

THE IMPACT OF RESETTLEMENT SCHEMES ON LAND-USE/LAND-COVER CHANGES IN ETHIOPIA: A CASE STUDY FROM NONNO RESETTLEMENT SITES, CENTRAL ETHIOPIA

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ABSTRACT

Ethiopia is a country characterized by enormous internal human displacements taking place either spontaneously or in planned mode. Recently, such displacement episodes are chiefly caused by two major driving forces: natural and manmade disasters, and development actions. This exerts heavy pressure on receiving/destination areas, which in turn results in swift land-use/land-cover (LU/LC) changes. Hence, a systematic analysis of LU/LC change is so crucial to better comprehend the extent of the change caused by the resettlement schemes. This study, therefore, is carried out to look into the extent of the LU/LC changes caused by the resettlement schemes of 2003/04 in Nonno resettlement sites. The study has made use of three sequential satellite images (1984, 1999, and 2007) and GIS technologies in combination with ground verification. The analysis detected both types of changes (conversion and modification) and five major land use types in resettlement sites. Shrub-grassland is found to be the most shrinking land use type in the area. It reduced from 41.29 percent in 1984 to 24.43 percent in 2007. It shrank at the rate of 1.06 and 7.07 percent per year from 1984 to 1999 and 1999 to 2007, respectively. This change involved a gradual modification of the shrub-grassland to grassland or conversion to farmland. A significant conversion from natural vegetation cover to cropland and settlement area was observed more profoundly between 1999 and 2007, where the cultivated land expanded by 330.41 percent. Another major land use type, resettlement site, appeared only in the image of 2007. This is attributed to the 2003/2004 intra-regional 'voluntary' resettlement program through which the government relocated over 1800 farm households in the area. The change from vegetated land to urban area over the years was found to be insignificant.

Keywords: resettlement; land cover; land use; Oromiya

INTRODUCTION AND CONCEPTUAL FRAMEWORK

It is essential to comprehend the existing definitions and theories related to resettlement schemes prior to working on land-use/land-cover change analysis. The definition of resettlement or internal displacement can be modified from United Nations High Commissioner for Refugees (UNHCR) (2004) and African Union Convention for the Protection and Assistance of Internally Displaced Persons (African Union (AU) (2009). Accordingly, it refers to persons or groups of persons who are

forcibly or voluntarily forced to flee or leave their places of habitual residence in order to avoid the effects of natural and/or human-made disasters and resettle within internationally recognized state borders.

Based on the modified definition above, resettlement or internal displacement can be classified into three categories in Ethiopian context. These are conflict, environmental, and development induced displacements. Conflict-induced displacement happens when people abandon their habitual areas in fear of either small-scale clashes or wide-ranging battles. A range of literatures indicates that such displacement episodes have been occurring throughout human history in Ethiopia. It had been common in Ethiopia during the past military government (*Derg*) when thousands of Ethiopians deserted their habitual areas in fear of the large-scale warfare among freedom fighters and the military government. The Ethio-Eritrean war of 1998 was also among the worst conflicts in Africa. It resulted in an estimated 150,000 to about 180,000 internally displaced Ethiopians (Fritzen, Byon, Nowakski and Pollock, 2006).

Environmental-induced displacement is usually attributed to manmade and natural disasters like erratic rainfall, drought incident, forestfire, flooding, earthquake, and avalanche. It has been a chronic problem in Ethiopia resulting in massive spontaneous and planned population displacements.

Development-induced displacements, on the other hand, have been rare in Ethiopia until very recently. However, the current 'changes in economic progress' in the country have been urging the construction of large built-up areas (chiefly hydroelectric power stations, roads, manufacturing industries, and urban slums upgrading) as a result of which numerous people are forced to leave their habitual areas. A case in point is the fact that the development or expansion *Derba-MIDROC Cement Company* (2008) and *Sheraton-Addis* (2010) projects displaced and/or affected about 432 and 3000 households, respectively, in Ethiopia. Likewise, *Gilgel Gibe I-Bedele 230kv Transmission Project* affected 470 households (Ethiopian Electric Power Corporation /EEPCO/, 2010; Ethiopian Press Agency /EPA/, 2010).

Of the three human displacement categories, the environment-induced one is the most common incident in Ethiopia. People used to drift particularly from moisture stressed and overpopulated northern, northeastern, northwestern, and southeastern parts of the country to more fertile, wetter, and scarcely populated lowland parts since the time immemorial.

Researchers usually dichotomize environmental-induced resettlement schemes into two forms: spontaneous and planned (rather assisted or sponsored) resettlements. Spontaneous resettlement refers to the gradual drift of population, usually in the form of chain migration, from more socio-economic and environmentally stressful areas to areas of better biophysical resources that offer them better livelihood opportunities. It happens when people on their own initiatives move to other places where they think they will be more secure in various aspects such as food security, resource ownership, social stability, and health. The second form of environmental-induced resettlement is planned resettlement, otherwise assisted or sponsored resettlement. This type of government sponsored or planned resettlement programs became well-known in the world in the first four decades following World War II in many developing countries. But starting from the mid-1980s, resettlement schemes were highly criticized and no longer favored. They have been criticized for their high expenses in relation to the

number of persons settled. Such resettlement schemes have been suffering from low productivity, natural resource depletion, high rates of desertion and deaths. In some cases they also appear to have created social tensions among the resettlers, and the hosting community (Oberai, 1986). As a result, the number and scale of resettlement programs declined and by the beginning of the 21st century few countries such as Ethiopia had kept on practicing resettlement schemes.

Planned resettlement schemes can further be classified into involuntary and voluntary resettlements conventionally. Both are considered as viable solutions to increase production, alleviate socio-economic and environmental troubles, and get access to the workforce in means of production i.e. land. Involuntary resettlement, opposing voluntary, is a forced form of resettlement ascribed to forceful events like environmental hazards, development projects, and conflict (Shami, 1993; Gebre, 2004; Piguet & Dechassa, 2004). It occurs when it is imposed on people by an external agent in a planned and controlled manner due to external circumstances which force them to do so. The basic reasons for the involuntary resettlement to happen includes scarcity and variability of rainfall, population pressure, depletion of natural resources, urban upgrading, infrastructure development, expansion of farmlands, and social conflict/unrest. The environment-induced displaces are sometimes termed as 'environmental refugees' Shami (1993). It can be spontaneous or planned based on source of initiatives for the movement.

Some researchers argue that the distinction of resettlement schemes between voluntary and involuntary is more theoretical than empirical; arguing that these two distinct forms of displacement fail to highlight the specific conditions of resettlement (Guggenheim, 1994; cited in Gebre, 2009). Gebre (2004, 2009) also argues the conventional dichotomy lacks conceptual clarity. In an attempt to tackle this limitation, Gebre proposed a modified and more practical conceptual scheme, which identifies four major types of resettlement: voluntary, induced-voluntary, involuntary/forced, and compulsory-voluntary movements. This classification bases on the nature of willingness to move and the causes of displacement.

In this theoretical framework, voluntary resettlement occurs when the migrants have the power to make informed and free relocation decisions and the willingness to leave their original place, whereas involuntary resettlement (Cernea, 2000) refers to the forcible uprooting of people from their original place of residence. As noted in Shami (1993), forced migration is distinguished from voluntary migration by the diminished power of decision in the former, sometimes reaching an extreme in which the forced migrants are totally powerless. Induced-voluntary resettlement, on the other hand, is the situation when people leave their home places to resettle elsewhere due to deliberate acts of inducements/incentives coming from outside agents like NGOs and the government. Although the migrants may maintain decision-making power, the facts on the basis of which their decisions are made, provided, and analyzed by such agencies. According to Gebre (2004, 2009), compulsory-voluntary resettlement occurs when people face forced worrisome removal, and when voluntarily resettled people are denied the right to leave the resettlement area.

As argued by Gebre (2004, 2009) such detailed categorization of resettlement schemes provide a clear practical importance in site selection, planning, implementation, and monitoring the resettlement schemes as well as identifying a responsible body for the failure or success of the program. It also helps to identify and address the resettlers' reaction to the program and identify which remedial measure is appropriate for which resettlement type. For instance, Gebre (2004) writes,

“...compulsory-voluntary migrants embrace forced resettlement initiatives, while involuntary migrants tend to resist it. Resistance to forced resettlement tends to affect the pace and degree of reestablishment in the new environment.”

WHY RESETTLEMENT SCHEMES USUALLY END UP IN CRISES AND ENVIRONMENTAL DAMAGE?

Both global and national experiences show that resettlement usually fails to achieve its objectives. It is usually unproductive, ineffective, catastrophic, grievous, and environmentally detrimental. As in the case discussed by Alula (2009), “...resettlement often leads to impoverishment...and sometimes involves abuse of human rights”. The works of Mengistu (2005), Gebre (2009) and Wolde-Selassie (2009) also vividly depict the absolute failure, harsh and ruinous life experience of resettlers in Ethiopia over previous decades.

Over the years, researchers have tried to describe why resettlement usually goes wrong. Several scholarly literatures attempt to elucidate resettlement processes, risks associated to resettlement schemes, the cumulative impacts of resettlement, and the practical guides to mitigate, if not avoid, resettlement risks. The most notable ones, among others, are Chambers (1969) and Nelson’s (1973) models, which have generalized the experience of voluntary settlers and conceptualized the institutional or organizational dimensions of managed land settlement programs. Scudder-Colson Relocation Theory (1982) was also another such earlier theoretical frameworks. It has greatly influenced relocation literature and resettlement planning in recent years as noted by Asthana (1996). This model argued that relocation, whether voluntary or compulsory, is a stressful experience.

According to Scudder-Colson Relocation Theory (1982) any genuine and legitimate human resettlement process should pass through four distinct stages: requirement, transition, potential development, and incorporation or handing over (Cernea, 1999). This model focuses on socio-cultural systems and resettlers’ stress and their specific behavioral reactions in each stage of the resettlement process. In the first (recruitment) stage, policy-makers may formulate resettlement plans, often without informing those to be displaced. In the second (transition) stage, however, the targeted people must learn about their future resettlement destiny. This may stimulate stress in the potential resettlers. The third (potential development) stage usually occurs after the resettlers are physically moved and relocated in their new areas. At this stage, it is assumed that resettlers begin the process of rebuilding their economy and social networks. It is the critical stage at which the resettlers badly require assistance to determinedly establish their livelihood bases. The fourth (incorporation) stage refers to the integration of the resettlers to the receiving site production and lifestyle systems. It is the stage at which the resettler representatives are encouraged to community leadership positions so that they feel at home in the new environment. This theoretical framework tends to conclude that resettlement is deemed to be successful if and only if it passed through such stages productively (Asthana, 1996; Cernea, 2000).

Whatever type it is, most planned resettlement schemes in the world, including that of Ethiopia, has been reported to be unsuccessful and environmentally devastating. Most of them have faced several predicaments and failed to meet the intended targets. Regarding this, Shami (1993) clearly notes that displacement usually results in multidimensional apprehensions, “...including physiological, psychological, and socio-cultural stresses”. The consequences of resettlement are multiple severely affecting; “...not only the displaced people, but also the community left behind, the receiving community, and

indeed, the society as a whole” (Shami 1993). Shami argues that inevitably resettlement results in multifaceted problems if not appropriately planned and implemented. Hence, most resettlement schemes have failed to meet targets throughout the world in general and in Ethiopia in particular. As a result, resettlers usually face multidimensional risks in resettlement sites, which eventually may lead to complete or partial failure of the scheme. Most of them ended in accelerated environmental degradation site desertion, farther impoverishment and increased fatalities (Gebre, 2004; Asefa, 2005; Bezuayehu and Geert, 2008).

According to de Wet (2004), there are at least two broad approaches as to why resettlement schemes are often unsuccessful. These are the ‘inadequate inputs’ and the ‘inherent complexity’ approaches. In the first approach de Wet argues that resettlement schemes usually fail principally because of lack of appropriate inputs into the program. These include lack of national legal resettlement framework, policies, planning, consultation and monitoring; political unwillingness; inadequate funding and pre-resettlement surveys; and hasty implementation of the program. Cernea (2000), quoted in de Wet (2004), argues that these problems “...can be controlled through a policy response that mandates and finances integrated problem resolution”.

Another de Wet’s approach that gives an insight for the usual unsuccessfulness of resettlement programs seems to have considered only involuntary resettlement. The formulator of this approach, de Wet (2004), called it Inherent Complexity Approach. In this approach, de Wet argues, resettlement fails because of the complex nature of involuntary resettlement which results in a range of problems that cannot be addressed only by the above mentioned kind of inputs. The inherent complexity nature of the involuntary resettlement arises from its basic characteristics including imposed spatial change of resettlers, significant change in the patterns of access to resources, larger and heterogeneous environment, involvement of the people in wider structure, and accelerated socioeconomic changes.

With regards to the inherent complexity nature of resettlement, de Wet (2009) writes that resettlement often imposes forces on the people that may completely transform their lives. It evokes weighty changes in environment, productive activities, social organization/interaction and political structure. The various factors involved in the schemes with their different interests and motives, the varied circumstances under which resettlement take place, the relation between various stakeholders, and others contribute to the intricate nature of resettlement.

As regards to de Wet’s ‘inadequate inputs’ approach, Cernea (2000) has already formulated (in his series of studies in 1990s) what he called ‘Impoverishment Risks and Reconstruction (IRR)’ Model to help in the analysis and prediction of risks associated to resettlement schemes. This risk constructed around three core elements: risk, impoverishment, and reconstruction. In fact, Cernea’s IRR model emphasis the case when people move to a new place in a forced and planned manner. According to this model, population displacement may lead to at least eight forms of socioeconomic risks: unemployment, landlessness, social marginalization (social exclusion), homelessness, food insecurity, loss of access to common property resources, community disarticulation or disjoin, and accelerated morbidity. Other researchers, however,

seem to expand the IRR model by including other risk variables and losses, such as the loss of access to public services, loss of civil rights and temporary loss of access to schooling for school-age children (Downing, 1996; Cernea, 2000).

Alula (2009) blames the emergency-based technical resettlement implementation approaches for the failure of resettlement programs in Ethiopia. This approach usually involves mass dislocation, hasty and dehumanized planning and site selection processes, unorganized implementation and lack of clear consensus with the host and potential resettlers. It is also costly approach economically, socially, and environmentally. Moreover, the fact that mostly the poorest, famine victims and most destitute are targeted to move results in less adaptability and failure of the scheme. Alula (2009) tends to argue that most successful resettlers are those male-headed households with good capital and social network. Hence, Alula (2009) recommends a more flexible human-centered interactive resettlement approach in which the resettlers move to the new area opting for better provisions and livelihood formation. Alula (2009) writes, "...resettlement should be considered as part of a long-term migration strategy including a range of measures, packages, credits, and options to attract settlers who are likely to become successful...". This alternative approach advocates gradual migration processes at their own pace and will, free and continuous two-way flows for mutual benefit, sending-receiving areas interplay, and host-resettler coexistence and joint development schemes for the host and resettlers to help avert the likelihood of failure resettlement.

CONCEPTUALIZING RESETTLEMENT VERSUS ENVIRONMENT AND CLIMATE CHANGE

According to UNHCR (1993), there are four core causes of human displacement worldwide. These are political instability, economic tension, ethnic conflict, and environmental stress. In this section, a brief discussion will be made on issues related to environmental stress and climate change seeing that the case of resettlers under investigation in this study mostly relate to these matters.

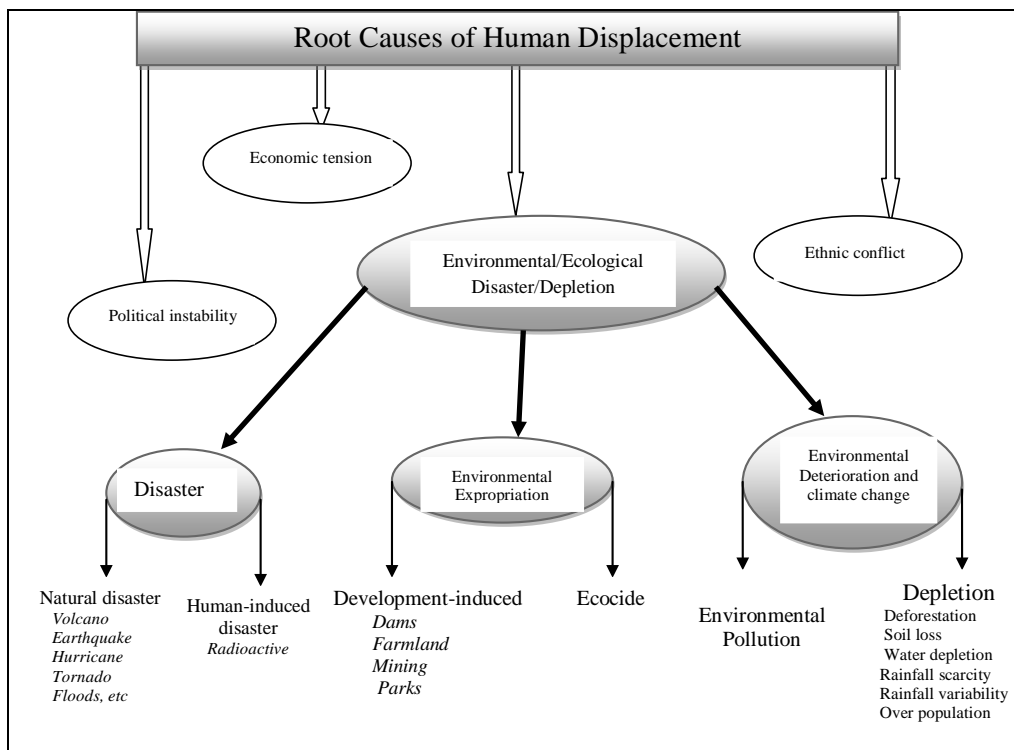
Globally, environmental degradation and climate change has caused population displacement since time immemorial. Historically, people have had to leave their habitual residence because the environment has been worn-out and the change of climatic condition overtime has disastrously influenced their livelihoods. Likewise, the adverse consequences of environment and climate change appear to be among the vital causes of food insecurity and resultant human displacement in Ethiopian history. People in Ethiopia have gradually and spontaneously deserted stressful environments and drifted to more secure areas since time immemorial. Even presently, some physical environments are changing into unfavorable circumstances making human population more vulnerable to socio-economic and environmental stresses that in turn result in massive population displacement like the resettlers under investigation in this study.

The concept of environmental evacuee was firstly described by Essam El-Hinnawi (1985), cited in Bates (2002), as:

"...those people who have been forced to leave their traditional habitat, temporally or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardize their existence and/or seriously affected the quality of their life."

Bates (2002) criticizes the above El-Hinnawi's account for not providing generic criteria to distinguish those people migrating due to environmental issues and those due to other reasons. Moreover, Bates rebukes El-Hinnawi for not specifying differences between types of environmentally displaced peoples. Consequently, he proposed three classifications of environment-induced resettlements, based on the characteristics of basic causes of displacement. These are disaster-induced, expropriation-induced and deterioration-induced displacements (Figure 1). Bates' proposal could be considered as a crucial theoretical framework against which case studies, like that of *Nonno* resettlement schemes, could be measured up.

Figure 1: Causes of Human Displacement



Source: Modified from UNHCR (1993), Bates (2002)

ETHIOPIAN EXPERIENCE IN RESETTLEMENT

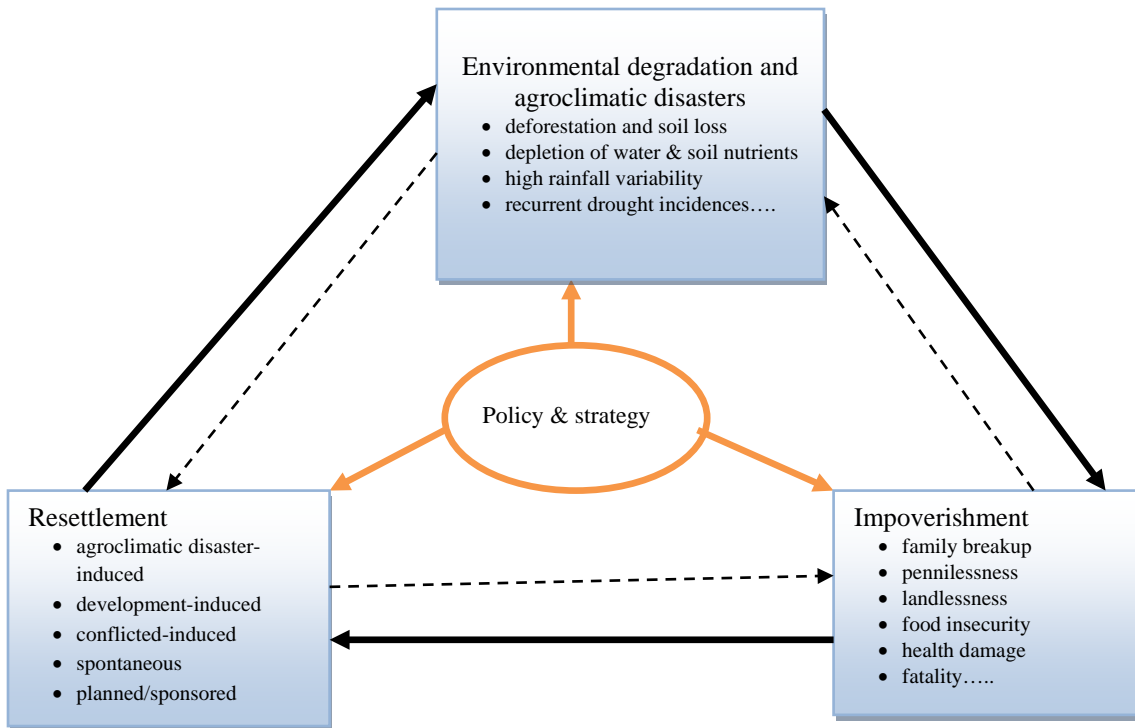
As it could be the case elsewhere in the world, people have been gradually and spontaneously drifting from stressful to more congenial areas in Ethiopia in search of better natural resources, security and hospitality since time immemorial. The drift had been from the north to the south to less populated areas (Federal Democratic Republic of Ethiopia (FDRE), 2004). Regarding planned resettlement, however, Ethiopia has begun to practice population relocation most notably since 1958 when the Imperial Government (1930-1974) established the first known planned resettlement scheme in the present day SNNP Regional State (Cernea, 2000; Gebre, 2004/09; Fosse, 2006). Resettlement schemes during the Imperial Period involved only 20,000 households (Feleke, 2004). It was also designed to achieve specific and limited objectives. At that time, state-sponsored-resettlement was largely undertaken to promote two objectives though failed to meet any. The first of these was to rationalize land use on government owned land and thus raise state revenue. The second was to provide additional resources for the hard pressed northern peasantry by relocating them to the southern regions. However, the results were generally poor.

The schemes failed and most settlers left the project. This was because of inadequate planning, inappropriate settler selection, inadequate budgetary support, and inexperienced planning and executive staffs (Pankhurst & Piguet, 2004).

It was during the Military Government (*Derg*) (1974-1991) that intensive and widespread resettlement schemes took place in Ethiopian history. *Derg* argued that the major objective of the program was to promote economic development and improve the living standards of the rural people. Specifically it aimed to ease the tension of farmland scarcity in central and northern parts of the country, combat drought, avert famine, and increase agricultural productivity. Initially, it insisted the resettlement program as purely voluntary and only a mechanism to organize the haphazardly drifting population in huge quantities from overworked and drought-stricken areas to more fertile and sparsely populated ones. However, practically the implementation of the program seemed to have the characteristics of forced or compulsory-voluntary relocation. *Derg* implemented it forcefully and even on quota bases without the consent of the potential resettlers (Ofcansky & LaVerle, 2002). Gebre (2004) clearly indicates the forceful mass dislocation practices to the extent of compelling the potential resettlers from market places and farms and sending them off collectively to the new areas where they had no prior information. At the new areas, (for example, *Beles* Resettlement Scheme) they had been deprived of their basic human rights, such as freedom of movement and social gatherings, thinking that the resettlers may get away.

Derg resettled 38,818 households by 1976 in 88 resettlement sites. By 1982, there were 112 planned resettlement center inhabited by more than 120,000 resettlers. During the ten-year development plan period (1984-1994), *derg* planned to relocate 115,000 peoples. Two months later, however, the government revised its plan and announced to resettle about 300,000 famine victim households (equivalent to 1.5 million peoples) from the most severely affected northern parts of the country to areas in west and southwest that had adequate resources and rainfall (Getachew, 1989; Gebre, 2009). One should note here to what extent it was haphazard and hasty. Of this, the government managed to resettle about 600,000 people (Mberu, 2006), Alula (2009) says 627,000 people, as of 1986 to three settlement areas. More than 250,000 displaces went to *Wollega*; about 150, 000 were resettled in *Gambela*, and over 100,000 resettlers went to *Pawe* (Gebre, 2004 says 82,000) in the present day *Benishangul-Gumuz* National Regional State. In addition, another 78,000 resettlers went to *Kafa*, *Shewa*, and *West Gonder* (Ministry of Agriculture and Rural Development /MoARD/, 2009).

Figure 2: Vicious circle of resettlement schemes during *Derg* Regime in Ethiopia



The review of the *Derg's* resettlement program would not be inclusive without mentioning another common practice of population relocation program commonly known as *villagization*. It was initiated in 1985 with objectives of transforming the rural community. Under this program *Derg* had attempted to group the scattered farming communities throughout the country into small village clusters, to promote rational land productivity; conserve natural resources, and provide access to public services like clean water, clinics and schools, electricity, market and cooperatives. It was also meant for escalating public self-defense and guarantee peace and security throughout the country. Government guidelines stipulated that villages were to house 200 to 300 households, with 100m² compounds for each family. As a result, by March 1986, about 4.6 million people in *Shewa*, *Arsi*, and *Hararge* had been relocated into more than 4,500 cramped villages. The government had villagized about 13 million people by 1989 in 12 of the 14 administrative units (*kiflehagers*); the exceptions being Tigray and Eritrea (Ofcansky & Berry, 2002).

Similar to its resettlement program, the *Derg's* villagization (collectivization) schemes eventually collapsed. A case in point is what is indicated in Ofcansky and Berry (2002): "Thousands of people fled to avoid villagization; others died or lived in deplorable conditions after being forcibly resettled... The services that were supposed to be delivered in new villages... were not provided [or provided with paltry resources] because the government lacked the necessary resources". Moreover, the program was severely criticized by international organizations and local academia. This, coupled with deteriorating security conditions and lack of resources, doomed the plan to failure. Owing to critical international and local criticisms to the program, *derg* essentially abandoned villagization in the early 1990 when it announced 'free-market' reforms.

Regarding the current government-sponsored resettlement situation in Ethiopia, the Federal Democratic Republic of Ethiopia (FDRE) was initially reluctant to consider resettlement as a viable option for development (Alula, 2009). However, the occurrence of a severe drought in the early 2000s and the resultant food security crises has initiated the government to launch intra-regional resettlement (also known as access to improved land) program. The main objective of the program at its commencement was to enable up to 440, 000 desperate and chronically, food insecure rural households attain food security in the cost of slightly over 2 million US Dollar (FDRE, 2003). It has then become key components of development strategy documents such as the Federal Food Security Strategy (2002), Sustainable Development and Poverty Reduction Program (MoFED, 2002), Rural Development Policy and Strategy (MoFED, 2003), New Coalition for Food Security Program (FDRE, 2004), Plan for Accelerated and Sustained Development to End Poverty, (MoFED, 2006) and Growth and Transformation Plan (MoFED, 2010).

The government initially began a pilot resettlement scheme in 2002-2003 that has resulted in intra-regional resettlement of about 45,000 households (180,000 people) in three regions: Amhara, Oromiya, and Tigray. Six months after the pilot phase, the government planned to implement a more intensive and prolonged intra-regional resettlement scheme targeting to resettle about 440,000 households (2.2 million people), who were land-poor/landless and lived in overworked, densely populated, and environmentally degraded rural areas (MoFED, 2006). They were prolonged food insecurity victims attributed to erratic rainfall conditions and population pressure. However, only 198,896 such households (equivalent to 1,317,054 peoples) were reported to have resettled in four major crop producing regions, (Amhara, Oromiya, Southern Nations and Nationalities Peoples Regional State /SNNPRS/ and Tigray) as of June 2009.

The current resettlement program seems different from the cases of the two previous governments in various ways. The most important variations are the fact that the current program considers only voluntary households as well as the resettlers are offered with the right to return to their home if unhappy in the new areas and keep their holdings in their original homeland for 3 years. The current program is also carried out intra-regionally to prevent conflicts among resettler and host community and enable both groups partake in local sustainable development endeavors. Moreover, the potential resettlers are recruited after intensive discussion forums and campaigns at *kebele* and sub-*kebele* levels. In this case, Alula (2009:175) writes, "...many of the abuses, shortcomings, and failures of the earlier phase [1980s] are avoided in the current program...".

However, some findings still indicate the existence of disputes in some sites. There are researchers (Desalegn, 2004; Gebre 2004; Hammond, 2008; Alula and Piguët, 2009) who argue that the program is inconsistent with the conventional concepts and definitions of voluntary resettlement though it seems a bit better than the earlier ones. Alula (2009), for instance, argues:

... the extent of voluntariness and ability to make real choices was constrained by four factors: (i) desperation resulting from increasing land shortage, drought and destitution [in sending areas]; (ii) the idyllic picture presented of the resettlement sites and the exaggerated promises of support; (iii) warnings in some areas that food aid would not continue in drought-prone highland areas; and (iv) social pressures from peer groups, kin, neighbours, and community members...

In fact, some recent research findings (Messay, 2009) verify that some resettlers are better off in their new sites at this moment than the case in their original residences. There is a trepidation that 'today may be better than tomorrow' in the sense that the prevailing high birth rate and unwise use of natural environment may result in 'vicious circle of resettlement'.

According to the FDRE's Food Security Program (2009–2014), resettlement will remain essential in food security attainment endeavors provided that there are fully volunteer farmers for intra-regional resettlement though some researchers (Alula, 2009) disagree with the presence of fully volunteers farmers to move. As a result, at least 173,835 households will be resettled within three years (2009/10-2011/12) in three major grain producing regions: Amhara, Oromiya and SNNPR. Likewise, the government planned to resettle about 45,000 households (180,000 peoples) in *Gambela* in 49 villages over the next three years /2010/11-2012/13/ (EPA, 2010). These forthcoming resettlement schemes are expected to be implemented in the same process as the cases since 2003. The position of the fourth major region, Tigray, has not yet been known whether or not to implement resettlement program henceforth.

THE CURRENT APPROACH TO RESETTLEMENT IN ETHIOPIA

As clearly discussed hereinbefore, the Federal Democratic Republic of Ethiopia embarked on planned intra-regional resettlement program in 2003 under four major pillars (voluntarism, availability of underutilized land, consent with the host and resettler community, and preparation at receiving areas) and numerous nice-looking (good-looking) guiding principles (FDRE, 2003). Moreover, the program targets only relatively impoverished resource-poor small-holder rural households who are 'entirely volunteer' to resettle somewhere in their respective region without any external pressure or manipulative mechanisms. Some academia (Desalegn, 2004; Alula, 2009), however, argue that the current resettlement scheme is rather devious, costly, wasteful, hastily undertaken, and lacks public consultation.

In order to make the resettlement scheme fair, free and triumphant, Resettlement Task Force was set at all administrative levels to accomplish everything related to resettlement schemes. At all levels the heads of administration chair the committees. Additionally, technical committees were formed at different levels responsible for the assessment of the technical aspects of planning and implementation. Intensive awareness creation activities are required to be accomplished both in the sending and receiving areas to orient and convince both the resettlers and hosts about the worthiness of the program. The expense of the program is covered by the Ethiopian government alone as donors are reluctant in funding the program in fear of the possible human and environmental crises.

The whole family of a resettler household may move altogether at a time or heads of households move initially, as the case in SNNPRS /2003-2005/ (Wolde-Selassie, 2003), and then other family members tag along after having established basic needs in the receiving area. The resettlers are entitled to maintain their land in the home areas for three consecutive years. Except selling or mortgaging, they can either sharecrop or cultivate the land by using either part of the family labor left behind or making institutional arrangements through local social networks.

a) Recruitment and transportation of the resettlers

First and foremost, only areas under severe chronic food insecurity and regular relief support qualify for resettlement. According to FDRE's (2003)-resettlement manual, Resettlement Task Forces (RTF) at different administrative stages are in charge of identifying such areas and potential resettlers. The task force at *kebele* level is responsible to orient, persuade and recruit potential resettlers. Only the food insecure, healthy, and those household heads or individuals at productive age and capable of producing enough food in the new areas qualify for resettlement. Pregnant women, people with physical and mental disabilities and elderly group of population never qualify for resettlement. Contrary to this, however, 4.4 percent of the resettler household heads in *Nonno* were found to be over 55 years old and 3 of them are 70. The resettlers are also expected to be free from any form of debt and other sideline social misbehaviors such as insincerity, theft, corruption, and dishonesty. Moreover, socio-economic and cultural factors that would facilitate productivity, adaptability, and host-resettler coexistence are taken into consideration.

The qualified resettlers move to the new area by trucks or buses free of any charge. Resettlers are provided with farmhouses, sufficient relief food, farmland, simple agricultural tools and utensils, and basic public facilities upon arrival. The resettlers are free to visit their families and can freely decide either to return or establish life and livelihood in the new location.

b) Preparations at receiving areas

According to FDRE's (2003) resettlement manual, site selection and brief assessments should be made by regional and zonal experts in consultation with local administrators and community representatives. The group assesses availability of farmland, hospitality, and amiability of the hosts, peace and security, agricultural potential, and accessibility of the receiving areas prior to the real commencement of relocation process. This is to be approved by delegates designated from potential resettlers and community elders who are in charge of visiting and verifying the suitability of the new sites. At the new site each resettler household is guaranteed a package of assistance that includes provision of up to 2 hectares of standard quality land (for cultivation, grazing and backyard) per household, irrigable land (if available), seed, traction animal, simple farm tools, cooking utensils, and food rations until they harvest their first produce. Settlers are also assured sufficient access to essential public services/clean water, health, education, and feeder road/ (FDRE, 2003). Contrary to this, 15.7 percent of the investigated resettler households in *Nonno* are discontented with the assistance made available to them asserting that they were not provided with what they had been promised prior to the onset of the resettlement scheme.

The host communities are expected to voluntarily support the incomers in constructing temporary shelters and making available cooked foods during the initial stages of their arrival and adaptation. The pattern of the sites is either separate villages or intersperse the newcomers among hosts if there is free space. The interspersed pattern of resettlement seems crucial in that the hosts share their overall experiences so that the incomers adapt quickly and easily.

It was amidst the above stated facts that 2,226 households (2,171 male-headed and 55 female-headed households) or 14,899 peoples (7,513 males and 7,386 females) were resettled in two woredas of West Shewa Zone of Oromiya National Regional State in 2003 and 2004. All the resettlers came from Arsi and East Hararge Zones of the region. Of the total resettlers, 1,747

households (78.5 percent) resettled in *Nonno Woreda*. According to West Shewa Zone Food Insecurity Disaster Preparedness and Prevention Office, some resettlers generated huge capital at present let alone attaining food security.

In fact, *Nonno* and its vicinities are not new to resettlement schemes. The flatness, good soil type and fertility as well as the sparse population settlement, up until recently, has been attracting both spontaneous and government sponsored resettlers since the Imperial Period. Living evidences assure that people from different corners of the country, particularly from two areas of Amhara National Regional State, *Wollo* and North Shewa, have been spontaneously drifting in towards *Nonno* and its vicinities. The fact that over 16% of the total population in *Nonno woreda* (excluding the 2003/04 incomers) is ethnically Amhara (CSA, 1996) may be outstanding evidence for the prolonged drift of population to *Nonno* from Amhara Region. Regarding to the history of planned resettlement, first and foremost the Imperial Regime resettled about 260 households, who came chiefly from the present day North Shewa Zone of Amhara Region, around *Jibat* forest at the border of *Danno* and *Nonno* woredas in 1960s. The military government (*Derg*) also resettled urban unemployed and displaced soldiers of the Imperial Government in 1970s around *Darge* and *Fasfasse* rivers in *Nonno* and *Abashige* (in Guraghe Zone) woredas. Again, *Derg* resettled people from the present day *Kambata* Zone around *Walga* River in *Abashige* woreda in 1980s. Likewise, the current government (FDRE) has moved over 9,000 incomers from drought-prone and overworked areas of Arsi and East Hararge zones in 2003 and 2004. The gradual spontaneous drift of people to the area has been continuing until today as a result of inducements by prior reseller relatives.

THE STUDY AREA

a) Location and brief biophysical profile

The resettlement sites (*Biftu Jalala*, *Hallo Dinki* and *Jiru Gamachu*) are located in the district of *Nonno*, West *Shewa* Administrative Zone of Oromiya National Regional State, Central Ethiopia. The resettlement sites are located in a flat terrain milieu (most areas <15% slope) with altitude ranging from about 1200m to about 1600m above sea level. The sites count up about 62 km².

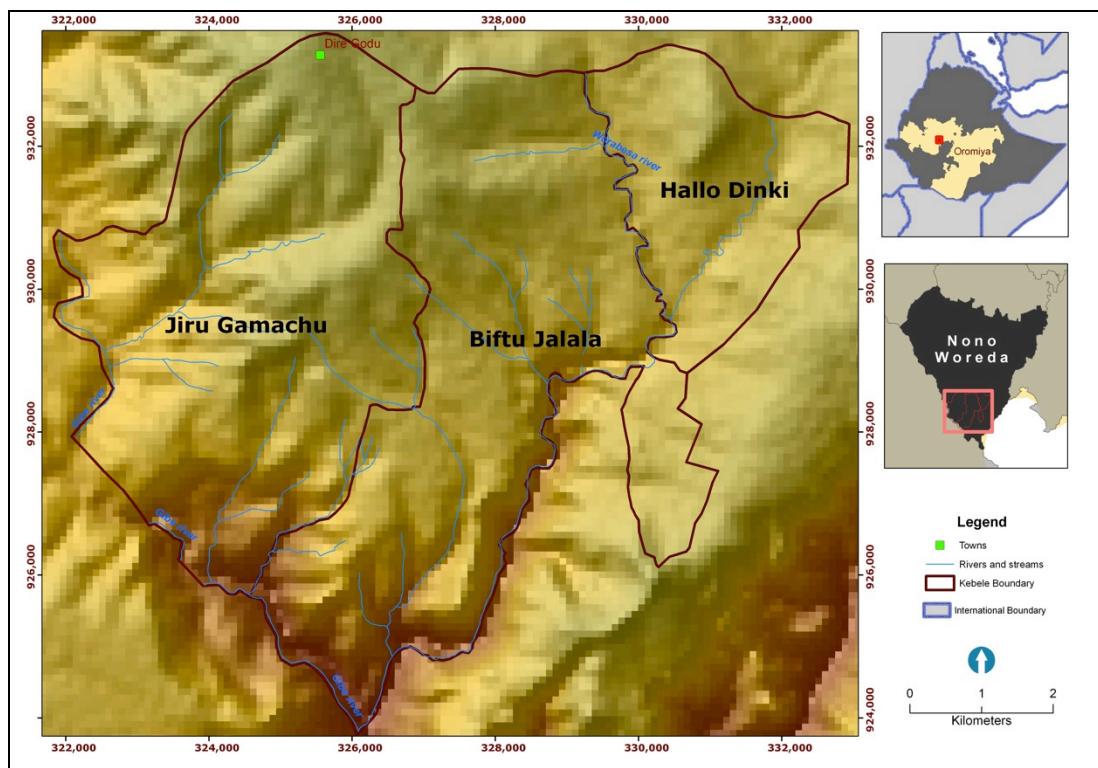
Climatically, most parts of the resettlement sites belong to moist *woinadega/semi-humid/* (65.8 percent) and *moist qolla /humid/* (34.2 percent) agroclimatic zones. Table 1 presents a brief description of the sub-agroecological zones and the dominant crops in the area.

Table 1: Agro-climatic zones of the resettlement areas

Characteristics	Agro-climatic zones	
	Moist <i>woinadega</i> (<i>Semi-humid</i>)	Moist <i>qolla</i> (<i>Warm semi-arid</i>)
Altitude (m amsl)	1500-2400	500-1500
Rainfall (mm)	900-1400	800-1400
Dominant crops	Teff, barley, maize, sorghum, wheat, nigger seed and millet	Sorghum, maize and sesame
Dominant livelihood strategies	Subsistence rain-fed agriculture, traditional animal husbandry (mainly cattle, sheep, goats, equine, poultry and apiculture)	Rain-fed agriculture, animal husbandry (mainly cattle, goats, equine, poultry, apiculture and minor fishery), charcoal production, firewood collection, small-scale traditional irrigation,

Source: Limited fieldworks based on Negash (1987)

Figure 3: Location of resettlement sites

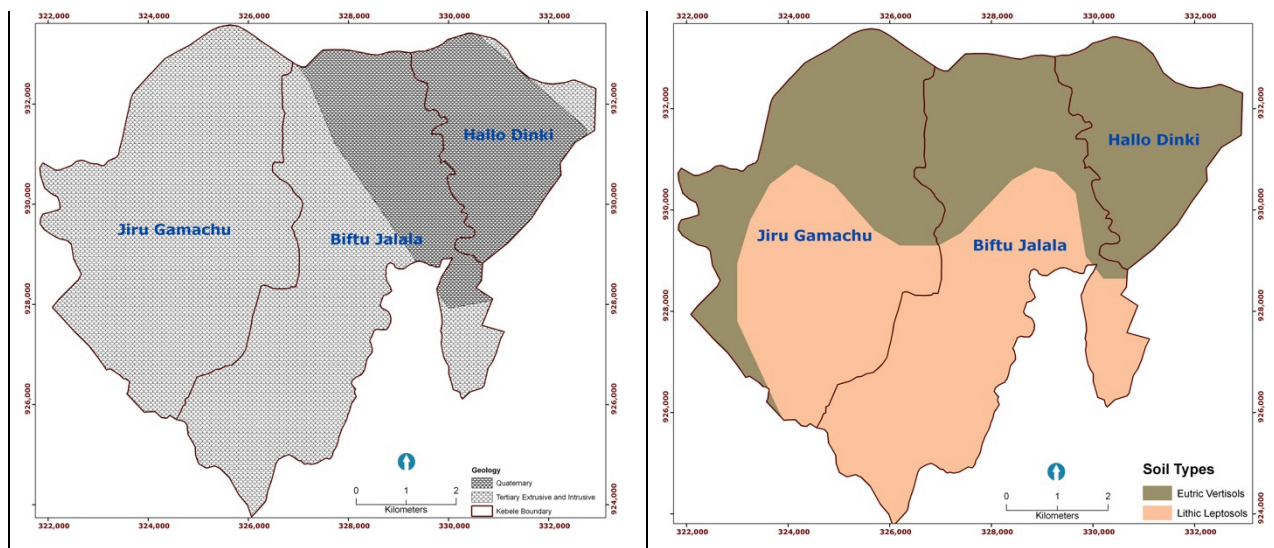


b) Geology and soil

The geological structure of the Ethiopian highlands in general and resettlement areas in particular are characterized by extreme folded and foliated basement Precambrian rocks overlain by Mesozoic marine strata and Cenozoic basement traps.

This series was uplifted in the Upper Eocene as part of the Arabo-Ethiopian swell resulting in the present day Ethiopian highlands (Ethiopian Institute of Geological Surveys /EIGS/, 1996; Geological Survey of Ethiopia /GSE/, 2003). Specifically, the major geological formations of the resettlement sites are primarily intrusive and extrusive quaternary and tertiary traps (Figure 4).

Figure 4: Geology and soil maps of the district of *Nonno*



As it is the case in other parts of the earth, such geological formations might have resulted in the existing soils resources. The two soil types in the area Eutric Vertisols and Lithic Leptosols covering about 51.31 and 48.69 percents, respectively. According to FAO (2006), vertisols are churning, heavy clay soils which develop mostly in areas with an alteration of distinct wet and dry seasons like that of central Ethiopia where the resettlement sites are located. Such soils are common in grass-covered and/or woodland areas like most parts of area. Vertisols, on the other hand, have substantial agricultural potential if appropriately managed for sustainable agricultural production. It is good for the production of crops like sorghum, cotton, chickpeas, wheat, barley and flax as can be evidenced by the current actual practices the area. Leptosols are very shallow, gravelly and stony soils particularly good for wet-season grazing and forestland. Luvisols, on the other hand, are soils that are well known for their higher clay content in the subsoil than in the topsoil owing to the permeation of the particles. Such soils are suitable for a wide range of agricultural activities.

c) The resettlers' livelihood strategies

Traditional rain-fed subsistence farming constitutes the basis of the economy in *Nonno woreda* in general and in resettlement sites in particular. The most dominant crops in the area are maize (*Zea mays*) and sorghum (*Sorghum bicolor*). *Teff* (*Eragrostis tef*), wheat (*Triticum vulgare*), barley (*Hordeum vulgare*), sesame (*Sesamum indicum*), nigger seed (*Guizotia abyssinica*), chick-pea (*Cicer arietinum*), and lentil (*Lens culinaris*) are also significant crops in the area.

Traditional small-scale irrigators in *Hallo Dinki* Site produce vegetables including onion (*Allium cepa*), garlic (*Allium sativum*), potato (*Solanum tuberosum*), cabbage (*Brassica oleracea*), pepper (*Capsicum annum*), and various types of spices. Yet, these are planted for cash purposes on a very small scale along *Warabessa* River. The irrigation scheme is not rewarding attributed to seasonal fluctuation of the irrigation water, meagerness of irrigable land (< 0.25 ha/household), inadequate selected seed and fertilizer input, and lack of appropriate market linkage.

Furthermore, resettlers attempt to produce various kinds of perennial crops including banana, orange, mango, coffee, chat, and eucalyptus trees. The perennial crops cover paramount proportion of the area occupied by the individual farms. This is because most of them disposed to cover their farmlands by temporary crops, rather than perennial ones, in order to fulfill their food requirements.

Animal rearing is also practiced mixed with crop cultivation in *Nonno*. Domestic animals such as cattle, goat, sheep, donkey, chicken, and bees are kept on traditional basis. This subsector provides the community with milk, butter, hides and skins, honey, and traction and transportation powers. It also serves as a means of security against crop failure.

Another notably important, but 'illegal' and environmentally devastating source of livelihood in the area, is the production and sale of charcoal and firewood. Some households produce charcoal/firewood and sale it at the nearest towns for their daily cash requirements. Similarly, some others make and sale dung-cakes for survival. The business of dung-cake making is usually the work of women and children. As noted by Aklilu (2006), such practices are said to be 'selling the future to survive' as they are practiced at the expense of environmental protection and soil fertilization.

Moreover, several resettler households in the district had partly lived on Productive Safety Net Program (PSNP). This program is one of the giant government programs to deliver social transfers to the poor farming households through public environmental protection works or as a direct support for households that are labor-constrained. As noted in Devereux and Guenther (2007), PSNP in Ethiopia in general and in *Nonno* in particular, aimed at smoothening food consumption, protecting household property and building community assets.

RESEARCH METHODS AND PROCEDURES

The main objective of this study was to detect and quantify the spatial changes on Land-Use/Land-Cover (LU/LC) after a huge resettlement undertaking in three kebeles of *Nonno* District. The kebeles (resettlement sites) are Jiru Gamachu, Biftu Jalala, and Hallo Dinki. Three years of satellite images were used for temporal change detections. These are Landsat Thematic Mapper Image of 1984, the Enhanced Thematic Mapper (ETM⁺) plus image of 1999 and SPOT image of 2007.

The 1984 image was used in order to have a clear picture of the former LC/LU circumstances prior to massive human interference in the area. The 1999 image was helpful to examine the LU/LC conditions few years before the implementation of the resettlement schemes. The 2007 image was used to see the post resettlement conditions of the study area.

At the outset, the raw satellite images underwent pre and post processing procedures under ENVI 3.4 software. The preprocessing activities include haze removal, dark subtraction, and sharpening. These were mainly meant to enhance image-readability and avoid wrong placement of reflectance signatures against the ground reality during classification.

The preprocessed image was classified based on the unsupervised classification technique and taken to the field for ground verification. Intensive GPS based ground verification was used to reclassify the images and derive the LU/LC maps. Moreover, the Landsat Images of 1984 with 30-meter resolution was used for Land-Cover/Land-Use mapping. A 15-meter resolution image was produced by making a resolution merge of a panchromatic 15-meter image with 30-meter multispectral image of Landsat ETM⁺ of 1999. In order to bridge the resolution gap between the 15-meter Landsat images with the 5-meter resolution SPOT image, a resolution merge was carried to bring the 15-meter imagery to 5-meter resolution.

RESULTS AND DISCUSSIONS

a) Characteristics of the land-cover units

Five major land-cover types were identified on the 1984 and 1999 satellite images of the district of *Nonno*. These were shrub-grassland, grassland, cultivated land, settlement, and a town. Though an all-weather road cuts the district north-south, it is found to be negligible in spatial coverage in this analysis. Settlement site was identified only in the image of 2007. The settlement was found to be the result of the government's resettlement (land access) program, which was part of the National Food Security Strategy (issued in 1996/updated in March 2002). The land access program was launched as one of the most viable options to alleviate food insecurity in Ethiopia. It targeted to relocate about 440,000 land-poor/landless rural households (2.2 million people) of those about 1800 households were resettled in the district of *Nonno* in 2003 and 2004 (FDRE, 2004).

Table 2: Brief description of land-cover types identified in resettlement sites

Types	Brief description
Shrub-grassland	Area with a plant community characterized by a mixture of shrubs, grasses and herbs. Here grasses and shrubs are the most dominant vegetation type. The community uses this land-cover type mostly for grazing and browsing. It is also the source of firewood and thatch.
Grassland	Grasslands are non-woody areas where the vegetation is dominated by grasses and herbs with nil or little proportion of shrubs. Coarse grasses are used as roofing on thatched houses while grasses are used for grazing in <i>Nonno</i> .
Cultivated land	This category encompasses areas allotted for crops production (both annual/seasonal and perennial), dispersed rural settlements and homesteads. Most cultivated lands are meant for seasonal subsistence rain-fed crops. Cultivated land LU/LC includes the existing few areas used for traditional irrigation schemes.
Resettlement site	Permanent residential areas of varied patterns and scale occupied by backyards, compounds and individual huts. The separation of individual settlements from the surrounding farm plots was not possible in this study.
Town	Urban area, <i>Dire-Gudo</i>

b) Types and trends of Land-Use/Land-Cover (LU/LC) changes in *Nonno* resettlement sites

Shrub-grassland was the predominant type of LU/LC (land-use/land-cover) in 1984 and 1999 in the area (Table 3). It covered the enormous part of the area in its southern and southwestern sections (Figures 5/1984/ and 5/1999/). Shrub-grassland alarmingly reduced to 24.43 percent of the spatial coverage of the district in 2007. Amazingly, cultivated land constituted only 2.34 percent and 3.42 percent in 1984 and 2002, respectively. This makes the area different from the other highland parts of the country where cultivated land has been dominating for over long period of time as noted in Belay (2002) and Solomon (2005) among others.

The proportion of cultivated land increased amazingly to 23.85 percent of the area's spatial coverage in 2007 i.e. within 8 years. These, along with the other firsthand data from the elderly community, confirm the fact that the area has been densely vegetated and sparsely populated until recently. The vast coverage of the northern, northwestern, and the northeastern parts of the area were covered by grassland land-cover types in 1984 and 1999 (Figure 5).

In 2007, the shrub-grassland diminished alarmingly (Figures 5/1999 and 5/2007) ascribed to the removal of plants for farmland preparation, fuel wood, construction, charcoal preparation, and traditional farm equipment making. Most vegetated LU/LC types in 1984 and 1999 were alarmingly changed to cultivated land in 2007 (Figure 5/2007). This finding sharply contrasts with that of Belay (2002), which reported an insignificant increase of cultivated land for South Wello Zone (North Central Ethiopia) for the period of over 43 years. Woldeamlak (2002) also reported a shrinking of farmland by only 2 percent between 1982 and 1998 in *Chemoga* Watershed, Ethiopia. This is attributed to both spontaneous and planned/sponsored

ecological-induced internal population displacements (in migration), coupled with the existing natural population increase within the area, over the last few decades which resulted in intensive population pressure in the area very recently unlike the case of other highlands areas in the country.

Table 3: Area of LU/LC units at different periods in the district of *Nonno*

LU/LC category	1984		1999		2007	
	Area (km ²)	%	Area (km ²)	%	Area (km ²)	%
Shrub-grassland	41.29	66.69	34.72	56.08	15.08	24.43
Grassland	18.23	29.44	23.69	38.27	30.09	48.74
Cultivated land	2.34	3.78	3.42	5.52	14.72	23.85
Towns	0.05	0.08	0.08	0.12	0.15	0.24
Settlement	0.00	0.00	0.00	0.00	1.69	24.43

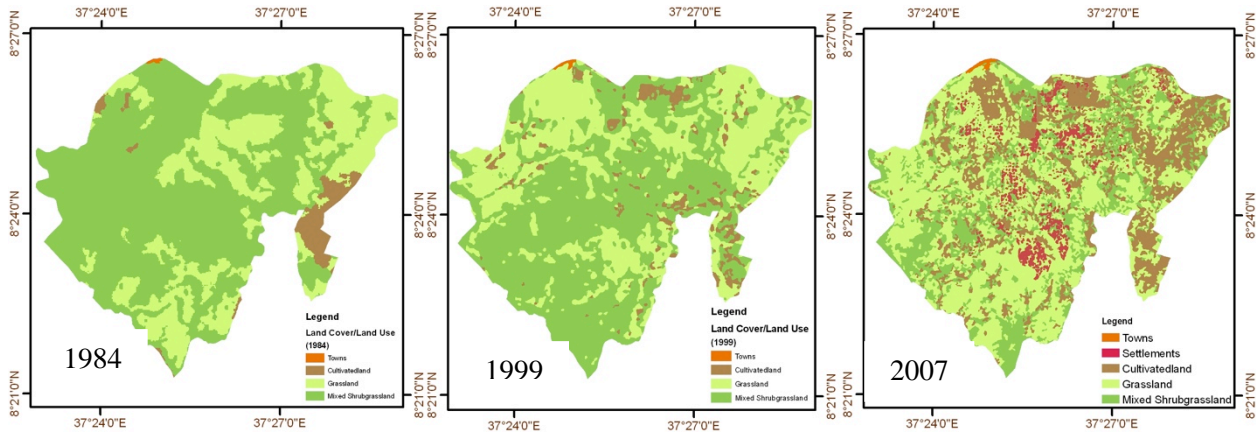
The analysis of LU/LC changes indicated both modification and conversion types of changes. Shrub-grassland diminished by 15.91 percent, with the average diminishing rate of 1.06 percent per year, within 15 years (1984 to 1999). Contrarily, grassland stretched extensively by 29.95 percent (with the annual average expansion rate of 2.0 percent) over the same period of time.

Table 4: Trends of LU/LC changes

LU/LC category	1984-1999			1999-2007		
	Change in km ²	% change	Average annual rate of change (%/year)	Change in km ²	% change	Average annual rate of change (% per year)
Shrub-grassland	-6.57	-15.91	-1.06	-19.64	-56.57	-7.07
Grassland	5.46	29.95	2.00	6.4	27.02	3.38
Cultivated land	1.08	46.15	3.07	11.3	330.41	41.30
Towns	0.03	60.00	4.00	0.07	87.50	10.94
Settlement	0	0.00	0.00	1.69	---	---

It is very shocking to see the conversion of an enormous vegetated spatial coverage (about 23.85 percent) into cultivated land within merely 8 years period (1999 to 2007) by the average annual conversion rate of over 41.30 percent. Uniquely, those areas contiguous to the resettlement sites are intensively converted to farmlands (Figure 5/2007). This is a dreadful and devastating episode that may result in irreversible environmental degradation and humanitarian disaster unless appropriate actions are designed and implemented soon. Unfortunately, this may end up in a 'vicious circle of resettlement'

Figure 5: LU/LC types of the district of Nonno in 1984, 1999, and 2007



c) Causes of LU/LC changes in the resettlement sites

The discussions hereinbefore indicate that resettlement sites are facing rapid LU/LC changes at present. Enormous extents of vegetated land uses (shrub-grassland and grassland) were converted to farmlands and settlement areas recently. Available satellite images and the respondents (both hosts and resettlers) evidenced for the fact that the current resettlement sites (namely *Biftu Jalala*, *Hallo Dinki* and *Jiru Gamachu*) were covered by dense woody plants and coarse-grasses just before the onset of resettlement. However, expansion of farmlands and establishment of settlement sites devastated natural plants accelerating the LU/LC changes in the area. The plants were massively bulldozed in expense farmland preparation and construction of over 1750 thatched houses for the incomers.

The current resettlers' livelihood strategies are found to be crucial driving force for the existing rapid LU/LC changes. Agricultural activities and firewood/charcoal production are among such fundamental conversion forces. The farmers are currently alarmingly converting the land into plots of farmlands in order to increase their crop output and cope with the problems of food shortfalls. Meanwhile, some rural households are increasingly engaged in charcoal preparation and firewood extraction as lucrative livelihood strategies. Particularly, those economically dejected households are highly dependent on charcoal and firewood sale to fulfill the livelihood requirements of their family. The combined effect of these factors certainly results in rapid conversion and/or modification of the district's LU/LC.

The existing high rate of population growth and the resultant newly emerging households seems exerting another immense pressure on land resources in the area. The emerging young households need cultivable land for livelihood purposes. This, undoubtedly, intensifies the conversion and/or modification processes of the land use types. They may be forced to encroach into vegetated lands for cropping, grazing, and settlement.

The existing land tenure system also seems contributing to the rapid LU/LC changes in the area. The land use policy of FDRE remained almost the same with the previous government. In fact, it has offered the rural community the right to use

land indefinitely. Particularly, Oromiya National Regional State, where the study sites are located, assured the rural people the right to use, lease/rent and transfer the land in its Proclamation Number 130/2007, the proclamation to amend the previous Oromiya rural land use administration. It also authorizes a sale of perennial crops on the land for restricted periods. However, selling land or getting collateral arrangements against loan is strictly forbidden by this law (Oromiya National Regional State /ONRS/, 2007). Though this land tenure arrangement appears to be better compared to the previous regimes, the resettlers are still lacking confidence to revitalize their land resources. They feel as if they have no full right over the land. Hence, they lack preparation and initiation to take environmental protection actions like afforestation and terracing.

CONCLUDING REMARKS

Sequential satellite images and GIS technologies, in combination with field observations, have been used to investigate the impact of resettlement on LU/LC changes in the district of Nonno, central Ethiopia. The study revealed both LU/LC conversion and modification processes chiefly attributed to the 2003/04 resettlement programs. Vegetated lands were either modified or converted. Shrub-grassland was found to be the most shrinking land use type in the area. It reduced to 24.43 percent in 2007 from 41.29 percent of the area in 1984. It shrunk at the rate of 1.06 and 7.07 percent per year from 1984 to 1999 and from 1999 to 2007, respectively. This change involved a gradual modification of the shrub-grassland to grassland or conversion to farmland. A significant conversion from natural vegetation cover to cropland and settlement area was observed more profoundly between 1999 and 2007, by the time the cultivated land expanded by 330.41 percent. Another major land use type, resettlement site, appeared in the image of 2007. This is attributed to the 2003-2004 intra-regional 'voluntary' resettlement programs through which the government relocated over 1800 farm households in the area. The change from vegetated land to urban area over years was found to be insignificant.

The expansion of farming is a primary force of vegetation clearing, environmental degradation, and LU/LC changes in the area. Of the total area of the district, the cultivated land accounted for 2.34, 3.78, and 23.85 percent in 1984, 1999, and 2007, respectively. These figures show an alarming conversion of naturally vegetated lands to cropland, chiefly between 1999 and 2007. Conversions of shrub-grassland and grassland have contributed significantly to the expansion of the cropland.

A small town, *Dire-Gudo*, is expanding slightly, accounting for only 0.24 percent of the total area of the study sites. The resettlement sites have altogether covers 24.43 percent of the area.

The overall consequence of these conversion and modification processes of the LU/LC is the severe degradation of natural environment in the area. Vegetated land-cover types are disappearing at frightening rate. Most part of the area may be entirely deforested and converted to plots of farmlands within very short period of time unless appropriate environmental protection and rehabilitation measures are taken. This, coupled with the current startling problems related to global warming, certainly leads to 'the vicious circle of resettlement' if unchecked. Hence, it is imperative to take all the necessary measures by the local government offices, NGOs, and other concerned bodies to rehabilitate the deforested environment so that the resettlement program realizes its food security attainment objectives and brings about sustainable rural development in the area.

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