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Jhum Cultivation Of The Marings Of Manipur

Dangshawa Mathew Maring and Dr. Anitha S. Pillai

Department of Humanities and Liberal Arts

Rabindranath Tagore University (RNTU), Madhya Pradesh

ABSTRACT

Jhum cultivation has been the traditional agriculture activity in the tribal society for centuries and also a component of traditional agro-ecosystem encompassing diverse set of knowledge and practices of indigenous and local communities embodying traditional and religious heritage for the conservation and sustainable use of natural resources for their livelihood since time immemorial. And it has been held responsible for disturbing ecological balance by causing disproportionate deforestation. It can be clearly mentioned that Jhum cultivation as an ecological sustainability; and comparatively critique the Modern Industrial Society and it's impacting the ecological crisis. It will reflect the implications of both Jhum or shifting cultivation and development of modern science and technology towards the ecological crisis. Despite the fact that in the practice of the Jhum cultivation there is optimal utilization of natural resources, the forces of modernization and the process of fast change; and an acute pressure of increased population have brought to relief the relative inefficiency of this form of agriculture.

KEYWORDS:

Jhum, Ecology, Economy, Technology of production and socio-cultural

INTRODUCTION

The Marings are one of the distinctive frontier and oldest indigenous peoples living in Manipur. They have their own distinctive identification, culture, traditional and religious heritage. It is also worthwhile to mention that in spite of its homogeneity, the Marings culture and their immemorial agriculture presents a slight variation from region to region or from village to village in its practice. Manipur is a palm shaped state in the North-Eastern part of India. It consists of about 800 sq. miles. There is a beautiful valley in the central surrounded by hills and mountains on all sides. The Tengenoupal District, where the majority of the Marings live is situated on the international boundary dividing Myanmar and India in the South –Eastern part of Manipur. The Tengenoupal has an area of 1,142sq.km and is divided into three Sub-Divisions/Blocks namely, Machi Sub-Division, Tengenoupal Sub-division, Moreh Sub-Division. Though the Marings are settled mainly in Tengenoupal District, they are not confined to the District of Tengenoupal alone. They also live in the adjoining Districts of Senapati, Thoubal, Imphal East and Ukhrul of Manipur. The Eastern foot hill of the Maring's hill was fixed on the boundary with Myanmar Maring country or land is a mountainous land with a chain of mountains.

Since time immemorial agriculture has been the main occupation of the people of Maring. Their economic life developed on an agricultural pattern and this has marked influence on the shaping of their -culture as a whole. About 95 % of the total population of Marings live in rural areas where they are mainly engaged in agriculture for their livelihood and economy.

Traditionally, each Maring family has their own land for Jhuming on the hills. The method of their cultivation is still confined to the Jhuming system, yet abundant harvest of paddy and other crops are found every year on various types of cultivation used by the Marings.

Kanglou is a type of cultivation and in this type of cultivation a piece of land is selected and all the vegetations on the same are cut down with Dao and spade in the month of January/ February and are allowed to dry. Then all the dried grasses are collected and burnt. Before sowing the land is worked in a crude way with hoes and spade but nothing like ploughing is attempt. The sowing is done in primitive way. This system of jhuming cultivation is prevalent in central and western regions where the people are living near the notified areas of Manipur. Beam, maize, rice, bajra, gram, peas, masur, and besides, food grain, linseed, rag, cotton, millet, were also sown in their fields.

The slash and burnt method known as Pamlou is common pattern of cultivation in the Eastern areas of Marings. This type of cultivation is changing year by year in rotation. The spot cultivated this year is not again used for the next year or ten years. In this method of jhuming cultivation, a piece of land is cut down in the month of January or February and after having been cut down the jhum is allowed to dry until March or first part of April. So that it may fire in season. This jhuming cultivation depends on mature fires; the premature burning of newly filled jungle could not produce good harvest. At the season of firing the village households gathered and fixed the day to set fire. When it is fired, the remaining logs were then gathered in group here and there, then again set the fire over them. After that the seed is sown in May or June. The weeding is done at least twice in a year. The rice crop is ready for harvest about the end of September. The rice harvest begins in October and continue until November/December, according to the location, season and kind of rice. Then the threshing is done with their relatives, neighbors and villagers and killed domestic animals. They also offered rice-beer (locally available) to all who join there. The rich family celebrated Customary Threshing Function and killed more than 2/3 mithuns and pigs and invited the whole villagers and friends from other villages too. Indeed, it is a very big festival, dancing with traditional cloths, singing folk song is the main program of the feast. Sometimes this very Customary Threshing Festival continues two or three days. After rice/paddy is threshed out, it is carried to the village and kept in the granary. Moreover, the other main crops and vegetable are also sown in the Pamlou. They are maize, beam, yams, cucumber, pumpkins, sesame, soyabean, sweat potatoes, groundnuts, brinjal, ginger, coriander and so on. But the rice is a stable food of the Marings.

Jhumming cultivation referred to a s forest agrarian system which has been widely practiced by hill communities in different part of the world such as Asia, Africa and Latin America. Practices of Jhum cultivation is characterized by a cultivation phase which involves clearing of forest. This method of crop cultivation for one to more than three years in followed by a fallow phase during which cultivation is suspended to allow recovery of soil fertility.

Marings are still predominantly shifting cultivation as their traditional way of occupation since time immemorial. They cultivate with love for their land, pride in their gardens and in a lone tradition of living off the land. They handle the land carefully and productivity in a long-term rotation sequence. Jhum cultivation is productive, thoroughly practical and stable, in tune with the physical environment and is not ruining its landscape. Land on the steep hills for almost one year only but it depends how they cultivate the rotation of the crops. In some region they use the plot for about three to five years by sowing different kinds of crops alternately. Needs for the shifting cultivation is being felt because there is no suitable substitute available in Maring land till today. They are spiritual cultivators and appear to be the most thriving by far of any of the hill tribes. Fields are placed on the hillsides without terrace but they drain them very indigenously. It is somehow like a small canal at least ten feet distance from each canal to save the soil erosion from the heavy rain. Village authority of the villages strictly prohibits the use of any fertilizers and pesticides in Jhum cultivation. Thicker jungle yields the better crop. Maring use simple tools which are local made such as dao , sickle, axe, hoe, spade etc. Jhum cultivation method involves slashing and burning the vegetation, raising crops and then abandoning the plot to recover fertility for a number of years before bringing it under cultivation once again. It is the fulcrum of the life of Maring people, the sole source of survival and around this activity is woven Maring's customs, culture, measure of time, quantities and distances. It keeps them occupied for most of the year and determine their well-being and quality of life. In

economic term such Jhumming cultivation is rather productive and it cannot be abolished without penalizing the level of the living villages.

It is a cropping system that permits a wide choice of physical sites to be utilized in term of both the major choice of physical attributes of the environmental region and with respect to the practice choices of garden sites. Jhumming cultivation are essentially pedestrians at the simpler level of operation and can walk or climb to almost any variety of surface site. It is culture and cultural history of the Maring tribe rather than physiographic which dictates the broad environmental location of Jhumming cultivation as cropping system. Free choice of any landform has been determined on the physical cultural criteria of soil, exposure, drainage, distance, locational relationships and animistic omens. Jhumming cultivation is one of the very oldest forms of agriculture practiced by humans. Its survival into the modern world suggests that it is a flexible and highly adaptive means of production.

Manipur is a hilly region with large portion of its geographical areas being covered by forests. The topography of the region apart from fertility of the soil can be attributed as one of the factors for widespread practice of Jhum cultivation. The sloppy hills, fertile soil and accessibility to the forests makes it an ideal site for Jhumming. Jhumming is also called shifting cultivation and is locally known as Pamlou. In the tribal society it is known with difference names by different ethnic groups of their own local terms. Shifting cultivation as the terms clearly signifies is a method of cultivation. Wherein crops are sowed in a particulars site for a single harvest and thereafter shifted to another site and the process continues as long as cultivable land are available in the forests.

Traditionally, Jhum cultivation is practiced by tribal groups, mainly in north-eastern states like Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland and Tripura etc. This system involves clearing a plot of land by setting fire, felling trees and using the area for growing crops such as upland rice, vegetables, species and fruits. They burn all the trees and grass for clean and fresh soil. It is believed that this helps to fertilize the land but can leave it vulnerable to erosion. Cultivation is one of the earliest Engling meaning to indicate a simple form of crops growing and then it is normally implied by the term agriculture in the modern world. Where the agriculture has become highly complex, variably mechanized, considerably commercialized and surrounded by differing degrees of scientific control and procedures. Traditionally, bush fallow system practiced by the Marings ensure that each plot left fallow gets sufficient time to regain its fertility and forest. Functioning system of LEISA (Low External Input and Sustainable Agriculture), such as crops, trees, herbs and animals is not only productive but also ecological. Producing organic matter, nutrient pumping creates a nutrient reservoir in the soil, naturally protecting crops and controlling soil erosion. This system contributes to the continuity and stability of farming. LEISA compare with the matured natural ecosystem in which nearly all biomass produced is re invested to maintain fertility and biotic stability of the system. LEISA is quite opposite to High External Input Agriculture (HEIA) which is brutally affecting the environment and living beings. In earlier times when the population density was less, slash and burn worked reasonably well. It was then possible to leave the plots fallow for some more years. This allowed considerable regrowth of the forest and good restoration of the soil fertility. Unlike many other parts of India, where even villages are in some way or the other connected to the capital markets, albeit through informal means, people in the rural hills of Northeast India for the most part engage in pre-capitalist sustenance activities, with surplus produce sold in nearby bazaars. The most important and widespread activity is shifting cultivation, of primarily the slash-and-burn variety along the hill slopes. This practice, called jhum, usually ensures enough grains and vegetables for the entire year. These communities have maintained these forests to serve as fallows. However, the management of these forests and their custody has changed in more recent times because of policy. This includes the conversion of large forest areas into reserved forests or protected areas, changes in ownership of forestland, unsustainable logging and development of other land use systems, including the expansion of settled agriculture and cash crop plantations. Combined with population increase, all this has led to reduced availability of fallow forests and resulting reduction of the fallow phase in the shifting cultivation cycle.

Along the lines of the egalitarian functioning of most tribes in the region, this form of cultivation has men and women playing equally large roles, with women often even playing a dominant role especially in deciding the distribution of the produce and the selling of the surplus. Jhum is a livelihood generation activity for food sustenance, and constitutes a large chunk of the labour performed by rural folk in the hilly

regions of the Northeast. In April 2006, the Government of Meghalaya agreed that it would no longer try to suppress shifting cultivation and would instead examine ways of integrating soil and water conservation measures within it. Earlier in 2004, the Shillong Declaration on shifting agriculture in 2004 was extensive in its coverage of jhum agriculture and several governments in the participating countries have placed it on their agenda. In India, many developments have been taken up, both at the central and the state government level. The recommendations have been advocated during important policy meetings and in reports, including the Farmers' Commission Report on North-East India, and an initiative on participatory forestry. The MoEF has set up a task force on 'Rehabilitation of Shifting Cultivation (Jhum) Fallows'. The state government of Nagaland has trained government extension staff in participatory mapping and the Government of Tripura is looking for opportunities to initiate shifting cultivation development projects.

The National Forest Commission has included in its advice to the Government of India ICIMOD's recommendations stating that security of land tenure for shifting cultivators for both the agricultural and fallow phases should be increased. This can be done by reconsidering the classification of shifting cultivation areas and categorising them as agricultural land with adaptive forest management in the fallow period.

By and large, the commission also asked for strengthening and capacitating customary institutions for improved local level governance, management of tribal, community-based natural resources, and tenurial access and control. Existing credit policies need to be reoriented to be sensitive and proactive to situations where common property regimes apply and coordination among different government agencies must be encouraged that have responsibilities for aspects of shifting cultivation. It also accepted ICIMOD recommendation of propagating medicinal plants and bamboo which is the most versatile crop of the North-East. The need to for better regulation seems of utmost importance. Farmers should be allowed to clear the fallows when it is time for the cropping phase, and the species selection should be adjusted towards soil conservation as well. The timber trade should be regulated in such a way that the farmers can sell the timber when they clear it.

Existing common property regimes should be strengthened, to avoid capture of the land and improved fallows by elites from within the communities. Overall, tenure security should be increased, as well as access to credit in those situations where common property regimes apply. Policies and programmes should be put in place that better acknowledge the role of customary institutions in the community management of the resources, in controlling the burning, and protecting forest resources against the timber mafia and elite capture.

Now the plot and fallow periods have to be reused soon with increasing population. But, it is possible to grow enough food reasonably easily with this system. And Jhum Cultivation uses the land only for one year with the most important purpose of livelihood for the human beings which is indispensable to human welfare to grow in all aspect of life. Jhum cultivators are terms as Jhumias and also known as Swidden method in general. The term Jhumia is a generic term used for tribal people who depends on shifting cultivation as their primary source of livelihood. It is also known as Swidden which is related to the burning of heather, brush, scrubs and peat off moors or tract of unenclosed wasteland which often were wet to boggy. Unlike many other parts of India, people in rural areas of northeast India mostly engage in pre-capitalist sustenance activities with surplus produce sold in nearby bazaar. Along the lines of the egalitarian functioning of most tribes in the region forms both men and women are playing equally large roles. Women often even play a dominant role especially in deciding distribution of the produce and selling of the surplus food stuffs.

Jhum cultivation is Ecological Sustainability:

The need to for better regulation seems of utmost importance. Sustainability refers to the maintenance or enhancement of resource productivity on a long-term basis which is related to livelihood security like community ownership of land, livestock or trees, rights to graze, fishing, hunting through stable employment with adequate remuneration. The Maring Traditional institution plays a vital role in the management of

Jhum land. It is very strong in matters of pertaining the management and control of the Jhum lands. The violators are punished. Science and technologies did not prove to be culturally specific fail to attract the Jhumias as it cuts into their socio culture life. Farmers should be allowed to clear the fallows when it is time for the cropping phase, and the species selection should be adjusted towards soil conservation as well. The timber trade should be regulated in such a way that the farmers can sell the timber when they clear it. A meaningful solution to the problem of jhum has become critical, not only from the point of biodiversity conservation, but also for productive agriculture in the region. The solution to the problem of the shortening fallow cycle lies in strengthening this already weakened agro-forestry system, through fallow management using appropriate tree species, rather than imposing an alien technology from outside the region. Nepalese Alder (*Alnus nepalensis*) and bamboos are examples amongst many others to be selected through intense community participation.

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Therefore, any alternative to Jhum must have serious thought and it must involve local people rather than being treated as mere object of study or trial. Moreover, the Maring has been sustainability managing the natural resource over the centuries.

The land after harvest is left fallow with any agriculture activities for at least five to eight years during which the land regains its fertility and allows plants and trees to grow. The main factors of this period are diverse. Plants and trees contribute towards enriching the soil for better harvest and productivity allowing the farmers to use the soil for reclaiming sustainable agricultural practices. Earthworm are regarded as the friend of farmers and great contributors in regaining of natural soil fertility. Birds' droppings, animal's droppings, biotics activities of flora and fauna, decomposed plants debris are the main natural sources for the fertility of the land. Hence, the soil composition with fair amounts of major nutrients like nitrogen, phosphorus and potash besides, creating a good soil structure makes the soil virgin in a cycle of fallow periods. Today, ecological sustainability is no longer regarded as a theoretical or esoteric but it is increasingly linked to the people and the poverty issues.

Jhum Cultivation Towards Food Security Food

Security means that all people at all times have physical and economic access to adequate amounts of nutritious, safe, and culturally appropriate foods, which is produced in an environmentally sustainable and socially just manner, and that people are able to make informed decisions about their food choices. It also means that the people who produce food are able to earn decent living wages by growing, catching, producing, processing, transporting, retailing, and serving food. It refers to secure ownership of resources and income earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies. At the core of food security is the access to healthy food and optimal nutrition for all. Therefore, it is dependent on a healthy and sustainable food system. Traditional Maring economy ensured that no one ever goes hungry or dies of starvation and there are no beggars in Maring society. Everyone has their own house and field to work for their survival. In 2011 during 68 days economic blockade imposed by United Naga Council (UNC) in Manipur, the most affected groups of people were not the Jhum cultivators but urban dwellers only. No serious effect was felt in the villages as there was enough food available.

Sustainability of Jhum Cultivation

The subsistence form of Jhum cultivation is based on common pool resources. Families have the customary right for getting some land allocation with the actual allocation, being done through annual lottery on village

assembly. At high altitudes of north-eastern region of India, tribal people practice mixed cropping and intensive cultivation on steep hill slopes by clearing patches of forest land in a very primitive way. They neither employ machines nor animals. Rather they use human labour as the key input. Women predominantly participate in activities like seed selection, planting and weeding. While other activities such as clearing jungles and burning of the cut under growths are carried out by their counterparts. Both men and women participate in harvesting. Traditionally, a village community collectively owns, controls the land and decides on such rotational cultivation patterns. This practice is not simply a form of cultivation rather it is a way of life for traditional tribal societies which they have been practising from pre-historic times till today. It provides the local people a balanced diet and also offers some form of crop insurance to the Jhumias in the event of failure of some crops. It also helps to conserve forests as this pattern observes a long fallow period which is followed by a short cropping phase. Sustainability does not necessarily mean a share of Gross National Product (GNP) or Gross Domestic Product (GDP) that contributes the largest population, but it still continues even it provides for a very large part of the population of the Maring tribe.

Jhum Cultivation and environment change:

The forests are destroyed by the seemingly inexorable advances of civilisation, industrialisation and warfare. The sort of advances that many of those who criticise shifting cultivators in the 19th Century thought are desirable and indicative of higher cultures. The same sort of processes is leading to the destruction of tropical forest in the last decade of the 20th century. So advancement in civilisation is known as development which has not resolved these problems. The problems are located not in the practice of a particular form of agriculture but within the fundamental relationships that human societies have with their environments. In complex developed economies these relationships have become very elaborate and are difficult to comprehend. However, in simple economies where agriculture is the major source of wealth creation, they can be easier to understand. A growing body of archaeological and palynological evidence finds that simple human societies brought about extensive changes to their environments. It is seen before the establishment of any sort of state, feudal or capitalist and before the development of large-scale mining, smelting or shipbuilding industries. In these societies agriculture is the driving force in the economy and shifting cultivation was the most common type of agriculture practised. The relationships between social and economic change and agricultural change in these societies, insights can be gained on contemporary social and economic change and global environment change of shifting cultivation in those relationships.

Forests were exploited for ship building, urban development, and for manufacturing casks, pitch and charcoal more than being cleared for agriculture. Although, goat herding is singled out as an important cause of environmental degradation, a more important cause of forest destruction was the practice in some places of granting ownership rights to those who clear felled forests and brought the land into permanent cultivation. Darby states that, land had once been tilled became derelict and overgrown and cultivated land became forest. The other major cause of forest destruction in the Mediterranean environment with its hot dry summers were wild fires that became more common following human interference in the forests.

By the Middle Ages in Europe, large areas of forest were being cleared and converted into arable land in association with the development of feudal tenurial practices. From the 16th to the 18th centuries the demands of iron smelters for charcoal. Not only that there was an increase in industrial developments and the discovery and expansion of colonial empires as well as incessant warfare. That increased the demand for shipping to levels never previously reached all combined to deforest in Europe countries.

Many people cannot see the past clearing and burning of standing forest and do not perceive often ecologically stable cycles of cropping and fallowing. Nevertheless, shifting cultivation systems are particularly susceptible to rapid increase in population and to economic and social change in the larger world around them. The blame for the destruction of forest resources is often laid on shifting cultivators. But the forces bringing about the rapid loss of tropical forests at the end of the 20th century are the same forces that led to the destruction of the forests of Europe. It was all because of urbanization, industrialization and the application of latest technology to extract ever more resources from the environment in pursuit of political power by competing groups. Studies of small, isolated and pre-capitalist groups and their relationships with their environments suggest that the roots of the contemporary problem lie deep in human behavioural

patterns. Even in these simple societies, competition and conflict can be identified as the main force driving them into contradiction with their environments.

Jhum Cultivation is Cultural Occupation

Historically, Maring tribe is a culturalistic tribe in their entire aspect of life that has been lived in a hill country. They become accustomed to work on the slope land with wide range of techniques adapted customs and traditional elements of cultural patterns, that constitutes the whole living systems of Maring tribe. For them culture is one of the important identities of indigenous people. Culture cannot be compromised or sold out to scientific technologies. Their traditional modes of hunting, gathering and Jhumming continued in the newly defined domains, retaining their uniform dependence on human energy, simple tools, local materials and indigenous techniques. It was and is their culture. In fact, the word culture comes from apiculture. Hence, Jhum cultivation is not only the source of the livelihood but also the source of their culture, tradition and customary. Globalization has become opium at hand, melting the culture of hard labour in Maring land. The Indian Forest Act of 1927, which classifies forests including protected areas, excludes the forests of the North East, which are community controlled. These communities have maintained these forests to serve as fallows. However, the management of these forests and their custody has changed in more recent times because of policy. This includes the conversion of large forest areas into reserved forests or protected areas, changes in ownership of forestland, unsustainable logging and development of other land use systems, including the expansion of settled agriculture and cash crop plantations. Combined with population increase, all this has led to reduced availability of fallow forests and resulting reduction of the fallow phase in the shifting cultivation cycle.

The melodious song that tunes during harvest time, return to home when the sun set, processing to the field before sun rise has been sold. The culture of sharing has been diverted in hiring, Sharpening of the Maring Dao shifted to grinders and hence Jhum cultivation is in threat by the recommended scientific technology. Main cause of hunger is industrial agriculture globalised trade in food. Industrial agriculture creates hunger both by destroying the natural capital for producing food and locking the farmers into debt because of its high cost of production. Globalised trade creates hunger by diverting fertile and for exports, promoting dumping and unleashing speculative forces. Industrial agriculture and globalisation also contribute 40% to greenhouse gas emissions that are leading to climate change which in turn is agriculture and food security.

Traditionally, Jhumming Cultivation and Shifting Cultivation are commonly used as a synonym of slashing and burning method of cultivation, It has been indigenous and traditional method of cultivation of the Marings of Manipur as well as all the tribal's in the world. Jhumming cultivation method is an integral farming system involving forestry, natural farming, sustainable agriculture and strong social organisation of the Marings. It brings strong bond of cultural setting and customary norms because of a village has hundred household there is supposed to be hundred numbers of Jhum field according to the number of the houses. Therefore, there is no beggar in the village, no one is homeless and no one dies by starvation

or famine because everyone has enough rice or paddy for one year till they get new rice. Everyone is compelled to cultivate for their livelihood and for survival through practice of

Jhumming cultivation. They don't care for any kind of blocked, strike and bandhs. The villagers use to stock food grains one year which they harvested through Jhum cultivation which is indispensable to human welfare to grow in all aspect of life according to the measure of the standard.

In my view, the most important step in mitigation and adaptation to climate change is to stop the assault on small farmers and indigenous communities to defend their right to their land territory and to see them not as remnants of our past but as the pat finders for our future. We need to stop coercion to trade liberalisation and rewrite the rules of trade to favour the local. Ecological sustainability demands that every person, every community, every society has the freedom to create and defend economies that cause no harm to the climate and to other people.

References

1. N Bhupendro Singh, Capital formation in Agriculture sector of Manipur (New Delhi : Akansha Publishing House, 2007)
2. R.K Das, “ Maring” The People of India, Manipur . Tribal Social Structure: A study of the Maring Society of Manipur
3. J.E Spencer, Shifting or Jhum cultivation in southern Asia.
4. R.K Das, Tribal social Structure: A Study of the Maring society of Manipur
5. M.Kirti Singh, Folk culture of Manipur.
6. RK Shimray, Origin and culture of Nagas
7. T.C Hodson ‘The Naga Tribes of Manipur , B.R Publishing corporation , Delhi-1974
8. ZK Pahrri Pou, Jhum Cultivation must stay with us.
9. Brewster Kneen, From land to Mouth
10. PS Ramakrishnan , Shifting Agriculture and Sustainable Development
11. Ralanthang Yathan, “ Jhum cultivation” The Nagaland Post , Oct. 22,2011.
12. MS Swaminathan, Sustainable Agriculture: Toward food Security
13. Jobby John, Globalisation and sustainable Agriculture : A Christian Ethical Response (Delhi : ISP, 2011)
14. P.S Ramakrishnan, Shifting and Sustainable Development (New Delhi :Oxford University, 1993.)
- 15 E.W Dun , Gazetteer of Manipur , Vivek Publishing House, New Delhi-1975.
16. Jaipal sing, Agricultural land use planning (Jaitapur: Shruti Publication, 2012)
17. Winin Pereira, Tending the earth: Traditional, sustainable, Agriculture in India.
18. John Madeley, Food for all: The need for a new agriculture (Bangalore: Books for change, 2022)
19. GS Puri, Forest Ecological, (second edition, 1983
20. Murry Bookchin, The Philosophy of social ecology (New Delhi: Rawat publication, 1996)

