INSTITUTE OF FOREST PRODUCTIVITY
(INDIAN COUNCIL OF FORESTRY RESEARCH & EDUCATION)
RANCHI

Assessment of Carbon Sequestration of different Eco-system/Forest

03.02.2021 to 05.02.2021

A three day training programme under HRD plan sponsored by Indian Council of Forestry & Education, Dehradun was organized by Institute of Forest Productivity, Ranchi on the topic "**Assessment of Carbon Sequestration of different Eco-system/Forest**" from 03.02.2021 to 05.02.2021. In the training programme, a total of 23 scientists and other technical staff from eight different institutes of ICFRE took part. The programme started with welcome speech by Course Director, Sh. Sanjeev Kumar, Scientist-E and Head, Forest Ecology and Climate Change Division, Institute of Forest Productivity, Ranchi and assisted by Dr. Shambhu Nath Mishra. In a brief Sh. Sanjeev Kumar discussed about the warming conditions of earth's atmosphere due to human activities that have caused an imbalance in natural carbon cycle consequently greenhouse effect and global warming. He said that there is more carbon emission in the atmosphere when fossil fuels are burnt for transportation, heating, cooking, electricity and manufacturing which leads to the path of global warming and climate change. He also discussed about the carbon pools along with the basic principles and methods of carbon sequestration. Carbon pool is reservoirs which have the capacity to accumulate or release carbon, play an important role in carbon sequestration.

In his inaugural speech, Dr. Nitin Kulkarni, Director, Institute of Forest Productivity, Ranchi said that these kind of training programme give the opportunity to discuss and interact with the subject experts and later talked about the carbon stocks in environment. He said that the carbon dioxide level in the atmosphere has reached above 400ppm and human activity is the major cause of it. Giving a reference he said that India is ranked 3rd among the top five carbon releasing country. He said that we all need to create an environment where our forests will release less carbon and more carbon will be sequestered in different pools. Carbon sequestration in the present time is a very important topic that needs to be discussed for improvement in sustainable agriculture and agro forestry. Later, he welcomed the speakers and participants from different institutes and wished that this training programme will be a great success.

The speaker Dr. Rajesh Kumar, Dy Director General (Retd), National Statistic Office (FOD), Dehradun gave his presentation on the topic "Forest Carbon Accounting in India as carried

out by FSI". He said after oceans, forests are the world's largest storehouse of carbon and they provide ecosystem services that are critical to human welfare and it includes absorbing harmful greenhouse gasses that induce climate change. Global Carbon stock (carbon stored in pools) amounts for 37,100 gigatons for deep and intermediate ocean whereas 2,300 gigatons for soil and vegetation. Based on the reference of Scharlemann *et al*., 2014, he talked about the organic carbon stored in ecosystems. While talking about the average ecosystem turnover times (years) of different terrestrial pools he said fastest turnover is observed in tropical forests while slowest in tundra forests. He said it is required to understand the climate change dynamics and role of AFOLU (Agriculture Forestry & Other Land Use) that accounts for 1/4th of Global House Gas emissions and mostly LULUCF (Land Use Land Use Change & Forestry). Later he gave a detailed view over the sectors reporting Green House Gas inventory as per UNFCCC.

The speaker Ranjan Bhattacharyya, FNAAS, FRGS, FAScT Principle Scientist, CESCRA, IARI, and New Delhi gave his presentation on the topic "Soil carbon sequestration for sustainable agriculture". In his presentation he discussed that Soil erosion is a quiet crisis that is not widely perceived. Unlike earthquakes, volcanic eruptions and other natural disasters, this human-made disaster is unfolding gradually. Only about 11% of world's land is suitable for growth of crops (13,077 Mha). Annual soil erosion over soil formation is estimated at 25,730 mt per year. 6,000 million tonnes of soil washed off India's croplands each year. Degraded land area in India accounts about- 104.2 Mha (Soil erosion- 74.2 Mha; Wind erosion- 12.0 Mha Soil salinity- 6.73 Mha; Soil acidity- 10.7 Mha). Giving with` reference he said India loses about 13.4 mt food grains worth US $ 2.5 billion (2008-09) due to soil erosion by water in rainfed areas (Sharda et al., 2010) and for maize, loss in productivity is 8.0 to 10.3 kg ha-1 from loss of each mm of topsoil (Ghosh et al., 2012). He discussed Carbon (C) sequestration is a win–win–win strategy because it advances food security, improves the environment and mitigates global warming.

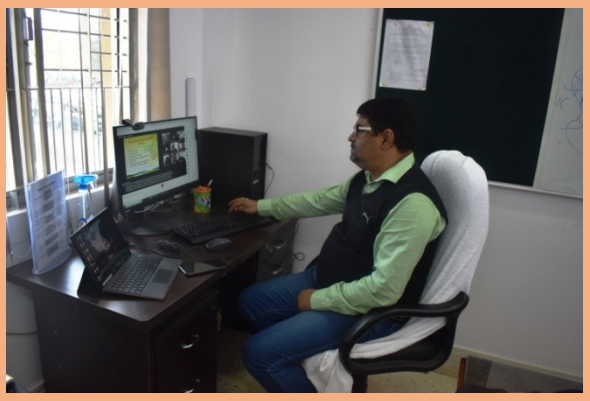
The speaker, Avijit Ghosh, Scientist (Soil Science) ICAR-Indian Grassland and Fodder Research Institute Jhansi gave his presentation on the topic "Practical Aspects of Assessment of Carbon Stock in Agro forestry systems". The lecture started with the basic discussion of carbon cycle in agroforestry and he explained about the measurement of Carbon Stock in agroforestry systems, both tree carbon stock and soil carbon stock need to be assessed. Tree carbon stock comprise of above ground carbon stock and below ground carbon stock. However, soil carbon also comprises of different compounds and they are measured as indicator of different soil functions. Giving reference to a research he said Carbon

sequestration is backbone of ecosystem services in agroforestry systems (Kumar and Ghosh, 2019). By ending his lecture he highlighted and raised few question that must be taken in account, Can agroforestry systems offer a positive carbon credit? Can agroforestry be integrated in societal planning to achieve zero carbon society? and the role of microclimate on carbon sequestration in agroforestry systems.

The speaker, Dr. Shalini Dhyani, Sr.Scientist, NEERI, Nagpur gave her presentation on the topic "Forest Tree Carbon Stock Assessment: understanding uncertainties in the warming world". In her presentation she discussed that forest ecosystems are a critical component of the world's biodiversity as many forests are more biodiverse than other ecosystem. And forest cover 31% of global land area. She said the global search database reports the existence of 60,082 tree species nearly half of all tree species (45%) are members of just 10 families. Nearly 58% of all tree species are single country-endemics. India ranks 3rd in the world for annual net gain in terms of forest area. Biennial SFR, 2019 reported India has increases of 24.56% in its total forest cover. LULUCF sequestered 301,193Gg of total Co2 emission in year 2014, which is about 18% of India's total GHG emission. The total Carbon stock in the forests for 2017 has been estimated to be 7,083 million tones.

The speaker, Dr. Subrata Nandy, Scientist-E/Engineer-SF, IIRS, Dehradun gave his presentation on the topic "Forest Biomass/Carbon and Productivity Assessment using Remote Sensing". He said in his presentation that Forests sequesters a large amount of carbon and thus helps in maintaining the atmospheric carbon balance. Quantification of carbon fluxes and stocks is essential for better understanding of the global carbon cycle and improving projections of the carbon-climate feedbacks. Remote sensing has played a vital role in quantifying carbon fluxes and stocks during the last five decades. The availability of satellite observations of the land surface has made it feasible to quantify ecosystem carbon fluxes and stocks at regional to global scales.

At the end of the presentation, few questions were asked by Sh. Anshuman Das, Scientist-B, IFP, Ranchi, Dr.Hukum Singh, Scientist-D, FRI, Dehradun, Sh. Ajay Kumar, Dr. D.Khotra regarding why we should consider organic carbon content in mineral soil and organic soil only up to a specific depth of 30 cm in India? What is the difference between stock-difference approach and gain-loss approach and among them which approach is generally more used? Why we use NPV (Net Present Value) in Forestry system? What is the formula for measurement of soil carbon sequestration? All these questions were concluded by the speaker with a very healthy and productive discussion.



Glimpses of the Seminar