

Jatropha sub-sector evolution in Tanzania

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Jatropha curcas originates from Central America. From the Caribbean, *Jatropha curcas* was probably distributed by Portuguese seafarers via the Cape Verde Islands and former Portuguese Guinea (now Guinea Bissau) to other countries in Africa and Asia. Today it is cultivated in almost all tropical and subtropical countries as protection hedges around homesteads, gardens and fields.

The Cape Verde variety of Jatropha is the one which is spread all over the world. A Jatropha variety in Nicaragua has fewer, but larger fruits. The yield per ha seems to be the same. A non-toxic variety exists in Mexico, which is used for human consumption after roasting. It does not contain Phorbol esters.

In Tanzania, *Jatropha* has been used as living fence for many years by agro-pastoralists especially the Maasai in the semi arid areas of north-eastern Tanzania. It was not used otherwise until 2000 when McKnight Foundation through HPI gave funds to develop the subsector in order to promote rural marginalised women in Arusha and Manyara regions. KAKUTE was then commissioned by HPI to be implementing agency of the project.

2.1 BACKGROUND

The *Jatropha* subsector development was initiated as Alternative Resources Income project for Monduli women (ARI-MONDULI). This project spanned between June 2000 to December 2004 and was funded by The McKnight Foundation of USA and executed by HPI-Tanzania. HPI contracted KAKUTE Limited to manage the day-to-day activities of the project in collaboration with FAIDA-SEP and UNDP-GEF¹ Cross Border Project. Specifically, FAIDA-SEP (currently FAIDA MALi) was responsible in the supervision of market study and market linkages activities. UNDP-GEF Cross Border Project was responsible in the management and supervision of the demonstration sites and assisted FAIDA-MALi with market study.

The purpose of the project was to help reduce bio-diversity loss while increasing household livelihood security and income of rural women. The project, therefore, introduced *Jatropha* crop through provision of seeds, seedlings, cuttings together with technical assistance, training, extension, production and marketing so that at the end of the project the result will be well developed subsector with new rural industries of soap making and fuel production through which rural women can increase their income.

2.2 KAKUTE STAKEHOLDERS

KAKUTE Ltd under support of McKnight Foundation, HPI, UNDP-GEF and FAIDA-SEP has developed the *Jatropha* chain from scratch. KAKUTE Ltd had contractual arrangement whereby, the company offer *Jatropha* seeds and seedling to women groups in the form of soft loan and deduct when these women sell seeds back to KAKUTE after harvest. There has not been, however, a structured loan

¹ The UNDP/GEF East African Cross-Border Biodiversity Project, "Reducing Biodiversity Loss at Crossborder sites in East Africa" is an Integ Conservation and Development Project (ICDP), developed and implemented through a participatory and collaborative effort by the three sister countries of Kenya, Tanzania and Uganda. The project is funded by the Global Environment Facility (GEF) and undertakes activities aimed at Reducing Biodiversity Loss at Cross-Border sites in selected districts. It addresses the root causes of biodiversity loss at decentralized and community level while at the same time influencing National and Regional processes for biodiversity conservation. The project is innovative and complex with entry points at regional, national, district and community levels.

scheme between them. It is envisaged that dealing with women groups has been instrumental for KAKUTE to manage to control the development of the chain without many defaulters.

2.3. Jatropha product Tanzania limited.

2005 Jatropha Products Tanzania Limited was registered in Tanzania as the sister organization of KAKUTE Ltd. which was registered in 1995. Many of the staff of KAKUTE, along with their accumulated expertise in Jatropha promotion and project management, has transferred to JPTL. While JPTL is a young organization, its staff and directors have a wealth of experience in this field.)

JPTL aims to develop and promote the use of the common tropical hedgerow shrub *Jatropha curcas*, and products made from processing oil-rich seeds from this multi-use species. Jatropha plants and products have many uses that benefit health, environmental protection, income and livelihood security for rural households, and as the base for expanding small-scale social infrastructure.

2.3 TECHNOLOGY DEVELOPMENT AND TRANSFER

KAKUTE Ltd has managed to develop and disseminate Jatropha processing technologies to women groups in Arusha and Manyara regions. The various processing technologies include Jatropha oil extraction, soap making, use of Jatropha oil as source of fuel for lamp, bio-gas for cooking and making charcoal. However, processing which is currently done by women groups include establishment of Jatropha tree nursery, seed collection, oil extraction and soap making. KAKUTE is attempting to diversify into renewable energy technologies. KAKUTE has thus in the process of signing memorandum of understanding with large companies such as Pamoja Inc. of USA, PROKON BV of Germany, DI Oil Plc of UK and Diligent Tanzania Limited in order to further develop the industry.

2.4 TATEDO AND KAKUTE INITIATIVES

In collaboration with KAKUTE, TATEDO has facilitated distribution of about 100 lamps to rural women in Manyara region and evaluation of its use and impact is in progress. TATEDO in collaboration with KAKUTE facilitated exercise of planting Jatropha seedlings in gullies and riverside slopes as a way of reducing excessive erosion and loss of soil fertility. Women who plant the seedlings were paid TShs 50 per seedling they raised and additional TShs 30 for planting it on gullies and riverside slopes.

2.5 TIRDO AND KAKUTE INITIATIVES

The design and development of Jatropha oil cooking stove was been done by KAKUTE and testing of performance is conducted jointly between TIRDO and KAKUTE. The design started in 1997 and TIRDO is researching on the stove efficiency and its pollution levels. The stoves have not been distributed yet.

2.6 KAKUTE and University of Dar es Salaam (UDSM)

KAKUTE and UDSM are jointly researching on various issues surrounding uses of Jatropha oil as source of renewable energy. The Department of Energy in the Faculty of Mechanical Engineering is looking at efficiency of using Jatropha seed cake as source of bio-gas and use in pre-combustion engine whereas the Faculty of Chemical and Processing Engineering is trying to find out ways of converting Jatropha seed oil into bio-diesel. The UDSM Institute of Production Innovation (IPI) is fabricating prototypes of Jatropha oil stove.

2.7 KAKUTE, WOMEN GROUPS AND SALES OUTLETS

KAKUTE has forged strategic collaboration with women groups (Arusha and Manyara) and few sales outlet in Arusha and beyond to further develop the jatropha soap chain.

3.0. Jatropha sub sector stakeholders and their functions

3.1 STAKEHOLDERS AND FUNCTIONS

There are various stakeholders of Jatropha subsector in Arusha and Manyara regions. There are actors of various functions and support organisations who support these subsector actors at different levels.

- Policy institutions identified in this subsector include Ministry of Agriculture and Food Security - MAFS, Ministry of Energy and Mineral Resources, District councils and village government administration.
- Research institutions involved with development of Jatropha subsector include Seliani Agriculture Research Institute Arusha (SARI), University of Dar es Salaam School of Engineering, TIRDO and TATEDO.
- Seedling and cuttings suppliers are mainly women groups, which are mobilised, organised and monitored by KAKUTE. Seedlings are more popular and recommended by KAKUTE to potential farmer producers because Jatropha tree from a seedling lasts up to 50 years due to a mere fact that seedling has tap root and four lateral roots whereas Jatropha tree from cutting don't have tap root and as a result, it lasts for at most four years before requiring replacement if there are no enough rains.
- Financial institutions are lacking in this subsector, however credit sources to women groups were mainly from KAKUTE under HPI project fund, this is therefore, not sustainable. Arumeru women groups are currently funded by McKnight Foundation through Tanzania Association of Foresters (TAF) as well as UNDP GEF.
- It is difficult to identify farmer producers of Jatropha seed. Since the inception of the ARI-MONDULI project, SARI is working on establishing costs and other resources required to produce Jatropha seeds. The research centre give special attention to the Jatropha seeds varieties and their suitability to grow in the north-eastern part of Tanzania. At the moment all Jatropha seeds in the market are collected from hedges and fences of agro-pastoralists in Manyara and Arusha regions. There is emerging initiatives by private sector opening up commercial farms in Arumeru district and Moshi.
- There are various levels of processing of Jatropha seeds. The first processing stage is oil extraction. Under appropriate technology and with well mature and dried seeds one bag (i.e. 70 kgs) give on average 10-14 litres of clear oil. KAKUTE processing unit reached on average 13 litres per bag of dried Jatropha seeds. Women groups in rural areas rarely exceed 10 litres of oil per bag of Jatropha seeds. Though all processors use similar ram press, the yield differ depends on the quality of seeds and use of appropriate extraction procedures.
- The second level of processing is when Jatropha oil becomes raw material for the final products. Soap making is the most popular Jatropha processing in rural areas. Many women groups in Arusha and Manyara regions are involved in domestic soap making for domestic use and for selling as income generating activity. Despite the fact that KAKUTE and its partners know and have introduced other uses of Jatropha oil, only KAKUTE, Monduli TTC and few households have started to use Jatropha oil as fuel (i.e. making charcoal and use of wastes to generate bio-gas, as well as use it as engine fuel). KAKUTE and TATEDO promote use of Jatropha oil lamps.
- Due to emergence of various products of commercial value from Jatropha tree, there has been growing population of Jatropha seed collectors and traders. Some women groups who extract oil and or make soap have been potential buyers of Jatropha seeds. Some women groups have decided to specialised in soap making and marketing and thus buy Jatropha oil from their colleagues who extract the oil from the seeds. Interestingly, there are varying value added per hour for every function along the chain. FAIDA MALI has establish market linkages and built capacity of farmer groups. FAIDA MALI has conducted market research of the Jatropha.

3.2 MARKET CHANNELS

The only product of Jatropha tree, which has penetrated market in Tanzania so far, is Jatropha soap. Jatropha seedlings, cuttings, seeds and oil transactions are still confined between seeds collectors, oil extractors and soap makers. It is however, difficult to quantify the volume of soap entering the market due to various limitations, but mainly un accessibility to information and scattered data.

It has been noted that the final consumers of Jatropha soap are people with skin diseases and those who are allergic to toilet and perfumed soaps. Due to changing life styles, majority of people belonging to high income bracket are also opting to buy natural products including soap. The threat of Jatropha soap substitute is neem soap and other natural soaps which are more popular and known by majority of natural products promoters. It is from this background that customers would expect to buy Jatropha soap at pharmacies, dispensaries and at times at supermarkets. The ideal place to buy Jatropha soap is from natural products shops. Jatropha soap is now sold in Dar es Salaam, Mwanza, Moshi and other major town centres in Tanzania. An export of Jatropha soap from KAKUTE is emerging with products being sent to USA.

3.3 R&D

Various actors have collaborated with KAKUTE and contributed to technology development at different levels of the Jatropha chain in Arusha and Manyara regions;

- Nursery propagation: KAKUTE, JPTL, TATEDO, WOMEN GROUPS
- Farming systems: KAKUTE, JPTL, SARI, TATEDO (growing Jatropha in gullies and valleys), SUA, UDSM (research of potential of Jatropha production in other regions in Tanzania)
- Processing technologies: KAKUTE, CAMARTEC, VYAHUMU
- Product development: KAKUTE, TATEDO/TIRDO, UDSM (Distribution of seedlings and lamps), SARI (Jatropha cake as fertiliser), UDSM (biodiesel), Diligent Tanzania (renewable energy), TBS
- Packaging technology: no intervention yet.

KAKUTE is expanding its capacity and has numerous diversification initiatives as a strategy to attract large investors.

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Kind regards

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