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Environmental policy in Ethiopia: a rejoinder to Keeley and Scoones

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ABSTRACT

Ongoing land degradation in Ethiopia requires urgent action, and has been addressed at different levels of society, including widespread soil and water conservation activities, and the introduction of technologies which integrate local knowledge and farmer's initiatives. This comment, drawing on extensive research on soil erosion processes in Ethiopia since 1994, in intense cooperation with farmers and local authorities, challenges the conclusions of a paper published in this journal on environmental rehabilitation and rapid agricultural intensification for food self-sufficiency in Ethiopia (Keeley & Scoones 2000). In our view, this paper firstly underestimates the importance of environmental degradation and apparently rejects current conservation techniques and policy, and secondly makes an artificial contradiction between environmental rehabilitation policy and a participatory approach. In our experience, and in line with studies reviewed elsewhere, natural resources conservation in Ethiopia is directed towards an integration of food self-sufficiency with conservation/restoration of the environment, and frequently follows a participatory approach.

INTRODUCTION

Land degradation in the Ethiopian highlands is related to a stagnation of agricultural technology and a lack of agricultural intensification (Girma &

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Jacob 1988; Ståhl 1974, 1990; Taddesse 1995). It has been caused by the nature of past and present social relations, as well as by international unequal development (Amin 1977; Blaikie 1985; Ståhl 1974). Ongoing land degradation requires urgent action at different levels of society, which has increasingly been undertaken in Ethiopia. Soil and water conservation activities are now widespread. Local knowledge and farmers' initiatives have been integrated with introduced technologies at various levels (Gaspart *et al.* 1997; Herweg & Stillhardt 1999; Hurni & Perich 1992; Mitiku *et al.* 2000; Nyssen 2001; SCRP 2000; Yibabe *et al.* 1999). Scientists involved in soil erosion studies and practitioners of rural development were therefore surprised by a paper published in this journal (Keeley & Scoones 2000), stating that a 'generalised Malthusian narrative' is adopted (p. 96). The paper criticises the adoption of the 'familiar collection of natural resource projects' (p. 97) in Ethiopia, and counterposes 'environmentalist' and 'participatory' approaches, which in no way need to be contradictory. Having been involved in research on soil erosion processes in Ethiopia since 1994, in intense cooperation with farmers and local authorities, we feel the need to respond to this paper, by discussing environmental rehabilitation and rapid agricultural intensification for food self-sufficiency in Ethiopia.

MAN AND ENVIRONMENT, A STATE OF THE ART

It may be useful to address briefly the environmental evolution of the Ethiopian highlands, as a background to current environmental policies. An extensive review of environmental conditions in the Ethiopian highlands is presented elsewhere (Nyssen *et al.* 2003). A long period with water availability throughout the year existed between 10,000 and 4,000 BC, as witnessed by an increase in arboreal pollen, high river, lake and groundwater levels, low river turbidities, and soil formation. Around 2000 BC, there was a shift to more arid conditions and slope instability. Literature gives increasing attention to human interference with the environment in the Middle and Late Holocene (Bard *et al.* 2000; Bonnefille & Hamilton 1986; Brancaccio *et al.* 1997; Ogbaghebriel *et al.* 1998), and many phenomena that have been interpreted as climate driven may be of human origin. Thick sediment deposits as a result of increased upslope soil erosion, and the increase of secondary forest, scrub and ruderal species in pollen diagrams, indicate that deforestation by man destabilised an ecological equilibrium that had lasted more than 6,000 years. At present, sheet and rill erosion throughout the country, gullying especially in the highlands, and wind erosion in the Rift Valley and the peripheral lowlands, are the

most important degradation processes. Most quantitative studies concern sheet and rill erosion, while few deal with gully erosion. Several studies of landslides exist, but tillage erosion[1] has seldom been recognised as a process active in cultivated land (Nyssen *et al.* 2003).

With regard to recent environmental changes, it appears that rainfall variability, apart from the catastrophic impact of dry years on the degraded environment, cannot explain the current desertification process (Conway 2000; Hulme 1992).[2] Changes in land use and land cover, expressing the human impact, are the real causes. Deforestation and removal of other vegetation cover over the last 2,000 to 3,000 years is probably a conjunctural, rather than a linear process. Studies of present-day changes in land use and land cover show a tendency towards increasing removal of vegetation cover (Kebrom & Hedlund 2000; Melaku 1992; van Muysen *et al.* 1998). A set-aside policy has slowed or reversed this trend in northern Ethiopia over the last two decades (Kebrom *et al.* 1997; Nyssen 2001; Tenna *et al.* 2001; Wisborg *et al.* 2000).

The results of the SCRP (Soil Conservation Research Programme) show clear benefits of the soil conservation measures in controlling runoff and soil erosion (El-Swaify & Hurni 1996; Herweg & Stillhardt 1999; SCRP 2000). In wet regions, runoff evacuation requires greater emphasis on the design of soil conservation structures. In these areas, investment in soil and water conservation (SWC) may not be profitable at farm level, although social benefits are positive. This argues in favour of government support for SWC activities (Bekele & Holden 1999; Bereket & Asafu-Adjaye 1999).

LAND REHABILITATION POLICIES IN THE ETHIOPIAN HIGHLANDS

With respect to land degradation and rehabilitation in Ethiopia, Keeley & Scoones (2000) suffer from the following limitations: (1) their underestimation of the importance of environmental degradation and an apparent rejection of conservation techniques and policy; (2) the artificial contradiction that is made between environmental rehabilitation policy and a participatory approach; and (3) a two-page long plea in favour of more international intervention in Ethiopian environmental policy through NGOs, which seems a bit contradictory in a paper insisting on participatory development and bottom-up approaches. This section addresses the first two topics. For the last point, we refer the interested reader to Adams (2000), Africa World Review (1994), Edwards & Hulme (1996) or Smith (1990).

Environmental degradation and improved land husbandry

It cannot be stressed enough that the environmental disaster in Ethiopia is real. Rangeland is overgrazed and the last shrubs and trees between the fields are removed. Soil erosion not only affects soil depth but leads in addition to rapid siltation of reservoirs. Nutrients are lost due to use of cattle dung as fuel, lack of manuring, and soil erosion. Gullying leads to rapid lowering of ground water tables. Keeley & Scoones (2000: 96–7) implicitly deny the existence of such phenomena. They also consider research on environmental degradation in Ethiopia as adopting a 'Malthusian narrative', a deterministic theory claiming that demographic expansion leads to ever-increasing environmental deterioration and other resource depletion (Malthus 1798; Maitra 1986). Most scientific publications on environmental degradation in Ethiopia, however, either do not address the population issue, or link it to important socioeconomic causes, such as war, poverty, foreign influence, or feudalism (Assefa 1986; Foucher 1985; Girma & Jacob 1988; Ståhl 1974, 1990). Grepperud (1996) found a positive relationship between degree of soil erosion and population pressure, but stressed that it 'would probably not have been identified if substantial innovation had occurred in Ethiopia'. The Malthusian approach is found not so much in scientific work, as in numerous reports that are influenced by the dominant theories of international organisations, rather than by scientific research ('the SCRP and particularly Hans Hurni's influence', as it is called by Keeley & Scoones (p. 104)).

Similarly, scientific publications do not generally show exaggerated data on environmental degradation, but many reports addressed to (potential) donor organisations do so. In the late 1980s and 1990s, several authors (Clapham 1988; Gascon 1998; McCann 1998; Pankhurst 1995; Ritler 1997; Wøien 1995) laid bare the myth of '40% forest cover in Ethiopia in 1900'.[3] Reports and newspapers also extrapolate soil loss data collected from runoff plots to whole regions, or even to the whole country, without taking into consideration that most of the eroded soil is deposited in nearby areas. Hänggi (1997) reviews the reasons why runoff plot rates cannot be extrapolated to whole catchments: (1) bounded runoff plots represent a ridge situation, and are unaffected by runoff or soil deposition from above; (2) erosion is a redistribution of soil particles: only a small part of the soil lost from a plot is lost from the catchment; and (3) due to the restricted size of runoff plots, gully erosion and often rill erosion are not taken into account. Other SCRP publications (El-Swaify & Hurni 1996; Hurni 1979, 1982, 1985, 1990) take this scale effect into account, since they make a clear distinction between (often high) soil loss from runoff plots and

lower area-specific sediment yield from catchments. Several authors (Bojö & Cassells 1995; Herweg & Ludi 1999; McCann 1998) argue over the characteristics of land degradation in Ethiopia, but in no way deny the importance of environmental degradation, as Keeley & Scoones state (p. 102).

Many soil conservation techniques are efficient, especially exclosures[4] (estimated to cover now 8% of the highlands of the northern Tigray region) (Nyssen 2001). Other techniques were analysed with the aim of improvement (see e.g. Herweg & Ludi 1999). In Tigray, collective terracing activities take place yearly and most of the highlands are now treated. Many people are now so accustomed to see cropland covered with soil conservation structures in northern Ethiopia that they forget how the situation was 10 to 20 years ago. In regions where the fields are not terraced, there is important rill erosion, a phenomenon that is nearly absent in areas with terraced land. Rather than rejecting the 'familiar collection of natural resource projects', a wise alternative would be to analyse the successes and failures of these projects and measures, and if necessary, to suggest improvements. For instance, we showed that excessive removal of stones for SWC activities can result in threefold increase of sheet and (especially) rill erosion (Nyssen *et al.* 2001) and eucalyptus plantation in edaphic wetlands is a major factor in gully erosion (Veyret-Picot *et al.* 2001). The Ministry of Agriculture and major local NGOs such as the Relief Society of Tigray (REST) are now preparing differentiated SWC approaches for different agro-ecological regions, rather than the standard packages used until now.

Environmental rehabilitation: top-down?

This brings us to the next major issue with respect to the Keeley & Scoones paper: it is unclear what justifies the classification of environmental policy in three major paradigms: (1) 'green revolution', (2) 'environmental rehabilitation', and (3) 'participatory approach'. Keeley & Scoones clearly demonstrate the World Bank's (and agribusiness multinationals') opaque influence on the promotion of a 'green revolution' in Ethiopia:[5] 'a package approach, linking supply of external inputs to a credit programme'. The number of farmers involved in these programmes has greatly increased, especially in areas with better resource endowment. Because of increased use of fertiliser, improved seeds and crop protection measures, crop yields have increased – sometimes greatly.

Farmers' initiatives, however, were often not respected in the implementation of this policy, maybe less even than suggested by Keeley & Scoones.

In Tigray, one could, for example, observe how local administrators induced farmers to accept the mineral fertiliser purchase quota, and blamed those unwilling to take up credit for this purpose as being 'obstacles to our development'.

In central Ethiopia, the 'maize & fertiliser' package was also introduced using the 'quota' system, but farmers are not maintaining it, and every year the extension agents have to go back to the same farmers. This is because maize prices have fallen, and because in low rainfall areas (and in low rainfall years), yields are decreasing, because of water–fertiliser interactions (too rapid crop growth, as compared to the availability of water).

The main problem was that such packages are not site or household specific: 'packages [included] standard applications of fertilisers based on the red and black colours of Ethiopian soils, irrespective of other factors that limit agricultural productivity such as the availability of water' (Berhane & Mitiku 2001).

Soil fertilisation is of great importance in Ethiopia, because of important nutrient depletion over centuries. However, use of mineral fertilisers, sold at (high) market price, with imposed quotas, may result in farmers contracting debts, as well as in a too rapid introduction of the technology, the necessary expertise not being built up gradually. Recent policy changes include the promotion of local soil fertility improvement initiatives (Mitiku 2000), and a new government policy stimulating the farmers to take tailor-made packages corresponding to their resource endowment (FDRE 2001). This new policy puts the emphasis on the site-specific use of packages, starting from indigenous knowledge. With respect to agricultural intensification, the Ethiopian government appears to be returning to farmer-based approaches, developed in the liberated areas during the struggle against the Derg regime in the 1980s: the integration of local and external technologies without losing the best of local practices and traditions (Berhane & Mitiku 2001).

The two other paradigms mentioned above, 'environmental rehabilitation' and 'participatory approach', should in our view not be opposed. First, there is a rationale for strong intervention by government bodies and other development organisations. As Boyd & Slaymaker (2000) state: 'social and economic support for rural populations to prevent the collapse of social structures and encourage labour to stay in rural areas is important, especially where labour-intensive techniques are necessary for natural resource regeneration'. Looking at economic returns, and especially at crop yields, Berhanu *et al.* (1999) and Vagen *et al.* (1999) found that investment in stone terraces in Tigray is profitable at farm level. However, Bereket & Asafu-Adjaye (1999) found that investment in soil conservation technology

may not be viable in the short term, from the farmer's point of view, although the net benefits for the society are positive (decreased gullying, decreased flood risk, less sediment deposition in reservoirs). Hence, 'there is a strong case for governments to provide incentives for soil conservation in view of the economic benefits'. Bekele & Holden (1999) agree on the necessity for public intervention: 'Where higher [crop] yields are lacking, society may have to look for other incentives (carrots and sticks) to persuade land users to install conservation practices.' One merit of the large environmental programmes during the 1980s is that the century-old environmental degradation issue was addressed. Thanks to this, many villages now have a forested area. Travelling around the Ethiopian highlands, one sees that many SWC structures dating from the 1980s are still in place. Our observations show that the destruction of these structures is not as widespread as stated by Dessalegn (1994) and in some other papers. Most of the farmers have accepted and maintain these structures. Most soil bunds throughout Wollo (around 400 km north of Addis Ababa) have evolved into full-grown lynchets;[6] even in the very rainy Ankober area in central Ethiopia, soil bunds have often been 'opened' to allow drainage, but are still in place over most of their length.

Keeley & Scoones rightly state that the Derg government (1975–90) acted on environmental rehabilitation in a top–down way. Major environmental rehabilitation can, however, also be achieved in a participatory way, with decisions at village level. Keeley & Scoones themselves quote the example of Tigray. Environmental rehabilitation is at the top of the agenda of the regional government, and is partly carried out in a participatory way. Senior officials of the different government bodies and concerned organisations in Tigray stress the necessity for more scientific research on soil erosion processes. The 1992 Symposium on Environmental Degradation held in Mekelle established the base for this approach (Aseffa *et al.* 1992), which stresses the necessary partnership of technicians ('with the necessary knowledge, as equal partners and not as patrons') and peasant farmers, 'through a natural extension of the present experience with participation'.

An increasing number of researchers in Ethiopia seek to synthesise the 'natural resources' and 'participatory' approach (see e.g. Atakilte *et al.* 2001; Mitiku *et al.* 1999; Mitiku & Kindeya 2001; Nyssen *et al.* 2001; Wisborg *et al.* 2000; Yibabe *et al.* 1999). Unfortunately, physiographic variables are often neglected by social scientists focusing only on the participatory approach. For instance, at a recently held workshop on farmer innovation in Ethiopia (Mitiku *et al.* 2000), there were many discussions on farmer initiative, participation or networking, but the workshop largely

bypassed the evaluation of the efficiency of initiatives in terms of soil conservation, crop yield or increase of biomass.

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The overall impact of SWC activity in Ethiopia has clear benefits for environmental recovery. Two facts seem to enhance the implementation of this strategy: (1) in a highly degraded environment, with high pressure on the land, no alternatives are left open but to improve land husbandry ('more people, less erosion' – Tiffen *et al.* 1994), and (2) a decision-making process at different levels in society giving the highest priority to the implementation of soil conservation and other environmental rehabilitation. According to our knowledge of the country, and to studies reviewed elsewhere (Nyssen *et al.* 2003), the overall orientation of natural resources management in Ethiopia seems to be directed towards an integration of the necessity, (1) to be food self-sufficient, and (2) to restore the environment, replacing the top–down approach by participatory local level action.

NOTES

1. Tillage induces important downslope movements of soil over the whole thickness of the plough layer. Soil and water conservation structures not only act as a partial barrier for water-induced erosion, but also form a total barrier to tillage erosion (Govers *et al.* 1999). Colluvium is deposited in the lower part of the fields and soil profiles are truncated in the upper part (Herweg & Ludi 1999). On average, tillage erosion generates half of the sediment deposited behind newly constructed stone bunds (Nyssen *et al.* 2000b).

2. Attention in the media to famines in Ethiopia has created a popular view of a drought-stricken country, with a tendency towards decreasing annual rain. Analyses of time series till 1990 give contradictory results. For Yilma & Demarée (1995), 'a decline of the rainfall in the Sahel observed since about 1965 is also seen on a lesser scale in the north central Ethiopian highlands'. Camberlin (1994) found a similar tendency. However, unlike the Sahel, a comparison between two reference periods (1931–60 and 1961–90) yields no significant changes in mean rain over Ethiopia, but an increased interannual variability (Hulme 1992). Mattson & Rapp (1991) state, 'it is not clear whether this pattern signifies the beginning of a long-term reduction or is within the range of normal fluctuations'. Analyses of time series of annual precipitation, reaching up to 2000 AD, both for Addis Ababa and the northern highlands, show that although the succession of dry years between the late 1970s and late 1980s produced the driest decade of the twentieth century in the highlands, there is no evidence for a long-term trend or change in the region's annual rain regime (Conway 2000).

3. In many reports and even scientific papers dealing with environmental degradation in Ethiopia, it is a commonplace to stress that 40 % of the country was covered with forests 'in 1900' (Allen-Rowlandson 1989; Taddesse 1995), '16 %, two decades ago' (Assefa 1986), or even in Eritrea '30–40 % of total land area forested in 1900' (Robinson *et al.* 1995).

4. Exclosure or hillside closure is land under strict conservation management, controlled by the community. There is no grazing, nor any other agricultural activity. Except for yearly grass cutting by the community, there is generally no human interference with vegetation.

5. 'An "aggressive technology transfer" approach … has become central to a number of key policy documents, most notably the government's Food Security Strategy. This document has now become the template for the development of regional strategies and for discussion with donors. The World Bank, also, has invested extensively since 1991 in technology transfer in the seed and fertiliser sectors

through two major projects, the National Seed Systems Development Project and the National Fertiliser Project' (Keeley & Scoones 2000: 96).

6. Between the fields of the northern Ethiopian highlands, one finds, besides the recently introduced stone bunds, many lynchets, with heights ranging from 0·3 m to 3 m. Grasses occupy the riser and a strip on the shoulder. These lynchets are made up of colluvium: the grass strip and the backwater that it creates during important runoff events, trap soil translocated by tillage and water erosion. The integration of such traditional techniques with well-thought-out modern SWC techniques is possible: in Tigray, the introduced stone bunds often rise on the existing lynchets. And especially in the less productive areas, one can observe that the farmers establish grass strips along the stone bunds, in the same way as they do with the lynchets (Nyssen *et al.* 2000a).

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