



CO2 Offsets and Poverty Alleviation from Tree Planting in Morocco

Morocco's Need for Trees

According to Morocco's Ministry of Agriculture, one billion fruit trees and billions of medicinal plants are needed as one of several essential contributions in order to overcome poverty in rural areas, which afflicts approximately 80 percent of its people. In addition, drylands cover 97 percent of Moroccan land, being one of the world's best long-term carbon sinks it requires immediate action to halt irreversible degradation of soils.

Obstacle to Transition

Farming families in Morocco are economically compelled to transition toward fruit tree agriculture and away from traditionally growing barley and corn. These staple crops are currently cultivated on 70 percent of agricultural land, yet only generate 10 to 15 percent of agricultural revenue. To address this obstacle to sustainable livelihoods, rural communities must build nurseries to grow from seeds the fruit trees and medicinal plants they need to cultivate in their localities. However, farming households cannot dedicate their land to build nurseries because their survival requires sowing and harvesting every year. Therefore, the in-kind contribution of land for people's nurseries is vital to meet the demand for trees of rural families.

Partners for Land In-Kind

The High Atlas Foundation (HAF) receives land lent in-kind for the nurseries of farming communities from government agencies, universities, and civil groups, including the High Commission of Waters and Forests, the Ministry of Culture, Youth, and Sports, the Ministry of Education and Professional Development, University Sidi Mohamed Ben Abdellah in Fes, Al Akhawayn University in Ifrane, the Moroccan Jewish community, and cooperatives.

HAF Nurseries: Millions of Trees

Currently HAF manages twelve tree nurseries in seven provinces of Morocco. At maximum capacity, they can currently grow 1.6 million organic fruit saplings grown from native seeds. In addition to these twelve locations of community-managed nurseries, HAF has also been lent land without cost from the above agencies to build 13 new nurseries of relatively large size, that if planted to their capacities, includes the generation of approximately 10 million trees per year.



Carbon Sequestration

Based on HAF calculations in consultation with carbon offset experts, the planting of 10 million fruit trees will generate approximately 425,000 verified carbon units (VCUs); 24 trees offset one ton of CO₂ at a cost of \$9.60. To secure these units, the trees require monitoring twice during the first five years. While VCU's are usually stored up to 150 years in living trees, due to the unique climatic conditions of Morocco, carbon is transformed into stabilized hummus, remaining in the soil for up to 1,000 years. HAF commits to sustainable long-term carbon storage, providing the wrap-around service of constructing and maintaining the nurseries, transplanting them with farming families, cooperatives, and education centers, while monitoring and registering the data. Ten million trees impact approximately 40,000 rural households, including 200,000 people, while cooling the climate globally.

As part of this program, HAF will: a) facilitate inclusive community planning of agroforestry projects; b) secure land for fruit tree nurseries that is lent in-kind by public and civil agencies; c) build community-managed nurseries with cooperatives of women and youth; d) plant local or native seed varieties and install efficient and clean energy irrigation systems; e) deliver technical and managerial capacity-building workshops in order to ensure sustainability of the nurseries and the trees planted; f) oversee the transplanting and delivery of the trees from the nurseries to locations in Morocco; g) monitor tree growth and survival rates, and plan and implement measures with partners to enhance the health and productivity of the trees; and h) secure certifications and develop reports (including budgetary and maps) that present accomplishments, challenges, and outcomes of planted tree.

Low Cost Offsets

HAF is able to provide tree planting, monitoring, and the required data to secure CO₂ offsets at the cost of \$9.60 per ton of CO₂ sequestered (growing 24 trees) due to these factors:

1. We grow the saplings from seeds, which allows us to retain significant value, spending only 16 to 25 percent of the private sector price per tree, depending on the variety.
2. The lending of free land by public and civil agencies further reduces costs and price-per-tree unit.
3. The utilization of local fruit seed varieties not only significantly enhances biodiversity, but enables seed procurement in close proximity to the nurseries, reducing transportation costs and increasing survival rates.
4. Nurseries are maintained by local community members who receive from the HAF a fair salary plus benefits, including health insurance and social security, with seasonal workers also coming from the neighboring vicinity. Thus, labor costs are relatively modest with a high level of commitment and satisfaction.
5. Finally, the trees are distributed to the farmers, where capacity building workshops on effective tree planting and care play a key role in maintaining the HAF's outstanding tree survival rate. Farmers pay \$0.20 per tree, and the entirety of that amount is reinvested in seeds in order to replenish the nurseries, provide for their caretaking, and continue the generation of young trees for subsequent years.