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Medicinal Plants of Kakamega Forests and Their Consistency Applications: Opportunities and Challenges To-Date.

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Abstract: *Biodiversity is fundamental and foundation to offering plant germplasmfor scientific investigations in the provision of useful biodata and biomedical data, both to benefit the flora and fauna. Studies were undertaken in the Kakamega forest, rich in diverse species of immense and unmeasurable resource at different levels of applications, for instance, alternative medicine provision and novel research studies in medicine to configure active biomedical potency of the plant species for disease and pests management.However, observations indicate urgent and remedial proactive measures should be put in place to attain the prime objective of the alternative medicine studies. These include but not limited to, protect and conserve the current biodiversity, provide relevant biomedical and floristic biodata (both at regional and national levels) though the creation of botanical gardens with valid and prospective specifications for posterity measures like the conventional and non-conventional models designed along the Indian approach models of testing the efficacy of the drug after processing, whether in pure or crude form to ensure its vitality. Due to less attention drawn to the assessment of plant diversity in the reserve Kakamega forest and its environ studies were initiated to add value to similar studies in the Indian Himalayan Region (IHR), India.Simple random sampling was used where the Questionnaire was administered to the traditional medical practitioners. Over two hundred and fifty plant species of economic importance, belonging to 71 families and 90 genera have been reported. Among the useful species, several species had multiple uses and rarely a species had single utility. The species included rare-endangered e.g. Clerodendrum myricoides, Terminalia brownie, Warbugia salutaris, Bixia orellana (Rare); Croton macrostachyus, Dioscorea alata (Vulnerable, 15 species). These and other species were categorized as critically Endangered (15 spp.); andEndangered (25 spp.), following criteria of the International Union for Conservation of Nature and Natural Resources (IUCN).During the studies, limitations abound the processing phase were observed in several ways. These included lack of infrastructure both in terms of personnel and research capacity, financial support-related items, patent-related regulations, availability and the high cost of the equipment, maintenance of the equipment, lack of technical staff, preparedness to protect and use wisely the biodiversity, procedure of processing of the drug from plant species is time-consuming, tedious and very expensive. Even basic research laboratories of international standards is hardly available; and policies for adopting alternative medicine are in their primordial phases. Also, limitations arise from the approval for manufacturing of the drug once potent compound is identified and confirmed. These limitations notwithstanding, the processed 'medicinal' material finds its way onto the market for disease management, for example, the 'Makini herbal clinic', 'Murugu herbal clinic' in east Africa.*

Keywords: *Utilization ofMedicinal plants, conservation, botanical gardens, vulnerable and endangered plant species*

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I. Introduction

Medicinal plant species in the Kakamega forests form part of the biodiversity that faces eminent and disproportionate loss. Kakamega Forest is often considered to be the easternmost remnant of the Guineo-Congolian rainforest system (Kokwaro, 1988) [1], and in comparison to these forests of Central and West Africa, it is relatively young, having developed only about 10 000 years ago. With 986 vascular plant taxa it has a fairly low plant species diversity compared to other forests in Kenya, *e.g.* Shimba Hills with 1396 species (Luke, 2005)[2].The future generation might not benefit the benefits that accrue from the loss of the varied medicinal plant species. This loss is occasioned by different forces driving the biological diversity loss, including deforestation. The Convention of Biological Diversity and agenda 21 (BGCI, 2011) [3] highlighted the importance of public education and awareness in promoting sustainable development and improving capacity of people to address environment and development issues. This Agenda 21 of the convention of biological diversity, sought to promote the conservation of biological diversity and its sustainable utilization. The agenda also highlights the importance of indigenous knowledge in the process of conservation and the need

for equitable sharing of resources by those seeking its utilization and those that own it. Inspite of the great importance of biological resources they have, where it is found and how it may be utilized. Indigenous knowledge has had a role to play in the understanding of the coexistence of man with fauna and flora over the centuries. In developing countries, information handed down from generation to generation is fast disappearing and with it will disappear also the knowledge on the use of genetic resources as well as indigenous conservation practices.Conservation of biodiversity is imperative since the biodiversity is being lost at an unprecedented rate (Sikolia and Omondi, 2017[4]; Heywood and Watson 1995[5]). Different forces threaten the natural plant resources of our planet. For example, environs around the University Botanic Garden of Maseno University (UBGM), just like in other several parts of the country, the survival of most plants in their natural setting is threatened as there is a lot of pressure on the plants due to land clearance to provide space for buildings, allied infrastructure development, agriculture, tree burning for charcoal and an unsustainable mode of harvesting medicinal plants, where roots and stem bark are the most preferred (Cunningham, 1997[6]; UNESCO, 1997[7]) [3]. Other destructive activities includes physical destruction of vegetation through trampling, feeding, grazing and browsing, logging, farming practice like shifting cultivation, transmission of diseases, reduction of vigour of plants by leaf-eating animals like beetles or of leaf-cutting ants, parasitism, wetland reclamation, flooding, irrigation, drainage of swamps, pollution of air, soil-cum-industrialization , invasiveness of alien species and fire. This therefore calls for integrated conservation strategies to be put in place to save the plants from extinction. In Kenya, indigenous knowledge has greatly contributed to the recognition of the importance of medicinal plants, as can be seen from the needs of the existence of herbal medicine clinics in various parts of the country. Medicinal plants has played a significant role in our health care system due to easy accessibility and affordable costs by the patients. In 1978, World Health Organization (WHO) reported that 90% of the rural dwellers receive health care from traditional healers[3]. About 80% of the population in Africa rely on traditional medicine for primary health care (Karori and Pulu, 2003) [8]. A study has showed that the members of the community around the UBGM, who are mainly Luos and Luhyas are no exception [3]. They still rely on traditional medicine for their primary health care, and during dry seasons when food scarcity is a major problem, the poor rural communities harvest wild plants, including fruits and leaves for food (Elizabetsky, 1991) [9].This usage is one of the cultural heritage hallmarks in the ownership of the indigenous plant resources of the society. Traditional knowledge and practices of medicinal plants within communities is to large extent held by the older generation. Whereas in the past, such knowledge was traditionally transferred from old to the young members, this practice is almost non-existent in many local communities. Thus, it may disappear totally if not recorded as narrated by the older generation and confirmed by the patients. Further, such information should be approved to authenticate their vitality and potency by the local administrative leaders and community members through experiences of being treated to healing or curing once in their life time.It was for this reason that the researcher and the research team of development partners, based in Kakamega town, Kakamega County, Kenya, undertook the study to record traditional information on plants found in former Ikolomani division, Kakamega district.

II. Materials and Method

The study site included Ikolomani division of former Kakamega district (now known as Kakamega County), Western Province, Kenya and its environs. The study area covers an approximately 1394km^2 and is divided into two administrative locations, North and South Idakho. Two major rivers, Isiukhu and Yala, with numerous tributaries traverse the locations, making the area quite hilly. The site is part of Kakamega forest, situated approximately 150 km west of the Rift Valley, 50 km northeast of Lake Victoria and 70 km east of the Uganda border. It is a remarkable intermix of plant diversity (Fischer, Rembold, Althof, Obholzer, Malombe, Mwachala, Onyango, Dumbo and Theisen, 2010)[10]. Beentje (1990)[11] classifies Kakamega Forest as Tropical Rainforest equivalent to the Transitional Rainforest of White (1983)[12].Simple random sampling was used where the Questionnaire was administered to the traditional medical practitioners. The study involved interviews of traditional herbalists or local medicine men practising in the area of study and its environs, as well as other members of the local communities. The plant species were identified both in the field and the laboratory. Difficulty species were taken to East African Herbarium or Chiromo Campus, University of Nairobi, Nairobi, Kenya for further verification and identification. Nomenclature followed Agnew (1974) [13], Blundell (1992) [14], Blackett, 1995[15], Beentje (1994) [16], Noad and Birnie (1992) [17], Lotschert and Beese (1994) [18] and Clayton (1974) [19]. Novel species were deposited at the East African Herbarium, Nairobi, Kenya. The plant species were preserved in the Herbarium of Development Partners, Kakamega town, Kakamega County, Kenya and Herbarium of Chiromo Campus, University of Nairobi, Nairobi, Kenya. The medicinal value of the plant species was documented and preserved. Most of the information was published in the text book entitled, "Medicinal and Agricultural plants of Ikolomani Division, Kakamega District."(Olembo, Fedha and Ngaira 1995) [20].

III. Results

Over two hundred and fifty plant species of economic importance, belonging to 71 families and 90 genera were reported for their medicinal uses. Plants of agricultural importance included those used for fodder, fattening of livestock and stimulation of milk production, treatment of east coast fever, black water, worms, expulsion of placenta stuck after birth, weight loss, poultry treatment, especially coccidiosis. Also observed were plants used as pesticides insecticides and biofertilizers. The biomedical data provided show the diseases treated and the medicinal plant source (s) as follows: Abortion/placenta expulsion/after birth pains/parturition – *Cynoglossum coeruleum, Crotalaria incana, Tragia bentham, Ajuga remota, Monchema subsessile, Psidia arabica, Taxaracum officinale, Kalanchoe densiflora, Acalypha psilostachya, Combretum paniculata, Gloriosa superba,, Sida cuneifolia, Tristemma incompletum, Trichilia emetica, Clausena anisata, Tarenna parvettoides, Physalis minima, Solanum micrantha, Dombeya burgessiae, Clerodendrum myricoides and Lippia javanica;* Anthelmintic and worms – *Vernonia adoensis, Vernonia amygdalina, Vernonia lasiopus, Momordica foetida, Ajuga remota, Phyllanthus nummularifolius, Albizia anthelmintica, Artemisia afra, Erythrina abyssinica, Hagenia abyssinica, Myrsine africana, Iboza multiflora, Leonotis mollissima, Cassia didymobotrya, Indigofera arrecta, Trifolium ruepellianum, Sida schimperiana and Solanum micranthum*; Bleeding stoppage – *Leucas calastachys, Glycine wightii, Achyranthes aspera, Ageratum conyzoides and Pittosporum manii;* Burns – *Salvia leucantha* and *Hibiscus aponeurus*; Cancer – *Bersama abyssinica, Ocotea obscura, Clerodendrum myricoides and Galium aparinoides;* Chest Pains, Pneumonia and Bronchitis – *Dombeya burgessiae, Alepidea longifolia, Leucas calastachys, Hibiscus fuscus, Bersama abyssinica, Toddalia asiatica and Clerodendrum myricoides;* Diarrhoea – *Paullinia pinnata, Canthiium gueinxii, Toddalia asiatica, Hibiscus aponeurus, Maesa lanceolata, Hypericum peplidiflolium, Abutilon mauritianum, Leonotis mollissima, Bridelia micrantha, Hagenia abyssinica, Sida cordifolia, Annona senegalensis, Ricinus communis, Ehretia cymose and Lippia javanica;* East Coast Fever – *Cassia occidentalis, Aerva persica and Clerodendrum myricoides, Clerodendrum formicarum*; *Clerodendrum melanocrater*; Eye and Ear infections – *Sesbania sesban, Ensete ventricosum, Leucas martinicensis, Leucas mollis, Coleus barbatus, Leonotis nepetifolia, Gutenbergia cordifolia, Senecio discifolius, Spilanthes mauritiana, Hypericum peplidiflolium, Plumbago zeylanica, Solanum incanum and Centella asiatica*; Fattening – *Sapium ellipticum and Psorospermum febrifugum*;Fever, Headache, Malaria and Cold – *Impatiens stuhlmannii, Spathadoea campanulata, Stereospermum kunthianum, Maesopsis eminii, Drymaria cordata, Combretum paniculata, Leucas martinicensis, Aneilema pendunculosum, Aspilia pluriseta, Gynura scandens, Sphaeranthus suaveolens, Ajuga remota, Astripomea grantii, Cyperus artulatus, Croton macrostachyus, Leonotis mollissima, Leonotis nepetifolia, Cassia didymobotrya, Cassia occidentalis, Indigofera arrecta, Hibiscus aponeurus, Kosteleskya adoensis, Ficus thonningii, Pittosporum manii, Plumbago zeylanica, Rumex bequaertii, Clausena anisata, Craterispermum laurinum, Blighia unijugata, Datura stramonium, Physallis minima, Solanum micranthum, Centella asiatica, Vitex fischeri and Asteracantha longifolia*; Fertility - *Pittosporum manii, Cassia kirkii, Agelea ugandensis, Tapinanthus oehleri and Bersama abyssinica*; Fish Poison, Bait and Stunner – *Synadenium glaucescens, Tephrosia interrupta, Alectra senegalensis and Capsicumfrutescens*; Heart ailments – *Albizia coriaria, Entada abyssinica, Entada gigas,Cyanthula polycephala, Warburgia salutaris, Vernonia adoensis, Indigofera arrecta, Tristemma incompletum and Maesa lanceolata*;Joint Pains – *Cynoglossum coeruleum, Cassia occidentalis, Acacia hockii, Canthium guensis, Canthium schimperum, Mussaenda arcuata, Zanthoxylum gillettii and Solanum incanum*;Kidney Disease – *Vernonia adoensis, Cassia occidentalis, Albizia coriaria, Entada abyssinica, Entada gigas, Cananvalia ensiformis, Indigofera arrecta, Aloe dawei, Maesa lanceolata*;Livestock Diseases - *Cassia occidentalis, Momordica foetida, Croton macrostachyus, Hyptis pectinata, Leucas calastachys, Momordica cistoides,Trifolium ruepellianum, Rumex bequaertii, Helinus mystacinus and Rhoicissus tridentata*;Liver and Spleen Diseases – *Acanthus pubescens and Erythrina abyssinica*;Mental illness and Madness – *Sphaeranthus gompherenoides and Cassia didymobotrya*;Measles – *Dracaena steudneri, Laggera alata, Turraea holstii, Launaea cornuta, Mikania cordata, Vernonia auriculifera, Trifolium ruepellianum, Azadirachta indica and Solanum incanum*;Milk Increase and Production – *Tephrosia interrupta, Antherostema naudinnii, Pentarrhinum insipidum, Basella alba, Eurphobia hirta and Eurphobia schimperianum*;Miscarriage – *Microglossa pyrifolia and Parkinsonia aculeate*;Mumps – *Erythrina abyssinica*;Pesticides and Insecticides - *Synadenium glaucescens, Cassia didymobotrya, Dracaena fragrans, Tagetes minuta, Vernonia amygdalina, Indigofera arrecta, Indigofera colutea, Aloe volkensii, Azadirachta indica, Trichilia emetica, Pittosporum manii and Lippia javanica;*Rabies – *Dryopteris marginalis*;Rheumatism – *Sphaeranthus napierae, Crassula granvikii, Zanthoxylum mildbraedii,Kalanchoe densiflora, Passiflora edulis and Zanthoxylumgilletii*;Sexually Transmitted Diseases –*Justicia betonica, Rhus natalensis, Cordia africana, Combretum paniculata, Tithonia tithon, Diospyros abyssinica, Bridelia micrantha, Croton macrostachyus, Harungana madagascariensis, Coleus barbatus, Leonotis mollissima, Cassia spectabilis, Delonix regia, Acacia hockii, Erythrina abyssinica, Trichilia emetica, Bersama abyssinica, Maesa lanceolata, Rubus apetalous, Rumex bequaertii, Mussaenda arcuata, Pavetta parvettoides, Zanthoxylum gillettii, Smilax kraussiana and Solanum mauritianum*;Skin Diseases –*Aloe*

dawei, Hibiscus aponeurus, Hilleria latifolia, Craterispermum laurinum, Amaranthus tricolor, Aspilia pluriseta, Dichrocephala integrifolia, Crassula granvikii, Eurphobia hirta, Hypericum peplidiflolium, Coleus barbatus, Bauhinia variegata, Cassia didymobotrya and Cassia kirkii;Snake Bite – *Dyschoriste radicans, Leucas martinicensis, Erythrina abyssinica, Indigofera colutea, Cissampelos mucronata, Rumex bequaertii and Paullinia pinnata*;Sterility – *Kigelia africana, Grassocephalum montuosum and Taraxacum officinale*;Stomachache – *Vernonia brachycalyx, Hewittia sublobata, Cussonia arborea, Basella alba, Momordica foetida, Spathodea campanulata, Cordia africana, Gynandropsis gynandra, Gutenbergia cordifolia, Zanthoxylum gillettii, Toddalia asiatica, Solanum incanum, Dombeya burgessiae, Trema orientalis, Lippia javanica, Rhoicissus tridentata, Ensete ventricosum, Maesa lanceolata, Pittosporum manii, Rumex bequaertii, Eriobotrya japonica, Rubus apetalous, Bridelia micrantha, Croton macrostachyus, Harungana madagascariensis, Coleus barbatus, Leucas mollis, Caesalpinia decapetala, Cassia didymobotrya, Delonix regia, Tamarindus indica, Albizia coriaria, Entada abyssinica, Indigofera arrecta, Indigofera circinella, Trichilia emetica and Turraea holstii*;Swellings, Boils and Oedema – *Maytenus senegalensis, Acanthospermum australe, Launaea cornuta, Crassula granvikii, Synadenium glaucescens, Borreria stricta, Mussaenda arcuata, Vanguaeria apiculate, Solanum incanum, Solanum micranthum, Triumfetta macrophylla, Centella asiatica, Iboza multiflora, Cassia occidentalis, Acacia hockii, Entada abyssinica, Indigofera and Trichilia emetica*;Toothbrush, Toothpaste and Toothache – *Piper guineense, Clerodendrum myricoides, Melanthera scandens, Trifolium bacarinii, Phytolaca dodecandra and Lippia javanica*;Throat infections, Cough, Mouth rashes, and Cold – *Platystoma africanum, Crotalaria incana, Hoslundia opposita, Leucas mollis, Colocasia antiquorum, Vernonia glabra, Sphaeranthus suaveolens, Vernonia lasiopus,, Gynura valeriana, Sonchus schweinfurthii, Croton macrostachyus, Eriosema robusta, Sesbania bispinosa, Tephrosia interrupta, Vigna schimperi, Rumex bequaertii, Corchorus trilocularis*;Typhoid – *Launaea cornuta and Ipomea hyoscyamoides;*Weight Loss – *Cynotis lanata, Canthium gueinxii and Allophylus abyssinicus*;
Whooping cough – *Aloe volkensii, Cissampelos mucronata and Triumfetta rhomboidea*; Wounds, Cuts and Ulcers –*Cynchium altiscandens, Commelina africana, Ageratum conyzoides, Dombeya burgessiae, Cyanotis lanata, Gynura valeriana, Microglossa pyrifolia, Eurphobia inequilatera, Coleus barbatus, Leucas calastachys, Gloriosa superba,Zanthoxylum gilletii, Lippia javanica and Vitex doniana.*

IV. Discussion

The importance of medicinal plants have transcended generations, abiotic (physiographic, edaphic and climatic) and biotic factors and regions, cultural groupings and phases of scientific drug/vaccine development but remain fundamental in their use in alternative medical therapies. Rather than disapprove their significance in the health care, integrative and conventional approaches suffice in its application to control rates of natality, reproductive,mortality and death in the future. The passage of the medicinal information from the old guard to the next generation is described as secretive and orally done to the extend some information can be lost. An observation made in the field showed that not a given "Doctor" had the ability to treat all the diseases but a few. The patients acknowledged healing from disease once suffered.Kokwaro (1976) [21] has indicated that the therapeutic or medicinal properties of plants are normally due to the presence of certain active principles to include fixed oils of the *Trichilia,* Balanites, fatty acids of *Ricinus communis* and *Croton* species. The Sulphur oils can be found in *Capsicum frutescens*. Resins occur in the *Albiziacoriaria, A. schimperiana* and *Entada abyssinica* species of Leguminosae, *Ipomoea hyoscyamoides*species of Convolvulaceae, *Piper umbellatum and Piper guineense* of Piperaceae, *Trichilia emetica* of Meliaceae and *Fagara macrophylla* of Rutaceae. The resins are best known for wound dressing. Tannins, gallic or protocatechuic acids should be present in *Acacia hockii, Kigelia africana and Spathodea campanulata* Anthelmintic glucosides can be present in the *Albizia coriaria, Maesa lanceolata, Hilleria latifolia* and *Phytolaca dodecandra*. Other active principles includes alkaloids in *Datura stramonium*, Toxalbumins in *Croton* species, and Anthraquinone Carthatics in the *Rumex bequaertii* species.A single plant was found to be used for more than one purpose and may be used as a potent cure for more than one ailment. Plants extensively utilized for multiple purposes include *Mondia whitei, Combretum paniculata, Trichilia emetica, Vernonia lasiopus, Coleus barbatus, Momordica foetida, Croton macrostachyus, Ajuga remota, Cassia didymobotrya, Indigo arrecta, Azadirachta indica, Zanthoxylum gilletii, Clerodendrum myricoides, Vernonia adoensis, and Launaea cornuta*. Further, the medicinal value of a plant species can be upgraded by mixing with two or more other plant species, for example, bark of *Trichilia emetica* is mixed with those of *Spathodea campanulata, Azadirachta indica* and *Fagara macrophylla*, boiled and used to cure swellings and sexually transmitted diseases.Some of these plants are extensively utilized that they become endangered and vulnerable in the habitat, for example, *Clerodendrum myricoides, Trichilia emetica*and *Mondia whitei*. Further, the natives exercise poor conservation practices and collection strategies like removal of the tree barks leading to poor and stunted plant growth and development. This can affect the efficacy of the plant medicinal potency in the future and even their death. Plant usage for medicinal purposes is indicative of diseases prevalence in the inhabited area, with most frequently mentioned being stomach ailments, malaria, fever, eye

infections, sexually transmitted diseases, wounds, swellings, measles, kidney problems and skin diseases. A number of the plants are known to be effective in reproductive processes, such as parturition, induction of labour, expulsion of placenta, correction of foetus placement in the uterus, bleeding stoppage and in the production of milk.Generally, plant species of the Acanthaceae, Apocynaceae, Compositae, Euphorbiaceae, Malvaceae, Leguminosae, Rubiaceae and Labiatae amongst the Angiosperm constitute highly medicinal group in terms of the active medicinal principle compounds and are well utilized by the natives as alternative medicine. Liliaceae, Cyperaceae and Dioscoreaceae of the monocotyledons, Angiospermous group, also show high traditional usage in the alternative medicine, especially in the studied area of the formerly Kakamega District (now known as Kakamega County), Western Province, Kenya. Another trending phenomenon is that the plant species in a given family can be used to treat almost similar disease. For example, *Maesa lanceolata* and *Myrsine africana* is used as anthelmintic and general stomach problems[20] [21].Similarly, *Oxygonum sinuatum* and *Polygonum pulchrum* of Polygonaceae is used to treat Sexually transmitted diseases like gonorrhea and syphilis, respectively [21].It is imperative that broad conservation systems should underscore the significance of the institutional approach in the management of biological diversity (Mugabe, 1978) [22] and heritage, especially in the area of alternative medicine. This will enhance technological learning, positive feedback and social interest in the ownership of the process for energized remedial action. Further, emerging issues of biodiversity should be tied to the national awareness through parliamentary bills and setting actionable policies and standards for implementation at the county levels, local levels and research institutions to complement the international efforts through conventions and conferences. The present researcher believe the integrative local manpower and their capacity to understand the terrain and use of their heritage can add value to sustainable utilization of the alternative medical therapies. The role of the native cannot be underestimated in alternative medicine. This approach should be understood in the context of the processes and products of ecological causes buttressed by anthropogenic changes in the ecosystems. The past structures and institutional framework should be revisited with a view to re-energize their vitality and functionalities to achieve desirable and novel objectives in tandem with time and spatial dimensions and activities for the betterment of mankind. The advancement in the area of biotechnology should be tapped to exploit great biodiversity trade-off potential that exist in East African countries (Mugabe and Clark, 1978) [23]. For instance, preservation of highly potent germplasm in gene banks through cryopreservation, *in vitro*tissue culture technique and sustainable, conserved and preserved species in *ex situ* conservation designated habitats. This strategic practices can save their germplasm. The convention on biological diversity realized the limitations of the conservation measures and proposed wide range of measures and their sustainable utilization as remedial action. Further, encourages fair and equitable sharing of the benefits resulting from usage of the genetic resources. Stronger premium is attached to the provisions to negotiate for benefits accruing from usage of the genetic resources of a given populace. The right to share the proceeds amongst the contracted parties. Thus, a specific entity should formulate its provisions that take into account specific programmes to promote sustainable development and conservation of their germplasm. This involve sound policies being developed by the inhabitants under the auspice of their constitution.During the studies, limitations abound the processing phase and setting bureau standards of the concoction used were observed in several ways. These included lack of infrastructure both in terms of personnel and research capacity, financial support-related items, patent-related regulations, availability and the high cost of the equipment, maintenance of the equipment, lack of technical staff, preparedness to protect and use wisely the biodiversity, procedure of processing of the drug from plant species as time-consuming, tedious and very expensive. The developing countries should improve and develop the personnel capacity to manage biological diversity through training programmes. To train policy-makers and researchers on the convention provisions in a well-designated research environment fully equipped to undertake the challenges arising from institutional reforms. This implies, deliberate national efforts should be redirected from mere "talk-conferencing" and establishment of inappropriate institutional structures to strengthening policy analysis phase with capacities to regulate and implement convention policies. Even basic research laboratories of international standards is hardly available; and policies for adopting alternative medicine are in their primordial phases. The barriers to biotechnology acquisition and utilization should be eliminated for the international scientists to develop novel discourse of knowledge and module advancement for benefit of the society. Funding should target Centres of Excellence in ethnobotany and pharmacology to be set-up for, upscale biosafety measures and empower its infrastructure capacity for further research studies and technology transfer. This will help in the approval of manufacturing of the drug once potent compound is identified and confirmed. Patent should be given to resource person whose alternative concoction has treating potency confirmed to a given ailment(s) and further improvement of therein alternative medicine composition should consider rebates. Also, the role of intellectual property rights should be spelled out clearly to the resource medicine men to understand the intricacies of what ownership entails.Pharmacological effects, active principle compounds and the toxicity of the medicinal plant species are yet to be established. Thus, the phytochemical analysis of the plants is a crucial phase, especially for the pharmaceutical companies in the production of the novel drugs for curing of various diseases(Wadood,

Ghufran, Jamal, Naeem1, Khan, Ghaffar and Asnad, 2013) [24].Medicinal plants show varying dosage formulation and extent of toxicity to be utilized in large quantities without the traditional practitioner confirmation. For example, *Phytolaca dodecandra* in low dosage can be used to cure stomach problems but is highly toxic in high concentrations and can lead to death. It is for this reasons that all plant species should be subjected to the appropriate biological/biochemical assays to determine their efficacy and toxicity for standard composition bureau formulations. Further, *Ajuga remota, Toddalia asiatica*, *Gloriosa superba, Tephrosia interrupta, Albizia coriaria,Trichilia emetica*, *Smilax kraussiana*, *Clerodendrum myricoides Commelina africana* (Commelinaceae)/*Haplocarpha scaposa*concoction, *Rhoicissus tridentata* concoction (Moteetee and Kose, 2016[25]; Makundi *et al*, 2015[26]), *Sida cordifolia* crushed stuff [21][22] and *Zanthoxylum gilletii* concoction [21][22] of therein plant species are highly recommended for the determination of the efficacy, toxicity and active principles resulting in their medical potency.Also, Acanthaceae, Apocynaceae, compositae, Euphorbiaceae, Malvaceae Leguminosae and Labiatae are recommended as families of high medicinal potential and potency for investigation to establish their active principles, efficacy and toxicity.

V. Conclusion

The records for the medicinal plant species is in its primordial phase yet the genetic diversity is disappearing at an alarming rate. The source of the medicinal practices, the traditional medicine men, are leaving the scene without equal measure of replacement. Further, the information past onto the young generation is not all that was known but at reduced degree with minimal documentation in place because of the mode of oral transmission that can suffer memory lapse. This is dangerous because dosage for alternative medicine administration is crucial and can lead to death in the event of overdose. Therefore documentation of medicinal plant species is significant. Medicinal plants require urgent measures of conservation and preservation in their habitats and designated reserved areas like botanical gardens and arboretum. Under these conditions the negative processes that eliminate the plant species especially the vulnerable and endangered species can be checked for posterity and future utilization by the next generations. Logging, deforestation, grazing, slashing and other forms of land clearance is a major setback in the conservation of plants in their habitats and to some extent the botanical gardens [3]. During slashing, many herbs and shrubs are cleared, making these plants to be unavailable in the botanic garden. Therefore any researcher or person interested in these plants may not access them all year round in the botanic garden. Examples of such plants include *Physalis minima*, *Datura stramonium* and *Ocimum basillicum* [3].Further, the effect of invasive species and their consequences in the designated areas is becoming a biological phenomenon of concern to researchers, especially their dominance behaviour against the native plant species. Many invasive species have been introduced in many botanic gardens via the horticulture trade during years of plant exploration and movement of plants around the world (Clubbe *et al.*, 2010) [27]. Thus botanic gardens have a high responsibility to monitor their holdings carefully for potential invasive (Lechner and Kiehn, 2010) [28].*Ex situ* conservation measures should be sensitized through well thought out policies and implementation phases at different levels of governance structure in any given society. Examples of political, institutional, and governance actions needed includes support for institutional reforms and improved governance; better stakeholder participation, support for devolved/decentralized forest sector institutions, especially community forestry associations; build the capacity of NGOs to better educate, advocate, and lobby for biodiversity and forest conservation (Byers, Hecht, and Mwangi, 2011) [29]. The locals should be encouraged and integrated in the conventional practices and strategies for the success of conservation and preservation measures, including biotechnologies for germplasm preservation and multiplication of the tissue cultured seedlings to the farmers. This should provide a sense of security to conserve the indigenous germplasm for the present generation and posterity.Thus, maintaining the diversity and quality of ecosystems to improve their capacity to adapt to physicaland biogeochemical change to provide for the fundamental requirements of future generations is advised to avoid plant species loss and land fragmentation as part of module measure to restore biodiversity loss and extinction of the vulnerable and endangered plant species. Some plant species are highly recommended for further phytochemical analysis and includes *Ajuga remota, Toddalia asiatica*, *Gloriosa superba, Tephrosia interrupta, Albizia coriaria,Trichilia emetica*, *Smilax kraussiana*, *Clerodendrum myricoides Commelina africana* (Commelinaceae)/*Haplocarpha scaposa* concoction, *Rhoicissus tridentata*, *Sida cordifolia* crushed stuff and *Zanthoxylum gilletii*.

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