Recognition and development of traditional medicine in Tanzania

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Abstract

The aim of this paper is to trace developments in Traditional Medicine (TM) and legislation concerning conservation and use of biodiversity in Africa, with Tanzania as a case study. Based on field trips, interviews with different actors, site visits, and literature we explored the history, current status, re-establishment, and development of TM. A summary of laws and regulations concerning forests, access and benefit sharing is presented. During the last decade the Government of Tanzania put forth legislation to address national health needs, traditional knowledge, and the resource base for TM (e.g., practitioners, biodiversity). Our findings indicate that TM is the most common form of health care, and that the HIV pandemic has highlighted the need to work across health sectors. New legislation has facilitated this need. In Tanzania TM is experiencing a renaissance in being formally recognized, integrated into mainstream health care, formal establishment of practitioners, and gaining the interests of different sectors. More studies on bioactivity, safety, domestication, and sustainability of use of medicinal plants are needed. Development of TM can also, other than making a significant contribution to health care and livelihoods, provide income possibilities. It is however yet to be seen if the recent regulations can be made fully operational and implemented.

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1. Introduction

Traditional medicine (TM) is the diagnosis and treatment of psychological and medical illnesses based on local knowledge and socio-cultural and religious beliefs, developed over time by local people within their belief systems and specific environmental (particular biodiversity) conditions of a particular area (Grenier, 1998; Diallo and Paulsen, 2000; Tabuti et al., 2003). It is a well-established system of medicine, parallel to the western or orthodox medicinal system, still in active use by rural communities in developing countries (Iwu and Laird, 1998; Tabuti et al., 2003). Due to the lack of proper conventional health care systems, TM is often the first choice for providing primary health care. In Tanzania (Fig. 1), the accessibility to conventional medical doctors is very low (1:33,000) compared to that of traditional medicine practitioners (TMPs) (1:350–450) (Marshall, 1998; IRIN, 2006).

In Africa, during occupied periods colonial powers connected TMPs to the use of supernatural forces or witchcraft, and TM was subject to discredit and legal bans. When colonization ended, independence made some nations more tolerant towards TM, regaining African identity and developing national and cultural values. Two nations fully incorporating TM in their health care systems are Ghana and Mali (Diallo and Paulsen, 2000; Romero-Daza, 2002). Other nations like the Ivory Coast, Comoros, Seychelles and Cape Verde are less favourable towards TM:
TMPs are not involved in the official health system and no regulations exist for their registration or licensing. Other countries, like Angola and the Central African Republic, have established systems for registration of TMPs but do not officially recognize their practices.

Most of the 45,000 TMPs in Ghana are recognized and licensed in various associations under the umbrella of the Ghana Federation of Traditional Medicine Practitioners’ Association. The Traditional Medicine Unit was established as part of the Ministry of Health in 1991, working directly with TMPs (Romero-Daza, 2002). In Mali the Phytotherapy Institute was established in 1968 as the first research establishment for the study of medicinal plants (Diallo and Paulsen, 2000). After several changes, the establishment is now called the Department of Traditional Medicine (Département de la Médecine Traditionnelle, DMT). DMT became a collaborating centre of the World Health Organization (WHO) for research in TM in the early 1990s. One of the primary objectives of DMT is to establish a mechanism to assure that TM becomes complementary to conventional medicine. In South Africa the governmental health service only provides western medicine (Light et al., 2005), but TM is still used by the majority of people, especially in rural areas. The new government and National Research Foundation, however, are now promoting more research on natural resources, and have allocated more funding to studies in Indigenous Knowledge Systems. This promotion had precipitated in significant increase in research, e.g., in the last 10 years the number of publications from South Africa in the Journal of Ethnopharmacology increased from about 20 to 55% of all African publications.

Internationally, TM has received much attention the last decades. In 1977 the World Health Assembly urged member states to utilize their traditional systems of medicine (resolution WHA30.49). In 1978 the International Conference on Primary Health Care, held in Alma-Ata, recommended that governments give high priority to the utilization of TMPs and Traditional Birth Attendants, and incorporate proven traditional remedies into national drug policies and regulations (Akerele, 1987) (Table 1). During the nineties several conferences and meetings on the topic were held in Tanzania and other African countries, starting with the International Conference of Experts from Developing Countries on Traditional Medicinal Plants, Arusha, February 1991. In a Meeting of the Inter-African Experts Committee on African Traditional Medicine and Medicinal Plants in the Organization of African Unity (OAU) the Decade of African Medicine was proclaimed from 2001 to 2010 (Mahunnah, 2002), and the African Traditional Medicine Day was set to be on the 1st of September. Tanzania celebrated the day for the first time in 2003. The urgency of recognizing TM has been further heightened by the HIV/AIDS pandemic (Romero-Daza, 2002) as many HIV positive individuals use herbal remedies to boost the immune system and to fight opportunistic diseases (Scheinman, 1998; IRIN, 2006).

Recent studies indicate the importance of TM among rural people in Africa today (Jäger and van Staden, 2000; Light et al., 2005) and that legislation concerning conservation/use of biodiversity and TM are increasingly adopted (Diallo and Paulsen, 2000; Romero-Daza, 2002). Tanzania we believe is one of the countries that has been championing TM and its practice, and in fact may be an example of good practice. We use it as a case study tracing developments in recognition, facilitation, and re-establishment of TM from current and historical perspectives. In light of the Convention on Biodiversity (CBD) and appreciating the close link between wild plant species and traditional medicine, the current status of biodiversity, conservation/forest legislation, and access and benefit sharing (ABS) to biodiversity in Tanzania is described briefly, followed by a comprehensive overview of the current status of traditional medicine in Tanzania. The case sheds light on salient processes and links that have been core to the ‘re-‘establishment of TM in Tanzania.

1.1. Methods

Informal and semi-structured interviews and group meetings with NGOs, traditional healers, medicinal plants collectors and researchers were conducted along with an in-depth literature survey. Field information was gathered during three visits to Tanzania in February 2002, October 2003 and August 2004. All information has been kept updated until the submission of this paper through communication with local informants. A chronology of related events in relation to TM and biodiversity was constructed and is provided in Table 1.

2. History, biodiversity, legislation and trade

The Republic of Tanganyika was formed in 1962, with Julius Nyerere as president (Table 1). Tanganyika and Zanzibar merged in 1964 to form Tanzania. Nyerere’s political programme was socialistic, founded on African collectivistic traditions and village community. Up to the mid-1970s, the economy of Tan-
Table 1
Historical events in Tanzania concerning biodiversity conservation and traditional medicine

<table>
<thead>
<tr>
<th>Year</th>
<th>International</th>
<th>Tanzania</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General history</td>
<td>Biodiversity conservation</td>
</tr>
<tr>
<td>2005</td>
<td>The Traditional and Alternative Medicine Act is operational</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>The 2004 Forest Note</td>
<td></td>
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<tr>
<td>2003</td>
<td>TPI launched an anti-malarial medicine</td>
<td></td>
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<tr>
<td>2002</td>
<td>The Forest Act 2002</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>OAU proclaimed the decade of African TM</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>TPI privatised</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>CBD, 05.06. Intern. Conf. of Experts from Dev. Countries on TMPs</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>The Institute of Traditional medicine (ITM)</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>Community-based conservation</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>The Tanga Aids Working Group (TAWG)</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>Economic recovery programs</td>
<td></td>
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<tr>
<td>1986</td>
<td>The National Tree Seed Programme</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>WHO: Alma-Ata conference</td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>Economical problems</td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>Traditional Medicinal Research Unit (TMRU)</td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>Tanganyika and Zanzibar merges to Tanzania</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>Republic, J. Nyerere president</td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>Independence, member of UN</td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>Medical Practitioners and Dentist Ordinance</td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>The Witchcraft Ordinance</td>
<td></td>
</tr>
<tr>
<td>1921</td>
<td>Kilimanjaro Forest Reserve</td>
<td></td>
</tr>
<tr>
<td>1919</td>
<td>Great Britain took over Tanganyika</td>
<td></td>
</tr>
<tr>
<td>1904</td>
<td>Forest Conservation Ordinance: 3/4 million ha converted to Forest reserves</td>
<td></td>
</tr>
<tr>
<td>1882</td>
<td>The Germans colonized Tanganyika</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Precolonial time</td>
<td>TM only medical system</td>
</tr>
</tbody>
</table>

Between 1991 and 1998 several NGOs mentioned in the text were established (e.g., The Dakika group, Envirocare and Honamed).

Zanzanian mainland was performing modestly well. Then problems began to arise. Agricultural and industrial production declined, partly due to the falling export prices for primary products and the rising import prices. Internal causes were an economic policy not stimulating growth, and for agriculture: recurring drought. Since 1986 the country has been through a number of Economic Recovery programmes. The economy relies heavily on agriculture, contributing to almost half of Tanzania’s gross domestic product (GDP); providing 85% of export earnings and employing 80% of the labour force. The economic growth is now 6.1% (2005), with a GDP per capita of US$ 700, among the lowest in the world (CIA, 2006). The population size of mainland Tanzania tripled from 13.6 millions in 1970 to 36.8 millions in 2005, and 80% of the population now lives in rural areas. With a population growth on 1.8% per year, Tanzania is currently experiencing an increasing land scarcity, shorter agricultural rotations, declining yields, and consequently a substantial increase in the pressure on remaining stocks of forestland (Kilahama, 2003; MNRT, 2003).

The health situation is severely worsened as the HIV/AIDS epidemic has spread. The first cases were reported in 1983, and it is now estimated that the percentage of population infected by HIV is 8.8% (estimated in 2003, CIA, 2006). The exact numbers are uncertain, and it is estimated that only one of five cases are reported. The epidemic has had a serious impact on the country’s economy, mainly affecting the most economically active group of adults, those aged 15–45, and also a large proportion of the poor.
2.1. Status of biodiversity

Tanzania covers an area of 945,000 km², of which the forested area constitutes 40–60% depending on the definition of “forest”, see Table 2; most of it is Miombo woodlands. The Central Government Forest Reserves comprise 10 million ha, of which 1.6 million ha are Catchment Reserve Forests (CRFs), and 3 million ha Local Government Reserves. The Eastern Arc forest represents one of the oldest and most stable terrestrial ecosystems on the continent, and is recognized to be one of the 25 biodiversity hotspots of the world, with a substantial number of endemic species. In a governmental report on biodiversity, the country is divided in six ecological zones (Table 2). All zones are exposed to degradation (GURT, 1998). The most important reasons for deforestation are conversion to agriculture and fuel wood consumption. It is estimated that fuel wood accounts for 97% of all fuel consumption and 92% of the country’s source of energy. The average degradation level in CRFs is 18.5%. In South Kilimanjaro CRF substantial illegal activities are linked to pit sawing of hardwood such as camphor and cedar for carpentry workshops in towns and for illegal trade. The World Bank (2001, in MNRT, 2003) sums up challenges facing Tanzania’s forest policy, related to weak oversight for forest and woodland management.

The Coastal forest is botanically rich, but 90% of original forest is destroyed (Table 2). Twenty percent of the forests are reserves, but many of them are too small to secure species survival. The mountain forest constitutes only 6.1% of total land area, but is very rich in flora. Of 4000 plant species, 75% are endemic. Nearly 30% of the mountain forests are reserves, 70% of the land outside reserves has been converted to farmland, grazing pastures or is degraded. The Brachystegia-Jubernadia Woodland (Miombo) covers almost 60% of the land area, nearly half of it being within protected areas (PAs). It is rich in flora with 8500 species of plants, 54% of which are endemic. Over 20% of the woodland is converted to farmland, grazing or degraded.

2.2. Legislation: forest, access and benefit sharing

In the past few years several new policies, laws and regulations have been adopted in Tanzania. The overall goal of the 1998 National Forest Policy is to “enhance contribution of the forest sector to sustainable development and the conservation and management of natural resources for present and future generations” (MNRT, 1998, see details in Kabudi et al., 2002).

The main objectives of the Forest Policy are: (i) ensured sustainable supply of forest products and services by maintaining sufficient forest area under effective management; (ii) increased employment and foreign exchange earnings through sustainable forest-based industrial development and trade; (iii) ensured ecosystem stability through conservation of forest biodiversity, water catchments and soil fertility; (iv) enhanced national capacity to manage and develop the forest sector in collaboration with other stakeholders (MNRT, 2003).

To implement the policy, two instruments have been used: (i) the National Forest Programme (NFP) commissioned in 2000 and (ii) forest legislation—the Forest Act of 2002. In April 2002 the Parliament approved the Forest Act 2002 (MNRT, 2002). It was made operational from 1 July 2004, when the Forest Regulations of 2004 were also approved. The Regulations provide arrangements on prior informed consent (PIC) and provisions for ABS related to genetic resources (MNRT, 2004). All access to resources in forests governed by the Forest Act shall be subject to an application for a prior informed consent (PIC) to the Director and the Forest manager. The application form is prescribed in the Regulations (29 Schedule). The application is to be published

Table 2
Characteristics of the Tanzanian ecological zones; botany and medicinal plants (MPs)

<table>
<thead>
<tr>
<th>Ecological zone</th>
<th>% of total land area</th>
<th>% area within PAs</th>
<th>Biodiversity quality and MP richness</th>
<th>Relative change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z I: moist forest mosaic</td>
<td>4.4</td>
<td>12.0</td>
<td>Rich in plant sp.; poor in endemic plants</td>
<td>Heavy human pressure due to cultivation, grazing and fuelwood; more than 20% of forest area has been lost</td>
</tr>
<tr>
<td>Z II: coastal forest</td>
<td>6.2</td>
<td>21.2</td>
<td>Rich in plant species and MPs rich, 600 endemic sp., habitat fragmentation threatens species survival</td>
<td>Over 90% of original forest destroyed; many FRs is too small to be viable as PAs</td>
</tr>
<tr>
<td>Z III: mountain forest</td>
<td>6.0</td>
<td>27.7</td>
<td>Rich in flora and MP's, of the 4,000 plant species, 75% endemic; 1/5 of tree sp also endemic</td>
<td>More than 70% of land outside PAs is converted to farmland, grazing or is degraded</td>
</tr>
<tr>
<td>Z IV: acacia-Savannah Grassland</td>
<td>18.1</td>
<td>41.4</td>
<td>Moderately rich in flora and MP's, 2500 species of plants</td>
<td>Extensive areas outside PAs suffer severe deterioration due to overstocking</td>
</tr>
<tr>
<td>Z V: acacia-Commiphora Thornbush</td>
<td>7.2</td>
<td>37.2</td>
<td>Moderately rich in flora, 2500 sp. of plants of which 50% are endemic</td>
<td>Extensive areas outside PAs suffer severe deterioration due to overstocking</td>
</tr>
<tr>
<td>Z VI: brachystegia Juberndedia Woodland (Miombo)</td>
<td>58.1</td>
<td>46.7</td>
<td>Very rich in flora and MP's, 8500 sp. of plants of which 54% are endemic; famous for fine hardwoods</td>
<td>Over 20% of woodland has been converted to farmland, grazing or degraded; extensive deforestation for charcoal, fuel wood and overgrazing occurs</td>
</tr>
</tbody>
</table>

in the Gazette or in a newspaper that is reasonably accessible to the public for 90 days. Any person may comment on the application. The Director can grant access only if all requirements under the Regulations have been fulfilled. An access permit is only valid if there is a written PIC. There are regulations on commitments to be undertaken by the collector, for example, (i) to adhere to limits on quantity and quality of biological resources for export; (ii) deposition of duplicates with all information to governmental agencies; (iii) not to apply for any form of intellectual property protection; (iv) sharing of knowledge and benefits. The access permit is subject to the payment of a fee made before a collection can be done. The state shall ensure that at least 50% of the benefits should be channelled to the concerned local community. The implementation and operationalization of this apparently comprehensive Forest Act is yet to be seen.

2.3. Trade in MAPs

Vendors are present in most urban centres in Tanzania. In Dar es Salaam, about 90 vendors were recorded in two markets, most of them being Maasai women. They were selling powdered plant material. Maasai men who transported plant medicines in 50 kg sacks supplied these vendors, who then sorted and prepared medicines for sale (Marshall, 1998). New groups like Honamed and Dakika (see Section 3.7) are selling their products at national and regional fairs and exhibitions as well as in their own clinics/shops.

Tanzania formerly exported medicinal plant material, but no information exists on quantities or species traded, as there is no written legislation pertaining to these issues. One taxon thought to be over-exploited for international trade for the cosmetic industry is Osyris sp., harvested in the Kilimanjaro region. A Dar es Salaam-based exporter of Prunus africana (Hook.f.) Kalkman has been located, reported to harvest up to 120 t per year. No trade of the species is reported to CITES, despite the taxon’s origin that might be of medicinal value, and to establish a record of this apparently comprehensive Forest Act is yet to be seen.

2.4. National Tree Seed Programme

The National Tree Seed Programme is a governmental body established in 1987. The activities of the National Tree Seed Programme are directed towards establishment of seed sources, procurement, and supply of high quality tree seed. Its aim is to meet immediate as well as future seed demand from all growers. The Programme has an Arboretum, three medicinal plant gardens and long experience on propagation and domestication of indigenous trees, and can now offer seeds from 130 indigenous tree species (www.tanzania.go.tz, 2006).

3. Current status of traditional medicine

3.1. Traditional medicine and regulations

During colonization and up to the present TM has not been officially accepted. Under the British rule, provision for TM practice was given through Medical Practitioners and Dentist Ordinance, 1929, but cooperation between TMPs and conventional doctors was forbidden. The Witchcraft Ordinance of 1928 was operational until 2002, forbidding witchcraft. However during the period 1970–1988, approximately 3690 people reportedly died in witchcraft-related incidents (Marshall, 1998).

Tanzania is now in the process of recognizing the TMPs and incorporating their practice in the health sector. In 2002 The Parliament passed The Traditional and Alternative Medicine Act, replacing the old laws (Table 1). The new legislation aims at integrating traditional medicine in the national health care system, and encourages cooperation between traditional healers and physicians. It also provides protection against piracy of the traditional healers’ products (Kauye, 2002). Traditional medicine is now under the Ministry of Health. In 2005 the new Act finally became operational.

3.2. Traditional knowledge and bioprospectors

Knowledge and identities of medicines are usually kept as personal secrets or within certain expert circles of TMPs. Bioprospectors have extracted knowledge by different means and contracts with or without benefits to the owners of the knowledge (see discussions and cases in ten Kate and Laird, 1999; Svarstad and Dhillion, 2000; Kabudi et al., 2002). In the case of Tanzania the earliest cases include the export of Busy Lizzie (Impatiens sultani Hook.f.) in the middle of the 19th century and the African Violet (Saintpaulia spp.) reportedly exported in 1893. These plants bring high amounts of profit to the actors in the North without any benefits of the shares appropriated to Tanzania. Today, however, contracts can be drawn to ascertain that benefits from the use of biological diversity and traditional medicinal knowledge are channelled to the South, ensuring equitable benefit sharing as recommended in the CBD (Juma, 1989; Svarstad and Dhillion, 2000; Laird, 2002; Nelson-Harrison et al., 2002; CBD, 2004; MNRT, 2004). In Tanzania detailed benefit sharing procedures have been worked out in The Forest Regulations, 2004 (see Section 2.2).

3.3. The Institute of Traditional Medicine (ITM)

ITM was founded in 1991 as a successor of the Traditional Medicine Research Unit founded as a part of the University in Dar es Salaam in 1974. The Traditional Medicine Research Unit had two broad objectives: to seek materials of plant and animal origin that might be of medicinal value, and to establish a record of cultural significance in Tanzania Society of the Traditional Healers and its role in the village. ITM and its precursor has performed and taken part in numerous ethnobotanical studies (Chhabra et al., 1984, 1987, 1990a,b, 1993; Hedberg et al., 1982, 1983; Johns et al., 1994; Schlage et al., 2000). Today ITM conceives a future in which it will have a prominent role in research.
and development of medicinal plants by helping the country to produce raw materials for plant-derived medicines, standardizing herbal medicines and biological testing. WHO AFRO has identified the priority areas for research in this decade to be malaria, HIV/AIDS, hypertension, sickle cell anaemia and diabetes mellitus. The main focus of ITM at present is on the testing for antiviral, anticancer and antiprotozoan activities and some of the opportunistic conditions of HIV/AIDS. The Institute is focused on the development of medicinal plants by helping the country to ethnobotanically (Mahunnah, 1996 in GURT, 1998). Most of the studies describe plants and their utilization (e.g. Hedberg et al., 1982, 1983; Kabudi, 1990; Chhabra et al., 1993; Merker, 1904). In the 1980s The Traditional Research Unit (now ITM) and the Department of Chemistry at the University in Dar es Salaam conducted comprehensive work on screening plants for active compounds (Chhabra et al., 1984; Weenen et al., 1990). The work continued through the decade with the registration of plants used in Eastern Tanzania supplemented with results of a literature survey on medicinal uses, isolated constituents and pharmacological effects (Chhabra et al., 1987, 1990a,b, 1993). Recently there have been several studies on bioactivity and screening for active compounds (e.g., Fyhquist et al., 2002, 2004; Beha et al., 2004; Moshi et al., 2004; Mbwambo et al., 2004; de Boer et al., 2005).

Another trend in the studies is gradually increasing attention on frequency of use and sustainability of harvesting. In one of the studies (Johns et al., 1994) among the Batemi people in north-central Tanzania, a quantitative interaction effect was calculated for each remedy. They used a log linear model developed by Johns et al. (1990) where the interaction of i and j, which indicates the potential of a plant i as a cure for disease j, is a quantitative measure of the degree of confirmation of any particular remedy. In a more recent study by Schlage et al. (2000) documentation and ethnopharmacological evaluation of medicinal plants of the Washambaa people in the Western Usambara Mountains were performed. A total of 328 taxa were collected, yielding 2260 individual use reports. The use reports were arranged into nine groups of medicinal uses based on the illnesses treated. A Factor of Informant Consensus was used in order to evaluate the ethnobotanical importance of the plants. For the most commonly used taxa an ethnopharmacological evaluation was performed. Studies to evaluate the effectiveness as well as toxicological data are still lacking for many of the species.

In the study of the Batemi people (Johns et al., 1994) the authors stress that they were particularly interested in the sustainable use of the medicinal plants. They refer to another ecological study performed in the area (Smith, 1993), showing that half of the medicinal plants in the study were locally rare or located far from the Batemi communities. Four of the species were found to be in need of conservation attention in the area.

A larger emphasis on sustainable utilization and conservation of tropical woodlands is expressed in a study of different utilization of trees and distribution of ethnobotanical knowledge in Morogoro, Eastern Tanzania (Luoga et al., 2000). The major type of vegetation was Miombo woodland. The overall aim of the study was to ascertain the local people’s knowledge of and reliance on woody resources as a first step towards sustainable resource conservation. A total of 133 arborescent species in 31 families was identified and classified into 12 categories of use. Major uses were charcoal, firewood, medicine and poles. A use value analysis was performed on all species; uses were categorized in three classes: no use (0), minor use (0.5) and major use (1). The results showed that 69% of the species had uses. Only 13 of 37 families recorded had use values greater than 1, whereas 6 families had use value 0. This indicated that the intensive and multiple uses were focused on few species/families. The study concludes that the harvest of the exceptionally useful species may far exceed their regeneration and production.

There have been several industries that have emerged as TM has been more discussed in the main stream. Here we give details on two companies to illustrate that sophisticated extraction and processing is carried out not in Tanzania. Tanzanian Pharmaceutical Industries (TPI) was originally created as a state business in 1978. The new private owners took over the plant in 1998 and have since renovated and modernized the installations. In September 2003, TPI launched an anti-malaria medicine based on the active ingredient in the plant Artemisia annua L. and expects to obtain a big share of the anti-malaria medicine market in Africa with this product. The product is a result of a joint venture between TPI, a Thai group, and the German NGO Action Medior. Recently TPI has expressed great interest in entering into something similar with any interested party. TPI however cannot buy medicinal plants directly, as it does not have an extraction plant. African Artemisia Ltd. is another company that grows the plant Artemisia annua in Arusha on a grand scale (plantation style). The quality of the Artemisia annua grown in Arusha is supposedly very good due to the volcanic soil. The plants are dried at the plant and sent to Belgium where the ingredients are extracted and to be sold to the pharmaceutical industry.

3.5. Management of medicinal plants

If the effectiveness of MPs gets widely known and the availability is improved, over harvesting and extinction of plants can result (Jäger and van Staden, 2000; Dhillion and Amundsen, 2000; Sparg et al., 2005). Some studies indicate that indigenous management systems (and community-based management) can be valuable for enhancing biodiversity conservation (Kivumbi and Newmark, 1991; La Frankie, 1994;


3.6. Information on TM research

There have been several donor-funded projects to gather and publish information on TM. Following are two examples that have made significant contributions. In a project running over 3 years in the 1990s, funded by the Canadian International Development Agency (CIDA), the United States Department of Agriculture (USDA), and the Food and Agriculture Organization of the United Nations (FAO), activities were undertaken to assess rural people’s needs for tree products and to match needs and species preferences with appropriate silviculture and forest management practices. The project resulted in the following: (i) a framework for assessing species of value to local people that have a potential for more intensive cultivation; (ii) a handbook: “Indigenous Multipurpose Trees in Tanzania” (Eckman and Hines, 1993, available on FAO, 2006); (iii) SPECIES, a user-friendly computer programme, developed as a data base for tree species information. Recently an extensive handbook: “Edible Wild Plants of Tanzania”, funded by the Regional Land Management Unit (RELMA) and the Swedish International Development Cooperation Agency (SIDA), has been published (Ruffo, 2002). Approximately 60% of the plants in the book are also used as medicine. In the book there is a report from a workshop held in Iringa in November 2002 that drew various actors and disciplines. They suggested several activities for the promotion of use, propagation and domestication of edible and medicinal plants in Tanzania.

3.7. New groups working with medicinal plants

In the 1990s there has been a surge of individuals and companies working with medicinal plants at the local and national scale. We give examples of the few that we studied.

The Dakika Medicine Plant Growing Group in Kikatiti, Arusha, was organized in 1991 by a local NGO with some external help. The group focuses on growing the Neem tree (Azadirachta indica) for making organic pesticides and to use as ingredients in traditional medicines. They appear to be well organized and have a sound economy coming from selling plants (various trees beside Neem), seeds for medicinal plants and medicines, herbs and nutritional mixtures for children. The group has contact with local and national institutions like the Tanzanian Wild Life Research Institute and the Ministry of Forestry who provide them with Neem-seeds from different regions of Tanzania and plastic-bags for growing the seedlings. The group is member of the Tanzanian Herbalist Organization and attends national and international conferences and exhibitions on traditional medicines. With the introduction of the new law of Traditional medicine in 2002, the healers and groups like Dakika now are under the Department of Health. This was seen as fortunate for the sector as it would increase study and research on the medicinal effects of local trees and plants. According to the group the market for traditional medicine is quite good with reasonable prices. Most of the products are sold directly to users at exhibitions and congresses or from their clinic in Kikatiti, while some are sold to middlemen.

HONAMED (the House of Natural Medicine) was founded by Dr. Meyenjwa Rugina in 1998. HONAMED has a small workshop where plants are processed and various medicines produced with the help of some simple machinery and three employees. The company is represented in conferences and exhibitions in Tanzania and the neighbouring countries. Marketing is easy even though the products are quite expensive. We were shown plastic bags of powdered Artemisia annua used against malaria that are sold for Tsh. 5000 a packet (US$ 5 per treatment). In addition many of the medicines are based on extracts from the Neem tree that is growing abundantly in the area since the government in the beginning of the nineties promoted the planting of one tree per family in the area. New mixes of medicines are also experimented with. There is interest in investing in machinery for extracting oil, better dryers, and milling machines, however it is difficult to get financing for this type of activity and the existing micro-finance is very expensive (with interest rates as high as 35–40%).

3.8. Cooperation between TMPs and primary health sector

Generally cooperation between TMPs and the health sector did not exist in Tanzania as in most other African countries. According to the old laws cooperation between physicians and TMPs was forbidden. For example, the Tanga AIDS Working Group (TAWG) started ‘by accident’ in 1990. The German doctor, Elmar Ulrich, provided by the German Development Service, was working at a hospital in Pangani District. He noticed that many of his patients visited TMPs prior to going to hospital, and that some were overdosed. He realised that the healers were treating people with strong substances and decided to contact them with the aim of starting a referral network. The healers responded positively and the referral group became the start of the present day TAWG. The objective of TAWG is to reduce transmission of HIV and assist people with AIDS. TAWG is an interdisciplinary group, which includes conventional physicians, service providers, traditional healers, patients, social scientists and botanists. TAWG collects plant medicines from traditional healers and distributes the medicines to their patients. They have offices in Bombo Regional Hospital, and in two other District Hospitals. TAWG also carries out ethnobotanical research; they distribute three plant-based medicines to other areas, and in the coming years aim at identifying at least 10 new efficacious medicines (Scheinman, 1998; IRIN, 2006). TAWG is a good example of fruitful cooperation between allopathic medicine and THs.
4. Conclusions

This review and study shows that TM has been progressively paid attention to and is included in the development plans of Tanzania. The Government has decided to encourage the integration of TM into the primary health system. In 2002 The Parliament passed The Traditional and Alternative Medicine Act, which became operational in 2005 with the aims of integrating TM in primary health care and encouraging cooperation between TMPs and western trained doctors. The Traditional Healers are the very source of knowledge on medicinal plants. Respect for the knowledge of Traditional Healers and operational regulations for benefit sharing as shown by the well-known case of Mali are regarded as an essential basis for fruitful cooperation across sectors. Here it appears that there are still strides to take in Tanzania but the prognosis is optimistic. Although plant species may occur across political borders their specific use and preparation, and cosmological place in each local community is unique and should be protected as alluded to by the CBD: uniqueness of use is not cosmopolitan. Species occurring across borders and having overlapping use does not justify non-recognition of local knowledge that has led to their know-how: regional and cross-border negotiations must take into account local uniqueness.

Two of the botanically most important ecological zones in Tanzania; Coastal forests and Mountain forests, suffer from severe degradation, 70–90% of forests outside Protected Areas being destroyed. Much of the medicinal plants are found in these zones. In new regulations and laws, the aim is to use the genetic resources for the benefit of present and future generations. The main legal framework seems to be in place, but the slow procedures of making the laws operational endanger its accomplishment. In addition, legislation related to the international trade in plants should be clarified and cooperation between agencies to implement existing laws should be promoted.

The world market in MAPs is estimated around US$ 60 billions, and in countries like China and India this trade is becoming increasingly important. In Africa there is a considerable informal trade in MAPs from TMs and in markets, but it is difficult to estimate the value of this ‘hidden economy’. Experience from China, India and South Africa shows that sustainable harvesting is not sufficient to save threatened species, and in China and South Africa there are initiatives to cultivate MAPs. Tanzania is quite well mapped in descriptive ethnobotanical studies. However there are few papers on population measurements, harvesting regimes, sustainability of harvesting and pharmacological studies. Before TM is to be developed further and incorporated in primary health care, it is important to intensify studies on populations and sustainability of harvesting of medicinal plants. Sustainable harvesting and growing of medicinal plants have the potential of accelerating rural development. Some local stakeholders have already started a process that can contribute to this development. Pharmacological studies to confirm safety and effectiveness of medicinal plants are now being done, but still very few plants have been screened.

Recent visits in Tanzania showed increasing efforts on the development of TM and modern phytomedicines. The Dakika group, for example, had for several years successfully been growing, harvesting and processing both exotic and indigenous MPs, and bringing the products out into a bigger marked. Their problems were poor equipments and labour-intensive methods. The Tanzanian Pharmaceutical Industries was newly renovated and had just launched a new anti-malaria medicine based on locally grown Artemisia annua L. However there are no extraction plants in Tanzania, so the plant material has to be dried and sent to Belgium to extract the active compounds. An increase in capacity and funds in developing more sophisticated approaches within the country would be of importance for both small and large industries.

It currently appears that several laws and regulations in Tanzania are being put in place as a result of commitments to the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and poverty eradication plans. Furthermore there are serious endeavours to include TM in primary health care also triggered by legislation. It is however a long process for the laws and plans to become operational and implementation to take place. It is also a question if the large number of laws and regulations will make implementation tedious and bureaucratic, and hinder the development of the R&D sector. The implementation of laws is difficult without capacity building, which requires serious consideration.

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References


