86.9 % of the valley's total population. Rural land use in the valley, as in other parts of the world, has passed through a long history to form a characteristic landscape broadly reflecting a harmonious relation between physical and cultural elements. The rural people in the valley have traditionally engaged in multiple use of their lands to optimize their use of resources and minimize risk. The traditional land use system is characterized by relatively low input of nutrients, low per hectare output and intensive use of human labour [Plieninger 2007]. The use of rural land is multifunctional in character and sustained by agriculture and natural resources [Brouwer and Heide 2009].

The rural landscape of the Brahmaputra Valley is the outcome of the diverse use of its land for various productive purposes including agriculture. Unlike in developed countries, agricultural land use in the Brahmaputra Valley basically means the cultivation of land for growing different types of crops in different agro-ecological settings, leaving a small proportion of land for grassland, horticulture, pisciculture and dairy farming [Bhagabati and Dutta 2001]. The use of some common land, such as forests, marshes, and grasslands, which are usually treated by the people as public

or government land, is also peculiar to the context of the diverse rural society of the valley. The physiographic make-up of the valley comprising the elongated north and south bank foothill belts, extensive built up plains and active floodplains including the most sensitive *charlands* (sandbars) and the variable weather, water sources, floods, and the needs and aspiration of the social groups combine to make the valley's land use remarkably diverse. The traditional land use system exhibits a slow rate of change resulting in a long period of relative stability and community management that enhances the structural diversity of vegetation and resource output on the one hand and a high level of self-sufficiency on the other [Baldock *et al.* 1995]. However, in recent years, the growing pressure of population on culturable land, due primarily to immigration from East Pakistan (the present Bangladesh) during and after the 1950s, increasing demand for food, fibre and fuel as well as the changing economic and political situation in the valley have given rise to a remarkable spatio-temporal variation in the pattern of land use.

The introduction of modern agricultural input and implements such as HYV crops, chemical fertilizers, pesticides and power tillers has, of late, led to either replace some of the traditional land use practices or modify them to cater to the present needs. The most noteworthy point in this regard is the fact that current agricultural practices have been eroding some of the indigenous land-use practices which were basically evolved to fulfill more individual needs rather than to maximize profit. Interestingly, the indigenous practices had an immense social and environmental significance as these were eco-friendly and culturally acceptable.

Several studies on land use in the Bahmaputra Valley have already been made, among which the works of [Bhagabati 1990], [Bhagabati and Das 1992], [Das 1992], [Bhagabati and Dutta 2001] are noteworthy. However, detailed studies covering all aspects of rural land use are yet to appear prominently. As a matter of fact, a holistic study on the rural land use is very important to diagnose the problems and prospects associated with each land use category so that proper steps can be adopted to resolve the problems and explore the prospects for the sustainable development of rural life. This paper is an attempt to study the pattern of land use in a floodplain village called Muktapur in the district of Kamrup (Rural) within the broad geographical framework of the Brahmaputra Valley, Assam.

## 2. Database and Methodology

The present study is mainly based on personal field experience, and primary data collected by interviewing all the 408 households of the village through a purposively designed questionnaire

during 2006–2007. In addition, oral interviews were conducted among some aged farmers to learn their perception of the changing pattern of land use. Necessary secondary data on land use, cropping patterns and practices, size of the farmlands etc. were collected from the Revenue Circle Office, Census Office, Directorate of Agriculture, Government of Assam, etc.

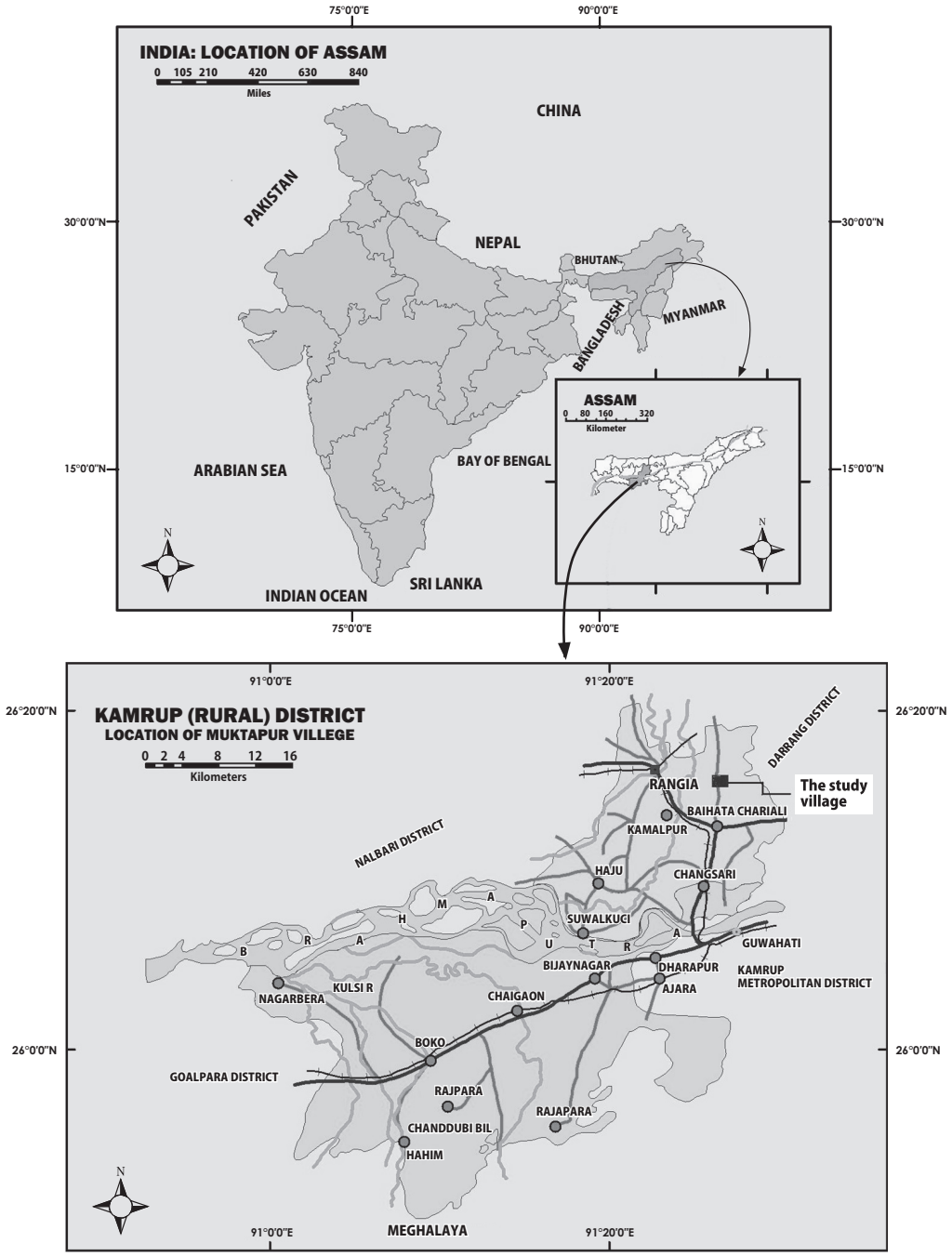
The detailed land use map has been prepared on the basis of the *dag* map received from the Revenue Office. The *dag* map shows the distribution of land owned by an individual or a small group. Thus the inhabitants of a *chuburi* (hamlet) may own lands in different *dags* identified by the Revenue Department of the State Government. *Dags* are the smallest land units of the village landscape and are generally demarcated by the village surveyors using numbers. While carrying out the field survey, the *dags* were again sub-divided according to the subsequent fragmentation of the plots with the help of the owners of the *dags* concerned. The data/ information regarding the land use patterns, land use changes, cropping patterns, flood levels, soil quality, land classes etc. have been obtained for each of the fragmented *dags* in consultation with the actual owners. In order to identify and understand the problems and prospects of local agro-ecological resources and niches, transect charts, or toposequences, have been prepared following the PRA method.

### 3. Background of the Village

The present study has been carried out in Muktapur village under the jurisdiction of Goreswar Revenue Circle of Rangia Sub-division, Kamrup (Rural) district, Assam (Fig. 1). The village lies within $26^0 26' 1''$ N to $26^0 25' 6''$ N latitude and $91^0 43' 14''$ E to $91^0 45' 6''$ E longitude. This is a typical village inhabited by indigenous non-tribal Assamese people. It is located in the northern floodplain of the Lower Brahmaputra, about 35 km from the city of Guwahati to the south and 40 km from the Bhutan Himalayan foothills to the north. The Muktapur village covers a geographical area of 3.67 sq km with a total population of 2080 (as of 2006). Out of the total working force of the village nearly 80 % is directly involved in agriculture. The literacy rate for the village as a whole stands at 84 %.

The village comprises 11 *chuburis* (hamlets) with their production territories coalescing within the broad and diverse village landscape. The villagers usually visit the nearby *hat* (periodic market) called Muktapur Bazar for selling and buying purposes. Baihata Chariali, a township, is located at a distance of 11 km from the village.

Fig. 1 : Location of Muktapur village



### 4. Toposequence of Land Use

The toposequence of land use obtained for the village reflects the pattern of its people's adaptation to the local ecological settings. It is the product of various cultural responses of inhabitants sharing a set of ecological elements in a micro environmental framework. The toposequence of the village from north to south-east is presented in Fig. 2. The village basically represents a flat alluvial plain with no perceptible relief variation. A very gentle slope from north to south broadly directs the surface run-off within the village. This village represents a typical land use pattern characterized by grain farming (primarily rice), cash cropping, traditional homestead gardening, fishing etc. Mainly following certain age-old indigenous knowledge and belief systems, the villagers generally use their lands for various purposes as per the local ecological conditions. In the case of rice, three different types are cultivated according to the natural water availability and soil condition.


| Agroecological Niche | Settlement | Village road | Settlement | Homestead garden | Winter rice field | Seed bed | Autumn rice field | Winter rice field | Dong (rivulet) | Grazing land | Dead channel |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil | Sandy | Sandy | Sandy | Sandy alluvial | Alluvial | Alluvial | Alluvial | Alluvial | Clayey alluvial | Sandy alluvial | Clayey alluvial |
| Water source | Deep tube well | Rain water | Deep tube well | Rain water | Rain water | Pond / *Khal* | Rain water | Rain water | Rain water | Rain water | Rain water |
| Corps | Nut trees & flowers | Shed trees | Nut trees & flowers | Fruit & wood trees | Indigenous rice varieties | Vegetables | Rice and *rabi* crops | Indigenous rice varieties | - | Natural fodder | Aquatic vegetables |
| Problems | Lack of civic amenities | Unsurfaced narrow road | Lack of civic amenities | Protection from animals | Small land holding, lack of irrigation, pest and diseases, winter fallow | Lack of irrigation | Small land holding, lack of irrigation, pest and diseases | Small land holding, lack of irrigation, pest and diseases, winter fallow | Irregular water supply | Small land holding | Weeds |
| Cropping Pattern | - | - | - | Horticulture | Mono cropping (rice) | After seedling, *rabi* cropping | Multiple cropping | Mono cropping (rice) | - | - | - |
| Use | Housing | - | Housing | Cash crops, fruits, building materials, medicinal and ornamental plants | Winter rice cultivation | Rice in summer, *rabi* in winter | Autumn rice and *rabi* cultivation | Winter rice cultivation | Source of irrigation, *rabi* crops on banks in einter | Fodder | Fishing, aquatic vegetables, source of irrigation |

Fig. 2 : Toposequence of land use in Muktapur along the cross section (AB) as shown in Fig 3.a

They are winter rice (*sali dhan*) cultivated on low land (*da mati*) where flood water rises up to 1.5 ft, autumn rice (*ahu dhan*) cultivated on intermediately low land (*madhyam mati*) where flood water attains a depth of 1 ft, and bao rice (*bao dhan*) cultivated on very low land where flood water rises up to 2.5 ft during summer. The land use pattern (summer and winter season) in the village is shown in Figs. 3.a & 3.b. Some relatively large *ahu* rice fields cover the central, eastern and westernmost parts of the village. On the other hand, the *sali* rice fields are located mostly in the central, east and south western parts of the village. It is noteworthy that the *ahu* rice fields are used for *rabi* cropping during winter, while the *sali* rice fields remain fallow in this season as the low-lying nature of these fields does not permit *rabi* cropping. Moreover, some small fragmented lands occupied by *ahu* and *sali* rice are found scattered within the village. The grazing lands, seed beds etc. are also seen to occur in a scattered manner. The homesteads (*gharveti*) generally occur in a linear pattern along the village *kutcha* (unpaved) road. The traditional homestead gardens (*basti*) generally spread from the backyard of the residential houses. The kitchen gardens (*sakanibari*) on the other hand are located on slightly raised land, usually near the homesteads.

Fig. 3.a: Land use pattern (summer season) in Muktapur village

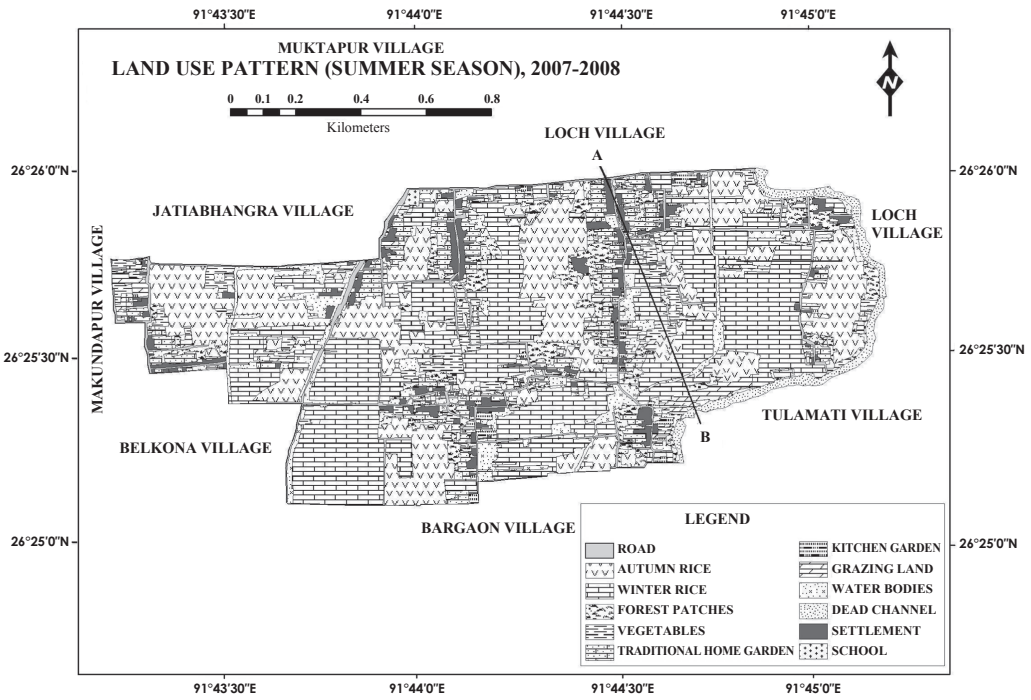
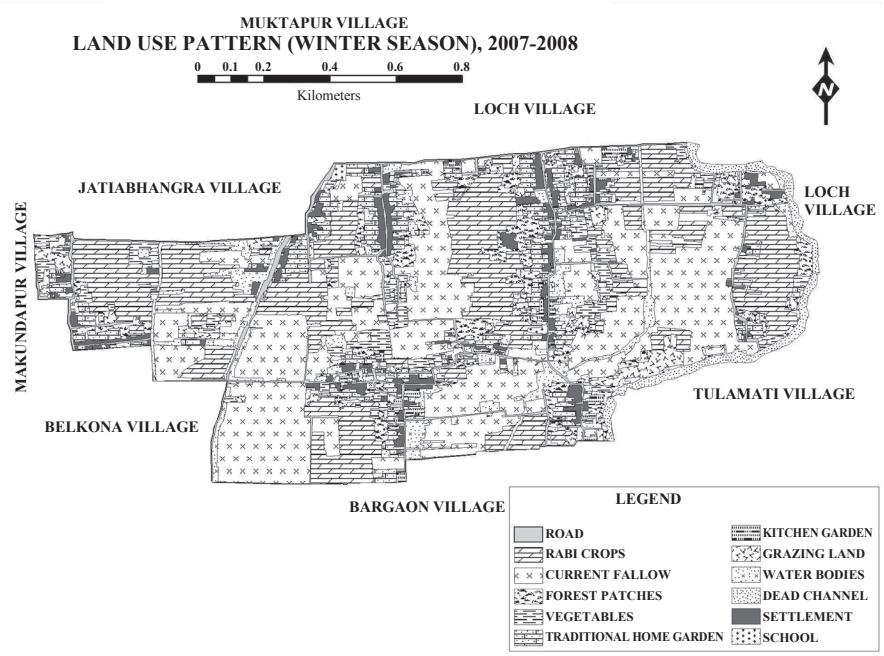


Fig 3.b: Land use pattern (winter season) in Muktapur village




Some man-made ponds or *khals* are also located near the homesteads. An abandoned channel of the Barnadi river, locally called Punai or Puspabhadra, lies along the boundary of the village, and a 700 metre long segment of it falls within the village.

## 5. Local Taxonomy of Land

The farmers themselves traditionally classify their lands into as many as 10 categories: (1) *Gharveti* (residential land), (2) *Basti mati* (homestead garden), (3) *Sakanibari* (kitchen garden), (4) *Kathiatoli* (seed bed), (5) *Ahutoli* (autumn rice field), (6) *Salitoli* (winter rice field), (7) *Baotoli* (bao rice field), (8) *Bakari mati* (grazing land), (9) *Janghaltoli* (forest patch), and (10) *Jalashay* (water body).

### 5-1. *Gharveti* (residential land)

The *gharvetis* are raised on slightly higher land and are usually arranged in a linear pattern along the village roads. Generally three types of houses, viz *kheri ghar* (thatched house), *kenchibatam* (wooden house) and *Asom arhir ghar* (Assam type house), are seen in the village. The house areas/houses such as *borghar* (sitting room), *baha ghar* (drawing room), *randhani ghar* (kitchen), *gohali ghar* (cowshed),

*dhekishal* (grinding house), *bharal ghar* (granary) etc. are built around the yard, bear different meanings and satisfy different purposes. The total area under *gharveti* stands at 24.96 ha, accounting for 6.8 % of the total village area. The villagers grow certain specific trees, like betel nut, betel leaf, coconut, *neem*, banana, bamboo etc. around the *gharveti*. The size of the individual *gharveti* ranges from 10 *lecha* to 2 *katha* 10 *lecha*[1)].

**5-2. *Basti mati* (homestead garden)**

*Bastis* are developed on slightly raised land which usually spreads for a distance of 10 – 50 m from the backyard of the homestead. The homestead gardens are endowed with highly diverse species facilitating year-round harvesting of edible products and a wide range of other products, such as firewoods, medicinal plants, and some ornamentals spices [Gonzalez 1985]. These *bastis* are treated by the villagers as a 'productive unit' from where they derive almost all the necessary resources for their livelihood [Bhagabati and Das 1992]. The homestead gardens have a multi-faceted utility. Economic plants such as the coconut, betel nut, betel leaf, jackfruit, blackberry, mango, citrus fruits like the olive, orange and *rabab tenga* (a citrus fruit), *thekera tenga* (a fruit considered to have medicinal value) etc. are used by the people for domestic consumption and also as a source of cash. Perennial woody trees such as the *moj*, *poma*, *teak*, *katakuhi* and *kohimallya* (planted/ wild tree species found in the floodplain) can be used as both firewood and construction materials.

Due to the diversity of species and variability in flowering and fruit maturity time, there is always something ready for harvest ensuring availability of food or some income throughout the entire year [Gliessman 1990]. It is also noteworthy that the traditional homestead gardens in a rural area also perform social and aesthetic functions and serve as an indicator of the social status of the families. The *basti matis* cover a total area of 42.28 ha accounting for 11.5 % of the total village area. The size of the *bastis* varies from 0.0134 to 0.27 ha (10 *lecha* to 2 *bighas*). At present, the output from the *bastis* has been gradually declining as they are constantly under attack from squirrels and various diseases. Therefore, some farmers have started planting valuable trees in the existing *bastis* or created new *bastis* intended for tree plantations.

**5-3. *Sakanibari* (kitchen garden)**

The *Sakanibari* is prepared by the farmers for day to day domestic use. They are prepared usually 5–25 meters away from the homestead, either at the front or at the back, to grow vegetables such as

cabbages, potatoes, chillies, leafy vegetables (*sak*), tomato, ginger etc. *Sakanibaris* in the village cover an area of 8.22 ha, representing 2.2 % of the village area. These are fenced with bamboo in order to protect them from cattle and other domesticated animals. The size of the individual *sakanibari* ranges from 5 *lecha* to 2 *katha*.

**5-4. *Kathiatoli* (seed bed)**

These are prepared in relatively high lands near some water sources like ponds, *khals*, etc. so that the required water can be obtained for the seed beds. Seed beds are prepared during April and May. These lands remain fallow during the off-season (summer season). However, some farmers grow vegetables there in the *rabi* season mainly for domestic consumption. The total area occupied by the *kathiatolis* measures 10.84 ha, i.e. 3.0 % of the total area of the village. The average size of the *kathiatolis* ranges from 5 *lecha* to 10 *lecha*.

**5-5. *Ahutoli* (autumn rice field)**

In the case of *ahu* rice cultivation, three types of cropping system are observed. In the months of March, April and May *ahu dhan* (autumn rice) is cultivated by both the broadcasting and transplanting methods. After harvesting *ahu dhan*, these fields are used for cultivating HYV rice such as *Aijong* and *Ranjit*. Again, in the winter season, *ahutolis* are put to use for mustard and pulses. The *ahutolis* are slightly higher in elevation than the *salitolis*. The autumn rice fields occupy an area of 55.68 ha, accounting for 15.2 % of the total village area. The average size of the *ahutolis* varies from 2 *katha* to 3 *bighas*.

**5-6. *Salitoli* (winter rice field)**

These lands are cultivated for indigenous *sali* rice varieties such as *Jaha*, *Barni*, *Gajia*, *Bardhan*, *Mainagiri* etc. In recent years, some farmers have started growing some HYV rice like *Aijong*, *Ranjit* and *Bahadur* instead of the local *sali* rice varieties as the yield of HYV rice is higher. With an area of 129.19 ha, *salitolis* take a maximum share of 35.2 % of the total village area. The average size of a *salitoli* varies from 2 *katha* to 3 *bighas*.

**5-7. *Bao dhantoli* (*bao* rice field)**

These are basically lowlands which remain inundated from April up to the first part of December.

Only *bao* rice which can withstand flood water, is raised in these fields. The popular *bao* rice varieties include *Kajeli bao* and *Bangla bao*. *Bao* rice fields cover a very negligible area of the village. A relatively big *bao* field with an area of 3.16 ha is located in a neighboring village, some portions of which are owned by the farmers of the village under study. The average size of the *bao* fields varies from 2 *katha* to 1 *bigha*. The clayey alluvial soil with sufficient surface water supports *bao* rice cultivation in the area.

**5-8. *Bakari mati* (grazing land)**

These are slightly elevated areas kept for raising grasses for the domesticated animals. Because of their higher surface level, the water retaining capacity of these lands is very low. The grazing lands cover an area of 13.85 ha, representing 3.77 % of the total area of the village. The average size of a *bakari mati* in the village varies from 2 *katha* to 1 *bigha*. *Bakari matis* are situated usually at a distance of 200 – 500 m from the homesteads.

**5-9. *Janghaltoli* (forest patch)**

These are some naturally evolved small patches of trees and undergrowth. *Janghaltolis* cover a very insignificant proportion of the village area, i.e. only 5 *bigha*. They are rich in plant species and provide habitats for some lower-order wild animals and birds. *Janghaltolis* are located considerably far from the homesteads. These patches play a major role by providing firewood, construction materials, medicinal plants, fruits etc. to the villagers and enrich the natural environment of the village. It is disheartening to note that the *janghaltolis* are being gradually depleted.

**5-10. *Jalashay* (water body)**

The *Jalashays* in the village include the *pukhuri* (man-made pond), *beel* (natural wetland), *khal* (natural pond), *mora nadi* (dead channel) etc. The average size of *jalashays* varies from 10 *lecha* to 1 *bigha*. *Jalashays* have played a major role in rural life by providing not only scope for fishing and collecting edible plants but also acting as facilities for bathing, washing clothes and utensils, the soaking of seeds and wood etc. Moreover, these are used as sources of water to irrigate the fields and to provide natural drinking water for the cattle.

### 6. Landholding Size and Fragmentation

The small size of landholdings that are also fragmented and scattered is a peculiar characteristic of the floodplain villages of the valley. The size and number of plots are determined by the degree of fragmentation of holdings resulting from the law of inheritance, socio-economic set up, history of settlement and transfer of land ownership [Bhagabati 1992]. The size and distribution of landholdings in the present village show notable inequalities in terms of the fragmentation and scattering of plots (Table 1). The average size of landholdings in the village is 0.71 ha. The highest proportion of land (40.8 %) is constituted by holdings of less than 1 ha in size, owned by 78.7 % of the total households of the village. Only 1.0 % of the households of the village own 8.1 % of the land with a size of more than 4 ha.

Table 1: Area under different landholding size-classes

| Size class in ha | Total land in ha (%) | No. of households possessing land (%) |
|---|---|---|
| Below 1 | 117.62<br>(40.8) | 321<br>(78.7) |
| 1– 2 | 84.37<br>(29.2) | 60<br>(14.7) |
| 2 – 3 | 41.97<br>(14.6) | 17<br>(4.2) |
| 3– 4 | 21.19<br>(7.4) | 6<br>(1.5) |
| Above 4 | 23.21<br>(8.1) | 4<br>(1.0) |
| Total | 288.36<br>(100.0) | 408<br>(100.0) |

Source: Field survey, 2006–2007
Note: Figures in parentheses indicate the percentage of the total

The agricultural lands of the village are fragmented into very small sizes and scattered over its space, inconveniencing the implementation of modern agricultural practices (Fig. 4). The total number of plots in the village is 2430, 33.7 % of which are of below 0.04 ha in size. These plots cover 4.2 % of the village's total area. The highest proportion of their area (37.0 %) is distributed in 217 plots of above 0.28 ha in size (Table 2).

According to the field survey carried out in the village, 76.7 % of land in the village is used for agriculture and the rest comes under non-agricultural elements like settlement, grazing land, ponds, marshes, and small forest patches. Out of the total 1157 agricultural plots, 24.7 % come under the category of 0.13 – 0.16 ha in size.

Fig. 4: Distribution of fragmented plots

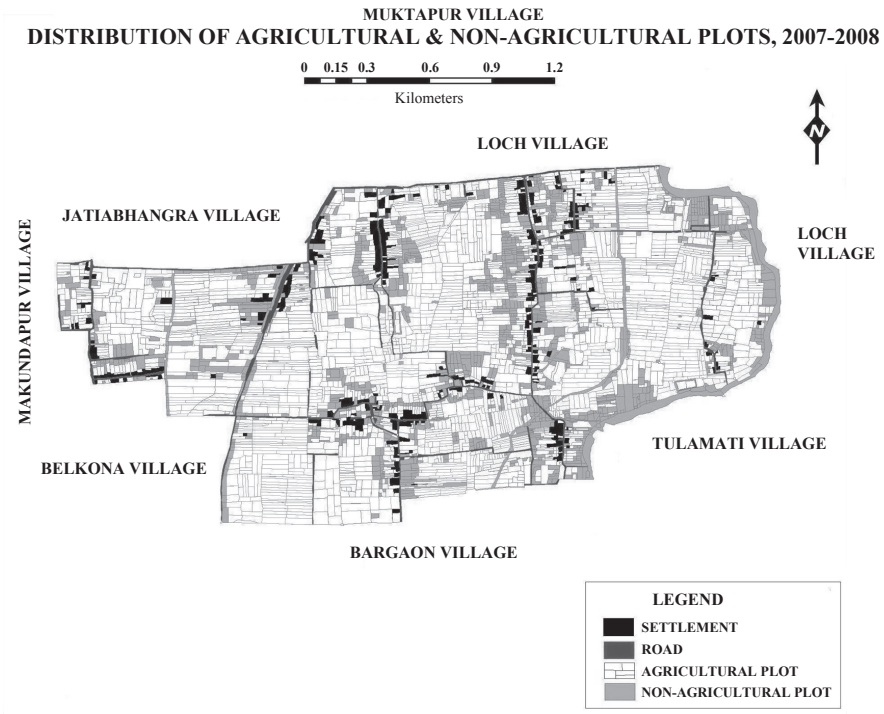



Table 2: Area under different plot size-classes

| Size class in ha | No. of plots (%) | Area under plots in ha (%) |
|---|---|---|
| Below 0.04 | 819 (33.7) | 13.07 (4.2) |
| 0.04–0.08 | 563 (23.2) | 33.15 (10.7) |
| 0.08–0.13 | 134 (5.5) | 19.79 (6.4) |
| 0.13– 0.16 | 379 (15.6) | 52.84 (17.1) |
| 0.16–0.20 | 105 (4.3) | 19.97 (6.5) |

| Size class in ha | No. of plots (%) | Area under plots in ha (%) |
|---|---|---|
| 0.20–0.24 | 20<br>(0.8) | 4.22<br>(1.4) |
| 0.24–0.28 | 193<br>(7.9) | 51.0<br>(16.8) |
| Above 0.28 | 217<br>(8.9) | 114.4<br>(37.0) |
| Total | 2430<br>(100.0) | 309.43<br>(100.0) |

Source: Field survey, 2006–2007
Note: Figures in parentheses indicate the percentage of the total

## 7. Croplands

*Kharif* (summer) and *rabi* (winter) are considered to be the two main cropping seasons by the villagers. It is seen that the *kharif* is the most important cropping season, when more than 75 % of the net area sown remains under rice. A statistical statement on the change of area under different crops is presented in Table 3. It reveals that out of the gross cropped area nearly 76.6 % is devoted to cereal crops, while only 23.4 % is used for non-grain crops such as sugarcane, potatoes, vegetables, oilseeds, tree crops etc. It is also clear from the table that the percentage of area under crops like sugarcane, vegetables, oilseeds, jute, black gram, coriander, lentils etc. has been gradually declining. The areas under mustard and rapeseeds, black gram, lentils, coriander, *kala* (*khechari*- a type of pulse), sugarcane, and jute have registered a percentage change of -60.0, -78.9, -61.5, -75.1, -89.3, -95.1 and -82.9 respectively during the period 1985–2006. It also reveals that there has been a gradual decrease of the gross cropped area (-14.2 %) during the two decades under consideration. Moreover, the net area sown has declined by 2.2 % during the period mainly due to the expansion of settlements and other infrastructural facilities.

Table 3: Area (in ha) under different crops in Muktapur village, 1985–2006

| Year<br>Crops, etc | 1985 | 1990 | 1995 | 2000 | 2006 | Change (in %) during 1985 – 2006 |
|---|---|---|---|---|---|---|
| Rice | 196.30<br>(68.2) | 194.7<br>(67.6) | 196.52<br>(70.2) | 192.55<br>(75.5) | 184.87<br>(74.9) | - 5.7 |
| Mustard &<br>Rapeseeds | 16.73<br>(5.8) | 14.85<br>(5.2) | 17.4<br>(6.2) | 6.02<br>(2.4) | 6.69<br>(2.6) | -60.0 |

| Year<br>Crops, etc | 1985 | 1990 | 1995 | 2000 | 2006 | Change (in %) during 1985 – 2006 |
|---|---|---|---|---|---|---|
| Black gram | 5.35<br>(1.9) | 6.69<br>(2.3) | 3.39<br>(1.2) | 1.94<br>(0.8) | 1.13<br>(0.4) | -78.9 |
| Lentils | 5.89<br>(2.0) | 5.35<br>(1.9) | 3.88<br>(1.4) | 2.67<br>(1.0) | 2.27<br>(0.9) | -61.5 |
| Coriander | 5.35<br>(1.9) | 6.02<br>(2.1) | 4.28<br>(1.5) | 2.40<br>(0.9) | 1.33<br>(0.5) | -75.1 |
| *Kala* | 7.36<br>(2.6) | 7.36<br>(2.6) | 2.94<br>(1.1) | 1.07<br>(0.4) | 0.79<br>(0.3) | -89.3 |
| Tree crops | 38.15<br>(13.3) | 38.68<br>(13.4) | 39.02<br>(13.9) | 41.49<br>(16.3) | 42.8<br>(16.7) | +12.2 |
| Sugarcane | 2.67<br>(0.9) | 1.67<br>(0.6) | 1.40<br>(0.5) | 0.46<br>(0.2) | 0.13<br>(0.1) | -95.1 |
| Potatoes | 4.01<br>(1.4) | 4.15<br>(1.4) | 5.35<br>(1.9) | 2.67<br>(1.1) | 3.59<br>(1.5) | -10.5 |
| Vegetables | 2.67<br>(0.9) | 4.75<br>(1.7) | 4.01<br>(1.4) | 2.87<br>(1.1) | 2.12<br>(0.9) | -20.6 |
| Jute | 1.87<br>(0.7) | 2.21<br>(0.8) | 0.93<br>(0.3) | 0.60<br>(0.2) | 0.32<br>(0.1) | -82.9 |
| Others | 1.33<br>(0.5) | 1.4<br>(0.5) | 0.73<br>(0.3) | 0.33<br>(0.1) | 0.67<br>(0.3) | -46.6 |
| Gross cropped Area | 287.41<br>(100.0) | 287.41<br>(100.0) | 279.85<br>(100.0) | 255.07<br>(100.0) | 246.71<br>(100.0) | -14.2 |
| Net sown area | 156.40 | 156.09 | 157.69 | 155.06 | 152.99 | -2.2 |
| Cropping intensity | 183.76 | 184.40 | 177.47 | 164.49 | 161.25 | -12.3 |

Source: Computed on the basis of unpublished data obtained from Revenue Office, Goreswar, Assam and the field survey conducted during 2006–2007.
Note: Figures in parentheses indicate the percentage of the gross cropped area.

The most important point to be noted is that, unlike in the past, the present generation of farmers, who have the opportunity to engage in off-farm activities, are not interested in practicing multiple cropping. Among the present generation, there are only a few who make agriculture their main occupation or their prime source of livelihood. Moreover, the low returns from agriculture, lower social status of the farming community, absence of modern irrigation facilities and gradual changes in dietary habits are seen to be responsible for the present decline in the cropping intensity.

The above table reveals that the level of cropping intensity was 183.76 % in 1985, which came

down to 161.25 % in 2006 registering a decline of 12.3 % during that period. This indicates a decline in the practice of multiple cropping in the village.

## 8. Conclusion

The foregoing discussion presents a picture of the land use practices followed by the people in a typical Assamese village of the Brahmaputra floodplain, Assam. The classification of land based on the knowledge and perception of the local environment bears great significance in so far as the sustainable development of land use in the area is concerned. The study has explored the linkages between the environmental setting and the pattern of landholding and land use in the area. As the land classification and agricultural practices are traditionally evolved by the people, these are seen to be environment-friendly and culturally acceptable and, therefore, these should get adequate attention in planning for the sustainable development of village land-use. This study is thought to be highly relevant and useful in the context of the local realities and thus provides the necessary basis for further improvement of the land-use scenario in the Brahmaputra floodplain, Assam.

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## Note

1) 1 hectare = 7 *bigha* 2 *katha* 6 *lecha*; 1 *bigha* = 5 *katha*; 1 *katha* = 20 *lecha*.

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