

# What Drives Land Cover Change in Eastern Escarpment of Wello, Ethiopia?

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Multiple factors, many operating concomitantly and as a chain of logical causation, were found responsible for non-linear land cover changes along the Eastern Escarpment of Wello (EEW). Unlike elsewhere, population in this region did not turn out to be an important factor in driving land use and land cover change (LULCC); however, it made its own contribution to these changes.



Figure 1: Wirgesa and its environs – A picture depicting marks of several land cover changes (hill top deforestation, hillside area closure, expansion of foot slope ravine/wasteland, soil conservation terraces on cropland, foot slope settlement) (Photo by Amare Bantider 2004)

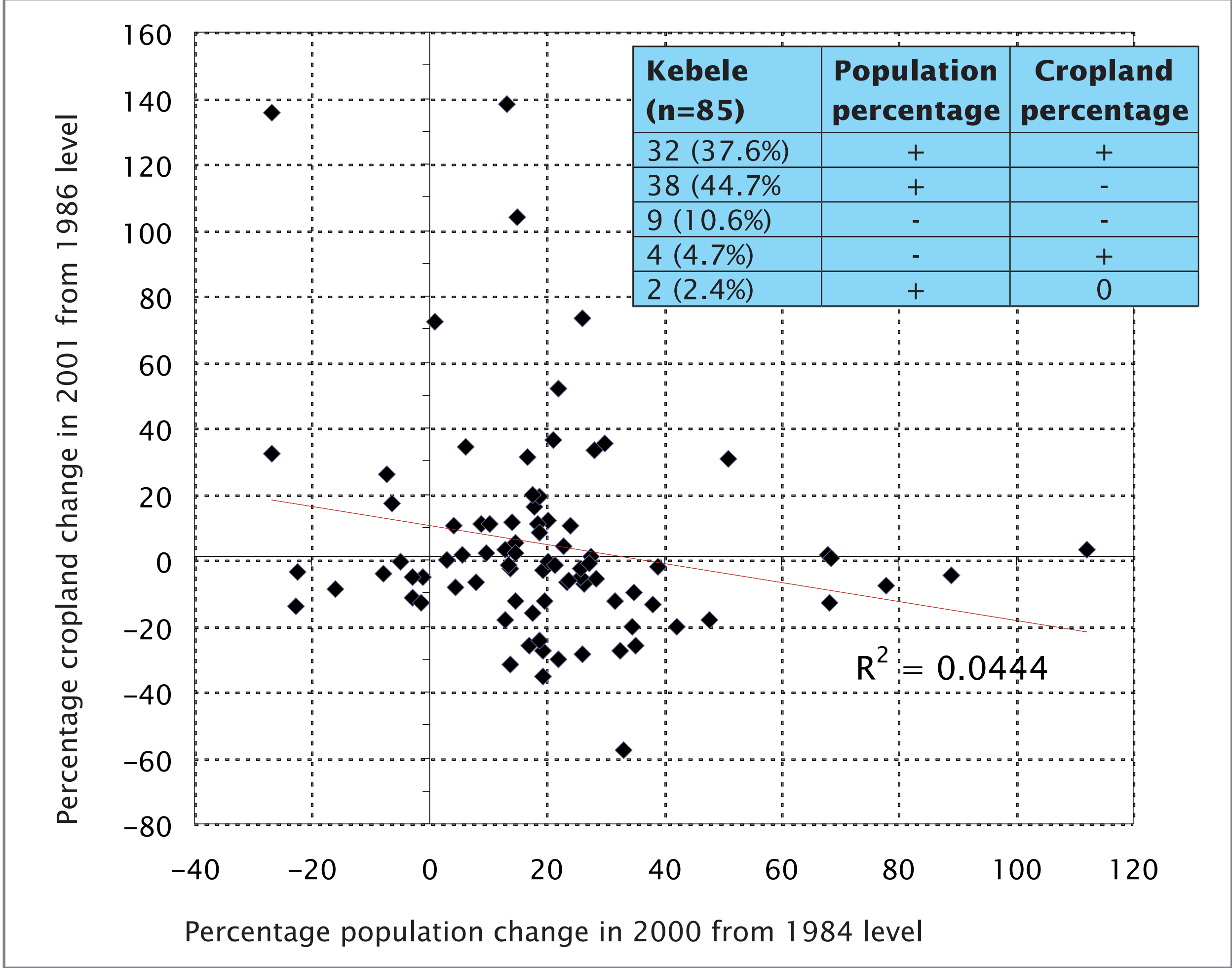


Figure 2: Correlation between percentage population change (1984-2000) and percentage cropland change in selected rural Kebeles of EEW ( $r = -0.02$ , total Kebeles = 85). The inset table in the figure shows that there is no simple association between population change and land cover change in the study area. In some Kebeles cropland and population change are positively correlated while in others not (Kebele is the official smallest administrative unit in Ethiopia having an area ranging between 16 km<sup>2</sup> to more than 50 km<sup>2</sup>) (Amare Bantider 2007).

Agricultural activity and land cover change due to human actions in North Wello have been occurring for more than 2000 years. Empirical land cover analyses from the 1930s to the present revealed three periods of rapid deforestation and a concomitant expansion of cultivated land, and two periods of improvement of woody vegetation cover and a concomitant decrease of cultivated land.

The deforestation phases were from the 1930s to the 1950s, from the mid 1970s to 1980, and from 1990 to the mid 1990s. The major driving forces were: land tenure insecurity and episodic factors (civil war, famine/drought, invasion and patriotic resistance, revolution and violent regime changes).

The two periods of improvement of woody vegetation cover were from 1980 to 1990 and the mid 1990s to the present. The

first period witnessed state-sponsored massive land rehabilitation programmes, backed by international donors and global-level environmental movements. Forced relocation of farmers from steep slopes in order to close/afforest them was also a factor. The second period was characterised by the consolidation of policies/institutions that collapsed during the civil war, the restoration of tree tenure security that was abolished during the Derg Government, the liberalisation of market forces, and the proximity of areas to roads.

Unlike elsewhere, population in EEW did not turn out to be an important factor; however, it made its own contribution to the changes. In general, many of the factors were operating concomitantly and as a chain of logical causation.

Period	Pre-1975	1975-1990	1990-1994	1994-2006
Major process (conversions)	<ul style="list-style-type: none"><li>Conversion of shrubland-treeland to cropland</li></ul>	<ul style="list-style-type: none"><li>Conversion of steep slope croplands and grasslands (grazing lands) to plantation-forestry and shrubland ("closure"),</li><li>Conversion of grasslands to cropland on gentle and flat slopes</li><li>Rehabilitation works dominated on villages/Kebeles located near the highways /roads</li></ul>	<ul style="list-style-type: none"><li>Deforestation of plantation-forests and encroachment of "closure"</li><li>Commencement of private</li><li>Tree-farming / woodlot</li></ul>	<ul style="list-style-type: none"><li>Maintenance of "closure", protection of forest and expansion of private woodlot</li></ul>
Causes and Drivers	<ul style="list-style-type: none"><li>Complex land tenure policy</li><li>Population increase (1-3% per annum)</li><li>The demand for large agricultural produce (status symbol)</li><li>Absence of new technology for intensification</li></ul>	<ul style="list-style-type: none"><li>Land rehabilitation policy</li><li>Environmental movement worldwide (external assistance)</li><li>Availability of technology (SWC) and awareness of the danger of degradation at national level (experts and policy makers)</li><li>Forced / planned resettlement / migration</li><li>Land tenure (state ownership makes it easy to establish "closure" through top-down decision-making process)</li><li>Accessibility</li></ul>	<ul style="list-style-type: none"><li>Civil war</li><li>Power vacuum/ weakness of formal institutions</li><li>Immigration (returnees from resettlement and repatriation of ex-soldiers)</li><li>"Piecemeal policy"</li><li>Tree-tenure security</li><li>Construction wood market in urban areas</li></ul>	<ul style="list-style-type: none"><li>Restoration of institutions after civil war</li><li>Policy change towards private woodlot holding</li><li>Good market demand for Eucalyptus</li><li>Crop yield decline on degraded farmlands</li><li>Accessibility</li></ul>

Table 1: Summary of major driving forces /causes of land cover changes, aggregated at regional level on a time line