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Traditional agricultural practices in Meghalaya, North East India

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The paper deals with traditional farming systems practiced by indigenous communities of Meghalaya. Majority of tribal people (*ca*. 83 per cent) in the state is engaged in agriculture. The shifting cultivation and terrace (bun) agriculture are two major farming systems, prevalent in Meghalaya. Tree based farming practices are also prevalent in the state. The crops are grown in association with tree species like alder, *Aquilaria*, areca nut, coconut, bamboo, *Khasi* pine, etc. Due to undulating topography and hilly terrain, the farmers predominantly use bamboo drip irrigation practice. The harvesting of crops adds a new dimension towards improvement of soil fertility. The farmers pick up ear heads of crops only, other parts of plant are left on cultivated land. The farmers store grains in structures, made of soil and plant materials. The seed storage structures are traditional and resistant to insects.

Keywords: Bamboo drip irrigation, Bun agriculture, Indigenous agricultural practices, Shifting cultivation, Traditional agriculture system, Traditional storage system, Terrace cultivation

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Traditional agriculture is often considered a step between the local *hunt-and-gather* practice, which provides communities with subsistence levels of food, and the practices of modern agriculture, used for mass-production of food for global distribution. This traditional agriculture practice develops a balance between meeting our present needs, conserving natural resources, and protecting the environment for the benefit of future generations. Traditional agricultural approaches are not practical for mass food production, but accounts for a substantial amount of local food production in the developing world[1].

In recent years, documenting the traditional wisdom has gained significant attention world over, because of its importance in developing a high potential environment and sustainable management. Identification and utilization of such indigenous knowledge from the elderly people of rural and tribals will surely bridge the gap between the current science and age-old practices[2]. Indigenous knowledge linked with the manipulation and use of natural resources in various ways, forms the basis for their link with nature, and the varied levels refinement depend on the level at which the society finds itself in the social evolutionary basis[3-6].

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Meghalaya (25.47–26.10N latitude and 89.45–92.47 E longitude) is one of the most picturesque states of India (Fig.1), offering a spectrum of sylvan surroundings, rich cultural heritage and luxurious vegetation comprising of a large variety of flora and fauna. Meghalaya is one of the seven sister states of the North-eastern region, bounded by Assam on the North and East, and on the west partly by Assam and Bangladesh. Bangladesh forms the southern boundary of this state. Meghalaya is divided into seven districts, *Jaintia* hills, East *Khasi* hills, West *Khasi* hills, *Ri-bhoi*, East *Garo* hills, West *Garo* hills and South *Garo* hills. It is among the wettest places on earth and is the home of an extraordinary diversity of people that includes the *Khasi*, *Jaintia* and *Garo* tribes.

Meghalaya experiences two distinct seasons, i.e. winter and monsoon, and is characterized by a cool climate throughout the year. The village of Mawsynram (about 16 km West of Cherrapunji) in the southern slopes of *Khasi* hills district receives the heaviest rainfall (11690 mm) in the world[7,8]. Numerous rivers flow through Meghalaya although none of them are navigable, due to steep slope, rocky beds followed by strong water currents.

Predominant tribal populations, the original inhabitants of this state are *Khasis*, *Jaintias and Garos. Khasis* and *Jaintias* trace their ancestry to the

Mongolian race, while the *Garos* belong to the Tibeto-Burman race. Their cultural traits and ethnic origins remain distinctive, mainly due to their geographical isolation. The *Khasi* language spoken here is believed to be one of the few surviving dialects of the *Mon-Khmer* family of languages in India[9, 10].

Present status of agriculture

Agriculture is the main occupation of the people of Meghalaya. About 83 % of the total population of state depends on agriculture for their livelihood. However, agricultural land is accounted as only 48 % of the total geographical area of the state. The state offers scope for cultivation of a wide variety of agricultural crops because of highly diversified topography, altitude and climatic conditions. Rice (*Oryza sativa* Linn.) and maize (*Zea mays* Linn.) are the major food crops. Important fruits grown are orange (*Citrus reticulata* Blanco), pineapple (*Ananas comosus* Merrill), lemon (*Citrus limon* Burm. f.), guava (*Psidium guajava* Linn.), jack fruit (*Artocarpus heterophyllus* Lam.) and bananas (*Musa* sp.). Potato (*Solanum tuberosum* Linn.), jute (*Hibiscus cannabinus* Linn.), cotton (*Gossypium* sp.), arecanut (*Areca catechu* Linn.), ginger (*Zingiber officinale* Rosc.), turmeric (*Curcuma domestica* Valeton), betel leaf (*Piper betle* Linn.) and black pepper (*Piper nigrum* Linn.) are the chief commercial crops. *Jhum* or the shifting cultivation and Terrace cultivation are predominant in the state, bringing land under permanent cultivation in later case[11].

Cultivation practices

The ethnic communities of Meghalaya follow two major types of agricultural practices such as shifting cultivation or slash and burn agriculture, and terrace or bun cultivation. Shifting cultivation is practiced in and around forests, and terrace cropping is practiced in valleys and foothills, and inside plantation forests.

These traditional systems of cultivation practices are well adapted to the environmental conditions and the traditional knowledge of indigenous communities growing cereals and other agricultural crops have enabled them to maintain an ecological balance. Enormous increases in human population have led to massive coverage of land under shifting cultivation[12]. Besides shifting cultivation and bun agriculture, there are some other potential indigenous farming systems in northeast India developed by the tribal farmers using their ingenuity and skill. These techniques and systems have a sustainable agriculture base and are practiced since centuries in some isolated pockets of Meghalaya and other northeastern states. These farming systems make use of locally available resources and there is need of an in-depth study to know the secrets of their success.

Shifting cultivation

Shifting cultivation or slash and burn agriculture (Fig. 1) is the most prevalent form of agricultural practice of the ethnic people and is commonly called *Jhum* or *Swidden* cultivation, which is one of the most ancient systems of farming believed to have originated in the Neolithic period around 7000 B C[13]. This system is a primitive cultivation technique and is transition between food gathering and hunting to food production. The system of farming is still in vogue in Meghalaya as well as whole northeast Himalayan region[14]. About 350,000 people practice shifting cultivation on about 4,160 km² of unsurveyed land. Shifting cultivation is a very wide term covering a number of very different forms of land use, its essential feature beings that the land is cleared and agricultural crops are grown for a limited period, which may range from one to over ten years, after which the cultivation is moved to a new site. The cultivators may or may not intend to return to the old site after the fertility of the soil has recovered[15, 16].

The practice of shifting cultivation is short and has a variable fallow period. In general, hill people who live in tropical region practice shifting cultivation. After a piece of land is selected, trees or bushes are cut down partially or fully, left to dry and then burnt *in situ*. In the cleared land, seeds of crops are dibbled into holes or broadcast, without using ploughs or animal power (Fig. 2). When the crop yield begins to decrease after some years, the cultivator moves to a new patch of forest to repeat the process, and allows the abandoned land to recuperate. After a period varying from 2-20 yrs, they return to the same land for cultivation[17]. At present the duration of the fallow cycle has been reduced to 3 – 5 yrs in most of the northeastern states of India, this may be due to overwhelming pressure on land[18 – 22]. Shifting cultivation is the most primitive form of cultivation of agricultural crops. This practice has continued for thousand of years and stood the test of time. This practice has an in-built mechanism of sustenance and conservation. However, due to anthropogenic pressure on land use for shifting cultivation adversely affecting eco-restoration and ecological process of forests. This

leads to degradation of land causing soil erosion and finally converting forests into wastelands[23]. Shifting cultivation is mostly practiced in community forests of Meghalaya[24]. In the state, the village council commonly called *Dorbar Shnong* owns the land, and allots the forestland for cultivation. The main interest of the cultivators is to produce almost everything that they need to fulfill their requirement.

The cultivation cycle in shifting cultivation is very important and varies considerably. The longer cycle is better for restoring soil fertility and it also stops soil erosion. At present *Jhum* cycle has reduced to 4-6 yrs, inadequate to provide recuperation to the site and repair the ecological damage[25]. Shifting cultivation on short cycles decreases soil productivity due to excessive loss of soil nutrients and imbalance in the socio-economic set up of the village communities. Earlier, a cycle of fifty years or more was adequate to maintain ecological balance. The shifting cultivation practice has socio-economic relevance for production of agricultural crops in Meghalaya. There is no other alternative means of livelihood for the ethnic peoples of the area because of their poor economic condition and this compels them to still practice this system and they are bound to reduce *Jhum* cycle for their need. The people who follow the *Jhum* cultivation are called *Jhummias*, the district wise *Jhummia* families of Meghalaya are listed (Table 1)[24].

Shifting cultivation practices cause tremendous loss of soil nutrients[26] and degradation of natural vegetation [27, 28], whereas, this loss can be minimized to almost negligible level by managing the watersheds[29 – 33]. The intensity of shifting cultivation practices leads to low rainfall due to destruction of habitat reduces biological diversity and extinction of previously undiscovered indigenous species too.

Shifting cultivation causes large-scale damage to the forests and has resulted in deforestation and denudation of hill slopes, exposure of rocks due to soil erosion, heavy silt loading on riverbeds and drying of perennial water resources[34]. Short *Jhum* cycle makes the land unsuitable for agriculture and leads to considerable loss of soil nutrients through run-off and leaching[35 – 45].

Terrace or Bun cultivation

Bun cultivation on hill slopes and valleys is a settled cultivation system being practiced for last three decades, to provide improved production system, to conserve soil moisture and also to prevent land degradation and soil erosion[24]. In this system, bench terraces are constructed on hill slopes running across the slopes. The space between two buns is leveled using cut and hill method. The vertical interval between the terraces is not usually more than one metre. Such measures help to prevent soil erosion and retaining maximum rainwater within the slopes and safely disposing off the excess runoff from the slopes to the foothills[46 – 52].

Agricultural cropping practices

Meghalaya produces a variety of agricultural crops such as food grains, commercial crops, horticultural crops, etc. [53–56]. Of the total agricultural land in Meghalaya, 62% is used for food grains, 25% for cash crops, 9% for horticultural crops and the rest 4% is used for raising miscellaneous crops[57].

Table 1—District wise *Jhummia* families of Meghalaya

Name of District	Total population (Rural)	*Jhummia* families dependent on *Jhum*	*Jhummia* population dependent on *Jhum*	Percentage of the *Jhummia* population from the total rural population	Annual area under *Jhum* in Sq Km	Percentage of the total *Jhum* area from the total geographical area
East *Khasi* Hills	383027	721	3605	0.94	.20	0.23
Ri – Bhoi	179630	4351	21755	12.11	27.40	1.53
West *Khasi* Hills	260595	5374	26870	10.31	46.19	0.88
Jaintia Hills	270669	1366	6830	2.52	11.74	0.31
East *Garo* Hills	211652	13630	68150	32.20	117.15	4.50
West *Garo* Hills	457422	18086	90430	19.77	155.45	4.19
South *Garo* Hills	90462	7900	39500	43.66	67.87	3.67
Total	1853457	51428	257140	13.87	442.00	1.97

Rice (*Oryza sativa* Linn.), the most important food crop occupies about 44 % of the total agricultural land. About 40 % of rice is cultivated from the *Jhum* fields. Sung valley of the *Jaintia* Hills is considered as the fertile paddy fields of Meghalaya. Meghalaya produces three cropping seasons for rice, autumn rice, winter rice, and spring rice. Winter cropping covers 67 % of the total production. Maize (*Zea mays* Linn.) is the next important agricultural food crop of Meghalaya. It is grown in about 8 % of the cropped

area and cultivated mainly in the plains of *Garo* hills, Mairang (West *Khasi* hills), Mawphlang (West *Khasi* hills) and Laskein block of *Jaintia* hills. Wheat (*Triticum aestivum* Linn.) is confined in some pockets of the lower elevation of *Garo* hills of Meghalaya. Pulses (gram, tur and few others) are less important in the agricultural economy of the state. Pulses occupy 1.3 % of the cropped area and are confined only in some pockets of remote areas of the *Garo* hills.

Potato (*Solanum tuberosum* Linn.), the most important commercial agricultural crop, covers about 7 % of the total agricultural area of the state. It was introduced in *Khasi* hills by David Scott in the early part of the 19th century and grown mainly in the terrace fields of the high altitudes of *Khasi* hills. Oil seeds are grown mostly in the plain areas of the *Jhum* fields of *Garo* hills. Among the oil seeds, mustard (*Brassica nigra* Koch), rape (*Brassica campestris* Hook. f.), castor (*Ricinus communis* Linn.), sesamum (*Sesamum indicum* Linn.) and soyabean (*Glycine max* Merrill) are grown. Fibre crops, cotton (*Gossypium* sp.) and jute (*Hibiscus cannabinus* Linn.) are grown in the *Garo* hills. Ginger (*Zingiber officinale* Rosc.) is mainly grown in *Jaintia* hills and some pockets of *Khasi* hills. Sugarcane (*Saccharum officinarum* Linn.) is confined only in plain areas of the state and grown in *Jhum* fields.

The soils and climatic conditions are suitable for the production of horticultural crops. Pineapple (*Ananas comosus* Merrill), litchi (*Litchi chinensis* Sonn.), guava (*Psidium guajava* Linn.), mango (*Mangifera indica* Linn.), banana (*Musa paradisiaca* Linn.) and jackfruit (*Artocarpus heterophyllus* Lam) are grown at low altitude, and orange (*Citrus reticulata* Blanco), plums (*Prunus domestica* Linn.), peaches (*Prunus persica* Batsch) and pears (*Pyrus communis* Linn.) are the major horticultural crops of high altitude.

Tapioca (*Manihot esculenta* Crants) is one of the subsidiary food crops and is grown in western part of *Khasi* hills. Turmeric (*Curcuma domestica* Valeton) is famous for its quality and has a great demand. It is widely grown in the *Jhum* and Terrace field of *Jaintia* hills[57].

Irrigation practices

Irrigation is one of the most important factors for assured crop production. It permits better utilization of all production factors and thus leads to increase yield per unit of land. Irrigation practices in agriculture provide suitable moisture environment to the crops to obtain optimum and sustained crop yields with maximum economy in the use of water as input. An irrigation practice begins at the time of rain and continues until it is efficiently used by the growing agricultural crops. Thus, it encompasses soil management and cropping pattern according to the rhythm of the plant.

The state receives rainfall throughout the year, so the irrigation is required only in the areas where soil is having poor water holding capacity and in undulating valleys. In such places, farmers mostly practice bamboo drip irrigation and continuous flow irrigation.

Bamboo drip irrigation practice

Bamboo drip irrigation is an excellent example of man's skill and ingenuity and glaring example in the evolution of indigenous agricultural systems[58]. It is widely adopted by the farmers in *Jaintia* hills of Meghalaya, where hill slopes are quite steep with low soil depth and having boulder soil. The bamboo drip irrigation system is a practiced using locally available bamboo species.

In this system, water is carried out with the help of different form of bamboo culms and further distributed into different bamboo water channels for irrigation of cropland (Figs.3-6)[59]. Bamboo drip irrigation practice prevents leakage and loss of water on the way. The indigenous farmers of the *Jaintia* hills have the potentiality to layout the bamboo networks with proficiency so that the sites remain productive. Plantation crops such as areca nut (*Areca catechu* Linn.), betel vines (*Piper betle* Linn.) and black pepper (*Piper nigrum* Linn.) are irrigated following this system[60].

Since the water is carried through bamboo culms in the indigenous farming areas, the system indirectly helps the forest areas. No cutting of trees and shrubs is required to clear the land for marking channels through the forest areas on hills. The farmers go for settled cultivation when bamboo drip irrigation practice is followed and shifting cultivation is reduced. The bamboo drip irrigation practice helps in conserving the environment and preserving the prestigious natural resources in the hilly terrain of Meghalaya[16].

Bench terrace Irrigation practice

This is the common irrigation practice in Meghalaya as well as throughout the North East Himalayan region. The hill streams are tapped as soon

as they emerge from the forests and the water is channeled to accommodate a series of terraces. In this system, water flows continuously from the upper to lower terraces (Fig. 7) [24]. This method of irrigation practice is widely used for non-fertile land to be utilized for raising rice crops. Stone and gunny bags help in the maintenance of terraces and stop soil erosion problems. Submergence of water up to 5 - 8 cm is maintained continuously throughout the year. After harvesting, ear head of rice is plucked and the straw is left as such in the field, which then gets rotted and helps improving soil fertility. Mostly all farm operation is done manually; bullock power is used for field preparations only in some pockets of Meghalaya[61 – 63].

Bench terracing is an important conservation measure for valleys and hill slopes. This is used predominantly for rice cultivation. In bench terrace agriculture practice under rainfed condition, topo-sequence crops such as maize, bean and potato are planted on upper slopes and crop requiring more water such as rice and jute are grown on lower slopes. The excess runoff from upper portion of slope is nutrient rich, utilized for the lower hill crops.

Traditional tree based farming practices

Tree based farming practice has a long tradition among indigenous people of Meghalaya, where trees are integrated extensively in the crop production practice according to the agro-climatic conditions. A variety of indigenous and cultivated crops are grown with edible and timber value trees[64]. Tree species are raised for food, fiber, medicine and other minor agricultural produce. The land is collectively used for vegetables, fruits, forest tree species, plantation crops and agricultural crops. Traditional tree based farming practice help in conserving and improving the field, optimizing the combined production of forest and agricultural crops[56].

Priorities of multipurpose tree and shrubs in traditional farming practices have been ascertained based on growth, uses and economic returns.[65] In this system, mostly edible and timber yielding plants are preferred and there is a symbiotic relationship among the species grown. Some of the indigenous tree based agricultural farming practices of Meghalaya are as follows:

Alder based farming practice

Alder (*Alnus nepalensis* D.Don) based farming is common practice among indigenous communities of Meghalaya. This multipurpose tree species is grown together with ginger (*Zingiber officinale* Rosc.), maize (*Zea mays* Linn.), potato (*Solanum tuberosum* Linn.), sweet potato (*Ipomea batatus* Lam.) and turmeric (*Curcuma domestica* Valeton) [66].

Aquilaria based farming practice

Areca nut (*Areca catechu*), bamboo (*Bambusa* sp.), banana (*Musa paradisiaca* Linn.), black pepper (*Piper nigrum* Linn.) and canes (*Calamus* sp.) are cultivated with *Aquilaria* (*Aquilaria agallocha* Roxb.). It is common practice in all parts of Meghalaya[67].

Arecanut – coconut based farming practice

Areca nut (*Areca catechu* Linn.) and Coconut (*Cocos nucifera* Linn.) are considered as the economically important tree species of Indian Peninsula. This homestead farming system is practiced in the foothills of Meghalaya. Black pepper (*Piper nigrum* Linn.), ginger (*Zingiber officinale* Rosc.), maize (*Zea mays* Linn.) and turmeric (*Curcuma domestica* Valeton) are cultivated in the inter spaces[67].

Bamboo based farming practice

The species of bamboo (*Bambusa* sp.) are the major non-timber forest product (NTFP) of Meghalaya used for construction, irrigation, pulp manufacture and other purposes of indigenous people. Young bamboo shoots are edible and most commonly used by the tribals of Meghalaya[68–70]. Common rhizome and tuber crop species are also grown in this system of farming[67].

Bamboo – arecanut - betel based farming practice

This is a prominent practice in some isolated pockets of Meghalaya. Arecanut (*Areca catechu* Linn.), bamboo species (*Bambusa tulda* Roxb., *Bambusa pallida* Munro, *Bambusa balcooa* Roxb., *Dendrocalamus hamiltonii* Nees & Arn., *Neohouzeaua dulloa* A. Camus, *Melocana baccifera* Kurz.) and *Piper betel* Linn. are cultivated together in this system[67].

Homestead farming practice

Mostly edible plants such as *Artocarpus heterophyllus* Lam., *Artocarpus lakoocha* Roxb., *Elaeocarpus reticulata* Linn., *Emblica officinalis* Gaertn., *Garcinia indica* Choisy, *Garcinia cowa* Roxb., *Litchi chinensis* Sonn., etc. are raised in homestead farming[71].

Khasi pine based farming practice

Pinus kesiya Royle ex Gordon (*Khasi* pine) having wide range of distribution in Meghalaya grows well

on dry exposed soil and dominates the broad-leaved forests. Tribals cultivate ginger (*Zingiber officinale* Rosc.), turmeric (*Curcuma domestica* Valeton), paddy (*Oryza sativa* Linn.) and vegetables under this system[67].

MPTS based farming practice

It is a common farming practice in foothills of Meghalaya. Various agricultural crops are grown in combination with MPTS (multi purpose trees and shrubs) such as *Anthocephalus cadamba* Miq., *Bombax ceiba* Linn., *Dipterocarpus retusus* Blume, *Gmelina arborea* Roxb., *Machilus bombycina* king, *Schima wallichii* Korth., *Shorea robusta* Gaertn.f., *Tectona grandia* Linn.f. and some of the bamboo species[72 – 76].

Tea based farming practice

Some timber yielding shade trees, *Aquilaria agallocha* Roxb. and *Alnus nepalensis* D. Don along with *Piper betel* Linn., *Piper nigrum* Linn. are grown with tea plantation[77 – 79].

Soil management practices

Of all gift of nature, none is more indispensable to man than soil[51, 80]. Soil is one of the most important natural resources that performs many functions essential for maintenance of ecosystem, especially forests. It serves the substrate that supporting plant growth, acts as a reservoir of many nutrients, as a filter maintains air quality through interactions with the atmosphere, as a storage and purification medium for water as it passes through the soil profile, and as a biological reaction completing the cycle of life through decomposition and recycle of organic materials[81]. The soil conservation practices in agriculture aims to maintain productivity for sustained production of crops. The term soil conservation includes the preservation and restoration of lands[51]. The soil management practices safeguard the soil against depletion by natural and anthropogenic activities[82]. In most of the agricultural fields, soil erosion is minimized through traditional methods such as by using bamboo culms, stones and gunny bags filled with soil (Fig. 8)[24].

Some non-cereal crops such as grass clover (*Trifolium repens* Linn.) and alfalfa (*(Medicago sativa)* Linn.) conserve the organic matter in the soil. Thus, growing these crops tends to conserve soil even if some minerals are carried away in the removal of crops[51, 83]. Applying green leaf and farmyard manure is the traditional method of improving the condition of the soil, in which green leaves and farmyard manure are ploughed into the soil. It helps in improving soil fertility through fixation of nitrogen using microorganisms[84 – 89].

Traditional harvesting and post harvesting practices

Harvesting of cereals in shifting cultivation is done by picking up the ear heads only, using a knife or sickle. There are about fifteen types of sickles used indigenously in the region. These vary in shape and size from tribe to tribe[62, 90]. After harvesting, proper drying of grains is essential before storage. The traditional storage structure in Meghalaya is ventilated out door structures constructed with locally available materials such as bamboo, timber and thatch grass. The storage structure is suitable under high humid conditions. Farmers use indigenous plant materials as insect pest repellent, but do not disclose the name of the plant species used for this purpose. The traditional knowledge largely remained with local tribal communities as a hidden treasure[91].

Farmers for storing of rice use separate storehouse with raised wooden or bamboo floor. In the hilly areas, usually un-husked paddy after threshing is stored, while in the plains, rice is stored either as a bundle of straw without threshing or un-husked paddy after threshing. Bamboo containers of different sizes, woven tightly and thickly are plastered with mud on the inner side also used for storing paddy mainly for consumption and rarely for seed purpose. Storing paddy for seed purpose is usually done in a specialized bamboo container commonly called *Thiar* in *Khasi*. The *Thiar* is a small container loosely woven with bamboo split into strips. The container is thickly padded inside using rice straw. *Thiar'* containing the seeds covered by the thick layers of straw inside is usually kept in warm places.

The wooden bin indigenously made by the *Khasi* tribes is called *Duli*. It is a double-layered bamboo basket, plastered on both the sides with cow dung and mud, and placed in the inner side of the wooden bin. This bin has been found to be most effective storage structure for storing grains particularly for wheat.

Most of the farmers store maize as cobs in un-husked condition. In the indigenous practices of storing maize, un-husked cobs are fastened on frame made out of bamboo poles and kept at a certain height to protect from damage by animals. A covering thatch grass is placed on the top to protect the cobs from

Fig. 1 Slash and burn of forest trees for shifting cultivation

Fig. 2 Traditional tools used for shifting cultivation

Fig. 3-6 Bamboo drip irrigation practices

Fig. 7 Bench terraces and crop grown under bun cultivation

Fig. 8 Traditional soil conservation practices

rain. Sometimes a conical bamboo box is fixed upside down in the poles to keep the rats away from cobs[62].

Storage of rice for seed purpose has been found to be easier than the storage of wheat and other seeds. This is due to the fact that rice grain with the husk is less susceptible to the high humidity prevailing in the region than the other seeds but they have found some problems in preserving wheat seeds[62, 90].

Conclusion

The people of Meghalaya believe in traditional agricultural system. The shifting cultivation is practiced since time immemorial. However, terrace (bun) agriculture was started three decades ago. The farmers predominantly use these two systems, more popularity to shifting cultivation. Slash and burn forest trees and to raise crops on ash rich soil for few years is the basis of shifting cultivation. Whilst, bun agriculture is done on terraces, ear heads of crops are taken and other parts of plant are left on cultivated land. The traditional agricultural systems help in improving soil fertility through decomposition of plant material left on soil. Farmers prefer the bamboo drip irrigation system because of its feasibility and no loss of water on the way. The villagers also grow crop plants in association with trees. The harvesting of crops is done by using different kinds of sickle made for the purpose. After harvesting, the food grains are stored in different kinds of structure traditionally made by the farmers using soil and plant materials. The materials from selective plant species are used to make these structures. Seeds are stored safely without any chemical. Thus, the seed storage structures are economic, environment-friendly and resistant to pests.

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