



SWFLG Briefing Note 9

Sheko's Unique Coffee Biodiversity



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WCC-PFM JUN 2014

Summary

Sheko rainforest is one of the birth places, and centres of diversity and domestication of Arabica coffee (*Coffea arabica*). The forest holds a unique coffee genetic pool that differs from the wild coffee in other forests in Ethiopia. These resources are under threat from deforestation and enhancement planting of improved coffee varieties, which justifies the need for their conservation. The challenge faced is how to conserve this wild coffee gene pool in its natural situation so that it can evolve, especially in response to climate change.

The Wild Coffee Conservation by Participatory Forest Management (WCC-PFM) project has adopted PFM as a strategic approach, enhancing the role played by forests in rural development, especially improved rural livelihoods, while also contributing to better conservation of wild coffee genetic resources. There are several reasons to be optimistic about PFM's positive impact on this conservation challenge:

- PFM engages and empowers local communities and allows them to develop institutions and the capacity to manage and use their forests in a sustainable way;
- Communities appreciate the benefits of the forests, which not only provide products but also create multiple ecosystem services, increasing community desire to maintain the forests;
- Today's forest biodiversity is a result of hundreds of years of human-forest interaction. PFM with controlled human management builds on this, rather than excluding people from interacting with their environment;
- PFM projects in other parts of Africa and Asia have shown the positive impacts of this approach for rehabilitating lost ecosystems and biodiversity as well as better management of existing forests.

Wild coffee and the Sheko forests

Ethiopia's Afromontane rainforests, such as the Sheko forest, are the centre of origin and domestication of Arabica coffee (*Coffea arabica*). They are also the last refuge of the genetic diversity of such species. The forests are the only ecosystem in the world where wild Arabica coffee plants exist today, hence they are a gene pool reserve for the species. Conserving this gene pool is of local, national and global importance.

Coffee genetic resource conservation is crucial in Ethiopia and globally. The Ethiopian coffee sector:

- Contributes 10% of the country's GDP;
- Generates 70% of Ethiopia's foreign exchange earnings;
- Provides livelihoods for 15 million Ethiopian smallholder farmers;
- Employs hundreds of thousands of citizens along its value chain from cultivation, harvesting, processing, transporting to small and big coffee shops and preparing for the export business across the country;
- Helps sustain the global coffee economy (coffee is the world's second most traded commodity), benefitting the economies and coffee consumers of over 70 coffee producing countries.

Coffee is therefore a very important agricultural commodity contributing to the growth and functioning of many economies.

Arabica Coffee and Climate Change

Coffea arabica is a climate 'sensitive' plant due to its restricted ecological range and specific temperature requirements. It is restricted to a high altitude tropical environment. Increasing temperature as a result of global climate change is likely to restrict its habitable environment. Conservation of the wild coffee genetic resources and its ecosystems is crucial to increase the survival chances of the species, and a long term strategy is required. The wild coffee is part of a very important ecological area.

The Afromontane forests of Sheko, which are the focus of WCC- PFM Project, are renowned for their unique coffee genetic diversity. The forests also host a wide range of plant and animal biodiversity other than coffee; there are over 400 plant species many of which are endemic. The forests have been recognized as one of the global Centres of Plant Diversity (CPDs) identified by World Conservation Union (IUCN) and the Worldwide Fund for Nature (WWF) (1988). CPD forests are defined by the presence of many species and a high level of endemism, the presence of an important gene pool of plants of value to people, a diverse concentration of habitat types, a high proportion of species adapted to local environmental conditions, and some degree of threat to the ecological integrity of the area. These same forests also belong to one of the 34 global biodiversity hotspots known as the Eastern Afromontane hotspot.

Sheko's unique coffee biodiversity

Ethiopia's rainforests, and some in neighbouring South Sudan, are the only places on earth where *Coffea arabica* exists in its wild state. This is where these plants evolved and as a result these forests contain high levels of Arabica coffee genetic diversity. Within the Ethiopian forests there is a diversity which varies by geographical region. The wild coffee population in Sheko is one of the most unique (Figure 1, B. Kontir) of all, exhibiting a high coefficient of dissimilarity to those collected from the other forest areas with natural coffee ecology within Ethiopia. It can therefore be said that the Sheko coffee gene pool is unique.



Sheko wild coffee cherries set out to dry

Potential Threats to Wild Coffee Biodiversity in Sheko

Two significant pressures are recognized in Sheko. The first is deforestation and forest land conversion to other land uses. A 2007 study in southwest Ethiopia, including Sheko, revealed significant loss of the natural forest, principally to coffee forest, and also settlement and cereal farm field expansion since the early 1970s. The underlying drivers of this are population growth, immigration, imbalance in incentives and policies which favour agriculture and leave the forest sector weak.

The second threat comes from increasing extension services and policy support for the adoption of high yielding varieties (HYV) of coffee. Although these HYV are selected from local genetic pools, increasing use of, and dependence on, a few selected varieties characterized by limited genetic diversity could reduce the pool for future breeding. In a very few cases, hybrid varieties are also being introduced. There are two potential threats from this process:

1. It is feared that the use of hybrids will cause genetic contamination of the wild varieties in coffee plots, as well as the wild genetic pool in the natural forest;
2. The use of HYV with a narrow genetic pool can cause erosion of broad based genetic pools, and result in an in-breeding effect over time. Lack of comprehensive monitoring of the distribution of hybrid varieties exacerbates the situation.

The combination of deforestation and erosion of the broad based wild genetic pool will have long term detrimental effects on the sustainability of a coffee based economy, impacting on the ability to breed for new varieties for low caffeine, climate change adaptation, disease resistance and so forth. Thus actions for the conservation of a sufficient wild genetic population are not only essential but also urgently needed. This is what the WCC-PFM project seeks to achieve.

Conclusions

Cognizant of the challenges facing this unique Sheko coffee, members of the SWFLG collaborated with partners to design a project to test the suitability of PFM to achieve sustainable *in situ* conservation of wild coffee. The project supports the engagement of communities and sees them as critical to finding and implementing solutions. The project also seeks to minimize reliance on long term external funding by building sustainable community institutions and working closely with government. By testing the application of PFM for the conservation of coffee biodiversity, this project is contributing to the growing experience of the value of PFM for a variety of development goals around the world.

Results from the project are reported in Briefing Notes 11 to 15.

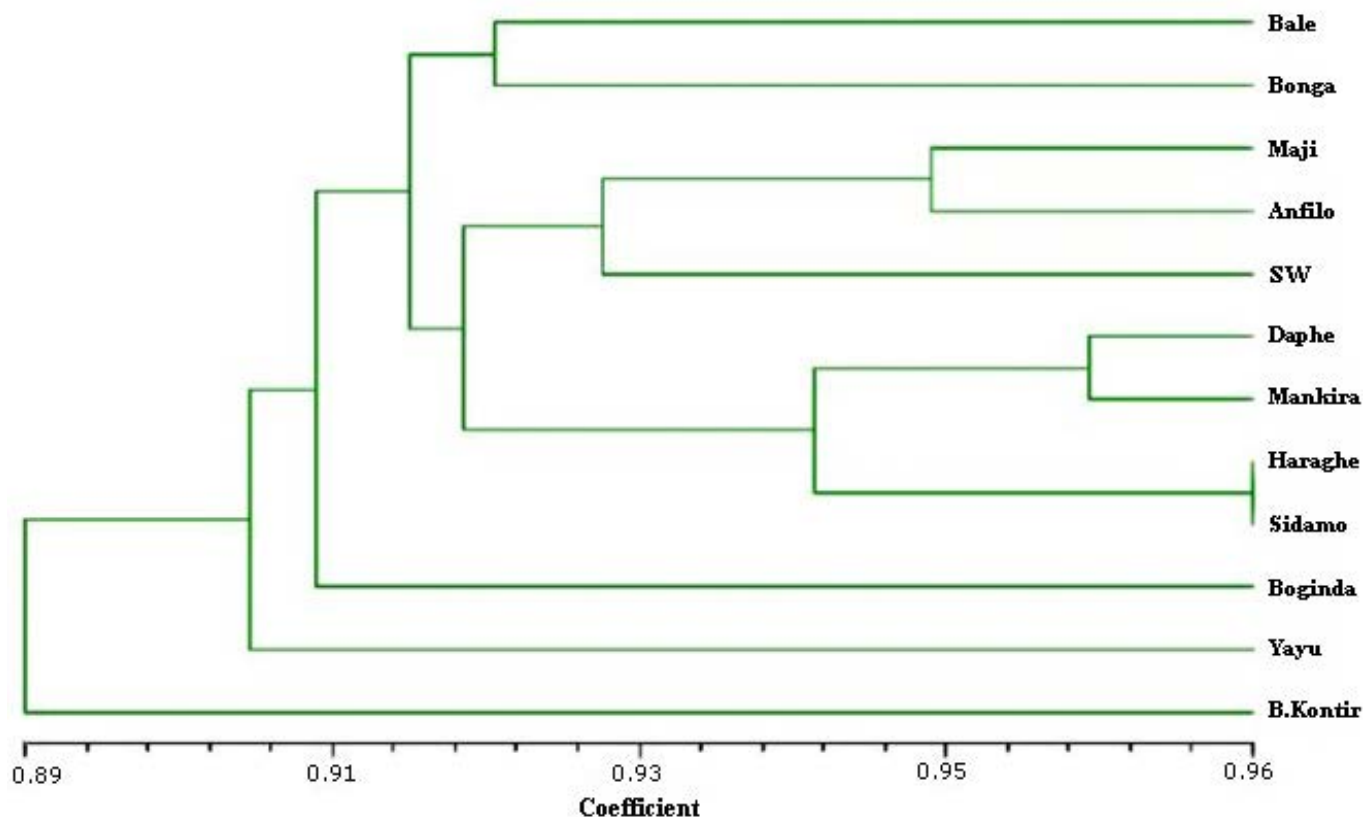


Figure 1. Coffee genetic relations

South West Forests and Landscapes Grouping

SWFLG is an informal grouping of organisations which are interested in the development of an ecologically sound and socio-economically sensitive approach to the management of the south west landscapes of Ethiopia. The members of the grouping to date are: University of Huddersfield (UK), Ethio-Wetlands & Natural Resources Association and Sustainable Livelihood Action/Wetland Action EEIG (the Netherlands). They have been partners in projects funded by the EU and several other international donors since 1996 and have built up specific expertise in the areas outlined above.

The grouping currently has two projects in this area besides the recently completed NTFP-PFM Project. These are:

Wild Coffee Conservation by Participatory Forest Management Project (WCC-PFM) led by the University of Huddersfield with contributions from EWNRA and SLA and funding from the European Union, the Horn of Africa Regional Environment Centre and Network and the UK Government Darwin Initiative.

REDD+ Participatory Forest Management in South West Ethiopia (REPAFMA-SW Ethiopia) led by Ethio-Wetlands and Natural Resources Association in association with the Development Fund of Norway with contributions from SLA and UoH, and funding from NORAD.

The Project is implemented with financial contributions from the European Union Delegation to Ethiopia, the Horn of Africa Regional Environmental Centre and the Darwin Initiative of the British Government. The authors are solely responsible for the views expressed in this document and they do not necessarily reflect those of the funders.

WCC-PFM Project Summary

The “Wild Coffee Conservation by Participatory Forest Management” (WCC-PFM) Project seeks to test and fine-tune PFM so that it can contribute to *in situ* conservation of wild coffee in the forests in southwest Ethiopia. At present the project is working in parts of Southern Nations, Nationalities and People’s Regional State (SNNPRS).

The focus of this approach to *in situ* conservation is the engagement of the communities so that they own and lead the process of PFM and forest management plan development and implementation. The plans include different forest management practices - development, protection and utilisation, including activities to ensure *in situ* conservation. The PFM process is driven by the way in which rights can be devolved to communities and forest-based enterprises developed which help forests become an attractive land use for communities, competing against other land uses and so “pay their way”.

Further details can be found at:
<http://wetlandsandforests.hud.ac.uk/forests.html>

All SWFLG Briefing Notes can be found at:
http://wetlandsandforests.hud.ac.uk/wcc_publications.html

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Project Funding Agencies



European Union,
Environment Budget



Horn of Africa
Regional Environment
Centre and Network



Darwin Initiative of the
UK Government

Project Partners



The University of
Huddersfield



Ethio-Wetlands and Natural
Resources Association.



Sustainable Livelihood Action



Ethiopian Institute of
Biodiversity



Southern Nations, Nationalities
& Peoples Regional State,
Bureau of Agriculture