CASSAVA STARCH TO BEER:
Transforming agricultural practice in Ghana by applying the Natural Capital Protocol

- At current rates of deforestation, Ghana's biodiversity-rich forests will have disappeared within the next 15 years.

- Agriculture is the primary driver for this loss, which has recently accelerated as the adoption of monoculture farming practice has become more widely adopted.

- Deforestation is depleting natural capital assets and disrupting flows of ecosystem services, such as soil fertility, water regulation and carbon sequestration, as these assets tend to be invisible to farmers and poliymakers alike.

- Oko Forests is developing agroforestry practices to enhance natural capital stocks and improve ecosystem service flows.

Background

It is estimated the tropical west African country of Ghana has 15 years of forest remaining, if the current deforestation rate of 2% per annum continues unabated. The agricultural sector is the main driver of this deforestation, which is accelerating through the more widespread adoption of 'European-style' monoculture farming practices. Such practices are poorly suited to tropical soils and climate, where heavy equatorial rains cause large fluctuations in run-off and erosion.

Cassava is a key agricultural product in Ghana, for which demand is growing fast. Latent demand for processed cassava is estimated to be 1.6 million metric tonnes (t) by 2020, while the current supply is limited to only 39,000t. With Ghanian forests already under intense pressure, this growth in demand cannot be sustainably managed without a change in dominant agricultural practice.

Oko Forests drives solutions

In this context, 'business-as-usual' must be challenged. As an innovative producer of cassava for industrial uses, **Oko Forests** is pioneering solutions to decouple agricultural expansion from deforestation, while enhancing the natural capital base and the ecosystem service flows from the landscape to the communities from where the cassava is sourced.

Oko Forests is developing **cassava agroforestry systems** with a network of smallholder farmers in Ghana's Mampong Ashanti District.

The trees in an agroforestry system help to:

- stabilize soil and prevent eroision during heavy rains;
- retain the water in the soil through sun-shading;
- smooth peaks and troughs in run-off;

Oko Forests work with cassava small holders in the Mampong Ashanti District of Ghana.

- improve soil fertility and moisture by retaining organic matter; and
- fix nitrogen in the soil for improved fertility.

Despite these environmental benefits, for some key national policymakers increasing short term yields is the priority. This approach can neglect the longer term depletion of natural capital stocks and flows.

In response, Oko Forests, in collaboration with the **Sustainability Management School** in Geneva, Switzerland (SUMAS) and environmental consulting firm, **Altus Impact**, has made an initial quantatitve assessment of a subset of the natural capital impacts of improved cassava production systems that use agroforestry principles.

Natural capital assessment

This initial natural capital assessment accounts for carbon sequestration, sediment retention and water purification

Emerging agroforestry techniques being deployed in Ghana by Oko Forests. Tree planting amongst cropped areas provides a number of benefits to soil fertility, erosion control, run-off regulation and carbon sequestration.

models by using the **Natural Capital Project**'s suite of open-source software, including InVEST models and FAO's *ex-ante* carbon footprint tool.

Preliminary results* indicate that deploying a novel agroforestry system and using higher yield, disease-resistant cassava varieties would:

- reduce nitrogen leaching by 1.1%/ha/year;
- reduce soil erosion by 305kg/ha/year;
- sequester carbon at 240t CO_2-e/ha/year;
- double cassava yields from 10t/ha/year to ~20t/ha/year;
- generate additional revenues of US$320/ha/year; and
- enhance income to smallholders during the lean season from the harvesting of Non Timber Forest Products from indigenous and commercial fruit trees.

Sustainably meeting the demand for processed cassava

The high and growing demand for processed cassava is mainly driven by the beer brewing industry. In support of this, Ghanaian brewers currently receive tax incentives to source locally produced materials.

Through the adoption of the Natural Capital Protocol Oko Forests can rigorously quantify and value their positive natural capital impacts, allowing it to guarantee an on-going supply of sustainably produced cassava starch to

major breweries, such as Guinness, the food industry and other consumers of starch in Ghana. In turn, this enables buyers of starch to meet their sustainability and responsibility goals.

The Natural Capital Protocol helps Oko Forests evaluate the sustainability of its practices at scale as well as providing a model for replication by other businesses - especially in light of the growing demand for processed cassava across Africa as a whole.

Next steps

The next steps involve the undertaking of a more rigorous and comprehensive natural capital assessment, including quantification and valuation of natural capital stocks and flows to business and society. Such an assessment will:

- Provide a solid framework to allow for better engagement with smallholder farmers and the wider community in understanding the true value of natural capital and the costs of its depletion and the benefits of its regeneration.
- Help current and future impact investors recognize and evaluate the sustainability credentials of enterprises and projects they invest in.
- Help major cassava starch buyers measure their sustainability and responsibility targets and communicate their actions to their consumers.

* These results are not yet calibrated to local data. Global datasets have been used. Therefore, do not cite this paper.