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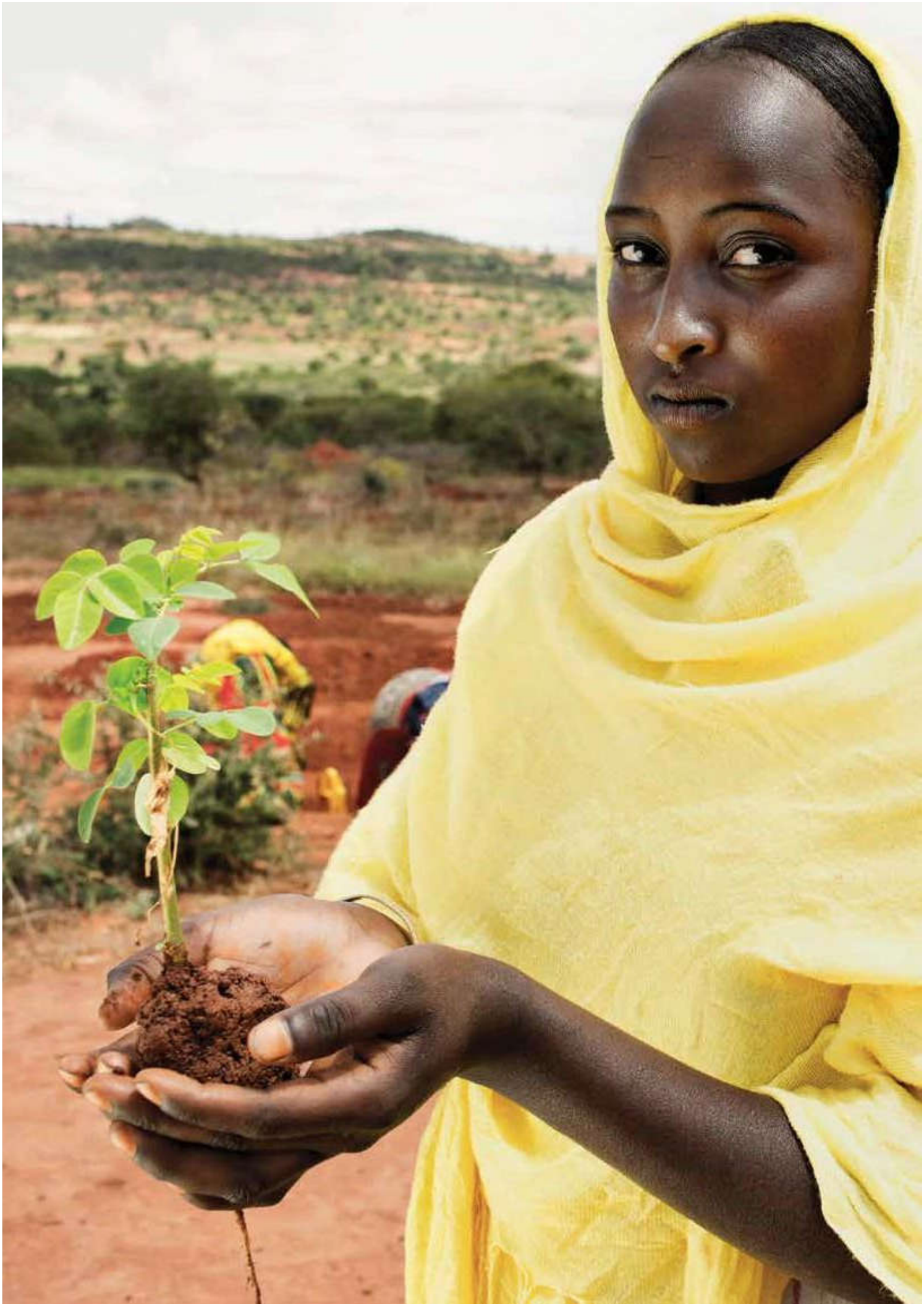

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OP2.1.3. CO_2 sequestration estimation for the Litsea-Cassava agroforestry model in the central highlands of Vietnam

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The Litsea-Cassava agroforestry model has been popularly practiced in the Central Highlands of Vietnam, producing a stable volume and contributing significantly to household income. This model overcomes the shortcomings of mono-cultivation of cassava on land under shifting cultivation; and according to many cycles, the model helps store carbon. It is therefore it is significant in reducing the greenhouse effect, which has become a global concern in recent years. In order to estimate the environment value of stored carbon of this model, the experimental method involves: sample plot, destructive sampling, conducting chemical laboratory tests to determine the stored carbon in the components of the tree; and then using multi-variables to estimate the biomass and stored carbon in the agroforestry models. This procedure forms the basis of predicting the CO_2 concentration in woody trees in the agroforestry model according to the age period, the cycle, and different combinations. The cycle of Litsea business varied over the 5-10 year period, while absorbed CO_2 in the agroforestry model varied from 25 to 84 tonnes per hectare. Within cycle two and three of this model, maintaining 2-3 shoots/stump of Litsea will have the greatest effect not only on productivity, but also on absorbed CO_2.

Keywords*: agroforestry, cassava, CO_2 sequestration, Litsea glutinosa*

OP2.1.4. Assessment of carbon stocks and fractions under agroforestry plantation in the hilly ecosystems of northeast India

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Soil organic carbon (SOC) degradation is very common in northeast India due to shifting cultivation on hill slopes coupled with unscientific management practices and high rainfall in this region. Agroforestry has a potentially important role to play in climate change mitigation through increased carbon storage in the above ground biomass and below ground soil. A 25-year-old agroforestry plantation consisting of four multipurpose tree species (MPTs) (*Michelia oblonga, Parkia roxburghii, Alnus nepalensis* and *Pinus kesiya*) maintained at ICAR Research Complex for NEH Region, Umiam, were compared with a control plot (without tree plantation) for soil organic carbon (SOC) stocks and fractions. Soil samples were collected from 0-15, 15-30, 30-45, 45-60 and 60-75 cm and analyzed for SOC stocks and fractions. MPTs showed significant influence on SOC stocks with the mean values ranging from 47.8 to 60.2 Mg ha^{-1} and followed the order: *A. nepalensis>M. oblonga>P. kesiya>P. roxburghii*>Control. Land conversion from fallow to agroforestry plantation significantly enhanced the total organic carbon (TOC), particulate organic carbon (POC), $KMnO_4$ oxidizable C (labile C) and microbial biomass carbon (MBC) fractions in soil. The increase in these fractions was greater with *A. nepalensis* compared to other MPTs including control. Overall, on average, MPTs increased the TOC, POC, labile C and MBC by 26.3, 54.9, 27.1 and 34% respectively relative to the control plot. Similarly, approximately 17% increase in SOC stocks was observed under MPTs compared to control. All these C fractions including SOC stocks decreased significantly with soil depths. The increased values of lability index and carbon management index under MPTs revealed that land conversion from fallow to agroforestry plantation have more sensitivity to the changes in SOC and other C fractions in soil. The labile soil carbon fractions were significantly (P<0.05) correlated with TOC indicating that the changes in TOC content of