COENOSES 4 (2): 61-67, 1989

THE ENVIRONMENTAL VARIABLES WHICH LED TO THE ECOLOGICAL CRISIS IN ETHIOPIA[1]

Tewolde B.G. Egziabher, President's Office, Asmara University, P.O. Box 1220, Asmara Ethiopia

Keywords. Ethiopia, north-western highlands, south-eastern highlands, Great Rift Valley, evergreen montane forests, combretaceous deciduous woodlands, microphyllous woodlands, evergreen scrub, highland grasslands, Vavilov centre, multiethnic, multi-religious, *debtera, shimaglle,* serfs, *chewa, neftenna.*

Abstract. Ethiopia's ecological crisis has acquired notoriety owing to the magnitude of the famines that have occurred in the last two decades. This agricultural country has played a very important role in the history of agriculture, and is now one of the 12 Vavilov centres of genetic diversity. The physical and vegetational setting of the country is summarized. Its history of changes of social organization and land tenure is reviewed. It is seen that, starting in the seventeenth century, the landed gentry class of *shimaglle*, their serfs and the soldier class of *chewas* coalesced as a consequence of legislation aimed at improving the fighting force so as to withstand the disruptive effects of the internal movement into the agricultural highlands of nomads from the south, and of foreign aggression from other countries. Whilst the *shimaglle* had absolute control over their land, the peasants could control their cultivated fields only during the growing season; all other lands (forests, grazing areas, etc.) and fallows, as well as harvested areas, fell to communal use. The peasantry was not allowed to organize itself to bring about communal responsibility commensurate with communal ownership. As a result, virtually all environmental management lapsed, and the land came to be used as a mine for food, feed and wood. No environment can withstand such treatment.

Introduction

Ethiopia is an agricultural country which came out of a feudal system following the popular uprising of 1974. Its agricultural production system is, therefore, a legacy of its feudal era. All feudal, essentially subsistence, agricultural people have, through history, suffered periodic food shortages arising from harvest failures or epidemics. Such periodic sufferings have figured in Ethiopian history as well (e.g. de Almeida 1954).

But the present Ethiopian crisis, which came to the world's attention in the early 1970's, has been persistent and must be viewed as a phenomenon distinct from what can be attributed to the usual vagaries of nature. To understand the roles of natural and man-made forces in the creation of this phenomenon, let us have a quick look at the environmental and demographic setting of the country. This has already been described more extensively elsewhere (Tewolde 1988a) and only a very brief mention of the salient points will be made.

The Environmental Setting

The Ethiopian highlands are divided by the Great Rift Valley into a larger north-western and a smaller south-eastern parts. On the whole, both highland masses are highest along the rim of the Rift Valley, though the two highest mountain systems in the country, the Simen and Bale Mountains, as well as a few others, occur away from the escarpment (Mohr 1971, pp. 166-171).

The inclination north-westwards of the bigger land mass is very slight, while the inclination south-eastwards of the smaller landmass is more marked. This has resulted in the rivers in the north-western highlands meandering and cutting into the terrain and producing very deep gorges and a more or less haphazard pattern of highland blocks. The rivers of the south-eastern highlands have had a more direct south-eastern flow, resulting in deep gorges alternating with flatter landmasses in between. The north-western highlands are, therefore, much more prone to devastation by erosion than are their south-eastern counterparts (Mohr 1971, pp. 166-167).

The main winds bringing rain to the north-western highlands come from the south-west, where the altitude is lowest. As the winds blow north-eastwards, therefore, they continue rising and losing their moisture. Rain thus reduces from the south-west to the north-east (Daniel 1977 pp. 4-10), but less than would have been the case had the altitude of the land been approximately uniform. But this also means that the rivers flow

1 Invited lecture at the 2nd CETA International Workshop on Mathematical Community Ecology, Gorizia, Italy; 19-25 November 1988.

westwards, away from the drier areas in the east. Because the rivers flow to the wetter parts of the country, and because they flow in gorges (some of which are as deep as 1 kilometre), the possibility for using much of the river wates for irrigation is limited in the highlands. On an extensive scale, irrigation can be undertaken only where the Sahelian plains, e.g. Gambella, occur within Ethiopia. Much of the south-eastern highland system receives a bimodal rainfall, both from the south-west and from the south-east (Daniel 1977, pp. 4-10). The rains coming from the south-west decrease eastwards, and those from the south-east westwards, giving a more balanced distribution over the southern parts of the country. But because the rainfall is bimodal, an apparently high annual rainfall may still fail to support crop cultivation. The traditionally dominant land use patterns of the lower altitudes of the south-eastern highlands are therefore based on animal husbandry. Because the rivers have cut very deep gorges, they are not very useful for irrigation except where low lying plains occur, e.g. in the Ogaden. Two of Ethiopia's smaller major rivers, the Awash and the Omo, flow in the Rift Valley making irrigation possible; the Awash Valley is already heavily irrigated. All these irrigated and irrigable areas are in the dry lowlands, and salinity is an important environmental problem.

Agriculture in Ethiopia is old, going back into the distant pre-Axumite period (de Contenson 1981, p. 341), and it has been intensifying since then. It is not a fortuitous coincidence that the erosion-prone Ethiopian highlands produced the Axumite civilization, which was characterized by elaborate terracing still visible over all Ethiopia, and water control systems (Kobishanov 1981, p. 383). Intensive land use has been expanding south and westwards ever since.

Because of higher rain coupled with a higher temperature arising from the lower altitude, the most complex and tallest primeval forests (the Moist Evergreen Montane Forests) occurred in south-western Ethiopia, with poorer and shorter forests (the Dry Evergreen Montane Forests) occurring in Central, Eastern and Northern Ethiopia. The forests on the highlands were not continuous, being interrupted by a mosaic of Highland Grasslands and Swamps where impeded drainage in the valleys on top of the basalt and other edaphic factors made the growth of trees impossible. The moister, western lowlands, going into the highlands along the river valleys, have been, and are , Savannas and Wooded Savannas, with the higher slopes being covered by Combretaceous Deciduous Woodlands. The drier eastern Lowlands have been under Microphyllous (Acacia) Woodlands where moisture permitted, and Acacia Scrub where it became drier. The eastern escarpments have been covered by Evergreen Scrub, with succulents dominating in places.

Under the influence of man, virtually all the Dry Evergreen Montane Forests and Highland Grasslands, and most of the Moist Evergreen Montane Forests, have changed to farmlands and grasslands. The Acacia Woodlands have also given way to farmlands. The Acacia Scrub is too dry to be used except for transhumant grazing. It is, therefore, not very badly disturbed. The Evergreen Scrub, which originally grew on shallow soils and in rock crevices, has been expanding because soil erosion has been creating new habitats for it. Until ten years ago the Combretaceous Woodlands were more or less safe from serious disturbance owing to trypanosomiasis, but they have now come increasingly under attack. The Savannas, while not extensive, are used for grazing and are managed through fires.

The combination of these environmental determinants have meant that environmental degradation through agricultural intervention first intensified in the driest and most rugged areas of the northern highlands, which were also where agricultural intensification started centred on Axum. Just as the civilization that created this agricultural intensification expanded south and west, so did the environmental degradation, resulting in an ever expanding ecological crisis.

It should, however, be remembered that it was not the Axumite civilization *per se* that brought about the ecological crisis. Axum collapsed in the ninth century after over a millenium of being the capital of Ethiopia; the current ecological crisis is a more recent phenomenon. Its roots have, therefore, to be sought in the events and situations that occurred in the last few centuries.

Land of Contrasts

In the mass media Ethiopia now epitomizes poverty, with faces of people dying from famine looking out wide-eyed at the world from television screens and posters. Yet since agricultural development predated Axum (de Contenson 1981, p. 341), Ethiopia has obviously had millenia of history of successful agriculture. Furthermore, it is one of the 12 Vavilov centres of crop genetic diversity in the world (Doyle 1895, p. 198). It has the most important pools in the world for genes of durum wheat, barley, sorghum, linseed finger millet, chick pea, cow pea, niger seed and Ethiopian rape *(Brassica carinata)* (Mooney 1979). It is reported that farmers in the U.S.A. alone benefit by about 150 million dollars per year from one barley variety resistant to yellow barley mosaic originally collected in Ethiopia (Doyle 1985, p. 200). Ethiopia has virtually all the genetic pool of arabica coffee (Tewolde 1988b). What is perhaps less known is that it also has a number of very important endemic crops, e.g. "tef" *(Ergrostis tef)*, the most important cereal in the country, the versatile "enset" *(Ensete ventricosum)*, whose corm and basal parts of leaves provide the main source of carbohydrate for the most densely populated areas of the country, and whose leaves also provide fiber as well as being used

for basket work, wrapping, eating out of and covering foodstuffs and other things, and the root crop "anchote" *(Coccinia abyssinica)*. Information on these and other crops, totalling around 100, as well as their wild relatives, has been summarized by Edwards (1989). Even this large number excludes the very many semi-wild plants sporadically used as crops, e.g. *Snowdenia polystachya, Cordia africana, Haplocarpha schimperi, Ziziphus spinachristi.*

It is indeed a series of very dry years that precipitated the Ethiopian ecological crisis. Nevertheless, even during those dry years, not all of Ethiopia was parched. It is often not realized that about 80% of the water of the Nile comes from Ethiopia (Wondimneh 1979, pp. 25-26). It is true that the flow of the Nile in Egypt and the Sudan did indeed get very low, especially in the winter and autumn of 1988, testifying to the reduced rainfall conditions in Ethiopia. But this caused no famine in Egypt, indicating that the famine in Ethiopia cannot be attributed to lack of water alone. Professor Mesfin (1984, pp. 125-143) has written extensively on this theme. Suffice it to point out that the Ethiopian drought occurred in spite of its rivers being full and taking much water (and soil) out of the highlands into the Mediterranean Sea to the north and to the relatively unihabited desert areas to the east and south.

Ethiopia has been an inward looking country since the fall of the Axumite Kingdom in the ninth century A.D. (Doress 1956, pp. 87-92). Following a struggle among many city states which started about the seventh century B.C. on both sides of the Red Sea, Axum emerged supreme around the first century A.D. It then became a sea faring world power which, when need arose, could commandeer a fleet of 250 ships for transporting its troops (Sergew 1972, p. 133). In the third century A.D., it came to be recognized as one of the four greatest empires in the world (Kobishanov 1981, p. 383). But the rise of Arab nationalism following the emergence of Islam cut off Ethiopia and its citizens from the sea and the rest of the world (Doress 1956, pp. 87-92). The only people who could travel became the very old who dared to go on pilgrimage to Jerusalem. The Ethiopians, with the exeption of a few Moslem merchants who owned merchant ships even at the beginning of the ninteenth century (Abir 1968, p. 7), became confined to the highlands for fear of being captured and sold as slaves by the Arabs (Abir 1968, pp. 1-3 and 8). A once sea-faring people thus became land-bound. As the rest of the world, with whom Ethiopia had in the past been interacting, progressed scientifically, technologically, socially and politically, Ethiopia remained isolated, its mountainous highlands forming an island surrounded by not too friendly Arab nations in the east, north and west, and by lowland deserts in the south.

And yet, even though this isolation weakened its central government and its ability to defend itself, its Arab neighbours did not conquer it. This was, no doubt, largely owing to the difficult Ethiopian highland environment. The Arab conquerors could come only past the surrounding deserts, which they would need to cross by camel. But camels would be useless in the cool climate of the Ethiopian highlands. This view is strengthened by the fact that within 100 years after the starting of Islam, the Arabs attacked the Ethiopian coast and totally destroyed Adulis (Doress 1956, p. 89). Nevertheless, prevalent Islamic tradition, which states that when Mohammed identified Christians as likely allies of Islam (Koran, Ch. 5, verse 84-85) he was referring to the Ethiopian Christians who had given refuge in Axum to his followers, might have initially bought for Ethiopia a slight amount of goodwill from the Arabs.

In any event, Moslem-Christian interaction in Ethiopia has been taking place peacefully. Zealotry in both Christianity and Islam has, on the whole, taken to proselytizing by convincing and converting, not by force. The exceptions to this rule occurred only through foreign interventions. In the sixteenth century, when firearms were unknown in Ethiopia, the Turks armed an Ethiopian Moslem group under Mohammed Grañ (Tekle Tsadik 1961, p. 43) and all the Christian highlands were ravaged. The Christians regained power through assistance in firearms and soldiers from Portugal (Teckle Tsadik 1961, pp. 59-62), but the Portugese were soon thrown out of the country and native Catholics were persecuted following an abortive all-out effort by Jesuits to convert the Ethiopian Imperial Court to Catholicism (Tekle Tsadik 1961, pp. 138-146). As a reaction to the fundamentalist Islamic Mahdist movement in the Sudan encroaching upon Ethiopia, Emperor Yohannes IV tried to force Christianity on Moslems (Tekle Tsadik 1964, p. 64) and died fighting to repel a Mahdist invasion of Ethiopia. Just before the end of the British protectorate rule in Eritrea in 1952, religio-political movements arose and there occurred a few days of sectarian violence between Christians and Moslems; many people still remember the events and tell the story. Now, in a country of almost equal Christian and Moslem citizens, there is no religious violence. The wars between Ethiopian emperors e.g. Amde Tsion (Huntingford 1965) and vassal kings, even when the latter have been Moslem, would have happened irrespective of religion; the conflicting interests of the Emperor and the vassal made these inevitable.

It is estimated that more than 70 languages belonging to four major groups (Semitic, Cushitic, Nilotic and Omotic) are spoken in Ethiopia (Bender 1976, pp. 1-14). And yet intolerance of other nationalities is unknown. The civil war in Northern Ethiopia is often portrayed as a nationalist war. If it is nationslist, it is one that has nothing to do with the sentiments of the general population, because people from other nationalities live in northern Ethiopia in total harmony and miscegenating

with the local population. Even more importantly, owing to their earlier contacts with the outside world and their consequent greater relative urbanization, there is no town in Ethiopia where northern Ethiopians are not found in numbers larger than their overall population size in the country would suggest. Again, they live in absolute harmony, and again miscegenating with the local people. Without going into the rights and wrongs of the civil war in northern Ethiopia, therefore, we can state that it is of political origin other than national, though the various protagonists now try to invoke national causes. It is true that this invoking can create nationalist feelings; but for our purpose it is enough to point out that before the political problems that have resulted in the civil war arose, a multinational identity for Ethiopia was a universally accepted norm; in fact, it is still so.

This multi-ethnic, multi-religious pluralist society thus stayed isolated and inward looking for more than a millenium (eighth to nineteenth century A.D.). In this time, its economic base shifted from international trade almost entirely to an internally limited agriculture. In total isolation, the agricultural and trading civilization of Axum, in which feudalism had been poorly developed (Kobishchanov 1986), was thus fully converted to a feudal system. According to Bahrey (1954, pp. 125-126), there were 10 social groups in the feudal Ethiopia of his time, i.e. at the end of the 16th century. These social groups consisted of the monks, the *debteras*, lay officials (including judges), men at arms giving personal protection to the wives of dignitaries and to princesses, the *shimaglle* who were the lords and hereditary landowners, their farm labouress or serfs, traders, artisans, wandering singers, and the soldiers who were called *chewas* (Alvares 1958, p. 428) though Bahrey does not call them by that name. According to modern thinking, some of these categories are not true classes. But at least the *shimaglle*, the serfs, the *chewas*, the artisans and the traders constitute definite classes. Power was vested in the Emperor and those aristocrats he appointed to execute his power, and the power-enforcing instrument consisted of a class, or perhaps a caste, of soldiers, the *chewas*. The means of agricultural production belonged to the *shimagllay* class, which included the aristocracy, whether involved in statecraft or not. The *shimaglle* managed the agricultural system, exacting services and produce from the serfs.

Bahrey gives this class analysis to show that only one of the ten classes fought, making it certain that the war against the Oromos, who were invading the agricultural highlands, would be lost: the Oromos, all of whose young men fought, would win. This seems to have been a widespread feeling in the country, for, we find that at the time the Emperors in Gonder had already started to change the land-holding system in order to increase their armies and also as a reaction tot he influence of the much more democratic Oromos. They gave land to the *chewas* (Pankhurst 1966, pp. 29-34) presumably as a lure to, and a reward for, fighting. This seems to have been accompanied by a swelling of the ranks of the *chewas* by the landless. Given the levelling effect of this more equitable access to land, the *shimaglle*, the *chewas* and the serfs soon lost their distinction. This process was speeded in the Era of the Princes by the break-up of the country into small warring principalities and the evergrowing demand for soldiers. By the end of the ninteenth century, therefore, the three classes, the *chewas*, the *shimaglle* and the serfs had all coalesced into the present day peasant. Because of the decisive brute force of soldiers and because of the legal basis emanating from the fact that the new land-holding system was carried out on behalf of the *chewas*, and perhaps more importantly because, in the Era of the Princes, local defence from marauders was necessarily led by the *chewas*, the values of the new class, that of peasants, became predominatly those of the *chewas*. However, some of the values of the *shimaglle* also crept in, and the term *shimaglle* in both Amharic and Tigrinya now means an elder, with all the connotations of wisdom that age in Africa entitles.

This process of creating the new peasant class eliminated not only the serf and the *chewa* as a class, but also the bulk of the aristocracy. Only the royal family and the top members, i.e. the nobles, remained as a class opposed to the peasantry. Having shared their land with all the classes that finally became the peasantry, all the distinction that remained even for the nobles was the royal favour empowering them to raise taxes for their own use from some areas designated as their *qults*. Owing to the discontinuation of minting money towards the end of the Axumite period (Doress 1959, p. 89), these taxes had to be raised in kind. Because centrally collecting taxes in kind to distribute later is clumsy, post-Axum Ethiopia had evolved the *qult* system through which the Emperor, and in times of imperial weakness whoever was ruling, gave the right to levy taxes in kind from specified villages. In northern Ethiopia, therefore, the aristocracy was left only with gult as a means of extracting produce, and only its share with all the peasants by way of access to land. It is true that because of his political position, an aristocrat in position of authority could obtain a larger than average share of land. Nevertheless, he theoretically had to claim his share at *par* with the poorest of his related peasants.

The arguments for tracing the evolution of the present day northern Ethiopian peasantry are too involved to describe here in detail. What is important for our present discussion is that this process of evolution of the Ethiopian peasant became dominated by the vandalous nature of the values of the *chewas* (de Almeida,

1954, p. 45). The egalitarian values of both the *chewas* and the serfs, imposed on both of them by their lack of property, resulted in a land-holding system with myriads of variations all having important characteristics in common: claim to land is hereditary, on both father's an mother's side. The right to a parcel of land enables its owner to keep people and animals off only when there is a crop in the field; the land reverts to communal ownership after harvest, so that anyone can graze it and remove any organic matter, (e.g. cow dung or firewood) from it. Perhaps more importantly, any tree growing any where except within somebody's compound was there for the taking by anyone who wanted it. It is true that, usually, people do not cut down trees from inside someone's parcel of land. But the land is cultivated and, considering the annual crop cultivation system prevalent in Ethiopia, there cannot be many trees in the parcel of land. Any where away from the edge of the parcel of land is entirely communal. This killed all initiative to plant trees except in one's compound, and existing remains of forests soon became decimated. The evolution of this total lack of responsibility for uncultivated rural land was triggered by the then relatively enlightened land reform of Emperor Iyasu I. This land reform, which occurred at the end of the seventeenth century, has been described by Mahteme Sellassie (1975). Southern and central Ethiopia were taken over by the nomadic Oromo before land management by the experienced *shimaglle* had lapsed. Forests, therefore, had remained in uncultivable patches and these soon covered all the areas as these lapsed from cultivation. That is why virtually all the present day remaining Ethiopian forests (Chaffey, 1979) are either in Oromo speaking areas, or in neighbouring areas occupied by ethnic groups not involved in annual crop cultivation, e.g. the *Messengo*.

The aristocracy, led by the Emperors, brought about this change in the class structure of society (and unwittingly, the change in land management) in order to swell its fighting force. It did so, but, at the same time, it also blunted its instrument of coercion, its *chewa* class, by changing it into a land-bound peasantry, a class antagonist to it. This meant that the government was always opposed to peasants organizing themselves; and yet, in the absence of organization, the peasantry could not evolve the capability to properly manage communal ownership. Empirical knowledge of how to manage the environment, inherited from its *shimagglay* ancestry, remained with it as anyone who has discussed the environment with Ethiopian peasants very well knows. But this knowledge remains unusable owing to a lack of peasant initiative and peasant organization. In short, the Ethiopian feudal government had to create the armed peasantry in order to withstand the outside world, but it also had to deny it organization in order to keep it docile and subjugated.

At the same time as the feudal highland Ethiopian state was adapting itself to the situation of having to withstand the outside world, the new conquerors of southern and central Ethiopia, the *Oromo*, were also undergoing change. Adapting to their new environment, they soon adopted the crop cultivation system of the agricultural highlands with all its faults. In so doing, they lost their initiative against the highland feudal system and were soon conquered and their lands given to the conquering warlords and their recreated *chewas*, now renamed *nefteñña*s. Most of this happened towards the end of the nineteenth century, in the time of Emperor Menelik II (Tekle Tsadik 1964, pp. 53-54) long after the *shimaglle*, the serfs and the *chewas* as classes had disappeared. The new land-owning aristocrats had been recruited not only from the mismanaged agricultural background of the north but, equally importantly, from the fighting elements of the now diffuse aspiring aristocratic component of the peasantry which had, therefore, minimal exposure even to the now inept agricultural system and had, as conquerors, absolutely no interest in anything as mundane as working on the land. The only thing they wanted to do, and knew how to, was the simple exacting of services and the collecting of produce through their representatives. The re-established feudal system in central and southern Ethiopia therefore became divorced from intimacy with the land, and as incapable of caring for the rural environment as its counterpart in the north. The net result was that in both the old feudal north and the newly established feudal centre and south, land came to be used simply as a mine to provide whatever could be taken from it - all types of crops, fuel, building material, even animal manure.

At about the same time as the evolution of the peasant, contacts with Europe grew (though still traumatic and resulting in major battles, e.g. those of Dogali, Adwa, Mai-Chew), and the aristocracy developed a new taste for European goods and services. This meant that towns arose. The land was, therefore, being mined not only to provide exports for buying firearms (a process which has been going on since the sixteenth century) or for supporting the aristocracy, but most importantly, also for feeding, housing and clothing the ever-increasing urban population. Such a major and continuous short-circuiting of the nutrient cycle uncompensated for by fertilizer application could not continue without serious consequences (Tewolde 1986). The syndrome of reduction in soil fertility, more extensive cultivation of unsuitable land to compensate for this, followed by even greater reductions in overall production capacity, made an ecological crash inevitable. The ecological crisis in Ethiopia, therefore, though triggered by a series of dry years, occurred because of the disappearance from the agricultural system of a clear correspondence between the right to the use of land

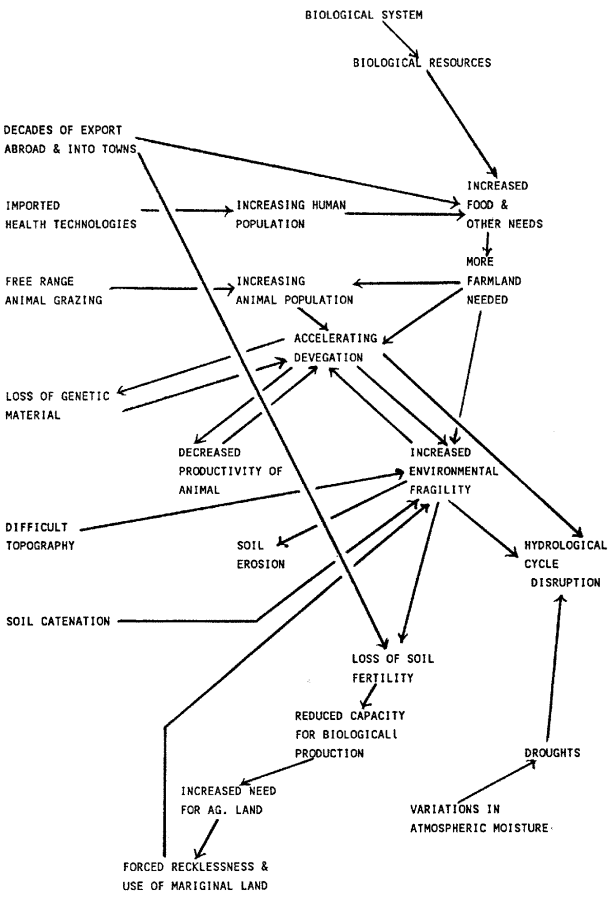

Fig. 1. Utilisation and state of biological resources in Ethiopia.

and the responsibility to care for it. This was exacerbated by a relatively sudden increase in the demands on food and other agricultural produce from the land, a physical export of this abroad and to towns within the country, and a total absence of any compensating mechanism in the form of fertilizer or other forms of investment in land such as soil and water conservation measures. The interactions among the components of the ecological crisis syndrome are shown in Fig. 1, which is self explanatory. It is the use of land as a mine rather than as a source of renewable resources that has caused the present Ethiopian ecological crisis. To usher in a desirable improved equity, the demon *shimagglay* (landlord) was exorcised, but the responsible spirt of peasant organization was prevented from replacing it, and the Ethiopian countryside could not cope with the resulting indefinite void.

The Future

That more attention should be given to the rural environment has now, at last, been realized. Encouraging efforts at reforestation, building dams to store water, terracing and other land management practices are being made. These are beginning to have an impact in some areas. However, the battle is far from being won.

The promising body of peasant organization is at last with us. We must make sure that it is always imbued with the spirit of not only collective ownership, but also collective responsibility that is felt by every individual member. The ambiguity as to who should care for the land must be cleared. Right of use must be given not only in part as has been the case with peasant ownership in northern Ethiopia but in its totality concomitant with responsibility of care, again in its totality. If what is left in good condition of the Ethiopian rural environment is to be protected and what has deteriorated is to be rehabilitated, there are two possible approaches to managing it. One possibility is to force every inch of the land into complete private ownership, not precluding the government or groups of organized individuals having the legal identity of individual owners. This alternative is obviously incompatible with Ethiopia's stated ideology of development, and it cannot be accepted.

The second possibility is the elimination, or at least the reduction into insignificance, of individual ownership as we know it now in Ethiopia and its substitution with ownership by peasant organizations which have rights, resposibilities and censures in the event of dereliction of responsibilities at the level of individuals belonging to that group and identified in lieu of that group. It is obvious that, if this system is to work at all, individuals answering for the group must be able to mobilize and motivate the group. To do that, they will have to be genuinely elected by majority vote. If there is the slightest suspicion among the members that the nomination or the voting has, in any way, been staged, it is not going to be possible for the leaders to mobilize their members. And if they cannot mobilize their members, the battle to rehabilitate the environment is as good as lost. There must also be developed an organizational structure to enable the detection and correction of defaults to the complementing twin, responsibility of care and right of use.

Proper land management, though an integral part of the Axumite and post-Axumite civilizations, has lapsed. This means that much of the repertoire of knowledge on it is also lost. However, some still exists. For example, isolated communities have well established communal woodlots, with the rights of access and utilization carefully controlled by the community. All such practices have to be recognised and respected for what they can contribute. Research into these practices and into new technologies to back the present encouraging efforts in modern approaches is, therefore, needed. This is especially true in the silviculture of native trees. The

international fraternity of scientists could help by making all the information known to it available, and by working on topics and materials that could yield information to support the encouraging efforts alongside the Ethiopian scientists involved in these efforts. The world community at large, it is hoped, will continue to lend the helping hand it has already stretched out to save lives, and to also continue the efforts to make the saving of lives unnecessary. The hand can then rest.

REFERENCES

ABIR, M. 1968. *Ethiopia, the era of the princes.* Longmans, Green & Co. Ltd, London.

DE ALMEIDA, M. 1954. Ethiopia and Its People. *In*: Beckingham, C.F. and G.W.B. Huntingford (translators & ed.). *Some Records of Ethiopia, 1593-1646.* Hakluyt Society, London.

ALVARES, F. 1958. *The Prester John of the Indies.* Hakluyt Society, London.

BAHREY. 1954. History of the Galla. *In*: Beckingham, C.F. and G.W.B. Huntingford (translators & ed.). *Some records of Ethiopia 1593-1646.* Hakluyt Society, London.

BENDER, M.L. 1976. Part I: Background 1. Introduction, *In*: Bender, M.L. (ed.). *The non-Semitic Languages of Ethiopia.* Michigan State University, East Lansing.

CHAFFEY, D.R. 1979. *South-West Ethiopia forest inventory project: A reconnaisance inventory of forests in South-West Ethiopia.* Land Resource Development Centre. Tolworth Tower, Surbiton, Surrey.

DE CONTENSON, N. 1981. Pre-Axumite Culture. *In*: Mokhtar, G. (ed.). *General History of Africa, II. Ancient civilizations of Africa.* Heinemann, California & UNESCO, Paris.

DANIEL GAMACHU. 1977. *Aspects of climate and water budget in Ethiopia.* Addis Ababa University Press, Addis Ababa.

DORESS, J. 1959. *Ancient Cities and Temples Ethiopia.* Elek Books Ltd., London.

DOYLE, J. 1985. *Altered Harvest.* Viking Press, New York.

EDWARDS, S.B. 1989. Crops with wild relatives found in Ethiopia (in preparation).

HUNTINGFORD, G.W.B. 1965. (Editor & Translator). *The glorious victories of Amda Seyon, King of Ethiopia.* Oxford University Press, London.

KOBISHANOV, Y.M. 1981. Aksum: Political system, economics and culture, first to fourth century. *In*: Mokhtar, S. (Ed.). *General History of Africa II, Ancient Civilizations of Africa.* Heinemann, California & UNESCO, Paris.

KOBISHCHANOV, Y.M. 1986. The Gafol complex in Ethiopian history. Paper presented at the Ninth International Conference of Ethiopian Studies, August 26-29, 1986, Moscow. (To be published).

MAHTEME SELLASSIE W. MESKEL. 1957. The land system of Ethiopia. Ethiopia Observer, no. 9, pp. 283-301.

MESFIN WOLDE MARIAM. 1984. *Rural vulnerability to famine in Ethiopia: 1958-1977.* Vikas Publishing House Pvt. Ltd., New Delhi, & Addis Ababa University, Addis Ababa.

MOHR, P. 1971. *The geology of Ethiopia.* Haile Selassie I University Press, Addis Ababa.

MOONEY, P.R. 1979. *Seeds of the Earth.* Mutual Press Limited, Ottawa.

PANKHURST, R.K.P. 1966. *The Ethiopian royal chronicles.* Oxford University Press, Addis Ababa.

SERGEW HABLE SELASSIE. 1972. *Ancient and Medieval Ethiopian History, to 1270.* United Printers, Addis Ababa.

TEKLE TSADIK MEKURIA. 1961. *The History of Ethiopia - Atse Libne Dingil to Atse Tewodros.* Berhanenna Selam Printing Press, Addis Ababa (in Amharic).

TEKLE TSAKID MEKURIA. 1964. *The history of Ethiopia - From Atse Tewodros to Haile Selassie I.* Berhanenna Selam Printing Press, Addis Ababa (in Amnharic).

TEWOLDE BERHAN G. EGZIABHER. 1986. Ethiopian vegetation - past, present and future trends. Proceedings of the Second Ethiopian Flora Symposium, October 27-30, 1986. Addis Ababa.

TEWOLDE BERHAN G. EGZIABHER. 1988a. Vegetation and environment of the mountains of Ethiopia: Implications for utilization and conservation. Mountain Research and Development 8: 211-216.

TEWOLDE BERHAN G. EGZIABHER. 1988b. The importance of African Forests in the conservation of coffee gene pools - Arabica coffee in the Ethiopian Highlands. Proceedings of the 1988 AETFAT Symposium. Hamburg. (in press).

WONFIMNEH TILAHUN. 1979. *Egypt's imperial aspirations over Lake Tana and the Blue Nile.* United Printers Ltd., Addis Ababa.

Manuscript received: December 1988