Promotion of Community based cultivation of *Hibiscus sabdariffa, Moringa oleifera, Adansonia digitata* and *Aloe vera* for use as herbal nutritional supplements for people living with HIV/AIDS

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Final Report

Introduction

The devastation resulting from immunodeficiency in HIV/AIDS patients predisposes patients to a multitude of opportunistic infections, ranging from bacterial, fungal, viral, and protozoa infections and malignancies such as Kaposi's sarcoma and non-Hodgikin's lymphomas. The availability of antiretroviral drugs (ARVs), which reduce viral load and help to restore the immune system, has given hope to those who can afford them. However, for the majority of people the availability of ARVs is a luxury that they cannot afford. The only available option is to curb emerging opportunistic infections so as to reduce illness episodes. The availability of easily accessible and cheap drugs for the treatment of opportunistic infections would be of great relief to patients.

The use of products from these 3 specific medicinal plants could contribute significantly towards the treatment of opportunistic infections in addition to supplying nutritional supplements to cope with the devastation of immunodeficiency. Nutritional supplementation could also be pivotal in dealing with the nutritional needs of pregnant women and undernourished children. Herbal nutritional supplements are likely to play an important role in improving the health of a large percentage of the population, especially in the rural areas, either directly through use or by generating income which will allow them to afford other types of foods.

General objective

Promotion of herbal medicines as a source for low cost nutritional supplements to support nutritional needs of people living with HIV/AIDS and interested population in natural foods

Specific objectives

(i). Promotion of cultivation of *Hibiscus subdarifa, Moringa oleifera* and *Aloe vera* by small scale farmers at Kongowe, Kibaha District.

(ii) Training of the target farmers on how to cultivate the three plants, good harvesting techniques, and how to dry the produce using solar driers.

(iii). Promotion of the use of herbal nutritional supplements as a means to meet basic nutritional needs among HIV/AIDS patients, pregnant women, children and health people interested in natural foods.

Strategic Goal of the Project.

The main strategic goal of the project is to contribute to implementation of the National Food and Nutrition Policy. The project, among other things, aims to improve the nutritional status of HIV/AIDS patients and among children and women.

The key elements of the Food and Nutrition Policy are:

- To integrate food and nutrition activities undertaken by various sectors.
- To improve the nutritional situation of the Tanzanian community, especially children and women.

- To strengthen the procedures of obtaining and supplying food within the household, villages and towns by utilizing locally produced foods
- To enable Tanzanians to produce and use food which can adequately meet their nutritional needs.
- To establish a viable research program which will facilitate the improvement of food and nutrition in the country

Activities:

Setting up demonstration plots

It was planned to plough and plant at least 6 hectares of land with *Aloe vera*, *Moringa oleifera* and *Hibiscus sabdariffa, i.e.,* 2 hectors each. These three plots would then be used as demonstration farms for training of at least 20 farmers.

Training of the target farmers on how to cultivate the three plants, good harvesting techniques, and how to dry the produce using solar driers

An initial meeting with farmers at Kongowe, Kibaha, was done in the month of August, 2005. A lot of interest was generated and the farmers indicated willingness to participate in cultivation of herbal medicines. Twenty farmers were involved in the harvesting of the *Hibiscus sabdarifa* that was grown in the trial phase. Some of the farmers who participated in the pilot phase indicated interest to join in the proposed project. It was planned to encourage and include some traditional healers who expressed interest and farmers from 3 selected districts already targeted by TACAIDS, including, Singida, Kyela and Bagamoyo. Workshops were planned to be held to local farmers in the Kongowe (Kibaha) area on the different uses of *Aloe vera, Moringa oleifera* and *Hibiscus sabdarifa*. The training was also intended to address good agricultural and harvesting practices for the target plants. The practice of organic farming will be emphasized and promoted.

Promotion of solar drying techniques

Many nutrients in herbal material are better preserved when the correct drying techniques are used. Many times drying using direct sunlight destroys oxidizable constituents like vitamins and reduce the nutritional value. Solar drying is mild, preserves fragile nutrients, and results in a product that is appealing in appearance and texture. It was planned to collaborate with AMKA (an NGO) to setup solar driers at the farm to be used for training and for drying the demonstration crop harvest..

Promotion of the use of herbal nutritional supplements as a means to meet basic nutritional needs among HIV/AIDS patients, pregnant women and children

It was planned to disseminate information on the nutritional value of the three plants among farmers at Kibaha. Seminars and workshops were planned to impart the knowledge. It was also planned to develop training booklets with information on how to cultivate the plants.

Results and achievements

Setting up demonstration plots

- 8 hectres of land were ploughed and successfully planted with *Moringa oleifera, Hibiscus sabdariffa*, *Aloe vera* and *Adansonia digitata.*
- 1300 seedlings of *Adansonia digitata* were planted and are doing well
- 4 hectres were planted with *Hibiscus sadariffa.* Two hundred and fifty kg of dried rosella was harvested
- 3200 seedlings of *Aloe vera* were planted and they are doing well.
- *Moringa oleifera* is performing well and currently there are 2 hectares of Moringa at different stages of growth. A total of 70 kg of dry leaves has been harvested, and is being used to make Morizella juice, and some is being sold in packets in the form of powder (100 g packets at 1000 TShs)

Figure 1: A section of the farm showing *Adansonia digitata* plants

Figure 2: A section of the farm showing labourers weeding

Training of the target farmers on how to cultivate the three plants, good harvesting techniques, and how to dry the produce using solar driers

- Training manuals for cultivation and processing of *Hibiscus sabdariffa, Moringa oleifera, and Aloe vera* have been produced and made available to customers at a nominal fee of Tshs 1500.

Figure 3: A section of the farm showing a flowering *Hibiscus sabdariffa* crop

Involvement of the community:

- A number of individuals at Kongowe Kibaha have been trained on the project. A few of them have now started growing their own rosella.
- Jipe Moyo, a group of people living with HIV who are based in Dodoma joined efforts with the Institute to promote hebal nutritional supplements among HIV patients. They participated in a workshop for promotion of cultivation of herbal nutritional supplements. They also jointly with the Institute staged exhibitions of packed rosella and Moringa based products at the Dar es Salaam International Trade Fair Exhibitions in July, 2006.
- An NGO based in Kilosa has joined hands with the Institute to promote organic faring of rosella. They recently sold 200 kg of rosella to the Institute Production Unit.

Promotion of solar drying techniques

- Three demonstration solar driers were constructed, which are now being used to dry Moringa leaves and rosella
- One person involved in the cultivation and processing of Rosella was facilitated to acquire a low cost solar drier from AMKA.

Figure 4: One of the three solar dryers which were made for demonstration and training of farmers.

Figure 5: A section of the farm showing *Aloe vera* plants.

Figure 6: One of a few mature *Aloe vera* plants on the farm

- One workshop was conducted on 22nd May, 2006 to promote cultivation of herbal nutritional supplements.

- Water pipes have been installed around the farm. One pipeline has been set up at each end and at the middle of the farm to bring water close to the edges of the planted areas.

- 3 training manuals developed

Figure 7: A section showing intercropping of *Moringa oleifera* with *Hibiscus sabdariffa*

Deviation to planned activities:

- The implementation of the project has gone on very well despite problems that were experienced at the beginning of getting a tractor to plough the land.
- Money was diverted to strengthen product development activities. Money was used to buy machines
- Additional funding will be used for promotional activities, renovation of production laboratory, and installation of machines
- Due to shortage of storage space for harvested plant material a 22 ft container was purchased.

Impact to the Nation

The project directly addresses reduction of income poverty and sustenance of livelihoods by providing nutritional supplementation. It may also have an industrial component since the rosella calyx is used for production of wine, juices, and in the confectionery industry.
The project is also likely to spin out to generate foreign earning, through export to the harvest of Rossela which has market abroad.
There is already a very visible impact of the project. Having exhibited Rosella and Moringa products at the International trade fair a lot of interest has been shown by the community. Packaged Rosella is selling very well. It is increasingly being used by pregnant women for treatment of anaemia and as a health drink. The Institute has assigned one BPharm IV student to work on the development of a flavoured health drink from Rosella.

Plans are under way to pack the extract of the calyx into capsules and make it available for use.

Impact to the Departmental

This project addresses two strategic objectives of the Institute:

(a) Strategic Objective no. 6: Improved Linkage between Research and Application of Results, where by it seeks to direct research results into inputs for income generation, reduction of poverty and improvement of livelihoods.

(b) Strategic objective no. 12: Enhance publicity and promotion of traditional medicines. It contributes to efforts to promote traditional/herbal medicines which is the core activity of the Institute

(c) The project also contributes to improving lives among people living with HIV/AIDS through provision of nutritional supplements (Institute Strategic objective no. 11: Enhanced prevention and research activities related to HIV/AIDS)

Impact to the University

At University level the project contributes to the University wide Goal no. 6: Enhancing linkages with the productive sectors and the society. It also links with the Institute strategic objectives no. 5, 7, and 12.

Future plans

The major task is to maintain Moringa, *Aloe vera* and *Adansonia digitata* crops that are on the farm. It is planned to employ 2 people to maintain the crop on the farm that will be paid using proceeds accruing from the sale of the products. The Institute will continue to involve the community in cultivation of these crops and sell them as packaged raw material or sell the crop to the Institute for use in production of formulations. The farmers who participated in this first phase are already benefiting from sale of their crop to the Institute. The Institute has already bought 300 kg of Rosella calyces from them.

The Institute in collaboration with a private entrepreneur has started another initiative to promote cultivation of *Artemisia annua* in Lushoto. Markets are being sought for these crops and others like Cinchona bark locally and in India.

It is also planned to develop a training program on organic farming as a way to guarantee production of good quality crops.

Appendix 1: INFORMATION ON HIBISCUS SABDARIFFA, MORINGA OLEIFERA AND ALOE VERA.

A. INFORMATION ON *HIBISCUS SABDARIFFA*

Hibiscus sabdariffa L.(Malvaceae), also known as roselle is a native to Old World Tropics, probably in the East Indies; but now it is cultivated throughout the tropics. It is being cultivated in some areas of Moshi, Morogoro, Coast, and Dodoma. The plant is a source of a red beverage known as jamaica in Mexico (said to contain citric acid and salts, serving as a diuretic). In the West Indies and elsewhere the fleshy calyces are used fresh for making roselle wine, jelly, syrup, gelatin, refreshing beverages, pudding, and cakes, and dried roselle is used for tea, jelly, marmalade, ices, ice-cream, sherbets, butter, pies, sauces, tarts, and other desserts. Fruits are edible (5). Perry cites one study showing roselle's usefulness in arteriosclerosis and as an intestinal antiseptic (6). Roselle is cultivated primarily for the fiber obtained from the stems. The fiber strands, up to 1.5 m long, are used for cordage and as a substitute for jute in the manufacture of burlap.

Folk Medicine

Reported to be antiseptic, aphrodisiac, astringent, cholagogue, demulcent, digestive, diuretic, emollient, purgative, refrigerant, resolvent, sedative, stomachic, and tonic. Roselle is a folk remedy for abscesses, bilious conditions, cancer, cough, debility, dyspepsia, dysuria, fever, hangover, heart ailments, hypertension, neurosis, scurvy, and strangury. The drink made by placing, the calyx in water, is said to be a folk remedy for cancer. Medicinally, leaves are emollient, and are much used in Guinea as a diuretic, refrigerant, and sedative; fruits are antiscorbutic; leaves, seeds, and ripe calyces are diuretic and antiscorbutic; and the succulent calyx, boiled in water, is used as a drink in bilious attacks; flowers contain gossypetin, anthocyanin, and glucoside hibiscin, which may have diuretic and choleretic effects, decreasing the viscosity of the blood, reducing blood pressure and stimulating intestinal peristalsis. In Burma, the seeds are used for debility, the leaves as emollient. Taiwanese regard the seeds as diuretic, laxative, and tonic. Philippines use the bitter root as an aperitif and tonic (6). Angolans use the mucilaginous leaves as an emollient and as a soothing cough remedy. Central Africans poultice the leaves on abscesses. Alcoholics might consider one item: simulated ingestion of the plant extract decreased the rate of absorption of alcohol, lessening the intensity of alcohol effects in chickens (5).

Pharmacology

Extracts of the calyx have *in vivo* and *in vitro* antioxidant activity. The extract exhibited antihypercholesterolemic, antinorciceptive and antipyretic activity (7). The extracts have a strong antihypertensive activity in rats and man and have a very low degree of toxicity (7).

Chemistry

Per 100 g, the fruit contains 49 calories, 84.5% H_2O, 1.9 g protein, 0.1 g fat, 12.3 g total carbohydrate, 2.3 g fiber, 1.2 g ash, 1.72 mg Ca, 57 mg P, 2.9 mg Fe, 300 µg β-carotene equivalent, and 14 mg ascorbic acid. Per 100 g, the leaf is reported to contain 43 calories, 85.6% H_2O, 3.3 g protein,0.3 g fat, 9.2 g total carbohydrate, 1.6 g fiber, 1.6 g ash, 213 mg Ca, 93 mg P, 4.8 mg Fe, 4135 µg β -carotene equivalent, 0.17 mg thiamine, 0.45 mg riboflavin, 1.2 mg niacin, and 54 mg ascorbic acid. The inflorescence, per 100 g, is

reported to contain 44 calories, 86.2% H_2O, 1.6 g protein,O.l g fat, 11.1 g total carbohydrate, 2.5 g fiber, 1.0 g ash, 160 mg Ca, 60 mg P, 3.8 mg Fe, 285 µg β -carotene equivalent, 0.04 mg thiamine, 0.6 mg riboflavin, 0.5 mg niacin, and 14 mg ascorbic acid (8). Seeds contain 7.6% moisture, 24.0% crude protein, 22.3% fat, 15.3% fiber, 23.8% N-free extract, 7.0% ash, 0.3% Ca, 0.6% P, and 0.4% S. Seed extracted with ether contained 0.7% fat, 29.0% protein, and 32.9% N-free extract (9) Component acids of the seed lipids were 2.1% myristic-, 35.2% palmitic-, 2.0% palmitoleic-, 3.4% stearic-, 34.0% oleic-, 14.4% linoleic-, and 3 unusual HBr-reacting fatty acids (cis-12, 13-epoxy-cis-9-octadecenoic (12,13-epoxoleic) 4.5%; sterculic, 2.9%; and malvalic, 1.3%). Two other studies (10, 11) report on the sterols in the seed oil, 61.3% β-sitosterol, 16.5% campasterol, 5.1% cholesterol, and 3.2% ergosterol (said to be rare in vegetable oil but the most common mycosterol in most fungi, including yeast). Seed has properties similar to those of cotton seed oil, and is used as a substitute for crude castor oil. Karkade (dried-flowers minus-ovary) contains 13% of a mixture of citric and malic acid, two anthocyanins gossipetin (hydroxyflavone) and hibiscin, and 0.004–0.005% ascorbic acid. Petals yield the flavonal glucoside hibiscritin, which yields a crystalline aglycone—hibiscetin ($C_{15}H_{10}O_9$). Flowers contain phytosterols. The dried flower contains ca 15.3% hibiscic acid ($C_6H_6O_7$). Root contains saponins and tartaric acid. Calyces contain 6.7% proteins by fresh weight and 7.9% by dry weight. Aspartic acid is the most common amino acid. Dried fruits also contain vitamin C and Ca oxalate; dry petals contain flavonol glucoside hibiscitrin.

B. INFORMATION ON *ALOE VERA*

Common name: *Aloe vera*
Biological name: *Aloe barbadensis L*. (Alocaceae)
Aloe vera (*Aloe barbadensis L*. (Alocaceae)
is one of the oldest known therapeutic herbs and is renowned worldwide as a healing plant. It originated in the Cape Verde islands off the West African Coast. First mentioned in the Egyptian "Papyrus Ebers" in 1550 B.C. for its medical and embalming value, aloe vera was supposedly used to embalm the body of Christ.

Both the Greek historian Dioscorides and the Roman naturalist Pliny recommended *Aloe vera* about 2,000 years ago as an effective remedy for constipation, burns, wounds, bruises, skin irritations, kidney problems and more.

The plant contains a variety of amino acids, enzymes, vitamins and minerals and it comes closer than any other known plant to the duplication of life's essential substances in the biochemistry of the human body. It has natural healing and detoxifying powers and works gently within the intestinal tract to help break down impacted food residues and thoroughly cleanse the bowel. It can help ease constipation and prevent continuing diarrhoea. *Aloe vera* is a stimulant to the immune system, a powerful anti-inflammatory, and analgesic and is able to speed up cell growth. *Aloe vera* contains a large number of mucopolysaccharides (basic sugars), which are found in every cell in the body and contains large numbers of nutrients including vitamins E, C, B1, 2, 3, and 6 as well as minerals like Fe, Mn, Ca and Zn. Seven essential amino acids and fatty acids are also found in *Aloe vera* (12-16). This plant should be promoted as a nutritional supplement to HIV/AIDS patients, who are likely to realize a lot of benefit from its use.

C. INFORMATION ON *MORINGA OLEIFERA*

Moringa oleifera Cam (Syn. *Moringa pterygosperma* Gaertner), commonly referred to as "drumstick tree" or "horseradish tree", belongs to the monogeneric family *Moringaceae* which grows throughout most of the

tropics and is native to sub-Himalayan tracts of North-West India, Pakistan, Bangladesh and Afghanistan. It is a large shrub or small tree well distributed in Africa and Asia. Its leaves and pods have great nutritional value, yield many vitamins and minerals. Parts of the tree can also be used as animal forage, a domestic cleaning agent, perfume, dye, fertilizer, medicine, water clarifying agent, fiber for rope, and as an agent for tanning hides (17).

Leaves and pods of *Moringa oleifera* can be an extremely valuable source of nutrition for people of all ages. For example, for a child aged 1-3, a 100 gram serving of fresh leaves would provide all his daily requirements of calcium, about 75% of his iron and half his protein needs, as well as important supplies of potassium, B complex vitamins, copper and all the essential amino acids. As little as 20 grams of fresh leaves would provide a child with all the vitamins A and C he needs. Twenty (20) grams of fresh leaves will satisfy all the daily requirement of vitamin C of pregnant and lactating mothers. For both infants and mothers, pods can be an important source of fiber, potassium, copper, iron, choline, vitamin C and all the essential amino acids. Six rounded spoonfuls of leaf powder will satisfy nearly all of a woman's daily iron and calcium needs during times of pregnancy and breast-feeding.

The numerous medicinal uses of Moringa are well documented. Moringa is used in the treatment of rheumatism and gout, helps lower high blood pressure and possesses anti-bacterial and anti-cancer properties. All parts of the Moringa plant are of medicinal importance and are used in folk medicine for treatment of numerous ailments. The fruits, seeds and flowers are all considered to be nutritious vegetables. The leaves are extremely rich in essential nutrients such as ß-Carotine, Vitamin C (ascorbic acid), iron and free leucine. For example, the ß-carotine content of the leaves is three times as high as in carrots, 4 times calcium in milk, 3 times potassium in milk, 2 times the protein in milk and seven times the vitamin C in oranges (18-21).

Moringa seed extracts are also efficient as a primary coagulant for wastewater treatment to remove suspended solids, microorganisms and even some metals. In developing countries, Moringa seed coagulants are a viable alternative to expensive and toxic chemical coagulants such as aluminium sulphate (alum) for purifying drinking water.

Uses of *Moringa oleifera* in Traditional Medicine

Moringa oleifera is already highly esteemed by people in the tropics and sub-tropics for the many ways it is used medicinally by local herbalists. Some of these traditional uses reflect the nutritional content of the various tree parts. The following are but some of the ways the tree is used in Asia, Africa and the Americas. In recent years, laboratory investigation has confirmed the efficacy of some of these applications (22, 23).

Leaves

Juice from leaves have a stabilizing effect on blood pressure and is used to treat anxiety. An infusion of leaf juice is believed to control glucose levels in cases of diabetes. Mixed with honey and followed by a drink of coconut milk 2 or 3 times a day, leaves are used as a remedy for diarrhea, dysentery and colitis (inflammation of the colon). Leaf juice, sometimes with carrot juice added, used as a diuretic (to increase urine flow). Eating leaves is recommended in cases of gonorrhea on account of the diuretic action. Leaves and young buds are rubbed on the temple for headache. In India and the Philippines, a poultice made from fresh leaves is applied to reduce glandular swelling. It was reported that Malaysians sometimes applied a

leaf poultice to the abdomen to expel intestinal worms. Leaf juice is sometimes used as a skin antiseptic. In India, leaves used to treat fevers, bronchitis, eye and ear infections, scurvy and catarrh (inflammation of the mucus membrane).Leaves are considered to be anthelmintic (able to kill intestinal worms). Leaves are used as an irritant and as a purgative. In Nicaragua, Guatemala and Senegal, leaves are applied as poultice on sores and skin infections. In the Philippines, eating leaves is believed to increase a woman's milk production and is sometimes prescribed for anemia.

Flowers

Flowers are traditionally used as a tonic, diuretic, abortifacient and anthelminitic. Floweres are also used to cure inflammations, muscle diseases, tumors and enlargement of the spleen. In India, juice pressed from the flowers is said to alleviate sore throat and catarrh. In Puerto Rico, an infusion of the flowers is used as an eye-wash and a decoction from the flowers has been used to treat hysteria.

Pods

Pods are believed to be anthelminitic. Pods are used in affections of the liver and spleen, and in treating articular pains (pain in the joints).

Roots

In India, roots are used as a carminative (promotes gas expulsion from the alimentary canal, against intestinal pain or spasms) and as a laxative. Roots are considered useful against intermittent fevers and are sometimes chewed to relieve cold symptoms. Juice from roots is applied externally as a rubefacient (skin tonic), counterirritant or vesicant (agent to induce blistering). Roots are used as an abortifacient, diuretic and a cardiac and circulatory tonic. Roots are used to treat epilepsy, nervous debility and hysteria. In Senegal and India, roots are pounded and mixed with salt to make a poultice for treating rheumatism and articular pains. In Senegal, this poultice is also used to relieve lower back or kidney pain. Roots are used as a purgative. In India, Indo-China, Nicaragua and Nigeria, a root poultice is used to treat inflammations, especially swelling of tissues in the foot (pedal edema). A decoction of roots is used to cleanse sores and ulcers. In India and Indo-China roots are used to treat cases of scurvy. Root juice mixed with milk is considered useful against in hiccoughs, asthma, gout, lumbago, rheumatism, enlarged spleen or liver, internal and deep-seated inflammations, and calculous affections. Crushed root mixed with rum has been used as a liniment on rheumatism. A snuff made from roots is inhaled to relieve earache and toothache. A juice made from a combination of fresh roots, bark and leaves is inserted into the nostrils to arouse a patient from coma or stupor.

Root bark and Stem bark

In Senegal, root and tree bark are used to treat sores and skin infections. Bark is regarded as useful in treating scurvy. In India, stem and root bark are taken as appetizers and digestives. In Senegal, a decoction of root bark, roots, leaves and flowers is used to treat epilepsy, hysteria, and intestinal spasms. In India, a decoction of the root bark is used as a fermentation to relieve intestinal spasm and is considered useful in calculous affections (mineral buildup/kidney stones). Stem bark is used to cure eye diseases. In India, stem and root bark are believed to be aphrodisiacs and anthelmintic.In India, root bark is said to prevent enlargement of the spleen and formation of tuberculous glands of the neck, to destroy tumors and

to heal ulcers. Juice from root bark is put into the ear to relieve earaches and also placed in a toothache cavity as a pain killer. Bark is used as a treatment for delirious patients. In the Philippines it is believed that, roots, chewed and applied to a snakebite, will keep the poison from spreading. Bark is used as a rubefacient and as a vesicant. In India, bark is sometimes mixed with peppercorns and used as an abortifacient (although often with fatal consequences).

Gum

Gum, mixed with sesame oil, is used to relieve headaches. This is also poured into ears for the relief of earache. In Java, gum is given for intestinal complaints. In India, gum is used for dental caries.Gum is considered to be diuretic. In India and in Senegal, gum is considered useful in treating fevers, dysentery and asthma. Gum is used as an astringent and rubefacient (skin tonics). In India, gum is sometimes used as an abortifacient. In India, gum is used to treat syphilis and rheumatism.

Seeds

Seeds are used against fevers. Flowers, leaves and roots used as remedies for various tumors, and the seed for abdominal tumors. In Aruba, a paste of crushed seeds is spread on warts.

Seed Oil

In India, seed oil is applied externally to relieve pain and swelling in case of gout or rheumatism, and to treat skin diseases. Oil is used to treat hysteria and scurvy. Oil is applied to treat prostrate and bladder troubles. Oil is considered to be a tonic and a purgative. Some of the above traditional remedies have been supported by recent laboratory studies (22, 23).

Chemistry

Per 100 g, the pod is reported to contain 86.9 g H_2O, 2.5 g protein, 0.1 g fat, 8.5 g total carbohydrate, 4.8 g fiber, 2.0 g ash, 30 mg Ca, 110 mg P, 5.3 mg Fe, 184 IU vit. A, 0.2 mg niacin, and 120 mg ascorbic acid, 310 µg Cu, 1.8 µg I. Leaves contain 7.5 g H_2O, 6.7 g protein, 1.7 g fat, 14.3 g total carbohydrate, 0.9 g fiber, 2.3 g ash, 440 mg Ca, 70 mg P, 7 mg Fe, 110 µg Cu, 5.1 µg I, 11,300 IU vit. A, 120 µg vit. B, 0.8 mg nicotinic acid, 220 mg ascorbic acid, and 7.4 mg tocopherol per 100 g. Estrogenic substances, including the anti-tumor compound, ß-sitosterol, and a pectinesterase are also reported. Leaf amino acids include 6.0 g arginine/16 g N, 2.1 histidine, 4.3 lysine, 1.9 tryptophane, 6.4 phenylalanine, 2.0 methionine, 4.9 threonine, 9.3 lucine, 6.3 isoleucine, and 7.1 valine. Pod amino acids enclue 3.6 g arginine/16 g N, 1.1 g histidine, 1.5 g lysine, 0.8 g tryptophane, 4.3 g phenylalanine, 1.4 g methionine, 3.9 g threonine, 6.5 g leucine, 4.4 g isoleucine, and 5.4 valine. Seed kernel (70–74% of seed) contains 4.08 H_2O, 38.4 g crude protein, 34.7% fatty oil, 16.4 g N free extract, 3.5 g fiber, and 3.2 g ash. The seed oil contains 9.3% palmitic, 7.4% stearic, 8.6% behenic, and 65.7% oleic acids among the fatty acids. Myristic and lignoceric acids have also been reported. The cake left after oil extraction contains 58.9% crude protein, 0.4% Cao, 1.1% P_2O_5 and 0.8% K_2O. Pterygospermin, a bactericidal and fungicidal compound, isolated from Moringa has an LD_{50} subcutaneously injected in mice and rats of 350 to 400 mg/kg body weight. Root-bark yields two alkaloids: moringine and moringinine. Moringinine acts as cardiac stimulant, produces rise of blood-pressure, acts on sympathetic nerve-endings as well as smooth muscles all over the body, and depresses the sympathetic motor fibers of vessels (24).

Pharmacology

Moringa leaf extract has been shown to be effective in lowering blood sugar levels within a space of 3 hours, albeit less effectively than the standard hypoglycaemic drug, glibenclamide. Effects increased with larger doses (25).

An extract taken from dried leaves showed an impressive ability to heal ulcers in laboratory animals. Administration of daily doses by injection caused a very significant improvement in the healing rate in induced gastric ulcers (26).

An extract made from dried powdered leaves was shown to have a very potent depressive effect on the central nervous system, resulting in significant muscle relaxation, decreased body temperatures and increased sleep time among laboratory mice. Subjects receiving the highest dosages spent twice as much time asleep as the control group (27).

An extract from dried roots, applied orally to laboratory mice, demonstrated clearly that the roots possess antiinflammatory properties. In another study, infusion of seeds, roots and flowers significantly inhibited the formation of pedal edema, although the authors concluded that the seed infusion may be the only one worthy of further investigation (28, 29).

An infusion made from seeds demonstrated an ability to inhibit intestinal spasms, as well as some diuretic activity.

An *in vitro* study showed that an aqueous extract made from seeds is effective against *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Escheridia coli*. This study showed the seed extract to be equally effective as Neomycin against *S. aureus*. Similar results were obtained with aqueous extracts from the roots (30). Fresh leaf juice has showed some positive inhibition of *Pseudomonas aeruginosa* and an extract from leaves was found to be effective at inhibiting the growth of the fungi *Basidiobolus haptosporus* and *B.ranarum.* The *in vitro* anti-fungal effects of the extract compared favorably the with the effects of some conventional drugs used to treat zygomycotic infections (31).

Aqueous extract from stem bark were shown to increase the rate of heart contractions at low concentrations and decrease the rate at high concentrations, with the effect of lowering blood pressure. Moringinine (32), from root bark, acts on the sympathetic nervous system and acts as a cardiac stimulant, relaxes bronchioles (bronchial tube inflammation) and inhibits involuntary intestinal tract movement. Anthonine, also found in root bark, is highly toxic to the cholera bacterium (32).

Spirochin, found in the roots, is anti-gram+ bacteria, analgesic, antipyretic, affects the circulatory system (by raising or lowering heart beat, depending on dose), and affects the nervous system. In high doses it can paralyze the vagus nerve. Also found in roots and seeds, benzylisothiocyanate (which works against fungi and bacteria) may be even better than medicinally utilized benzylisothiocyanate and other isothiocyanates (32).

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Appendix 2. WORKSHOP PROCEEDINGS

WARSHA YA WADAU WAENDELEZAJI WA MADAWA YA MITI KAMA CHANZO CHA LISHE NA VIRUTUBISHO KATIKA WILAYA YA KIBAHA, TAREHE 22/05/2006

RATIBA YA SEMINA YA ULIMAJI WA MITIDAWA KONGOWE- KIBAHA TAREHE 22-05-2005

MUDA	MADA	MHUSIKA
2.30-3.00	KUJIANDIKISHA	DR. E. J. KAYOMBO NA E. SHUNDA
3.00- 3.05	KUKARIBISHA MGENI RASMI NA WANA WARSHA	MKURUGENZI TAASISI YA MADAWA ASILIA
3.05-3.25	UFUNGUZI WA SEMINA	MGENI WA HESHIMA
3.25-3.30	NENO FUPI LA SHUKRANI	MR. MAGOMBEKA
3.30-4.00	CHAI	E.SHUNDA
	AWAMU YA KWANZA MWEZESHAJI DR. MBWAMBO	
4.00-4.30	KWA NINI TUKO HAPA	E.KAYOMBO
4.30-11.15	UMUHIMU WA LISHE KWA WAGONJWA WANAOISHI NA VIRUSI VYA UKIMWI NA MAGONJWA NYEMELEZI	DR. G. NDUNGURU
5.15-6.00	ULIMAJI NA UTUNZAJI WA ROSELLA	DR. M. MOSHI
6.00-7.00	CHAKULA CHA MCHANA	E. SHUNDA
	AWAMU YA PILI MWEZESHAJI DR. G. NDUNGURU	
7.00-7.45	ULIMAJI NA UTUNZAJI WA MLONGE	E. SHUNDA
7.45-8.30	ULIMAJI NA UTUNZAJI WA ALOE VERA	Z.MBWAMBO
8.30-9.30	KUTEMBELEA SHAMBA NA SOLAR DRYER	E.SHUNDA NA DR.E.KAYOMBO
9.45-10.00	MAJADILIANO KWA UJUMLA NA MTAZAMO WA MBELE	WOTE
10.00-10.30	KUFUNGA SEMINA NA KIBURUDISHO	DIRECTOR NA MGENI MWALIKWA

HOTUBA YA UFUNGUZI WA WARSHA YA WADAU WAENDELEZAJI WA MADAWA YA MITI KAMA CHANZO CHA LISHE NA VIRUTUBISHO KATIKA WILAYA YA KIBAHA, TAREHE 22/05/2006.

MHESHIMIWA C. ISHENGOMA; MKUU WA MKOA WA PWANI

Mkurugenzi, Taasisi ya Madawa ya Asilia, Chuo Kikuu Kishiriki cha Sayansi za Tiba Muhimbili, viongozi Wilaya ya Kibaha, Wadau waendelelezaji wa dawa za miti na dawa asili, na washiriki wengine wa warsha hii.

Kwa niaba yangu, na kwa niaba ya wakazi wote wa Mkoa wa Pwani, napenda kuwakaribisha nyote hapa Kibaha, baada ya safari zenu ndefu kutoka huko vijijini na Dar es Salaam. Ninafahamu kuwa wengi wenu hamkai hapa karibu, pia ninafahamu wengine wametoka Dodoma, hivyo inabidi niwapongeze kwa juhudi kubwa mliyoifanya ili kuweza kuhudhuria katika warsha hii. Ninafahamu vilevile kuwa kutokana na barabara zetu kuharibiwa na mvua, inawezekana hata usafiri kutoka huko vijijini kwenu ulikuwa wa shida.

Ndugu washiriki wa warsha hii, mimi nimefahamishwa kwamba, warsha hii inalenga katika kubadilishana uzoefu kuhusu njia mbadala ya kupambana na janga hili la UKIMWI. Sote tunaelewa kwamba maambuzi ya UKIMWI katika Tanzania bado yanaendelea, na dawa ya kutibu bado haijapatikana. Ugonjwa huu hauna mipaka kwa vile unashambulia jamii za aina zote. Dunia nzima inakiri kwamba, ugonjwa huu hauna tiba kwa sasa na uwezekano wa kupata tiba bado uko mbali sana.

Ndugu washiriki, serikali yetu inajitahidi sana kutafuta njia mbalimbali za kupambana na tatizo hili la UKIMWI. Serikali inanunua dawa za kurefusha maisha ya waathika, kuhamasisha wananchi kupima afya zao pamoja na kutoa elimu kwa umma kuhusu athari za ugonjwa huu na jinsi ya kuepukana nao. Mafanikio yake bado yamekuwa kidogo sana na wananchi bado wanaendelea kuteketea. Ifahamike vilevile ya kuwa serikali haina uwezo wa kumpatia kila mwathirika mahitaji yake yote, ikiwa ni pamoja na lishe bora na dawa za kurefusha maisha. Ni wajibu wa wananchi wenyewe kutafuta njia na mbinu mbadala za kujisaidia, ikiwa ni pamoja na kutumia tiba na lishe zao za asili. Hatua ya serikali kusambaza dawa za kuongeza maisha ni ya kupongezwa. Hata hivyo dawa hizi zingeweza kumsadia zaidi mgonjwa wa UKIMWI kama zitaendana na uboreshaji wa lishe yake.

Ndugu wana warsha, mimi nimeelezwa kuwa warsha hii inalenga katika kuwaelimisha washiriki kuhusu umuhimu wa lishe zitokanazo na miti dawa katika kurefusha maisha ya waathirika wa UKIMWI.Vile vile nimeambiwa kuwa kwa kiwango kikubwa washiki watajifunza kuhusu matumizi ya tiba mbadala katika kutibu magonjwa mbalimbali yanayomwandama mwathirika wa UKIMWI kwa kutumia rasilimali zetu za misitu. Nimeambiwa kwamba, washiriki watajifunza jinsi ya kukuza mimea aina ya Mlonge, Rosella na Aloe vera na matumizi yake katika kutibu magonjwa mabalimbali kama vile shinikizo la damu, saratani,

kisukari na kupunguza makali ya UKIMWI.

Ndugu washiriki wa warsha hii, semina hii inafanyika wakati mwafaka kwa vile inalenga pia katika kuboresha mazingira yetu ambayo yanaelekea kuwa janga kwa sababu ya miti kukatwa ovyo. Mimi nina imani kabisa kuwa miti hiyo ikipandwa na kutunzwa vizuri itaweza kuhifadhi bianwai na hivi kuweka ikolojia nzima katika hali nzuri. Sina wasiwasi kuwa miti hii inaweza ikakua vizuri na kutoa bidhaa ambazo mkulima anaweza kuuza na kujipatia kipato kizuri na hivyo kuondokana na umaskini, ikiwa ni mchango wa ziada ukijumuishwa na manufaa ya moja kwa moja ya kujipatia lishe mbadala.

Ndugu zangu, mafanikio yote ya mradi huu yatategemea ni jinsi gani mtakavyoweza kushirikiana baina yenu, na taasisi nyingine. Mkakati huu ukiimarishwa vizuri utachangia katika kukuza kipato chenu kwa vile inategemewa kuwa mazao ya hii miti yataweza kuwekwa kenye vipakiti na kuuzwa sehemu mbali mbali hapa kibaha na kwingineko. Mazao haya vile vile yanaweza yakawa chachu ya kuanzisha viwanda vidogo vodogo vya dawa za miti. Ni mategemeo yangu kuwa wadau wengine kama vile Mamlaka ya Dawa na Chakula ya Wizara ya Afya nayo yatajiunga na mkakati huu ili kuimarisha mafanikio ambayo yanatarajiwa.

Ndugu washiriki, kabla ya kufungua hii warsha naomba niwashukuru waandaaji wa warsha hii pamoja na wachangiaji ambao wamewezesha warsha hii kufanyika. Napenda kuwashukuru pia kwa kuchagua kufanyia mradi huu, na warsha hii katika Mkoa wangu. Hii ni bahati kubwa sana kwa Mkoa wetu tukizingitia kuwa Tanzania ni kubwa na waandaaji wangeweza kwenda sehemu nyingine kufanyia huu mradi. Kwa bahati hii tuliyopata, mimi naomba mzingatie kwa makini sana yale yote mtakayofundishwa kwenye warsha hii na kwenda kuyafanyia kazi huko vijijini kwenu. Mimi binafsi naahidi kufuatilia kilimo cha mimea hiyo na kuona kuwa inatumika vizuri katika kuboresha maisha ya watu wanaoishi na virusi vya UKUMWI na watu wengine ambao wanakabiliwa na matatizo mbalimbali ya lishe kwenye Mkoa wetu. Nitapenda kuona kuwa kilimo hiki kinaenea Mkoa mzima wa Pwani, na kuwezesha uanzishwaji wa viwanda vidogo vidogo vya usindikaji wa haya mazao, kama vile kutengeneza mvinyo wa rosella.

Kwa hayo machache, ninachukua fursa hii kuwatakia mafanikio katika warsha hii, na hasa hasa utekelezwaji wa huu mradi wa miti ya vyanzo vya lishe.

Sasa kwa kuhitimisha ninatamka rasmi kuwa warsha hii imefunguliwa.

UMUHIMU WA LISHE KATIKA KUBORESHA MAISHA YA WATU WANAOISHI NA UKIMWI

DK. GABRIEL T. NDUNGURU

MTAFITI-LISHE

UTANGULIZI

- *Madhara ya ugonjwa wa UKIMWI katika jamii*
    1. *Huua wazalishaji wa chakula*
    2. *Husababisha kero nyingi za utunzaji*
    3. *Huua wafanyakazi*
    4. *Huongeza gharama za matibabu*
    5. *Huathiri elimu*
- *Magonjwa yanayoweza kusababishwa na UKIMWI*

1. Homa za mara kwa mara

2. Kikoozi

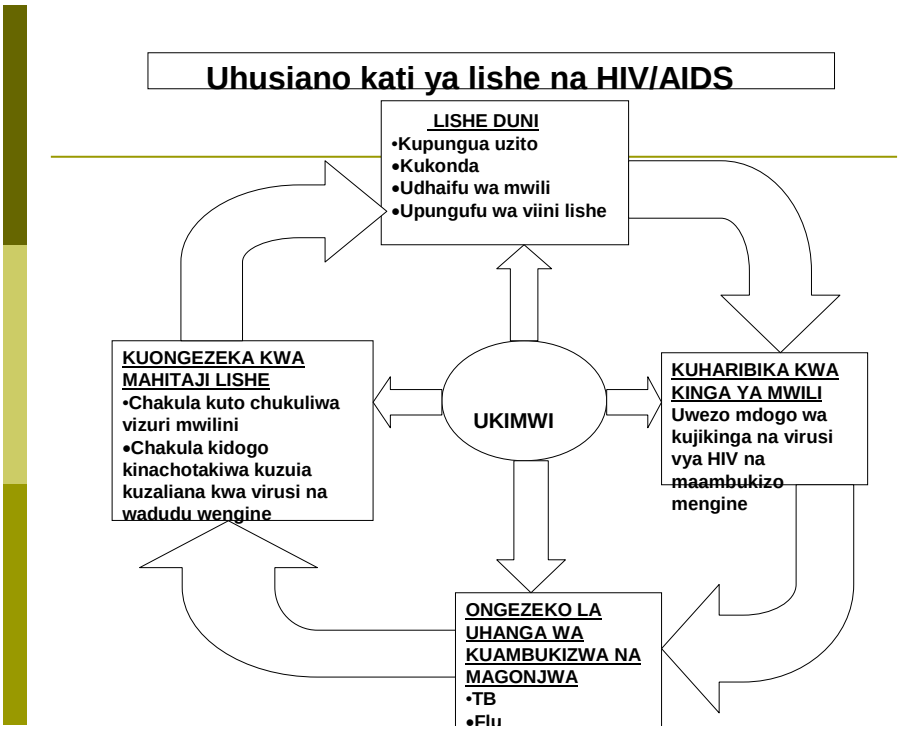
3. Mwasho wa mwili

4. Kuharisha sana

5. Pumu

6. TB

7. Vidonda vya mdomoni



Athari za magonjwa mwilini

- *Huongeza mahitaji ya kani (Energy) mwilini*
- *Hupunguza hali ya mwili kufyonza chakula vizuri kutoka tumboni*
- *Uharibu nguvu ya dawa mbalimbali*
- *Husababisha kuharisha*
- *Husababisha magonjwa ya mara kwa mara*
- *Huongeza mahitaji ya viini lishe kwa ujumla*
- *Husababisha chakula kuto tumika vizuri mwilini*
- *Usababisha uvimbe mwilini*

Kazi ya lishe mwilini

- *Kuongeza kinga mwilini*
- *Kuponyesha magonjwa mbalimbali*
- *Kuzuia magonjwa*
- *Kujenga mwili*
- *Kuleta nguvu*

Aina mbalimbali ya vyakula

- *Vyakula vya proteni*
- *Vyakula vya wanga*
- *Vyakula vya mafuta*
- *Vitamini mabalimbali kama vile A, kundi la B, C na E.*
- *Madini mabalimbali kama vile Chuma na zinc*

JUHUDI ZA SERIKALI NA MASHIRIKA YA KIMATAIFA NA KITAIFA

- *Kusambaza dawa ya kuongeza maisha*
- *Kuhamasisha lishe bora*
- *Kupima afya za watu*
- *Kutoa elimu kuhusu UKIMWI*
- *Kufanya utafiti kuhusu UKUMWI*

MALENGO YETU

Kutumia nguvu zetu zote katika kuunga mkono juhudi za serikali kwa:

- *Kutafuta tiba mbadala*
- *Kutafuta mbinu za kuboresha lishe ya watu wanaoishi na virusi vya ukimwi*
- *Kupeana taarifa kuhusu matokeo ya utafiti wetu*
- *Kuzalisha mazao mbalimbali yenye sifa za kutibu magonjwa na kuboresha lishe*

MATUMIZI NA ULIMAJI WA MLONGE

(*Moringa oleifera*)

DR. MAINEN MOSHI

1. UTANGULIZI

- *Mlonge ni Nini?*
- *Mlonge ni mti mdogo, na unaokuwa kwa kasi, unaovumilia ukame*
- *Huweza kufikia kimo cha meta 12 unapokomaa*
- *Hukua sehemu mbalimbali*
- *Una matumizi mbalimbali kwa binadamu na mifugo.*
- *Majani na matunda yana virutubisho vya aina ya protini, vitamini, madini*
- *Mmea huu hutumika kama dawa*

2. Mti wa Mlonge

- *Ni mti laini wenye shina moja, matawi kadhaa na vijani vidogo vidogo*
- *Mizizi yake hujishika vizuri ardhini*
- *Maua yake yana rangi ya maziwa na hutoa harufu nzuri*
- *Matunda yake huwa na urefu wa sm 30-50 na yanafanana na ya kunde*
- *Mbegu zake ni nyeusi na zina "mabawa"*

3. Mahitaji ya Mlonge

- *Hupendelea sehemu zenye mvua za wastani kiasi cha mm 250-1500 kwa mwaka*
- *Pia hustahimili joto na sehemu lowezi zenye mvua zaidi ya mm 3000 kwa mwaka*
- *Huota katika mwinuko wa hadi kufikia meta 1000 kutoka usawa wa bahari*
- *Hupendelea udongo unaopitisha maji kirahisi na usiotuama maji hasa wa mchanga*
- *Tanzania: Unakua vizuri ukanda wa pwani*

4. Ulimaji wa Mlonge

- *Mlonge huweza kuoteshwa kutokana na mbegu au vipandikizi/vijiti*

4.1 Uoteshaji wa mbegu kwenye bustani/shambani

- Loweka mbegu kwenye maji kwa usiku mzima na vunja gamba la mbegu
- Otesha mbegu 2-3 kwenye kikapu (chenye urefu sm 18, upana sm 12) kilichojazwa vizuri na mchanganyiko wa udongo na mchanga (3:1), katika kishimo cha sm 1-2.
- Mbegu huota kati ya siku 5-14

- *Lima ardhi vizuri kabla ya kupanda miche*
- *Chimba mashimo ya upana wa sm 50 na kina sm 50*

- *Changanya kilo 5 za mbolea ya asili na udongo wa juu na weka kwenye shimo la kupandia mti*
- *Ni vizuri kupanda miche wakati wa mvua au weka maji siku moja kabla ya kupanda*

- *Weka maji kidogo siku za mwanzo*
- *Endapo miti itainama ifunge kwenye miti ya urefu wa sm 40 ili kuisaidia*

- *4.2. Upandaji wa mbegu moja kwa moja shambani*
- *Chimba shimo la kutosha kuweka mbolea na kumwagia maji kabla ya kupanda kwenye bustani ya nyumbani wakati wowote ikiwa unaweza kumwagilia*

- *Katika shamba kubwa ni vizuri kupanda mbegu mwanzoni mwa msimu wa mvua*

- *4.3. Upandaji wa vijiti*
- *Tumia vijiti vya mti uliokomaa vilivyokatwa katika vipimo vya urefu sm 45-100 na unene sm 4-10.*
- *Vijiti huweza kupandwa moja kwa moja au kwenye vikapu*
- *4.3.1 Moja kwa moja: Panda kwenye udongo mwepesi wenye kichanga na panda sehemu moja ya tatu ya kijiti chini ya ardhi, mwagilia maji kiasi ili mizizi isioze*
- *4.3.2 Kwenye Vikapu: Unaweza kuongeza mbolea (km phosphorus) ili kuharakisha ukuaji. Vijiti vinaweza kuoteshwa shambani baada ya miezi 2.*

5: Nafasi katika upandaji

- *Panda katika nafasi ya mita 3 kati ya miti na mita 3 kati ya mistari*
- *Panda miti mashariki kuelekea magharibi ili kuruhusu mwanga wa jua na hewa ya kutosha*
- *Miti ya milonge inaweza kuchanganywa na mahindi, ufuta nk baada ya miaka 2.*

6. Ukataji wa ncha za miti

- *Miche ikishafikia urefu wa sm 60 ikatwe kwenye ncha urefu wa sm 10 kutoka juu*
- *Matawi ambayo huota juma moja baada ya kukata ncha yakatwe yakishafikia urefu wa cm 20.*
- *Ukataji wa matawi ufanyike X4 kabla ya miche kutoa maua (miezi 3 hivi) ili kuruhusu mti kuota majani, matawi na matunda mengi*
- *Kwa aina ya miloge mikubwa shina lote likatwe mara moja kwa mwaka katika urefu wa sm 90 kutoka ardhini.*

7. Wadudu na magojwa

- *Milonge huvumilia kushabuliwa na wadudu*
- *Mizizi huweza kushambuliwa na fungua aina na Diplodia kwenye maeneo yanayotuama maji*
- *Miti midogo hushambuliwa na wanyama km ng'ombe, mbuzi, kondoo, nguruwe nk*
- *Ni vyema kupanda miti ya uzio hususani "*Jatropha curcas*" ambayo matunda yake hutengeneza sabuni*
- *Pia miche huweza kushambuliwa na mchwa*
  - Zuia uharibifu huu kwa kuzungushia kwenye shina majani ya mti wa mbono, majani ya mti wa "Tephrosia"; weka jivu kwenye shina

8. Uvunaji

- *Vuna majani machanga na vikonyo kwa ajili ya kuliwa*
- *Vuna majani yaliyokomaa kwa ajili ya kutengeneza unga*
- *Vuna matunda ya mlonge mchanga yenye unene wa sm 1 kwa ajili ya chakula*
- *Mbegu zivunwe kutoka katika tunda lililikomaa na kukauka(linakuwa la rangi ya kahawia)*
- *Mbegu zihifadhiwe kwenye mifuko mikavu na inayoruhusu hewa*

9. Matumizi ya Mlonge

9.1 Matumizi ni mengi:

- *Majani ya mlonge ni chanzo kizuri cha madini ya kalsium, potasiam, chuma, shaba;*
- *Majani yana vitamin A, B and C*
- *Mlonge pia una protein yenye ubora*
- *Matunda pia ni chanzo kizuri cha protini*
- *Mbegu za mlonge hutengeneza mafuta*

9.2 Mlonge ni Dawa!

- *Huweza kutibu magonjwa yanayosababishwa na bakteria, fangasi na virusi*
- *Mizizi: hutibu homa na pumu*
- *Pia hupunguza matatizo katika mfumo wa kukojoa*
- *Majani husaidia uyeyushaji wa chakula tumboni, huzuia vidonda vya tumbo na pia hutibu sikio*
- *Maua: hutibu majipu*
- *Matunda: huongeza hamu ya kula na ni dawa ya macho*
- *Hutibu pia magonjwa ya mfumo wa damu*
- *Mbegu hutoa mafuta kutengenezea sabuni*

10.Hitimisho

- *Mlonge ni zao muhimu .*
- *Ni Dawa na ni chakula*
- *Una Vitamin A ambayo ni muhimu sana kwa watoto*
- *Una madini ya Chuma ambayo ni muhimu kwa watoto na akina mama wajawazito na wanaonyonyesha*
- *Una madini, protini na vitamini ambazo huweza kuongeza kinga ya mwili dhidi ya magonjwa*
- *Huweza kuzuia magonjwa yanayoambukizwa (Kuumwa sikio) na yasiyo ambukizwa (pumu, presha)*
- *Ni zao linaloweza kulimwa na kuchangia katika kuboresha afya na kuongeza kipato!!!*

ULIMAJI NA UTUMIAJI ENDELEVU WA *HIBISCUS SABDARIFFA* – MALVACEAE (ROSELLE)

Mr. Edwin Shunda

Utangulizi

- *Rosella ni mmea wenye virutubisho vingi km vitamini, na madini ya chumvichumvi*
- *Hutumika kutengenezea juisi, jam, jellies, sauces, na mvinyo (pombe)*
- *Hutumika kuukinga mwili na magonjwa km saratani, ini na ukosefu wa lishe*
- *Unapunguza rehamu, unatibu presha*
- *Mmea wa Rosella wenye maua mekundu hujulikana kama choya-Dodoma*
- *Huitwa mkakaka(pwani) na wengine huutumia kama kiungo cha mboga(ndimu)*
- *Majani yake yanaweza kuliwa kama mboga vilevile*
- *Ni zao la biashara na hutumiwa nyumbani*

Mrosela

- *Mmea huu hukua na hufikia urefu wa mita 3.5 kwa msimu*
- *Mti pamoja na matawi yake vimenyooka*
- *Majani yamepishana kimpangilio na kugawanyika katika sehemu 3 – 7 pembeni yakiwa kama msumeno*
- *Una rangi ya kijani, nyeusi hadi nyekundu*
- *Maua ni makubwa yenye rangi nyekundu hadi njano*
- *Una mzizi mrefu na hutoa maua wakati wa kiangazi.*
- *Pia unavumilia ardhi yenye tindikali ya juu na ya chini pamoja na magonjwa*
- *Kuna aina 2:*
  - *Hibiscus sabdariffa* yenye vikonyo vya rangi nyekundu hadi njano ambavyo vinaliwa
  - *Hibiscus altissima* Webster ambayo hupandwa zaidi kwa ajili ya kamba kamba (fibres) zake lakini vikonyo haviliwi

Mahitaji ya Mrosela

- *<u>Hali ya Hewa</u>:*
- *Maeneo ya tropiki yenye mvua kati ya 1500 – 2000 mm kwa mwaka*
- *Mwinuko wa hadi meta 600 kutoka usawa wa bahari*
- *Inavumilia joto na hali ya unyevunyevu*
- *Hupendelea udongo wa mchanga wenye rutuba ambao hupenyeka kwa urahisi*

Mahitaji ya Rosela

- Hata hivyo unaweza kukua kwenye aina mbalimbali za udongo
- *Huhitaji palizi ya mara kwa mara ili kuondoa kivuli na majani*
- *Huvumilia mafuriko, upepo mkali na maji yaliyotuama*

Ulimaji:

- Uchaguzi wa eneo, utayarishaji wa eneo, uchaguzi wa mbegu
- Mahitaji ya bustani : vikapu, mbolea, udongo, mchanga

- *Tifua ardhi vizuri kwenda chini kama sentimeta 20*
- *Piga mashimo ya ukubwa wa sm15 X sm 15 na kina cha sm 5*
- *Panda mbegu kilo 11 – 22 kwa hekta*
- *Ni vyema kupanda mbegu kwa mistari*
- *Palizi katika mwezi wa kwanza ni muhimu sana*
- *Mbolea za asili zinafaa kutumika na husaidia sana*
- *Mtindo wa kubadilisha mazao (crop rotation) hutumika hasa kwa ajili ya mdudu anayeshambulia mmea huu kwenye mizizi (root knot nematode)* Heleredera radicicola
- *Unaweza kubadilisha na mazao ya kijani kama kunde, mahindi*
- *Mashamba madogo nyumbani:*
  - Panda mistari halafu ikisha ota punguza iwe katika mistari ya meta 1 x meta 1.
- *Mashamba makubwa:*
  - Mbegu zioteshwe kwenye kitalu halafu zipandwe shambani kwa upana wa meta1.3 hadi 2.6 na mistari ya upana wa meta 2-3.3

Magonjwa

- *Fungi: fangas (ukungu) mbalimbali hushambulia kwenye mizizi na majani*
  - Nyunyiza dawa, fungicides

Kumbuka: Uangalizi wa shamba unahusisha;

- Palizi, Kukata mapukutu, kufyeka
- Kunyweshea
- Uwekaji mbolea
- Uwekaji dawa kwa wadudu waharibifu

Uvunaji

- *Uvunaji wa matunda na vikonyo hufanyika majuma 3 baada ya maua kuchipua.*
- *Inashauriwa vikonyo viondolewe baada ya kupika matunda*
- *Kwa Rosela ya kamba: kupanda hadi kuvuna ni miezi 3-4 na ivunwe wakati mimea inatoa maua*
  - Mimea ikatwe chini kabisa na kisha kuning'iniza ili kamba ziachane na mti
  - Kamba zioshwe na kuanikwa juani
  - Mashine zipo na zinaweza kutumika kwa ajili ya kutenganisha kamba na mti

- *Ukaushaji Unafanywa kwa kutumia*
  - solar dryer
  - chekecheke
  - Kuanika moja kwa moja juani
  - Kutumia majamvi kwa kukaushia matunda yenye mbegu

Maandalizi:

- *Andaa turubai, jamvi, mkeka nk*
- *Bandua vikonyo*
- *Hifadhi matunda yenye mbegu*

Kuhifadhi

- *Weka rosela iliyokauka kweye mifuko safi ya nailoni au viroba*
- *Hifadhi mifuko kwenye chumba kisafi chenye mzunguko mzuri wa hewa na kisiwe chenye unyevunyevu*

Uvunaji wa kiuchumi

- *Uvunaji wa vikonyo kilo 1.5-7.5 kwa mmea*
- *Kilo 17000-19000 kwa hekta*
- *Uzalishaji wa kamba ni kg 1700 – 3500 kwa hekta*
- *Kiasi cha kamba kwenye rosela ni 5%*

Matumizi ya Rosela

- Majani, matunda, maua, vikonyo, mbegu, mizizi

- *Vikonyo vya matunda hutumika kutengenezea jams, jellies, sauces na mvinyo*
- *Vikonyo pia hutumika kuweka rangi na ladha kwenye vyakula*
- *Majani machanga huliwa kama mboga*
- *Mbegu hutumika kwa ajili ya kuongeza nguvu za kiume*
- *Matunda yake yanaliwa*
- *Kamba zake hutengenezea vitu mbali mbali*
- *Rosela pia hutoa mafuta*

Matumizi kama dawa asilia

- *Huongeza nguvu za kiume*
- *Hutibu magonjwa ya tumbo, majipu, matatizo ya moyo, kikohozi, kansa (vikonyo), homa homa, na magonjwa ya akili*
- *Hupunguza kiwango cha kulewa kwa mtu anapokunywa pombe*
- *Maua yake ni mazuri sana katika kupunguza rehani kwenye damu*

Hitimisho

- *Ni zao lenye matumizi mengi yenye faida*
- *Linaweza kulimwa kama zao la biashara*
- *Linaweza kuongeza ajira*
- *Linaweza kuongeza kipato na kupunguza umasikini*
- *lnatengeneza mvinyo mzuri sana.*

ULIMAJI NA UTUMIAJI ENDELEVU WA *ALOE VERA*

na Dr. Mainen J. Moshi

Utangulizi

- *Aloe vera (*Aloe barbadensis *L.) ni mojawapo ya mimea iliyojulikana zamani kama mimea ya tiba*
- *Inasemekana ulitumika kunakshi mwili wa bwana Yesu Kristo*
- *Kihistoria ni tiba ya kufunga choo, kuungua, vidonda, michubuko, ngozi, figo n.k.*
- *Una aina kadhaa za "amino acids", vimeng'enyo, vitamini na madini*
- *Unaongoza kati ya mimea ijulikanayo kwa kuongeza viini vya uhai kwenye mwili wa mwanadamu!!!*

- *Una uponyaji wa asili na nguvu za kutoa sumu tumboni*
- *Husaidia kuponda chakula kilichoganda na na hulainisha choo*
- *Huzuia kuharisha, na ni kichocheo kwenye mfumo wa kinga, unapunguza maumivi na unaongeza ukuaji wa chembechembe*
- *Una kiasi kikubwa cha viini lishe pamoja na vitamini E, C, B1, 2, 3 na 6 na madini kama Fe, Mn, Ca na Zn.*
- *Huweza kutumika kama lishe mbadala kwa wagonjwa wa ukimwi (HIV/AIDS)*

Ulimaji

- *Unapendelea zaidi udongo wenye mchanga na rutuba ingawa huota ktk aina nyingi za udongo*
- *Huwa unakuzwa kwa kutumia:*
  - maoteo (root suckers)
  - mabaki ya mizizi baada ya kuvuna (rhizome cuttings) ambazo hukatwa sentimeta 5 – 6 urefu na vyenye vijicho (nodes) 2 – 3.
- *Vinapandwa kwenye matuta maalum au vihifadhio*
- *Miche impandwa baada ya kuanza kuchipua*

- *Ulimaji wa Aloe vera unafuata hatua zifuatazo:*
  - Ardhi ilimwe vizuri na udongo uwe na tindikali kiasi; Inashauriwa kuongeza mbolea aina ya ammonium nitrate kila mwaka
  - Miche ipandwe katika umbali wa inchi 31 kati ya mche na mche na kati ya mstari na mstari (heka miche 5,000; na itachukua miezi 18 – 24 kwa majani ya Aloe vera kukomaa)
  - Kwa mwaka mmoja mimea itatoa maua yenye rangi ya njano na majani yenye urefu wa futi 1 hadi 2 hukatwa bila kuharibu mmea ili udumu kwa miaka kadhaa
- *Uvunaji hufanywa mara nne kwa mwaka katika kiwango cha majani kwa kila mmea. Hivyo majani 12 huvunwa kutoka kwenye kila mche*
- *Kwa wastani kila mwaka unaweza kuvuna kg 60,000 kwenye hekari moja*
- *Majani yakishavunwa, mara moja huwekwa kwenye boksi la mbao lililoundwa kama V lenye upana wa futi 4 na kina cha inchi 12 – 18 sehemu iliyokatwa ikielekea chini.*

- *Boksi la mbao huwekwa kwenye mwinuko ambao huruhusu juisi kutoka kwenye majani itiririke haraka na kudondokea kwenye chombo kilichowekwa chini kupitia tundu lililopo kwenye boksi hilo*
- *Majani hayachemshwi bali baadaye hutumika kama mbolea. Maboksi yakishajaa, huondolewa na kuhifadhiwa*
- *Juice huwekwa kwenye chombo cha shaba na kuchemshwa*
- *Sehemu ya chini imetengenezwa ili kuhifadhi takataka ambazo huondolewa mara kwa mara wakati uchemshaji ukiendelea*
- *Baada ya uchemshaji, juisi nzito huwekwa kwenye chombo kikubwa cha gudulia au boksi na kuachwa ipoe.*

Matumizi

(1) Husaidia kuhamasisha na kuimarisha kinga kutokana na kuwepo "mannan polysaccharides"

(2) Husaidia magonjwa ya mafua, kikohozi na "Allergies" kutokana na magnesium lactate and salicylates

(3) Husaidia kama "anti – inflammatory agent", hutibu "arthritis" na kusaidia mzunguko mzuri wa damu kwa ajili ya moyo na mfumo wa akili.

(4) Husaidia kushusha kiasi cha rehamu mwilini; kutokana na polysaccharides zilizomo

(5) Inasaidia kama "antioxidant" hivyo hulinda na kuondoa sumu zisizotakiwa mwilini, kurekebisha msukumo wa damu

(6) Hutibu rheumatism, arthritis, maambukizo ya figo, njia ya mkojo (UTI) na prostate

(7)Hutibu matatizo ya tumbo, kama:

- *vidonda vya tumbo*
- *kulainisha choo*
- *Kupunguza tindikali*
- *husaidia chakula kisagwe vizuri tumboni*
- *vidonda na uvimbe kwenye njia ya haja kubwa (haemorrhoids)*

(8) Hutibu ugonjwa wa ini na kisukari

(9) hutumika kutengenezea dawa za aina mbalimbali za ngozi

Hitimisho

- *Aloe vera ni mmea unaojulikana kote duniani kutokana na matumizi yake mengi*
  - Chanzo cha viinilishe (vitamini, madini)
  - Ina kinga ya mwili
  - Ni tiba kwa magojwa mbalimbali
  - Hutumika kutengenezea vipodozi
- *Ni zao la biashara*
- *Linaweza kuongeza kipato na kuondoa umasikini*
- *Inafaa sana kutumiwa na husaidia wagonjwa wenye upungufu wa kinga mwilini (HIV/AIDS)*

HOTUBA YA KUFUNGA WARSHA YA WADAU WANAOHUSIKA NA MADAWA ZA MITI LISHE WILAYA YA KIBAHA, TAREHE 22/05/2006

Mkurugenzi, Taasisi ya Madawa ya Asilia, Chuo Kikuu Kishiriki cha Sayansi za Tiba, Muhimbili, viongozi wa Wilaya ya Kibaha, Wadau wa dawa za kiasili na washiriki wengine wa warsha.

Ndugu wana warsha, kwanza kabisa napenda niwashukuru waandaaji kwa kunikaribisha kuja kufunga warsha hii. Kwa niaba ya Wilaya yangu napenda kuwapongeza wadau wote kwa moyo wenu wa kujitokeza kwa wingi kuja kuhudhuria warsha hii muhimu.

Ndugu washiriki, nimeelezwa kuwa warsha hii ilikuwa ya siku moja ikijumuisha wadau mbalimbali wanaohusika na matumizi ya bidhaa za misitu katika kupata vyanzo mbadala vya kuimarisha lishe, kutibu magonjwa mbalimbali ya binadamu pamoja na yale yanayoambatana na UKIMWI. Binafsi warsha hii imenifurahisha sana kwa vile imelenga pia katika suala zima la hifadhi ya mazingira na kuondoa umaskini katika jamii yetu.

Ndugu washiriki, mimi nimeambiwa kuwa katika hii siku moja washiriki wameweza kujifunza mambo mengi sana ya manufaa kwao na kwa taifa zima. Nimefahamishwa kuwa mmejifunza masuala ya nafasi ya lishe bora katika kuboresha maisha ya wenzetu wanaoishi na virusi vya UKIMWI, jinsi ya kukuza mlonge, rosella na aloe vera na matumizi yake kama dawa mbadala ya maradhi mbalimbali ya watu hao. Nimeelezwa pia kuwa mmejifunza faida ya mazao haya katika kuboresha lishe na kuboresha mazingira. Mimi naamini kabisa kwamba ujuzi huu mliopata mtakwenda kuutumia kwa vitendo na baada ya muda mfupi mazao haya yataonekana yakishamiri mashambani mwenu. Naomba maafisa wote wa ugani wa kilimo na misitu wawahamasishe wakulima kwa bidii katika kuzalisha mazao haya na kuyatumia ipasavyo. Majani ya mlonge, na rosella ni mboga nzuri tu na zenye virutubisho. Wananchi wasingojee wawauzie watu wengine, anzeni kutumia wenyewe ili na wengine wawaone mnavyofanikiwa wawaige. Baadaye hawa watakuwa ndio wanunuzi wa mazao yenu na hapo ndipo biashara itakapoanzia.

Ndugu washiriki, umuhimu wa warsha hii ni mkubwa sana, tukizingatia umuhimu wa mazao haya katika kupambana na janga hili kubwa la UKIMWI, umaskini na mazingira. Kutokana na umuhimu huo, nawaombeni wote ambao mmepata bahati ya kuhudhuria warsha hii kuyazingatia yale yote mliyojifunza hapa na kuyafanyia kazi kwa vitendo. Nawaombeni pia mjenge mshikamano baina yenu ili kuhakikisha kuwa malengo yenu na yale ya Taifa zima yanafikiwa kama tunavyotarajia. Hata hivyo mnaweza msifanikiwe sana kama hamtashirikiana na Taasisi nyingine, kama vile ile ya Madawa ya Asilia Muhimbili

na ile ya utafiti wa magonjwa Tanzania. Taasisi zingine muhimu ni zile za Chakula na Lishe Tanzania pamoja na ile ya Chakula na Madawa.

Kabla ya kufunga naomba niwapongeze tena wote kwa moyo wenu wa kuja kuhudhiria warsha hii na kuwatakia safari njema vijijini kwenu. Naamini mmehamasika vya kutosha na mtakwenda kueneza yale yote mazuri mliyoyapata kwa wenzenu ambao hawakupata fursa ya kuhudhuria warsha hii.

Kwa hayo machache napenda kutamka kuwa warsha imefungwa.

MAJADILIANO

Wajumbe walipata fursa ya kujadili masuala mbalimbali yaliyotokana na warsha kuhusu tiba za asili kama ifuatavyo.

Mada zilizotolewa:

1. Uwezo wa waganga wa tiba ya asilia.

Waganga wengi walidai kuwa na elimu kubwa pamoja na uzoefu wa miaka mingi katika tiba ya asili. Kwa mfano baadhi ya waganga walidai kuwa na uwezo mkubwa wa kutibu maradhi ya shinikizo la damu, kisukari, tumbo na matatizo ya njia ya mkojo. Pamoja na hayo walidai pia kuwa na uwezo mkubwa wa kuwasaidia akina mama wajawazito wenye matatizo ya kujifungua. Baadhi ya akina mama hao ni wale ambao madaktari walionyesha kukata tamaa katika akina mama hao kujifungua salama. Waganga hao walidai kuwa kuwa walikuwa na dawa nzuri za kufunga kizazi na kuondoa ugumba. Waganga walidai kuwa walikuwa na dawa nzuri sana za kuamsha nguvu za kiume.

2. Soko la dawa na bidhaa zingine zitokanazo na miti ya kisili

Waganga walionyesha wasiwasi wao kuhusu soko la dawa zao. Walidai kuwa wanayo mimea mingi majumbani mwao kama vile mlonge, rosella n.k lakini hawajui soko la bidhaa zinazotokana na mimea hiyo. Kwa hivi walishindwa kuona umuhimu wa kuendelea kulima bidhaa hizo.

Mkurugenzi wa Taasisi ya Tiba ya Asili, Muhimbili, aliwahakikishia wajumbe kuwa soko lipo na ni kubwa. Aliwaelimisha kwa kusema kuwa soko la kwanza na kubwa ni sisi wenyewe. Sisi wenyewe tuna mahitaji makubwa sana ya kutumia bidhaa hizo ili kukidhi matatizo yetu ya kiafya. Dawa hizi zinaweza kuuzwa kwa bei nzuri kutokana na mahitaji makubwa. Wasiwasi ulijitokeza kwamba wazalishaji wa bidhaa hizo unaweza kuwa mdogo kuliko mahitaji yake.

3. Haki Miliki ya bidhaa zao.

Wajumbe walionyesha wasiwasi mkubwa wa kupoteza haki zao za kumiliki bidhaa zao endepo watawashirikisha watu mbalimbali katika utengenezaji wa bidhaa hizo. Walionyesha hofu kuwa ya kuibiwa utalamu wao na wao kubaki bila kitu.

Katika kuwatoa hofu waganga hao Mkurugenzi aliwahakikishia kuwa taratibu za kisheria zipo ambazo zinaweza kuwalinda. Taasisi inautaratibu wa kuwekeana mikataba ya kulinda haki miliki na watu ambao inashirikiana nao katika tiba ya asili. Taasisi pia inashirikiana na mwanasheria wa serikali pamoja na wanasheria wa Chuo Kikuu cha Dar es Salaam katika kulinda miliki za watu hao. Kwa hali aliwasihi waganga hao kushirikiana na Taasisi hiyo katika shughuli zao za tiba pamoja kujiunga na chama cha waganga wa tiba ya asili Tanzania.

4. Utunzaji na kuweka kumbukumbu

Katika warsha hiyo ilionekana kuwa waganga wengi wanatibu wagonjwa bila kuweka kumbukumba na kushirikiana na wataalamu wa afya. Hali hiyo ilileta utata wa kuelewa kama kweli dawa husika inauwezo kweli wa kutibu ugonjwa fulani ambao hakuthibitishwa na wataalamu wa afya. Hii pia inaleta ugumu katika kufuatilia maendeleo ya mgonjwa husika.

Waganga walishauriwa kuweka kushirikiana na wataalamu wa afya ili kujua kikamilifu kuhusu aina ya ugonjwa wanaotibu. Kwa hali hiyo walishauriwa kuwapeleka wagonjwa wao kwenye vipimo mbalimabali ili kuona maendelea yao wakati wote wa tiba yao.

Walishauriwa pia kuweka kumbukumbu za tiba zinazoonyesha vipimo vya hospitali, sehemu anakoishi na mfumo mzima wa tiba yake ili kubaini uwezo wa aina za dawa au tiba anayopata.

5. Lishe Bora

Wajumbe walikubaliana kuwa lishe bora ni msingi wa tiba za maradhi yote. Waganga walishauriwa kulipa kipaombele suala la lishe na kuwashauri wagonjwa juu ya umuhimu wa lishe bora. Waganga walikubali kuwa miti mingi ya tiba, pia ina viini lishe kwa wingi ambavyo vinaweza kutumika katika kuboresha afya za wagonjwa.

6. Dawa ya kufunga kizazi

Baadhi ya wajumbe walipendekeza kuwa waganga wajitahidi kutafuta dawa ya kuzuia mimba ili kuondokana na tatizo la kutumia dawa za hospitali ambazo walidai kuwa zina madhara.

Waganga walidai kuwa dawa hizi zipo na zinatumika. Lakini ilikuwa vigumu kuelwa suala hili kwa vile hakuna mifano mingi iliyotolewa kuhusiana na madai hayo.

7. Mbegu za Mlonge, Rossella an Aloe vera

Wajumbe waliiomba Taasisi kuzalisha mbegu za mimea hiyo kwa wingi na kuzigawa kwa wajumbe ili ziweze kupandwa mashambani mwao kwa wingi. Wajumbe walishauri pia maofisa ugani wa kilimo na mali ya asili wahusike kikamilifu katika kusaidia kilimo hiki.

8. Waganga kuvaa mavazi rasmi

Wajumbe hawakuona umuhimu wa kuvaa mavazi ya jadi wakati wa tiba usika. Warsha ilikubaliana kuwa kulikuwa na umuhimu wa kuvaa nguo safi na yenye heshima wakati wa tiba. Sare pia zingefaa kuvaliwa wakati huo kama vile wataalamu wa afya wanavyovaa.

9. Ufafanuzi

Wajumbe walielimishwa pia tofauti kati ya waganga wa jadi na wale wa tiba ya asili. Katika maelezo ya msingi ilionekana kuwa waganga wa jadi bado wana matatizo ya kuhusisha tiba yao na utamaduni wao kama vile mizimu na kupiga ramli.

Waganga wa tiba ya asili ni wazuri kwa vile wanatumia miti na bayonohai katika tiba zao.

MAHUDHURIO

	NAME (JINA)	ANUANI	SAA
1	Albert Budondi	Box 31579 DSM	2.00
2	Angella Tarimo	Box 1984 Dsm	9.26
3.	Margareth Katanga	Box 1984 Dsm	9.26
4	Selina William	Vikuge Kibaha	2.15
5	Omari Shabani	Soga Kibaha	2 15
6	Kashinde Maonaje	Soga kibaha	2 15
7.	SAIDI. A. CHANZI	SOGA	2 - 15
8	[illegible] K. [illegible]	[illegible]	2 . 15
9	Abdalla S. Mpendu	Fosta Misitu	2 . 15
10	COSTANCIA SOLOMON	KIBAHA	2. 15
	CLEOPHA SHEMBILU	BOX 30072 KIBAHA	2. 15
13	OMARY KIHANGA Mganga wa Tiba	PO BOX [illegible]	2.15
14	HALIYAX KIBAYU Mkunga wa Jadi	VIKUGE	2.15
15	KHDIJA ABDALLA MNGAGA ASILI	087-14776 Kongowe	2.15
16	ASHA ATHMANI Mkunga wa jadi	SOGA	2.15
17	ASHA SELEMA JUMA MNGAGA ASILI	0744,899557 Kongowe	2.15
18	SALMA CHUMA MKUNGA WA JADI	SOGA KIBAHA	2 . 15
19	TAGU H. IDD Afisa Mtendaji wa Kijiji - Vikuhe	0748-524263	2 15
20	Asha Bufu - Mkunga wa Jadi	Mjumbe Saba	2.00

	NAME (JINA)	ADDRES ANUANI	TIME SAA	DA TA
21	IDDI DIWANI M/KITI S/MIAA-MISUGUSU	30,22 KIBAHA 0744 436264	8:55 am	22/
22	HAMIS SIMBA	0741-324139		
23	PATRICK B.K. MATEMBELE MGANGA WAJADI	30,000-KIBAHA 0744 995479	"	22/05
24	SAUDA HADIJA MPONDA MKUNGA WA JADI	30,000-KIBAHA	"	"
25	ENNE S. HAULE MKULIMA MISITU	30823-Msangani		"
26	MIKIDADI SULTAN K. SOGA MGA WA JADI		=	-
27	IEZEKIEL SHIGALU	~~MKULIMA~~		
28	MKULIMA MISITU	P.O.BOX 30800		
29	Rajabu N-Kibaya	Mkuti wa	Miaa Kanga	
30	Rajabu I. Simba	I. Mganga	wa	22/5
31	GERSON SILAS	K/KIBAHA		
32	J. G. MWAKA	KILIMO/MIFUGO (W)		22/05
33	KAIM LIAME	Kongowe		
34	R. KAMBI	Kongowe		
35	KASSIM MWINJIMVUA	MLEMBESABA		
36	KASSIM MPATE	VIKOGE	=	K.B
37	JOSEPH H. BUTABU	KONGOWE		JOS
38	HASSAN KIWANITE	KONGOWE	819202	
39	MOHAMMED SALUM	Kongowe		22/5
40	SUFIANI KINDUMBILI	KONGOWE		22/05
41	Zahiri Msangi	Ruvu Forest project Box 30072 Kibaha Simu # 804928		

NAME (JINA)	ADDRES ANUANI	TIM SAA
42 ✓ ZELINA NJAU	30011 KONGOWE	"
43 ✓ ADAMSON D. MWANDALIMA	30011 KONGOWE	"
44 ✓ Lucas Fidelis	30072 "	"
✓ Simon Haule	Mwesagani	"
45 ✓ NOURMUHAMED A REHMAN	—	"
46 ✓ Emmanuel JAPINA	30072	"
* 47 Raymond Mlelwa	2340 DAR	"
* 48 David W. YONAZA	30153 KIBAHA	"
49 RAMADHANI H. BOGHSI	29000 VISIGA	"
50 SAIDI M. MTONDA	0745-891820	"
51 Alex B. MWASINGO	0748-382651	"
52 ALLY SIMBA	0744-810269	"
✓ 53 NASSORO S. A. KAZAMBO	0787-722699	"
✓ 54 HALIMA RASHID TENGWE	—	"
✓ 55 BUSHIRI MPAHAMBO	0746-239764	"
✓ 56 Serafina JOSEPH	30072	"
✓ 57 IBRAHIMU MWALIM	0743-151331	"
✓ 58 SALAMA RAJABU	30072	"
* 59 ZAUDA MPONDA	MISUGUSUGU	"
✓ 60 Paulo Shinda	30072	"
✓ 61 MWAMVITA MUSSA	30072	"
62 MWANJAA MIRAJ.	30072	"
* 63 Ben Komba	0744899621	"
* 64 Magreth Malisa	0745571227	"
✓ 65 Habibu		
✓ 67 Kingi		

Three thousand each participant [signature] 22/5/08

NAME (JINA)	ADDRESS / ANUANI	TIME / SAA	DATE / TAREHE
68 Msangi Zahir	10000/= Each participant		
69 Bugando Katwale			
70 Raymond ~~Katwale~~			
71 Ndozi			
72 Bundondi Albert.		22/3/06.	
73 Komba			
74 Melisa.			
75 Faluma			
76 Margaret Kitange			
77 Angela Tanino			
	Received 90000/= 22/3/06.		
Resource person			Facilitator
Edwin Shunda	40,000/=		
Dr. M. Moshi	40,000/=		
Dr. E. J. Kayombo	40,000/=		
Dr. G. Ndumgwa	40,000/=		
Dr. Z. Mbwambo	40,000/=		
~~Areva M. Mtenga~~ ~~Areva~~.			
Dr. Ndumgwa (workshop preparation)	30,000/=		
Dr. Pax J. Masimba (workshop preparation)	30,000/=		

Mahudhurio

NO	JINA	ANWANI	KAZI	MAHALI UTOKAPO	SAA	TAREHE
1	QUEEN L. MGONDE	~~Box~~ C 787 215052	MSINDIKAJI JINA MSHO NAJI-KITO (NET GROUP)	MKOANI BL/B	3:00	22/5/2006
2	Asha Jumapili	0744 073984	Usindikaji na kutengeneza nguo batiki (KIFONET GROUP)	Mkoani BL/B	3:00	22/5/2006
3	MARY SHAKA	0744 073984	MSINDIKAJI NA KUTENGENEZA NGUO ZA BATIK (KIFONET GROUP)	MKOANI BLK/B	3.50	22/5/2006
4	PRISCA SWAI	Box 30112	A. MTENDAJI KATA KONGOWE	P/NDEGE	3.59	22/05/2006
5	T.G. NWAKA	BOX 3003	KNY AFISA KILIMO/MIFUGO	KIBAHA (W)	3.59	22/05/06
6	HABIB ATHUMANI	Box	MKULIMA	KONGOWE	3.59	22/05/06
7	[illegible]	[illegible]	[illegible]	[illegible]		
8	James P. Nonga	[illegible]	[illegible]			
9	NICEPHORY MNAMBA	Box 30153 KIBAHA	AFISA MTENDAJI WA KATA	SOGA	6.30	22/05/2006

Paid 3000/ each participant 22/5/06

Drewa

M. muya 10,000/=

Kaloli Mos 10,000/=

Secretary

B. Tewba 20,000/=

Wageni waliokuja kufunga na ~~mkutano~~ ~~wa~~ Semina

Mr. Edward Shilogile 50,000/=

mkuu wa mkoa

MS 50,000/=

mkuu wa wilaya)