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THE TERRAIN TRADITION AND CROPPING PATTERN PRACTICES: MAPPING THE CHANGES ACROSS THE FARMING SYSTEMS IN MEGHALAYA PLATEAU

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Introduction

In less developed countries, the process of agricultural commercialization is more rapid in the last few decades. The universal factors such as globalization, modernization and liberalization and a host of other local factors are responsible for the changes (Trébuil et al., 2006). The impacts of these changes are well documented globally across the scholars of different disciplines. It includes the impact on local land use/cover (von Braun et al. 1986; Pingali, 2001, Behera et al, 2016), food security (Kennedy, 1994, Maxwell, 1996, Carletto et al, 2017), environment including biodiversity (Brown, 1990, Ramakrishnan, 1993, Ilybery, 2012; Maxwell et al. 1989), land ownership (Tiwari et al, 2008), gender relation (Nongbri, 2008), and other economic and societal impacts (Rubhara et al., 2020). Further, studies on land suitability for different crops (Kilic et al., 2005; Taghizadeh-Mehrjardi et al., 2020), factors responsible for cropland allocation (Adjimoti, 2018) and impacts of physiography on land use/cover (Ford, 2000) have also attracted many scholars within and outside the discipline of geography. However, the impact of agricultural commercialization on traditional land allocation practices is one of the areas need further understanding and assessment. Thus, the paper highlights the recent alternation in local land uses with reference to different terrain types in different farming systems.

Study area and data collection

Cropping patterns of an area refers to spatial arrangement of crops and fallow land over a same

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period of time. In subsistence economy, cropping patterns are generally guided by household requirements, socioeconomic-cultural milieu and agroclimatic conditions prevails in the area. All these factors are significantly varying in hilly area such as the Meghalaya plateau. For example, the land ownership is significantly differed from one village to other because it is shaped by customary laws and practices of the respective village unlike a homogenous land laws in rest of India. Similarly, the agroclimatic conditions also vary sharply within a short distance because of difference in elevation and consequently the other parameters of agroclimatic parameters also differ. There are a variety of relief features even with in a single village boundary that includes steep hills, valleys, gorges, inter montane plains, ridges and so also the socio-cultural diversity. These physical and socio-cultural diversities are remained as the crucial bases for sharp regional differentiation. Thus, traditionally the farmers of Meghalaya use the different types of terrain to grow different crops based on local agroclimatic conditions. But there are some changes in the land utilization due to ongoing agricultural commercialization. In this study, seven different farming systems were (Table 1) selected to know the recent changes and its implications for the village communities. Further, the seven study sites are classified into three categories based on levels of commercialization (Pingali et al., 1995). The study sites are spread across the state of Meghalaya (Fig. 1).

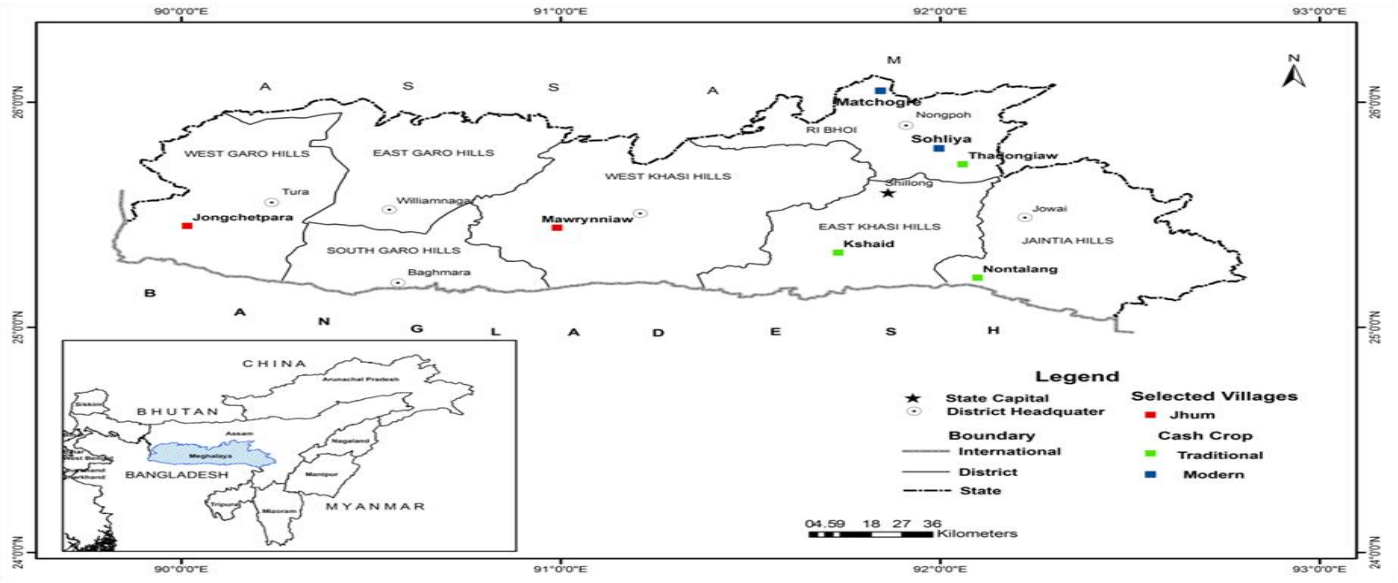

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Fig. 1: Location of the study sites, Meghalaya

Table 1: Distribution of study sites in Meghalaya

Farming systems		Study site	District
Subsistence system	*Jhum* I	Mawrynniaw	West Khasi Hills
	Jhum II	Jongchetpara	West Garo Hills
Traditional cash crop	Ginger	Thadnongiaw	Ri Bhoi
	Broom	Kshaid	East Kashi Hills
	Areca nut	Nongtalang	Jaintia Hills
Modern cash crop	Rubber	Machokgre	Ri Bhoi
	Tea & strawberry	Sohliya-Mawthoh	Ri Bhoi

Agricultural land allocation pattern has been observed through 'transect walks'[i]guided by local farmers) across agricultural fields with famers of the concerned village as a part of the participatory rural appraisal technique adopted under the peculiar circumstances. The technique helped in assessing the aggregate patterns of land allocation for different types of crops at village level. Some of the observations have been presented through photographs taken during these transect walks. The transect walk method was profitably used to identify and explain the relationship between topography and cultivation. However, this has its own limitation as it merely depicted a highly generalized picture of cropping pattern for the village. However, the methods are being increasingly used instead of questionnaires to generate valid and reliable quantitative and qualitative data at the village level (Chambers, 1994).

Terrain types and cropping patterns in different farming system

Jhum system

Traditional *jhum* farming system uses only hilly lands for growing a range of subsistence crops (Fig 3a, b). *Jhuming* activities are limited to hill slopes and hilly which are also one of the pre-requisites for this type of farming in the region. Valleys are mostly narrow and are not used for agricultural activities in *jhum* areas though with some exceptions. Further, valleys are

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mostly shadow areas that receives less sunlight and are covered by forest and natural streams used for the purpose of drinking water. However, some changes have been noticed in the *jhum* II village (Table 2). Here, a few valleys are being recently being used for wet paddy cultivation. This is may be because the *jhum* II village is located in Garo hills where valleys are relatively wider and deposits a narrow belt fresh alluvium because the elevation is relatively less compared to the Khasi hills. The introduction of wet paddy in valleys is a sign of the growing pressure even in the subsistence farming systems.

Table 2: Cropping patterns and terrain type across farming system

Farming system		**Cropping pattern**		**Remarks if any**
		Hill slopes	**Valleys**	
Subsistence	*Jhum* I	*Jhum* cultivation	-	-
	Jhum II	*Jhum* cultivation	Settled paddy (subsistence)	A few households have introduced recently
Traditional Cash crop	Broom	Broom (cash crop)	Bamboo (cash crop)	-
	Areca nut	Areca nut (cash crop)	-	Subsistence crops grown as an inter-cropping wherever suitable
	Ginger	Ginger (cash crop)	Settled paddy (subsistence)	Limited paddy is introduced recently
Modern Cash crop	Rubber	Rubber (cash crop)	Rubber (cash crop)	-
	Strawberry & Tea	Tea (cash crop)	Strawberry (cash crop)	-

Source: field work by the author

Traditional cash crop system

Broadly speaking, there is some arbitrary crop boundary between subsistence and cash crops in traditional cash crop-based farming systems. The best example is the village growing broom grass where the upper and lower part (including the valleys) of the hill slopes are used

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for broom grass and bamboo plantation respectively (Fig. 3c). But, villagers of Kshaid grow limited tuber and leafy vegetables (during monsoon) wherever suitable (Fig, 4f). Similarly, the other two traditional cash crop villages (i.e., ginger and areca nut plantation) have also some rooms for food crop cultivation. Ginger based farming system grows both subsistence crop (cereals and vegetable) and cash crop (ginger) in valleys and hills respectively (Fig. 4c, d). Fertile valleys have been left for subsistence crop cultivation and cash crop (i.e., ginger) is cultivated on hills in Thardnongiaw village. It means that the hills have been used for cash crop while the valleys are used for subsistence crops. Likewise, in areca nut area where limited edibles have also been planted side by side within the areca nut plantation, is limited to colocasia and leafy vegetables (Fig. 4e). Tuber crop and leafy vegetables are grown as inter-cropping wherever the land is suitable both in areca nut and broom grass cultivated area. Villages growing traditional commercial crops have a good combination of subsistence and cash crops which ensured food for subsistence and cash for non-subsistence use.

Modern cash crop system

On the contrary, in the modern cash crop areas, both the hills and the fertile valleys have been used only for cash crop production. An example of this pattern is found in Machokgre village where both the hills and the valleys are used for rubber (Fig. 4a, b, Fig. 3f). Sohliya-Mawthoh village is another example of this type where tea is planted on the hills and strawberry on the fertile valleys (Fig. 3g). Both tea and strawberry are cash crops. However, paddy is cultivated in the valleys in rotation with strawberry. But recently commercial vegetable cultivation is gradually replacing paddy from the valleys. Thus, commercialization has almost replaced the traditional food crop cultivation in modern cash crops in rubber plantation areas.

Land allocation for different crops is made based on factors such as elevation, slope and sometimes through inter cropping method particularly in traditional cash cropping areas. Often inter-cropping method is common in areca nut plantation areas too (Fig. 4e). A few suitable patches of land are left for cultivation of subsistence crops in villages growing broom grass on

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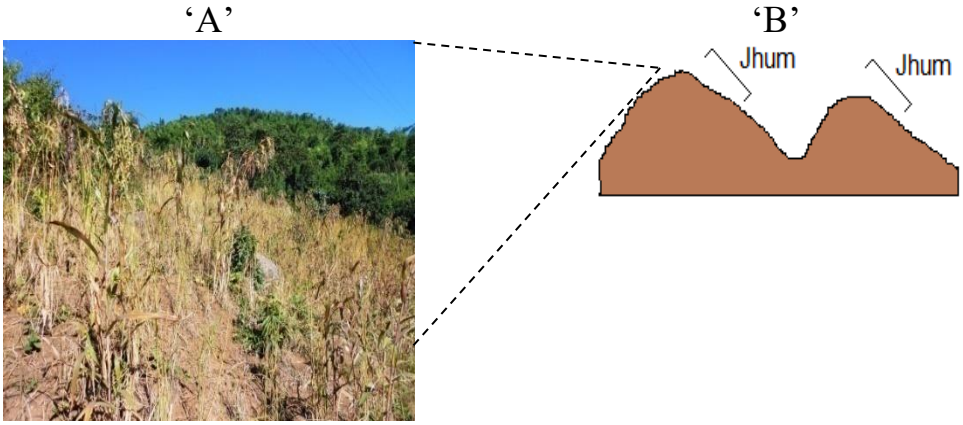
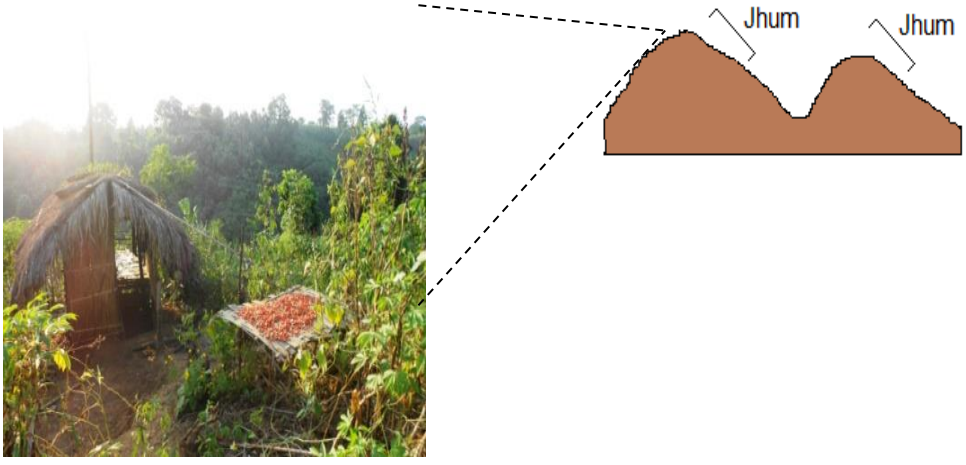
a commercial basis. Mostly traditional tuber crops, leafy vegetables and a few green vegetables are grown both in areca nut and broom grass cultivating villages (Fig. 4c, e, d). In broom grass cultivated areas as well as areca nut and rubber plantation areas, land previously used for food crops are presently being used for cash crop production. However, in ginger and tea-strawberry farming systems this is done with some adjustments, addition and intensification of land use. People in these two areas have started using narrow valleys for paddy cultivation as an addition to traditional *jhum* cultivation. There is no competition between food crop and cash crop as such in ginger area because it has both valley and hilly terrains. Hills are used for ginger while the valley land is used for paddy (Fig. 3e). Similarly, in tea and strawberry farming system, the hills have been used permanently for tea cultivation while the valleys are used for double cropping i.e., paddy in summer and vegetable and strawberry in winter.



a) *Jhum* is the predominant land use on hills, Mawrynniaw



b) *Jhum* is the dominant land use on the hills, Jongchetpara

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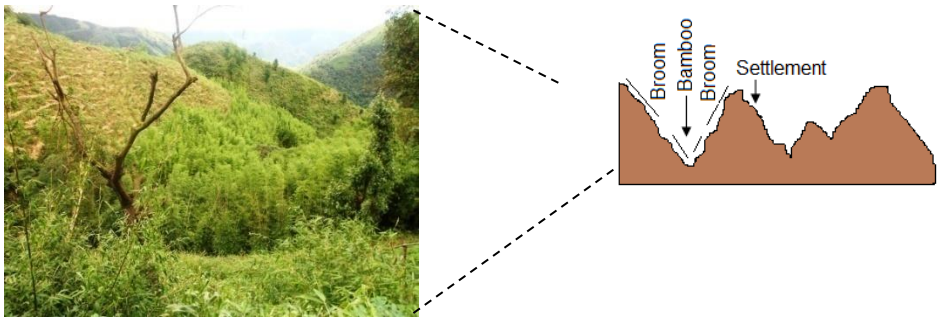
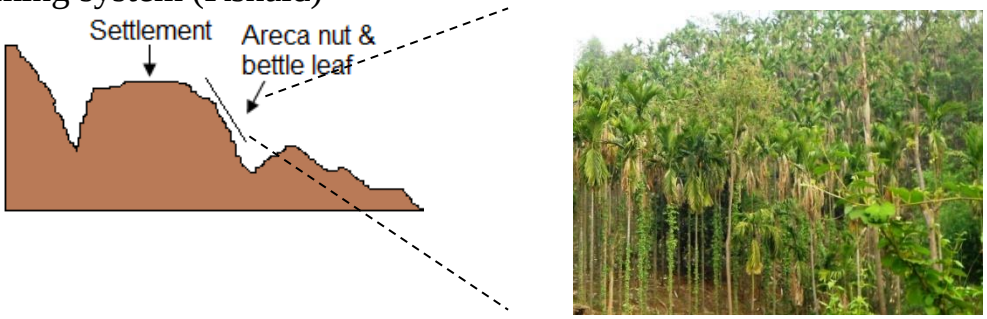
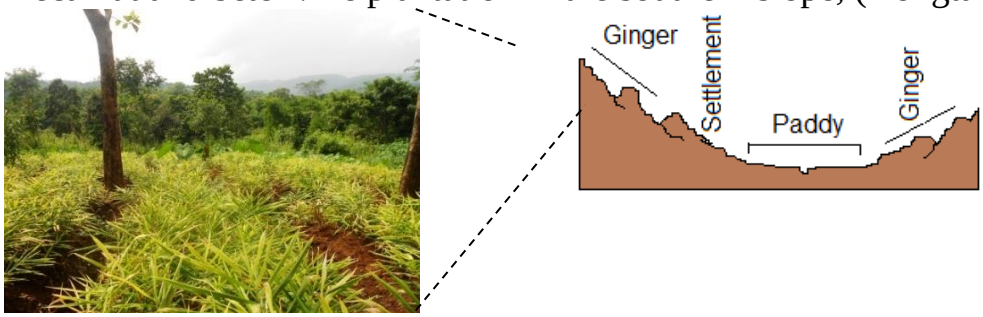


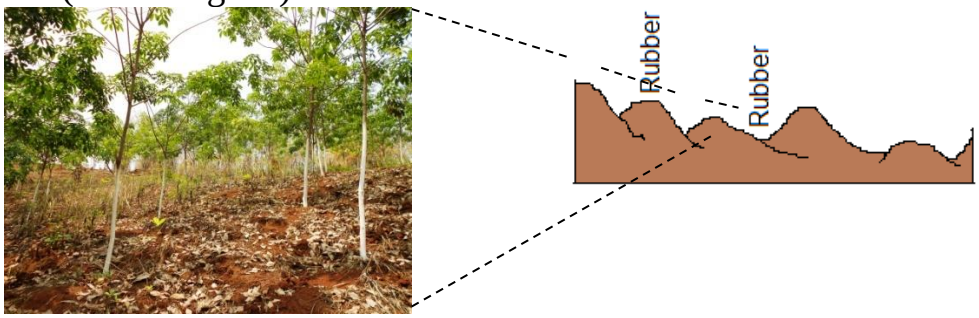
c) Broom and bamboo plantation on the hills and valley in broom farming system (Kshaid)



d) Areca nut and betel vine plantation in the southern slope, (Nongtalang)



e) Ginger cultivation in hills and paddy in valley in ginger farming system (Thadnongiaw)



f) Rubber plantation on undulating hills in rubber plantation (Machokgre)

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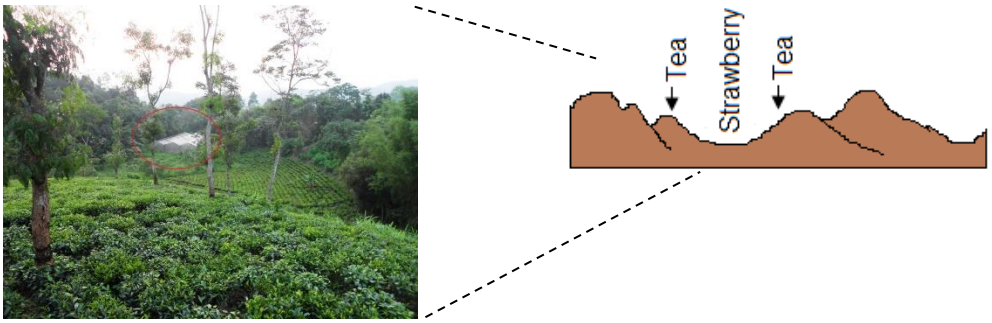

g) Tea & Strawberry plantation in hills and valley respectively in Sohliya-Mawthoh village

Fig. 3: Land allocation of selected farming systems of Meghalaya: Cropping site distribution

Note: The schematic presentations of topography are not to the scale

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Fig. 4: Land allocation patterns in cash and subsistence crop-based villages: (a, b) Both hills and valleys have been used for rubber plantation in Machokgre; (c) ginger and paddy grown in upland and low land respectively in Thadnongiaw village; (d) valleys and lower hills used for growing vegetable and tuber crops in Thadnongiaw village; (e) Colocasia surrounded by areca nut and betel leaf plantation in Nongtalang village; (f) growing of leafy vegetable in Kshaid village.

Discussions and Conclusions

The people practicing *jhum* cultivation, planting areca nut and growing broom grasses largely depend on the hilly land for their livelihoods. Similarly, the people of rubber farming system also have access to hilly lands for rubber plantation. On the contrary, both ginger and tea & strawberry based villages have access to both hilly and valley lands. It means households of these two villages have choice for wet paddy cultivation as well as cash crop plantation in the hilly lands. Thus, households with access to hilly land either practice *jhum* or go for cash crops whereas households having access to both valley and hilly land can cultivate wet paddy in valleys and cash crops in hilly lands.

In the *jhum* farming system, hill slopes are used for growing food crops and valleys are under forest cover that enhances biodiversity conservation and restricts soil erosion. On the contrary, both the hills and valleys are being used for growing crops in cash crop regime. This shows the growing demand for land in this regime. Further, there are some contestations between subsistence and cash crop under cash crop has also noticed in the regime. That is maximum in modern cash crop-based farming systems compared to the traditional cash crop-based farming system. In rubber farming system, both hills and valleys are being used for rubber plantations and in another modern cash crop-based farming systems grows tea in the slopes and strawberry in the valleys, for instance. This indicates the farmer's attitude towards profit maximization by using available resources particularly in the modern cash crop regime. Thus, adopting profit maximization as only goal may hamper the local food system and ecology adversely. These changes in the terrain tradition of local communities may lead to several implications for household food security, conservation of forest and biodiversity and local land ownership

patterns.

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Foot note

[i] Transect walks is a developed and tested methods of PRA, for details see Chambers (Chambers, 1994: 1437).