Livelihood security of small and marginal farmers through Technological diversification in Meghalaya

Meghalaya –became the 21st State of India on 21st January, 1972, on obtaining fully fledged Statehood. The name Meghalaya was given by Internationally famed linguist and scholar extraordinary Dr. Suniti Kumar Chatterjee, professor Emeritus, Culcutta University. This nostalgic hilly state with its panoramic sylvan beauty, magnetized and captivated the visitors, whether foreigners or fellow Indians. Meghalaya virtually enchants and mesmerized visitors into pangs of undiluted joy which made them longed for revisitation. This enchanted land enfolds cascading milky white falls, scented pines, sweet fragrance wild orchids, abundance rainfall and numerous caves apart from other blessed assets that nature's offered. It is the homeland of three of India's ancient hill tribe, the Khasi, Jaintias and the Garos. Meghalaya is the only State in the entire North East which is Matrilineal through lineage and takes the identity solely from the mother. Meghalayan women are very lucky in this regard, because they are treated with equal rights, but the Head of the Family is always the Father. The occurrence of illegitimacy or child abandoning in this society is rare except for some stray cases. On the whole, the society is unique, devoid of complexes and the much feared and dreaded bride burning or dowry system. Meghalaya prided itself about the equality of both sexes and are sturdy and hard working .

Agriculture is the main stay of the people of the Meghalaya where 80% of the population of the State depends on Agriculture for their livelihood and our farmers are Small and Marginal farmers. The assets of a small and marginal farmers in Meghalaya is of various kinds such as – a small piece of land, a homestead garden, few chickens, 1~2 livestock. Therefore their livelihoods are centred in farming in their small holding. These farmers produce 2,32,368 Tonnes of Food grains from just 1, 31,559 Hectares and these total Food grains production comes mostly from Rice and Maize. Rice are grown as upland Rice,

autumn, winter and Spring Rice and the av.yield is 1.9 tonnes/ha only. Maize are grown as Sole maize and the yield was just 1.8 t/ha thus the technology diversification was done through the Transplanting of Lowland Rice which increases the av.yield from 1.9 tonnes/ha the yield to 2.9-4.1t/ha, System of Rice Intensification and the av.yield ranges from 3.5 to 5.5 t/ha. To generate extra incomes, Crop rotation of short duration Horticultural crops such Potato, Tomato, Capsicum etc are grown in the Rice field during Off-season in Paddy i.e Rice followed by Tomato/Potato/ French bean/Capsicum which fetched good income to the farmers particularly in potato which increases the av.yield from 6.9t/ha to 9.3t/ha. Intercropping of maize with Soybean and the av.yield as Sole Soybean=0.9t/ha and Maize+Soybean=1.5t/ha. Terrace cropping of potato+chow-chow. This cropping system developed by farmers themselves which brings them a handsome profit from just a single season as the Yield of potato crop is 9.3t/ha and the yield of Chow-Chow is 16.6t/ha.This system enables productive and economic utilization of cultivable wasteland and provides viable alternative to shifting cultivation are the most Distinct advantage of this system.

Most of the state land under Agriculture and Horticulture is covered with pineapple (Giant Kew), followed closely, by Citrus, Banana and Potato (Kufri Jyoti, Kufri Giriraj).Meghalaya is the major producer of Ginger in N.E Region as it is the 2nd Largest producer in the country with the total share of 19.59 % after Kerala. With relatively low fiber content, Meghalaya ginger enjoys good demand in the National and International markets and lends itself well to value addition, technology diversification on ginger by using Bio-Organic formulation (GF1) to manage the soft rot of ginger has been increases the yield the from 9.5t/ha to15.6t/ha. Oranges (Khasi Mandarin) which is currently being exported to Bangladesh as it is famous for its taste and sweetness and the technological diversification was done through Propagation by grafting and Citrus rejuvenation increases the area (8,328 Ha) and production (34,394 MT) and from the sylvan environs of Jaintia Hills, comes

Meghalaya's famous Lakadong turmeric having the cucumin content of more than 7% which is highest in the world. Moreover it is having proven medicinal properties and the area under this crop is 2,000 Ha where as the Production=10,512 MT and the Productivity=5.3t/Ha. Arecanut (*Areca catechu* L.) which is very important and attached with the Culture of Khasi,Jaintia and Garo are grown in some part of the state. Introduces of new varieties as well as its Scientific cultivation are the technology diversification in this crop therefore its Area=15,448 Ha and the Production=21,638MT as well as vegetables (Area= 37,750 Ha and Production=3,57,144) which make availability all year round. Cauliflowers, Cabbage, Tomato and Radish are mostly marketed outside the State. The State has surplus of cabbage=15,149MT, cauliflower = 8812 MT and Other vegetables = 1,20,219 MT. Farmers are majority do not used Chemical Pesticide/fungicides and few used negligible compared to National level. Intensive protected cultivation of low volume high value commercial crops & maximizing usage of family labor. Cultivate tomatoes under protected cultivation with vermicompost instead of adding chemical fertilizers found favourable results. This is one of the pathways that lead us to live in harmony with nature. The State's latest foray into cultivation of high value low volume crops such as strawberries, carnation and Cultivation of high value vegetables like Broccoli and colored capsicum increases the income of Farmers. These are the main support to the smallholding of the State.

Although cereals and Horticultural crops dominate the cropping pattern whereas Livestock also is one of the major pillars of income, food and employment security as 50 % of income generation of poor households in crop-livestock systems in Meghalaya is from livestock. More than 1.64 Lakhs households are engaged in rearing animals. During the early days the people reared livestock under free ranging system or scavenging system, where the animals were let loose in search of their own food by feeding on wild vegetation and plants available in the forest or vegetation grown by the people. With the passage of time, pasture

enclosure were introduced where animals were confined in enclosure which was a simple barrier of fence to prevent escape of animals or attack by predators during the night time. To strengthen the livestock industry in the State, the Government of Meghalaya has established various farms and other infrastructures. These included the Intensive Cattle development Project, Stockman Centre (with and without A.I facilities), Key village centres (with & without A.I facilities), cattle Breeding farms, Buffalo farms, Poultry farms, Pig farms, Rabbit farm, Sheep and Goat farm, dairy Plant, Fodder demonstration farm. The introduction of better performing poultry breeds of birds, improved breeds of cattle and pigs have taken a strong hold on the farming community of the people thereby raising the economy of the state in general and farmers in particular. At present traditional housing system made from locally available materials are practiced till date as the majority of the farming community belongs to small or landless farmers.

Fish has been an important part of human food since time immemorial. Hill regions of NE India is considered as one of the hotspots of freshwater biodiversity, however, there is a glaring lack of data on the ecology of fishes in these regions. Capture fisheries (fishing from rivers, streams, etc) and the art of catching fish in Meghalaya have been evolved by the fishermen communities and passed on from generation to generation. Traditional knowledge and practices in catching fish which involves netting, trapping, etc has supported the livelihood of the fishermen communities which however depends upon the abundance of fishes from natural resources. With the changing values of the society in terms of modernization and development, 'fish sport' has become most reputed and delighted entertainment. In Meghalaya, angling in streams, rivers, ponds, lakes, etc has fascinate the local masses residing far and nearby these fishing spots and catch fish for enjoyment as well as for food. Most of the waters in the State are not only fished by anglers or sports loving people but many of them are known for angling competition. The Livelihood security of small and marginal fish farmers in Meghalaya can be improved through technology

diversification eg. Composite Fish culture (instead of unscientific culture of single species or different incompatible fish species), integrated fish culture, poly culture, paddy-cum-fish culture, artificial breeding in Chinese Hatcheries or FRP (Fibre Re-enforced Plastic) Hatcheries, etc. Only very few farmers practice scientific Fish culture while majority needs proper training as commercial fish culture itself is very new to the State. In integrated fish culture, the farmer can enhance production through proper utilization of food and space available in the farm and also through the recycling process of waste in the different components. Here, the farmers not only that they rear fish but also incorporate agriculture, horticulture and within the available restricted farm which reduce the input costs and even if one component fails, others will compensate the economic loss. Governments can support small farmers through policy interventions that create a conducive economic environment for market-led development, and by providing stable economic incentives and necessary public goods and services. With the helping hand of the State Government and Central Government in terms of financial assistance, the technologies from Research Institutes (eg ICAR) and the activity profile of KVK in promoting the diversified technologies in the farm level of farmers, productivity of crops/livestock will increase which ensure the livelihood security of the farmers thereby improving their standard of living.

Diversification in any farming system imparts sustainability. Mushrooms are such component that not only impart diversification but also helps in addressing the problems of quality food, health and environment related issues. In Meghalaya, Mushroom playing important roles in preparation several traditional dishes. More than fifty types of mushroom are natural habitats and collecting during their respective growing season. Farmers Seasonally earned their livelihood through selling of eatable wild mushroom. Tit Thnaw syiar (*Ramaria Formosa),* Tit Tyndong (*Gomphusfloccosus*),Tit Snier masi (*Collybia allegretti),* Tit Stem (*Cantharellus cibarius*),Tit Dud (*Lactarius sps.),* Tit Labong Hati(*Ramaria*

holorubella),Tit Bol (*Scleroderma verucossum)and*Tit Bun (*Boletus edulis*) are some identified wild mushroom. Various kind of mushrooms are sold in different markets of the State. Therefore both Farmers as well as vendors earned their Livelihood through wild Mushroom. Technology diversification on Button and Oyster mushroom cultivation has been done. This enhance the income of Farmers.

Though Meghalaya is lacking behind in the field of Agriculture but with the intervention and diversification of New Technologies and when our Farming communities possess technological knowledge, technology adoption by the participating farmers and its diffusion to non-participating farmers, as well as the capacity to innovate by themselves thereby to promote food security and eradicate poverty. This will only happen if small farmers are much more closely involved in the generation and diffusion of technology then the Agriculture sector will further develop thereby uplifting the farming community and the State as a whole.