The Indigenous Soil and Water Management Farming Systems of the Tribes of North Eastern Region of India

The project entitled "Centre for Advanced Agricultural Science and Technology (CAAST) on Standardization of Integrated Farming System Models for the state of Jharkhand" under world bank sponsored National Agricultural Higher Education Project (NAHEP) of Indian council of Agricultural Research (ICAR), New Delhi, Government of India conducted a guest lecture at Birsa Agricultural University which focus on "The Indigenous Soil and Water Management Farming System of the Tribes of North Eastern Region of India" to enhance the knowledge of the students and faculty members. The Lecture was open to the UG and PG students and approximately 35 people attended. Scientists of different faculty including Director Research Dr. D. N. Singh, Dean College of Agriculture Dr. M. S. Yadava, Dean College of Veterinary Science and Co. PI Dr. Sushil Prasad, Chairman Department of Agronomy Dr. R. Thakur, Chairman Department of Genetics and Plant Breeding Dr. Z. A. Haider, Chairman Department of Soil Science Dr. D. K. Shahi attended the lecture. During the Lecture, attendees shared opinions, thoughts and suggestions for consideration in sustainable agriculture.

Dr. M. S. Malik, Principal Investigator NAHEP-CAAST-IFS, BAU was on hand to open the Guest Lecture Programme focused on the objective how M.Sc and Ph.D students can be promoted for higher education, advanced technical training, exposure visits at National and International institutes for up-gradation of their knowledge and skill in various IFS models.

Scaling up the capacity building of the faculty for enhancing their research and teaching capabilities to impart advanced knowledge to P.G. students in areas of IFS and enabling them for Agri- entrepreneurship.

Dr. B. K. Agarwal welcomed the Guest of event Dr. U. C. Sharma, Ex National Coordinator, NIAP and Joint Director ICAR Institute, Barapani a renowned personality by presenting a bouquet.

The keynote speaker Dr. U. C. Sharma, Ex National Coordinator, NIAP and Joint Director ICAR Institute, Barapani focused on the major problem of water management of the Tribes of North Eastern Region.

Dr. Sharma discussed on various topics related to water management and about north eastern people and told how the tribes of Nagaland State in India recognized the importance of water centuries ago and developed a unique rain water harvesting and management system for meeting irrigation and drinking water needs. This system was based on the ingenuity and skill of the tribal farmers, known as "Zabo", which means "impounding of water" in the local dialect. The adoption of this system has resulted in scarcity being turned into plenty and it has transformed the society by improving crop productivity, the environment, the resource base and the quality of life of the people. The "Zabo" system is a combination of forestry, agriculture, livestock and fisheries management with a sound water and soil conservation base. This system makes efficient use of rain water and helps in minimizing soil erosion.

Rain making ritual- Among some tribes, there are authorities who conduct certain rituals to produce rain. This indicates a type of "Earth and Sky" cult. The "Rain maker" symbolically wears a rain protecting dress made of dried grass. This is done to make the rain God happy so, that the rains are plentiful.

- Fertility cult- In Naga tribes, the fertility of the soil and prosperity of the village were closely associated with the dead, whose life substance was conceived as forming a continuous cycle of reproduction, passing from man to the cereals sown and then back through grains eaten or through the flesh of the animals that had eaten it, to man again.

- Zabo system - The word "Zabo" means the impounding of water in the local language. The system has forest land at the top of the hill, water harvesting tanks (silt retention ponds and water storage tank) further down the hill slope, followed by livestock enclosures and then terraced rice fields at the foot. The system is a unique combination of forest, agriculture,

livestock and fisheries with a water and soil conservation base, which encourages the sustainability of the environment, besides increasing crop productivity. The system is followed on the land belonging to individual farmers, but a group of 10-15 farmers may join together to practice the Zabo system.

- Forest land - The area on the hilltop serves as a catchment for rainwater and is kept under natural vegetation. This area is not normally disturbed by cutting the trees in the forest. Slope in this area is usually extremely steep. Being permanently under vegetation, there is hardly any loss of soil through erosion.

- Water harvesting system - Water harvesting ponds are formed by digging out earthen embankments below the catchment area. The first two small ponds serve as silt retention tanks, followed by a big tank down the slope. The size of these tanks depends on the catchment area, but the usual capacity is 300-600 m3 with a depth varying from 1.5 to 2.5 m. Silt retention tanks are constructed in between the forest land and the main water storage tank to store runoff from the catchment area for a few days. Soil, humus and organic matter is retained in these tanks for a few days before passing to the main tank. Soil containing organic matter is put in the rice fields to enhance the fertility. The ponds are rammed and compacted from the inner sides so as to avoid water loss through seepage. The main water-harvesting tank is plastered on the inner surface with mud mixed with chopped paddy straw to minimize water losses due to seepage. The bottom of the tank is rammed and animals are let loose in it in to make the bottom surface hard to reduce water losses before water is admitted.

- Cattle enclosure - Enclosures are made with wood and bamboo for cattle and are managed by a group of farmers by stocking cattle on a rotation basis. The enclosure is constructed on the lower side of the pond. During irrigation, the water from the main tank is taken to the paddy fields passing through the cattle enclosure so that it carries dung and urine from the animals to make the fields highly fertile.

- Agricultural land - Paddy and other crop fields are located at lower elevations. The application of cow dung and runoff are the common methods of manuring. Leaves and succulent branches of Alnus nepalensis and Albizia lebbeck are also added to the fields and decompose to improve soil fertility. No inorganic source of nutrients is added, making the whole system organic fanning. There is no pollution of the water and the surrounding environment due to the use of fertilizers.

- Impact On Society - The Zabo system of water resource development and management is a unique method of farming which has helped society in improving the quality of life and the environment. Farmers in areas with similar agro climatic conditions are adopting the system to their advantage. The paddy yields in the "Zabo" system are more than double the average yields of the State and three times more than shifting cultivation. The community lives in an unpolluted environment, one free of the frequent occurrence of common ailments. The system has added sustainability to agricultural productivity and has produced a healthy environment as it makes use of only locally available resources.

- Reduction of Risks - Besides having a considerable impact on society, the Zabo system has helped in reducing the risk of floods. Dr. Sharma concluded his presentation by giving emphasis on Zabo system and told that this system is a unique method of water resource development and the judicious utilization of water.

Sessions lasted for 90 minutes. After the completion of the lecture the session was opened for discussion, in which all the students and scientist took part and cleared their query regarding Soil degradation issue and how it can be overcome.

The lecture was concluded by Dr. Arvind Kumar vote of thanks to the Guest Dr. U. C. Sharma and a Shawl was presented by the PI of the project Dr. M. S. Malik, and also thanked to him for organizing such an educational lecture for students and Scientist to enhance their knowledge and also thanked to the students who attended it.