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Jhum Cultivation and Its Effect on Crop Pests in NEH Region of India

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INTRODUCTION

The knowledge behind the culture and beliefs of indigenous community needs to be harnessed and should be used to complement the modern technologies and policies for better and sustainable use of biological resources and increase resilience of the sector associated. The cycle associated with the system reflects the synergy of practices with the natural phenomenon and indicators. Contrary to common modern belief, Jhum is carbon sink, maintain soil health, preserve biological diversity and sustain local climate. Forest clearing during Jhum is not deforestation but forest modification allowing forest regrowth during sufficiently long fallow. Instead of being threat to climate or environment, the system can provide deeper insight into the many different aspects of sustainable and climate resilient development and the interrelated role of local peoples and their cultures. Growth of insect pests is much favorable in the nature and climate of hilly areas.

Jhum cultivation- a brief

The word Jhum may be the most misunderstood term among the environmentalists, scientists and others concerned with natural resource management. Jhum is a component of traditional agro-ecosystem encompassing practices derived from ages of observations to interact with the environment in most harmonious manner that took the form of traditions, customs and rituals that governs agriculture in a most cultural and sustainable way where land is cleared by means of controlled fire and employ natural fallow phase long enough to be dominated by woody vegetations (Bhagawati et al. 2015). It is an extensive method of agriculture in which farmers rotate land rather than crops to sustain livelihoods. The most commonly shifting cultivation is defined as any agricultural system in which the fields are cleared (usually by fire) and cultivated for shorter periods than they are fallowed. In shifting cultivation no draft animals or heavy machineries (tractor, power tiller etc.) are used except the human labour.

Sowing is done by the minimum tillage operations through dibbling or broadcasting and after harvesting the crop residues are left in their field (Kuotsuo *et al.*, 2014).

It is considered to be well adapted to tropical climates and soils, and accessible to small farmers because of its low cost. In India, shifting cultivation is still practiced in the hill areas of North-Eastern Region, Bihar, Orissa, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Kerala, Karnataka and Maharashtra. But among all these states, such practices are still prevalent in the hill slope areas of North-Eastern states. Orissa accounts for the largest area under shifting cultivation in India. The difficult topography, inhospitable terrain, incessant rains and harsh climatic conditions in the hilly regions led the people to adopt this age old practice (Bhagawati et al., 2015). In India, the total area under *jhum* cultivation is 0.94 m ha whereas North East India itself accounts for 80 percent of the jhum area (0.76 m ha) (Panda et al., 2016).

Jhum cultivation, being a labour intensive and low subsidy based farming system, provides an assured source of food security to the substance level farmers of the hills region. The use of fire is an integral part of *jhum* cultivation, and helps in the organic management. Burning of slashed vegetation is only carried out once in the *jhum* cycle of many years, although some communities also burn crop residues before planting in the second year. The main reason that farmers use fire is that it enables them to manage soil fertility and control weeds and pests in a labour efficient manner. Use of fire is one of the major reasons that use of agrochemicals can be avoided.

Incidence of pest and diseases under *Jhum* cultivation

Jhumias have very good understanding of insect pest and disease dynamics through ages of observations. They lower incidence of insect and pest by proper selection of date of sowing and other cultural management depending on lunar cycle. Sowing during the days in the vicinity of Full Moon found to lower insect attack and favour germination. Slashing medium girth plants to a certain height depending on the expected height of the crop to be shown is a unique insect control technique of Jhumias. During initial growth of the crop especially rice, the stumps acts as platform for birds to sit and feed on the insects in the leaf of crop, but when the plant grow to maturity it outgrow the stamps and avoid birds from feeding on its grains. Burning of vegetations at Jhum sites besides adding carbon to the soil, also help neutralization of soil acidity. Soil acidity may be one of the main reasons of prevalence of diseases and pests in NEH areas, but burning not only control soil acidity but also help to get rid of spores of pests in the soil. Majority (75%) of respondent are of opinion that due to destruction of their favorable environment for soil borne pathogens multiplication due to heating or antiseptic property of the smoke formed while burning of slashed matter might be the reason or naturally they are resistant to disease. However, 25 % said presence of white grub is most common in Jhum field if control measure is not taken by mechanical removal and destroyed. Otherwise the entire crop gets destroyed by soil born single insect (Bhagawati et al., 2015). On contrary around 60 percent of farmers said the pest attack is more common in Jhum area compared to arable cultivation especially vertebrates pest like rat and birds are very common, apart from other wild animal because majority of Jhum are practiced in deep forest near the dwelling area of predators that makes them convenient to visit frequently and attack on standing crop of Jhum plot (Tayo et al., 2014).

Nature and climate of hilly areas are also favorable for insect growth. Among the insects, whitefly, yellow stem borer, fruit and shoot borer, field cricket are highly harmful to shifting cultivation in the hilly areas. Diseases like leaf blast, leaf blight, wilting, stunted growth, stem rot, anthracnose, and leaf spot were prevalent in areas where shifting Available online at http://sunshineagriculture.vitalbiotech.org

cultivation was practiced (Bhattacharjee *et al.*, 2020). *Jhum* crops are acclimatized to local conditions and are usually resistant to pests and diseases. Therefore, the use of chemicals for pest and disease control is not required (Panda *et al.*, 2016).

Many studies indicate that fewer pest experienced problems are in shifting cultivation due to its inherent management practices, such as mixed cropping, fallowing and rotation. In contrast. continuous monocropping in settled cultivation is reported to contribute to the build-up of pests and diseases. In upland paddy grown in shifting cultivation fields are almost free from insect pests, while those grown in semi-terraced lands had moderate incidences of the gundhi bug (Leptocorisa oratorius). On the contrary, crops grown in terraces were found to be attacked by a number of pests in addition to the gundhi bug, like stemborers, the rice hispa, rice caseworms, leaf folders and hoppers. Farmers say that the terrace cultivations initially provided good harvests. However, infestation of paddy by different types of pests previously unseen soon became a major cause of concern (Sinha et al. 2014).

The burning of organic matter increases pH in soil due to ash deposits on forest floor also results in loss of fungal spores, actinomycetes and mycorrhiza but the status of bacterial population is improved due to the enhanced availability of N and K and might have tolerated higher temperature and proliferated heavily after fire (Chandra and Bhardwaj, 2015). Upland paddy is often mixed with other crop primarily to create a physical barrier for the movement of insect pestspathogens. Secondly, this practice provides food source to the farmers throughout the year. Sometimes creeping vegetables like pumpkin, cucumber, etc., are incorporated in between plants primarily for checking the weed pests and secondly attracts the insect pest pathogen for feeding in preference over the paddy crop (Kuotsuo et al., 2014).

CONCLUSION

Jhum encompasses a complete body of knowledge, know-how and practices maintained developed by and peoples, generally agrarian in nature, who have extended histories of interaction with the natural environment. It provides the basis for local-level decision making about agriculture and adaptation to environmental or social change. In understood properly, instead of being threat to climate or environment, the system can provide deeper insight into the many different aspects of sustainable development and the interrelated role of local peoples and their cultures. It has great potential to strengthen the modern developmental programmes and make them sustainable and acceptable. However, further scientific studies are required to optimize the deforestation for the development of scientific oriented Jhum cultivation practices without harming the native biodiversity under the perspective of climate change.

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