



# SWFLG Briefing Note 12



# Managing Land Use and Land Cover Change

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## Summary

Wild Coffee Conservation by Participatory Forest Management (WCC-PFM) is a six-year project running from 2010 to 2016. It aims to use participatory forest management to help conserve coffee biodiversity *in situ* in the forests of southwest Ethiopia. In seeking to assess the effectiveness of participatory forest management as an approach to conservation, the project undertook to monitor changes in land cover. Four land cover types were established for monitoring, namely: 1) agriculture & settlement, 2) forest, 3) agro forestry & shrub, 4) grassland. A baseline as an approach to *in situ* conservation was established in 2009/10 in Sheko Woreda where the project began operations. Changes against that baseline were monitored in late 2015, as the project moved into its final year of operations. Changes were monitored in kebeles in which the project worked and kebeles in which the project did not work.

In project kebeles, the annual rate of forest loss was 0.18%. In non-project kebeles the annual rate of forest loss was 2.6%. This is a huge variation and suggests a positive contribution has been made by the project and its approach to Participatory Forest Management.

### Land cover change in Sheko Woreda, (2009-2015)

In 2009, when the project baseline was established, land cover across the whole of Sheko Woreda was divided into the following proportions:

- 68.1% was covered by forest
- 13.3% was occupied by grassland
- 9.4% was classed as agriculture and settlement
- 9.2% was classed as agro-forestry and shrub.

The size of forest land which was 33,927.5 hectare in 2009 had declined to 32,744 hectares by 2015, a reduction of 1,183.5 hectares in six years, representing a decline of 2.4%. Agro-forestry & shrub land and agriculture & settlement increased by 9.2% and 1.9%, respectively. Given the importance of coffee in this woreda it is expected that most of the agro-forestry and shrub category is land planted with coffee bushes. Grassland showed the greatest decline in coverage, down by 8.7%.

### Land cover change differentiated between project & non-project kebeles

The project was not able to work in all kebeles in Sheko Woreda. It therefore sought to assess the rates of change in land cover between those kebeles in which the project had worked and those in which it had not worked. Given the project's focus on forest conservation, the rates of change in forest cover were of particular interest.

Table 2 shows that there has been huge variation between project and non-project kebeles. In the six years between 2009 and 2015, only 1.08% of forest has been lost in those kebeles in which PFM has been introduced by the project and is being practiced. This is compared with 15.57% of the forest being lost in those kebeles in which PFM has not been introduced.

When the percentage of forest cover that has changed over the six years of the project is calculated as an annual rate, project kebeles show a rate of forest loss of 0.18% per annum compared to non-project kebeles which show a rate of 2.6% per annum. This is a huge variation and suggests that the WCC-PFM project is having a major impact in slowing rates of deforestation.

Land cover type	Area in 2009	% of total in '09	Area in 2015	% of total in '15	% change
Agriculture & Settlement	4,692	9.4	5,606	11.3	1.9
Grassland	6,630	13.3	2,287	4.6	-8.7
Forest	33,928	68.0	32,744	65.6	-2.4
Agro-Forestry & Shrub	4,579	9.2	9,190	18.4	9.2
<b>Total (hectares)</b>	<b>49,830</b>	<b>100</b>	<b>49,826</b>	<b>100</b>	

Table 1: Woreda level land cover distribution and change across the whole of Sheko, 2009 and 2015

Project & non-project kebeles	Area (ha)	% of total forest	Total forest change (ha)	Change (ha/yr)	% change of 2009 forest	Annual rate change
Project kebeles forest cover 2009:	28,281	83%	304	50.7	1.08%	0.18%
Project kebeles forest cover 2015:	27,977	85%				
Non project kebeles forest cover 2009:	5,646	17%	879	146.5	15.57%	2.6%
Non project kebeles forest cover 2015:	4,767	15%				

Table 2: Forest cover change in Sheko woreda - a comparison of project & non-project kebeles

## Land cover change in project kebeles – Landsat imagery

In addition to the difference in rates of forest cover change there have been changes in the other land cover types, in project and in non-project kebeles. Preliminary analysis of the Landsat imagery from 2009 and 2015 suggests that major differences include the cultivation of grassland, the planting up of farm and grassland with coffee, and the conversion to other land uses of areas of forest closest to the settlements. Figures 1 and 2 show land cover in Sheko Woreda in 2009 and 2015 respectively.

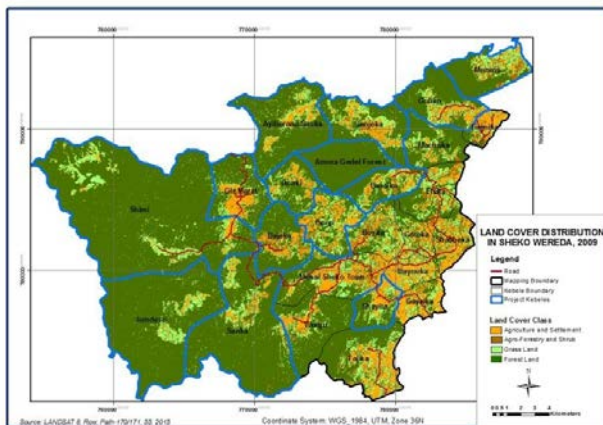


Figure 1: Land cover in Sheko Woreda in 2009

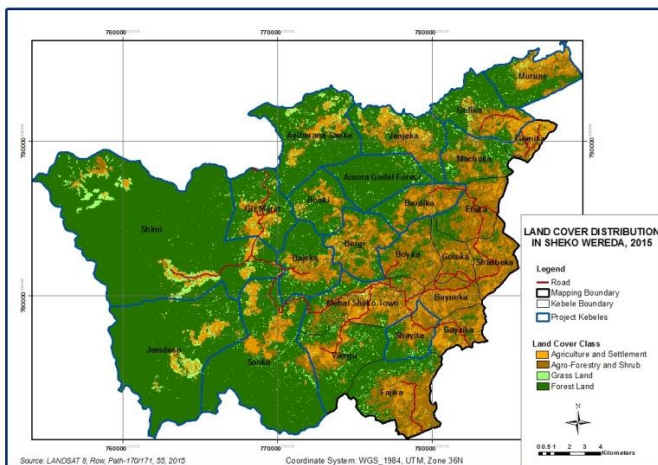


Figure 2: Land cover in Sheko Woreda in 2015

## Investigating the importance of Got-level operations to the success of the project

The results of the woreda level analysis of the Landsat images are very encouraging. But the project recognises that more detailed analysis and research is required, e.g. which of the following has played the most important role in reducing forest cover change? Participatory Forest Management practices; PFM land rights; Local Government support; Cooperatives that have brought financial benefit to the communities working with the forest; external factors such as the price of coffee, etc. As

part of the PFM process, for instance, each community has a detailed Got-level management plan which includes GPS reference points for all wild coffee stands (Figure 3). The maps in these management plans also demarcate boundaries between settlements, areas of lightly managed / natural forest and areas of intensively managed / coffee forest. How important are the Got-level maps and the plans of which they are part in effectively maintaining boundaries between different land uses? The project plans to further investigate changes at Got level and beyond to better understand the most important factors for slowing forest cover change and the potential to apply these more widely.

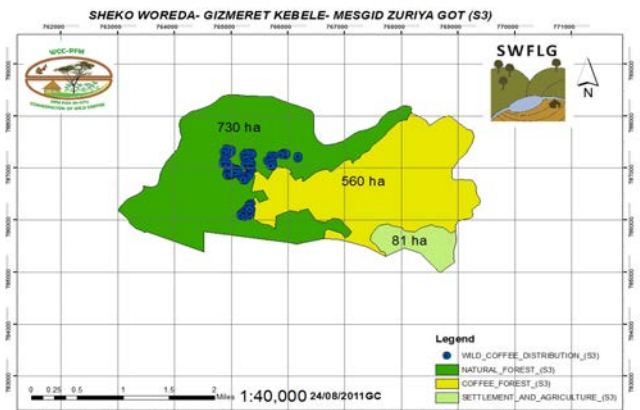


Figure 3: Example of a got level map

## Establishing baselines for future analysis

In addition to working in Sheko Woreda and monitoring changes between 2009-2015, the WCC PFM project elected to consolidate its work in Sheko by working in the three woredas that adjoin it. A land cover baseline was therefore drawn up for Guraferda, North Bench and Yeki woredas where the project began operations in 2014. Figure 4 shows the four woredas and their shared boundaries. Lessons learnt from the WCC PFM project will hopefully be applied in these new project woredas and other ones in southwest Ethiopia and beyond.

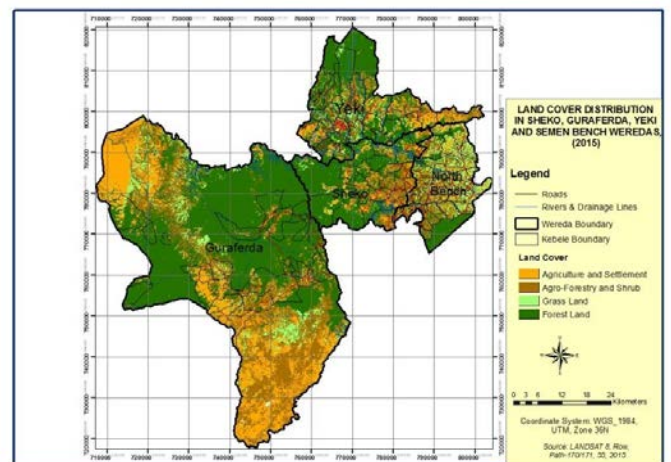


Figure 4: Land Cover Distribution in Sheko, Guraferda, North Bench and Yeki woredas. SNNPR, Ethiopia

Landsat images were used to map the whole woreda. The images were freely downloaded from United States Geological Survey (USGS) website (<http://www.usgs.gov>). They were geo-referenced and radiometrically corrected by USGS. Landsat images from February 2009 and February 2015 were used with the view to reducing seasonal inconsistency and the effects of cloud cover.

## 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](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