

Whose responsibility is dryland forest management?

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Abstract

Dryland forest resources have great socio-economic and ecological importance in countries of SSA by playing significant roles in livelihood diversification of both rural and urban households, wood and food security, providing animal feed, human health care and environmental conservation. Despite their great importance, these resources have been subjected to severe degradation, owing to several and complex natural, anthropogenic as well as socio-economic and policy-related factors, leading to their complete disappearance in some places. As a result, undesirable consequences, for example wood famine, degradation of land and water resources, decline/loss of biodiversity and enhanced global warming, that affect the welfare of humans, plants, animals and micro-organisms have been observed. Several challenges could also be anticipated in future efforts to properly manage dryland forest resources. To prevent any further degradation of dryland forest resources in SSA, there is an urgent need to address the agents responsible for their degradation with the corresponding undesirable consequences. This requires appropriate and timely interventions from all stakeholders before the damage to the remaining dryland forest resources proceeds beyond the possibility of their rehabilitation. The interventions required to address causes and consequences of dryland forest resources are discussed, and each stakeholder can significantly contribute towards the realization of these interventions.

1. Introduction

The socio-economic and ecological importance of dryland forests is enormous. For instance, the multitude of uses, which could be obtained from trees and shrubs of the Sahel have been categorized as timber, fuelwood and charcoal, food, forage, medicine, raw materials as well as protection and soil improvement (von Maydell, 1986; Table 1). The great potential use of these resources is also reflected in the number of trees and shrubs grouped in each of the use categories (Table 1). Detailed surveys in drylands of all countries in the Sahel (von Maydell, 1986) might reveal even greater number of useful trees and shrubs. In general, the socio-economic and ecological importance of dryland forests is reflected in their contribution to *livelihood diversification* of rural and urban communities, *wood and food security*, *animal feed*, *health care* and *environmental conservation*.

Table 1. Uses of trees and shrubs in the Sahel

Item for use	Specific Use or Plant Parts	Number of Species*
Timber	Structural uses, tools, arts, crafts, furniture, fences, etc.	60 (32)
Fuelwood and charcoal		64 (39)
Food	Leaves, flowers, fruits, seeds, gum, other exudations	68 (22)
Forage	Leaves, twigs, flowers, fruits, seeds, etc.	100 (28)
Medicine		107 (25)
Raw materials	Gums, tannins, dyes, ash/salts/saponins, fibers	82
Protection and soil improvement	Shade, erosion control, dune fixation, nutrient enrichment, improvement of soil structure, wind protection, improvement of water budget, other positive effects (e.g. fire protection)	39 (20)
Amenity		53 (32)

Source: von Maydell (1986); * = the minimum number of species, including exotic species; figures inside brackets indicate the number of species suitable for planting and natural regeneration

2. Causes and consequences of dryland forest degradation

Despite the great actual and potential socio-economic and ecological benefits that could be derived from dryland forest resources in SSA, they had been under tremendous pressure from unsustainable utilization, which has resulted in their rapid dwindling or complete disappearance in some areas. Their development, conservation and sustainable utilization have been constrained by quite a number of complex factors, which are discussed below.

2.1. Causes of dryland forest degradation

The causes of dryland forest degradation (DFD) have economic, social, ecological, policy and institutional dimensions, and could be categorized under *natural*, *anthropogenic* as well as *social and policy-related factors*.

2.1.1. Natural factors

The natural factors responsible for DFD could also be further sub-divided into:

- ☞ *Physical environmental factors*: sloppy topography, erosion by wind and water, soil fertility decline, low organic matter and associated physical problems, salinity, alkalinity, bush fires, etc.
- ☞ *Climatic factors*: insufficient and variable total rainfall, unpredictable variation in rainfall pattern within and between seasons, occurrence of intermittent but serious drought periods that affect natural and plantation forests, etc.

- ☞ *Biological factors*: diseases and pests, e.g. high malaria and tsetse infestations in the lowlands leading to burning of forests and woodlands and, hence, constraining tree planting practices; aggressive perennial plants; termite attack, etc.

2.1.2. Anthropogenic factors

The major anthropogenic factors that have been implicated to result in DFD include:

- ☞ *Deforestation* – destruction, clearing or incineration of dryland forest and woodland resources for: (i) expanding crop cultivation spurred by the ever-increasing human population coupled with several constraints preventing/narrowing possibilities of options for economic diversification; (ii) charcoal and wood production meant for domestic requirements of energy (because of shortage or lack of alternative sources of energy), construction material (because of shortage or lack of alternative sources of construction materials) and carpentry/household utensils as well as for sale to generate income and support household livelihood; (iii) urgently required socio-economic/infrastructural development, namely re-settlement, mining, road construction, etc.
- ☞ *Overgrazing/grazing by livestock*: leading to soil compaction, herbivore damage of seedlings and hampered natural regeneration.
- ☞ *Unsustainable utilization*: improper and unplanned harvesting practices resulting in wastage of wood (because of very low recovery rates) and damage to the residuals trees/plants and stands.
- ☞ *Introduction of invasive alien species*: resulting in the displacement of the native dryland forest flora in particular and biodiversity in general.

2.1.3. Socio-economic and policy-related factors

A number of socio-economic and policy-related factors contribute, directly or indirectly to DFD. Among these, the major ones include:

- ☞ *Poverty, population growth and poor economic performance*: declining standard of livelihood of the farming communities and their close dependence on forests and woodlands have lead to clearing/burning for subsistence farming, cutting of trees/shrubs for fuelwood and charcoal production (both for consumption and sale), construction material, overgrazing, burning associated with traditional apiculture, etc.
- ☞ *Inadequate or Absence of land-use classification, land use and forest policies and legislation*: lack or inadequate policies and legislation that lay down guidelines for development, conservation and sustainable utilization as well as research in dryland forests.
- ☞ *Absence of land and tree tenure/ownership right*: because trees have long gestation period, the decision to plant trees is generally influenced by farmers' perception of risks and absence of secured access to land that reduces investment risks.

- ☞ *Underestimation of contribution of dryland forests:* because of either under-valuation or absence of valuation of forest products and services.
- ☞ *Lack of pricing and incentive policies:* “under pricing” of fuelwood and construction wood that occurs as a result of “open access” to dryland forest resources in state and communal land.
- ☞ *Inadequate institutional arrangements/set-up for (dryland) forestry:* low profile given to forestry by Governments and frequent restructuring of forestry institutions leading to discontinuity of planned activities, inadequate budget, qualified manpower and infrastructure and *brain drain*.
- ☞ *Inadequate or lack of viable dryland forestry development strategies:* inadequate participation of rural population and no demand-driven forest development strategy.
- ☞ *Weak forestry research system:* general absence of (dryland) forest research policy that clearly defines research directions, priorities, strategies, and weak performance that has not been able to generate knowledge and technologies useful for forest development, conservation and utilization.
- ☞ *Insufficient information acquisition, management and dissemination:* lack of or insufficient knowledge about dryland forests, woodlands and their components leading to inappropriate management and utilization as well as inadequate conservation practices and lack of or insufficient awareness of the environmental role of forestry by communities; inadequate information about traditional knowledge as well as local institutions and their contribution to dryland forestry development and conservation; etc.
- ☞ *Political instability leading to civil wars and unrest:* leading to widespread destruction of dryland forest resources and also creating insecurity for planting trees.

2.2. Consequences of DFD

The consequences of DFD could be summarized as wood famine and environmental degradation, which is reflected in the forms of land degradation, degradation of water bodies, decline/loss of biodiversity and enhanced global warming.

3. Addressing the causes and consequences of DFD

The foregoing discussions imply that there is an urgent need to address causes and the associated undesirable consequences of DFD if further degradation of dryland forest resources is to be prevented. In general, addressing the causes or factors responsible for the degradation of dryland forests, namely natural, anthropogenic as well as socio-economic and policy-related factors (refer to subsection 3.1), and the associated consequences requires developing and implementing realistic or feasible and appropriate interventions/measures applicable to the objective realities and overall conditions relevant to each of the countries in SSA.

3.1. Interventions required

Some of the major interventions/measures required to address the causes and consequences of dryland forest degradation could be summarized under the following topics:

◆ Development and conservation/Institutional Arrangements:

- ☞ Continue to fight poverty by using a viable and realistic poverty reduction strategy (PRS), which rests on the four pillars, namely: (i) promoting human resources development and improving access to education and health care; (ii) promoting institutional development based on good governance and full participation of all stakeholders involved in the fight against poverty; (iii) accelerating economic growth with an enhanced role of the private sector, which shows that the issue of land tenure, improving market channels and pricing policies are important; and (iv) developing growth potential and productivity of the poor by promoting sectors from which the poor derive direct benefits, i.e. agriculture and livestock sectors, and focusing on areas where the poor disproportionately live.
- ☞ Diversify the livelihood of rural households.
- ☞ Developing and implementing realistic, effective and comprehensive National Forest Programs.
- ☞ Rural development project, with a forestry component, based on the needs and priorities of women and men residing in the areas and implemented with their full participation.
- ☞ Switching/Shifting from grain-based agriculture to those involving indigenous or exotic high value multipurpose trees on agriculturally unproductive lands (e.g. introduction of Carob and Olive for the degraded drylands of Ethiopia).
- ☞ Introduce "*eco-agriculture*", which is strongly based on trees and tree products.
- ☞ Developing markets and associated infrastructure, exploring domestic and international markets, providing timely market information, regulating price to improve prices of dryland forest products.
- ☞ Providing alternatives sources for energy than wood, charcoal, dung and agricultural residues to reduce the pressure from the remaining dryland forests, such as biogas, solar, wind, electricity (water-based), etc.
- ☞ Multidisciplinary approach to solve the multi-dimensional and heterogeneous dryland forest problems, i.e. integrated approach combining components focusing on sector development and those targeting on specific areas.
- ☞ Initiatives to upgrade statistical gathering, data collection, recording and analyses as well as use of computers to develop data bases and useful models.
- ☞ Collect, organize, compile, publish and disseminate the valuable grey literature on dryland forests that has been accumulating over the years and shelved by scientists, experts, development agents, etc. in countries of SSA.

- ☞ Joint forest management: there are already encouraging starts both in Tanzania, Kenya and Ethiopia.
- ☞ Coordination of efforts at all levels.

◆ **Policy-related**

- ☞ Putting in place the appropriate policies and corresponding legislations that provide for the development, sustainable utilization and conservation of dryland forest resources; e.g. land use policy and legislation, environment policy and legislation, biodiversity policy and legislation, forest policy and legislation, population policy, etc.
- ☞ Developing systems for monitoring and evaluating policies and legislations that have been put in place and revise those that have been partially accepted, rejected or completely ignored by communities. A good example in this regard could be cited from Tanzania (Box 1).

Box 1. Cognizant of the contracted capacity of the Government to manage forest resources, resulting in deforestation and land degradation, the revised forest policy issued in 1998 encourages stakeholder involvement in the management of forest resources. For instance, statement Number 03 of the Forest Policy states: "To enable participation of all stakeholders in forest management and conservation, joint management agreements, with appropriate user rights and benefits, will be established. The agreement will be between the central Government, specialized executive agencies, private sector or Local Governments, as appropriate in each case, and organized local communities or other organizations of people living adjacent to the forest". There are already several pilot projects on joint forest management (JFM), and the results are said to be encouraging so far.

- ☞ Strategies for conflict management and negotiated joint programs with communities.

◆ **Cooperation, collaboration and Networking**

- ☞ Better institutional collaboration, mainly at national and regional levels
- ☞ Commitment and active support from the international community
- ☞ Developing strong international, continental, regional and national mechanisms to either prevent or control invasive alien species

◆ **Research**

- ☞ Making available technical options for improved natural resource management.
- ☞ Proper valuation of products and services from dryland forest resources and trees on farms.

- ☞ Research on not only biophysical but also demographic, socio-economic or institutional aspects of changing forest conditions, especially as it relates to land degradation and rehabilitation.
- ☞ Address the several unknowns, e.g. (i) What is the appropriate institutional arrangement for conservation and utilization of open access and common property woodland resources? (ii) Nature and requirements of collaborative management models in terms of practical applications - which models can work under what conditions? What are the perceptions of communities on the collaborative models?
- ☞ Indicating scientifically how the causes of dryland forest degradation affect the natural resource bases and recommending the need for policy interventions
- ☞ Generating solid data showing the effectiveness of the intervention/methodology to be applied with reliable ways to evaluate the intervention/guidelines of management practices: to help policy makers determine when and how they should intervene.
- ☞ Generate knowledge about ecological factors, and factors that affect human behaviour in environmental management.
- ☞ Information about the political and economic surroundings, sectoral policies, i.e. economic, land tenure and forestry, implication of these policies and the culture (by TALKING TO THE PEOPLE).
- ☞ Capacity building of institutions and improving the research environment, especially the career structure of researchers (e.g. not much is expected from a researcher who drives a taxi over the whole night to supplement his salary!).

◆ **Education/Training/Awareness creation**

- ☞ Improvement in the education system and curricula development, especially at the University level.
- ☞ Continuous on-the-job training and exchange of visits to learn from each other.
- ☞ Education on population control.
- ☞ Developing human skills in up-to-date methodologies, program conceptualization and applications of multidisciplinary and holistic approaches.

3.2. Challenges in future dryland forest management

Given the scenarios discussed above, the challenges associated with dryland forest management could be summarized as: (i) arresting or retarding further destruction of dryland forest resources; (ii) rehabilitation of degraded dryland forests; (iii) expanding dryland forest resources to meet demand for energy, construction, wood-based industries and NTFP; (iv) keeping sustainable balance between utilisation and conservation of dryland forests to improve the quality of human life; (v) harnessing dryland forest resources to urgently needed socio-economic development; (vi) designing mechanisms to enhance the production of timber and NTFP for export; and (vii) reducing or substituting imports of forest products into countries of SSA.

These challenges could be tackled by preparing and implementing appropriate management plans for the natural or artificial dryland forests, which are very instrumental to ensure their development, sustainable utilization and conservation, in addition to addressing the various causes and consequences of DFD discussed above.

4. Whose responsibility is dryland forest management?

When the huge potentials of dryland forest resources, which have not been fully and sustainably utilized, are analyzed in the light of their alarming disappearance or degradation, the associated consequences reiterated above and the formidable challenges laying ahead of us, for sure, trigger a series of questions in our minds, such as: (i) Do we really have hopes to save and properly manage the remaining dryland forests and rehabilitate the degraded ones?" (ii) Who are the stakeholders responsible for the management of dryland forests? and (iii) what roles could these stakeholders play?

The answer to the first question is yes, but only if we could address the causes and consequences of DFD already discussed above properly and before it is too late, i.e. by designing and implementing the appropriate mechanisms or strategies for the development, sustainable utilization and conservation of dryland forest resources, including the rehabilitation of degraded areas, before their degradation proceeds beyond the possibilities of repair. Since dryland forests are resilient, compared with rain forests, they are relatively easier to rehabilitate. The main reason for the dryland forests to be more resilient is their capacity to store long lived and viable propagule banks in the soil, namely seeds or modified stems (e.g. tubers, bulbs, stolons, rhizomes, etc.), coppice from damaged stems, root suckering or a combination of them.

Good examples of the resilience of dryland forests witnessed from the rehabilitation of degraded areas in SSA can be cited from Ethiopia. These involve establishing *enclosures*, areas protected from interference from humans and animals, in northern Ethiopia, i.e. Amhara (Tefera, 2001) and Tigray National Regional States as well as *planting tree seedlings and grasses* in Tigray (Emiru, 2001; Mitiku & Kindeya, 2001; Tesfaye, 2002). However, there are different factors that endanger sustainability of the rehabilitation initiatives discussed above.

The stakeholders responsible for the proper management of dryland forest resources include government, non-government and community-based organizations/institutions, African Union (AU), United Nations (UN), European Union (EU), professional and civic societies/associations, local and international communities, development partners or donor communities, CGIARs, RROs/SRROs, researchers/scientists, educators, development and extension agents, journalists and media, domestic and international networks, etc. play in addressing these factors and the management of dryland forests?". Each of these stakeholders could play significant roles through addressing, directly or indirectly, the causes and consequences of DFD as well as challenges in future dryland forest management discussed above.

For instance, the roles of governments of countries of SSA in this connection include, among others, developing institutions with appropriate physical, financial and human resources as well as policies and regulations, i.e. the Organization(s), that prevent deforestation of dryland forests and the associated environmental degradation as well as catalyzing the rehabilitation, expansion, management, sustainable utilization and conservation of dryland forests by using the resources at hand in the most effective and rational ways with support from researchers for know how and technologies. These policies and institutions should be established not merely on the basis of political interest but for the economic development of countries in SSA. At the same time, it could be possible that good policies and legislations may have been issued, but only on paper. Therefore, unless there are enabling political and institutional environments coupled with effective and rational implementation of the policies and legislations, it might be fruitless to think of short-cut solutions to address the causes and consequences of DFD as well as challenges in future dryland forest management.

Similarly, non-government organizations could play crucial roles through actively fostering the efforts of governments and their organizations in addressing the causes and consequences of DFD as well as challenges in future dryland forest management. They have proved to be very instrumental in changing the perceptions, attitudes and behaviour of people towards their environments, livelihood diversification of rural households, actual rehabilitation of degraded dryland forest areas, e.g. efforts by REST and GTZ in northern Ethiopia (refer to Box 2), etc. For instance, in close cooperation with the farming communities, Relief Society of Tigray (REST) has been reported to have planted eight to ten million trees per year (with about 60-70% survival rates) on the degraded steep slopes of mountainous areas of Tigray NRS in northern Ethiopia. In seven years, some 50,000 ha have been planted with trees using the "food for work" approach.

Research organizations and their staff members could play significant roles by improving and promoting indigenous knowledge, generating new knowledge and appropriate technologies that could be used to rehabilitate, expand, manage, sustainably utilize and conserve dryland forest resources. In general, the overall responsibilities of dryland forest management could be shared among the stakeholders enumerated above in countries of SSA if feasible and appropriate strategies, programs and projects are developed and implemented.

5. The way forward

Dryland forest resources have great socio-economic and ecological importance in countries of SSA. Specifically, they play significant roles in livelihood diversification of both rural and urban households, through income generated from sale of products obtained from plant and animal resources, wood and food security, providing animal feed, human health care and environmental conservation. Despite their importance, these resources have been subjected to severe degradation, owing to several and complex natural, anthropogenic as well as socio-economic and policy-related factors, leading to their complete disappearance in some places. As a result, undesirable

consequences, for example wood famine, degradation of land and water resources, decline/loss of biodiversity and enhanced global warming, that affect the welfare of humans, plants, animals and micro-organisms have been observed. Several challenges could also be anticipated in future efforts to properly manage dryland forest resources. To prevent any further degradation of dryland forest resources in SSA, there is an urgent need to address the agents responsible for their degradation with the corresponding undesirable consequences. This requires appropriate and timely interventions from all stakeholders before the damage to the remaining dryland forest resources proceeds beyond the possibility of their rehabilitation. The interventions could be broadly categorized under development and conservation/institutional arrangements, policy-related, cooperation/collaboration/networking, research and education/training/awareness creation. Each of the stakeholders could play significant roles through addressing, directly or indirectly, the causes and consequences of DFD as well as challenges in future dryland forest management.

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