

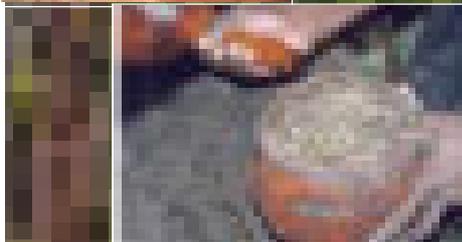


UN-HABITAT

UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

Small Urban Centres Around LAKE VICTORIA

Income Generating Activities through
**COMMUNITY-BASED WATER AND
SANITATION INITIATIVES**



Rural-Urban Linkages Support Programme (RULSUP)
An initiative of UN-HABITAT for promoting Sustainable Development



Income Generating Activities through Community-based Water and Sanitation Initiatives in Small Urban Centres around Lake Victoria

Rural-Urban Linkage Development: A New Regional Perspective



The increasing economic, social and environmental interdependence between urban and rural areas calls for a balanced and mutually supportive approach to development of the two areas. A new regional perspective, referred to as the *rural-urban linkage development approach*, is becoming increasingly recognized throughout the international development community.

Rural-urban linkages generally refer to the growing flows of public and private capital, people, goods, ideas, information and diffusion of technology. Adequate infrastructure such as transportation, communication, energy and basic services is the backbone of the rural-urban development linkage approach. There is a positive relationship between the quality of the transportation infrastructure and ease of mobility on the one hand, and access to employment and enhancement of income in both urban and rural areas on the other. Adequate investments in infrastructure, particularly transportation infrastructure, also improve rural productivity and allow greater access to markets, jobs and public services by both men and women.

UN-HABITAT Initiatives

UN-HABITAT considers this approach as having a great potential for promoting regional socio-economic development and, in particular, for generating employment opportunities and thus contributing to poverty alleviation. UN-HABITAT encourages Governments to institutionalize and integrate rural-urban linkages into their respective national and sub-national development planning processes. It also disseminates good practices and policies on mutually beneficial rural-urban development relationships which could be replicated in other countries. In addition, UN-HABITAT can help develop the capacity of both national Governments and Local Authorities in this area.

UN-HABITAT has taken concrete steps to launch various programmes and initiatives to promote and implement this approach. For example, in cooperation with UNDP and the Government of Nepal, UN-HABITAT has implemented the *Rural-Urban Partnership Programme (RUPP)*, which aimed at strengthening urban-rural development linkages in Nepal. RUPP addresses not only the physical and spatial aspects of development, but also its key socio-economic dimensions. It has demonstrated a holistic approach to urban and rural development centred on the notion of urban areas as engines of national economic growth. The Government of Nepal has adopted the RUPP approach as a national development strategy.

Similarly, with financial support from UNDP, UN-HABITAT has implemented the *Poverty Alleviation through Rural-Urban Linkages (PARUL)* project in Indonesia. This project adopted several strategies to strengthen rural-urban linkages. First, PARUL gives priority to sector-oriented strategies which promote local economic development based on exports, with a focus on the clustering of economic activities associated with export commodities. Second, it has introduced a *market-driven* approach to local economic development, notably by linking small scale producers to broader markets through collaboration with large scale enterprises. Last but not least, PARUL has promoted public-private partnerships to formulate action plans, mobilize resources and implement plans for local economic development.

Rural-Urban Linkages Support Programme (RULSUP) of UN-HABITAT

These concepts, policy analysis and proposed strategies are contained in two recent UN-HABITAT publications entitled, 'Report of the Inter-regional Conference on Urban-Rural Linkages Approach to Development' and 'Urban-Rural Linkages Approach to Sustainable Development'. Building on this past work, the Urban Economy Branch of UN-HABITAT has recently set up the Rural-Urban Linkages Support Programme (RULSUP) to promote the incorporation of rural-urban development linkages into national and sub-national development planning processes in developing countries.

RULSUP will initially focus on strengthening rural-urban development linkages in the Lake Victoria Region (Eastern Africa)



Lake Victoria Local Economic Development (LV-LED)

Lake Victoria is the world's second largest freshwater lake and the largest in Africa. It is the source of the River Nile and the main water-body for riparian states. Its shores are shared by Tanzania (51 percent), Uganda (43 percent) and Kenya (6 percent). The lake and its catchment area are used as a source of food, energy, water, building materials, recreation and transport. It supports an estimated population of 30 million people, or one-third of the combined population of Kenya, Tanzania and Uganda. The annual gross domestic product of the lake's catchment area is approximately US\$ 5 billion. There is, however, widespread poverty in the region, which is estimated to have an average annual per capita income of less than US \$270.

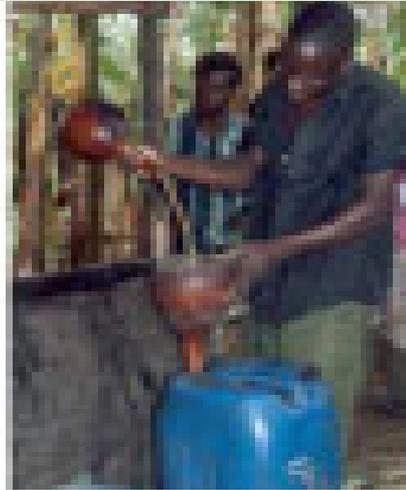
People living in the Lake Victoria region derive their subsistence from fishing, small-scale farming and other rural economic activities. It is estimated that over 80 percent of the population in the lake basin is engaged in agriculture. The lake's fish resources directly or indirectly sustain the livelihoods of around 3 million people engaged in subsistence and commercial fishing. But the lake and the welfare of those who depend on it are now under serious threat as a result of water pollution, soil erosion and sedimentation.

The Lake Victoria region has experienced a process of rapid urbanization over the recent past. Increasing poverty, lack of job opportunities and inadequate development and provision of services in rural

areas have all contributed to significant migration from the countryside to main urban centers, such as Kisumu, Kampala, Musoma, Mwanza, Bukoba and smaller towns in the region, as well as the other two large capital cities outside the lake region, namely Nairobi and Dar es Salaam. As in many other African countries, rural inhabitants, notably the youth, have been moving away from farming activities throughout the region, primarily due to low labour and land productivity and low profitability. A combination of factors, including depressed commodity prices, notably for coffee and cotton, inadequate transport and marketing infrastructures, and lack of job opportunities in rural areas have all contributed to accelerate the rate of rural-to-urban migration.

Lake Victoria Water and Sanitation (LWATSAN) Initiative

The rapid urbanization of many small towns bordering Lake Victoria has had a severe impact on the lake's water quality and ecosystem, in addition to placing enormous pressure on capacity of towns to provide adequate water and sanitation services for their growing population. Therefore, LWATSAN initiative aims at supporting small towns in Lake Victoria region to meet the Millennium Development Goal on water and sanitation. Its key objectives are two fold: first, to improve water and sanitation coverage for the poor and secondly, to arrest the increasing pollution of Lake Victoria from these towns. Lake Victoria is shared between Kenya, Tanzania and Uganda.



RULSUP initiatives for Local Economic Development in Lake Victoria Region

With aim to revitalizing local economies in the Lake Victoria region, UN-HABITAT, through RULSUP, is taking the lead in developing a broad programme development activities with co-operation from FAO, IFAD, ILO, UN-HABITAT, UNIDO and WFP as well as Common Fund for Commodities (CFC) and other funding agencies. This partnership is expected to further complement the objectives and impacts of UN-HABITAT's Lake Victoria Water and Sanitation Initiative currently being implemented in 15 secondary towns in Kenya, Tanzania and Uganda.

This partnership is aimed at promoting a viable and sustained regional economy based on improved agricultural productivity and the development of complementary urban markets. On the agricultural side, particular emphasis will be given to the provision of alternative irrigation facilities, appropriate financial intermediation and the procurement of farmers' surplus agricultural produce. In addition, partner agencies will support the creation of sustainable employment and income-earning opportunities by providing an enabling environment for the development of agro-processing and other small-scale industries in the region, together with urban development strategies. The ultimate objectives of this partnership are to improve the livelihood of the poor in both rural and urban areas and to accelerate local economic development through the enhancement of socio-economic linkages between rural and urban areas. One of the first concrete examples of the LV-LED initiative will be the implementation of a banana drinks project in the Lake Victoria region.

Construction of Local Banana-based Beverages Preserving and Packing Plants

UN-HABITAT and CFC will be jointly funding the construction of two local banana-based drinks preservation and packing facilities in two major banana growing areas in the Lake Victoria region of Tanzania and Uganda. The project aims at adding value to banana drinks, viz, Banana Juice (Mulamba) and Brew (Rubisi), produced by farmers through improving the quality, preserving and packing them at factory and marketing them.

The project was conceived as an income diversification intervention for coffee farmers who intercrop coffee and banana in the region. Banana-based beverages are already produced in small quantities, mainly by women, in the region. Their production, however, is mostly home-based and just enough to satisfy the local demand in villages. Due to poor processing and packing facilities and poor transport and marketing arrangements, these drinks are not marketed in sufficient quantities in secondary towns where the potential demand is much greater. Moreover, as a result of the use of contaminated water and unhealthy production techniques, the shelf-life of these drinks is very low (only 1-2 days). The overall goal of the project is to alleviate poverty of coffee and banana farmers in the region through commercialization of banana-based drinks and thereby lower the rate of rural-to-urban migration in the region. The project is also expected to provide tangible benefits to women engaged in the production and sale of banana-based beverages.

Mulamba and Rubisi Background

Banana growing areas in the Lake Victoria regions of Tanzania and Uganda and in some regions of Burundi and Rwanda have a big potential to produce and market local drinks namely banana juice (*mulamba*) and brew (*rubisi*). The preparation process of these drinks uses large volumes of water of which the sources are vulnerable to contamination, does not apply aseptic techniques, and lacks preservation steps. Consequently, the quality of the drinks is sub-optimal, their safety for drinking is uncertain and their shelf life is short. These drinks are produced in small quantities and only consumed at village level fetching very little income for the banana farmers. In attempt to add value to these drinks, a feasibility study for community demonstration of the optimization of their production and preservation as part of its income generating activities for community-based water and sanitation initiatives for small urban centre's around Lake Victoria was done.

The traditional technology of extracting banana juice "*mulamba*" and banana brew "*rubisi*" has been developed over a long time involving many generations of the banana growing tribes living along Lake Victoria in Kagera region and southern Uganda. The Department of Food Science at Makerere University have developed the technology which is superior to the modern enzyme technology and is likely to be commercialized by foreign companies.

Social and economic role of the Drinks

Mulamba and *rubisi* play important social and economic roles within the communities of Central and Southern Uganda and Kagera region in Tanzania. They are the major soft alcoholic drinks for people in all socio- economic groups.

- The prices of *mulamba* and *rubisi* are 4 to 8 times lower than prices of factory bottled drinks because of a limited market and low income of majority of the customers. Therefore, adding value to the drinks through preservation will expand the market and increase the prices, hence more income to the farmers.
- While activities in the production of *rubisi* are dominated by men, small scale *mulamba* production for home consumption and sale is solely done by women. A number of urban-suburb women earn their livelihood by selling *mulamba*. Commercialization of *mulamba* is therefore likely to benefit the women more.

*Mulamba production process:
Abella Boniface of Kagabiro village
in Muleba, Kagera kneading a
mixture of banana and grass (left)
and foam formation during juice
extraction (right)*



Issues relating to Water, Sanitation and Hygiene

Hygiene during production of *mulamba* and *rubisi* is not up to standard as described below:

- Sources of water for the drinks are not protected and hence subject to contamination. Water used for *rubisi* production was found to contain faecal coliform bacteria. Juice for *rubisi* production and mature *rubisi* were found to contain pathogenic microorganisms. This is a health hazard that needs to be addressed.
- Community members are not aware of the hazards of contaminated water; their ability to judge the degree of water safety is limited - to them clear water is safe.
- Handling processes (cleanness of personnel, grass used, production and storage container) and general cleanness of production environment are poor, and give room for contamination of the drinks with both pathogenic and spoilage microorganisms.

Objective of optimizing *mulamba* and *rubisi* production

The aim is to commercializing the drinks after adding value to generate more income for the farmers. This is in line with the MDG No. 1 which calls for the eradication of extreme poverty by 2015.

The community demonstration of the optimization of production aims at the following:

- Improve the quality and yield of *Mulamba and Rubisi*;
- Investigate suitability of community made *mulamba and rubisi* for factory preservation and packing;
- Assess production capacity of the factory;
- Determine logistics of collecting juice from small scale producers;
- Investigate economic feasibility of commercial processing, demand and marketing of *mulamba and rubisi*.

Need for monitoring water quality

The production of *mulamba* and *rubisi* uses large volumes of water (100 litres of *rubisi* requires more than 40 litres of dilution water) which is often bought from vendors at US \$ 0.2 per 20 litres. Considering the very low income (below one US dollar per day) of an average farmer, this is an expensive component. The water can be from a number of sources including rivers, springs, taps or even stored rain water. Since most of the sources and catchment areas of the rivers are not protected, the water is vulnerable to contamination and not safe, and might be a source of gastro-intestinal infections. Besides, use of unsafe water for preparing the local drinks will contribute to poor quality of the drinks and will shorten their shelf lives.

Unfortunately for most people, the quality of water is considered good if it looks clear and does not smell bad. There is, therefore, a need for making people understand the concept of “safe drinking water” and enable them to monitor the water quality and take appropriate action when necessary. However, conventional monitoring of water for microbial and chemical contaminants require trained personnel and well equipped laboratories which are not present in rural areas. There is therefore a need for testing simple and cheap water quality monitoring kits for use by rural communities and developing simple and effective locally made ceramic filters. Again this proposed initiative is in line with MGDs No. 6 and 7 which calls for reducing incidences of major diseases and improve access of safe water to all.

Mulamba

Mulamba is made from over 58 cultivars of banana; about 7 are exotic types and the rest are indigenous to East Africa. Traditionally, juice extraction involves mixing ripe banana and grass, then kneading the mixture using hands until juice appears. The solid cake and grass are squeezed to recover 1500 ml of concentrated juice and diluted to the required taste. Exotic banana types are said to give much clearer juice with longer shelf life than the indigenous ones. On the average, juice yield is 0.9 ml per gram of ripe banana.

Sugar content of undiluted (single strength) mulamba is between 16%-25% and a pH of about 4-5 making it suitable for industrial preservation and packing. At community level, shelf life of mulamba is 24 hours, and there are no proper preservation methods available.

Juice preparation procedure of mulamba

Banana fingers (Enkundi type) weighing 1.6 kg is peeled and mashed while adding grass and the mixture was kneaded. Foam appears within 2 minutes but kneading should be continued until liquid juice appears and the foam disappears.

A recent study on current practices of above mentioned juice preparation revealed that, hygiene and water quality is not maintained during the preparation process. Some important interventions are suggested to improve preparation process to maintain hygiene and water quality, which also improves the shelf life of juice. Critical points and suggested interventions are detailed below:



Pit ripening of banana. Top photograph shows Pit layout, note the fire hole for sending hot air to the pit (foreground) and the pit lined with grass (background; below; Bottom photograph shows ripe banana ripening in the pit.

Critical points	Suggested interventions
Selection of banana type for juice production	Identification of common and successful banana types producing good quality juice with high yield.
Ripening of banana	Develop alternative ripening method to the pit method to eliminate soil character smell in the juice while maintaining fast ripening.
Type and quality(cleanliness) of grass	<ul style="list-style-type: none"> Identify the best suitable local grass for juice extraction and improve on its cleanliness. Identify alternative juice extraction material to improve cleanliness and hygiene.
Quality of water	<ul style="list-style-type: none"> Raise awareness of the communities on proper water communities and safety. Produce and distribute water testing kit to selected communities. Train selected local community members to monitor water quality and safety by using locally made water testing kits. Use locally made ceramic filters to produce safe water.
pH and sugar content of mulamba for factory processing	<ul style="list-style-type: none"> Determination of effect of pH and sugar content of juice on shelf life of packaged product. Evaluation of suitability of using other fruit juices (e.g. citrus and passion) to improve the pH of juice for packing.
Hygiene and sanitation including general cleanliness of production area, personnel and containers	Raise awareness of the communities on proper sanitation by demonstrating good hygienic practices.
Filtration	<ul style="list-style-type: none"> Develop better filtration methods than traditional ones used at community level. Identify proper filtration method for industrial production of drinks.
Storage and preservation conditions	<ul style="list-style-type: none"> Look into refrigeration/deep freeze of juices awaiting processing at a factory. Preservation of mulamba at community level before shipping to a processing factory.

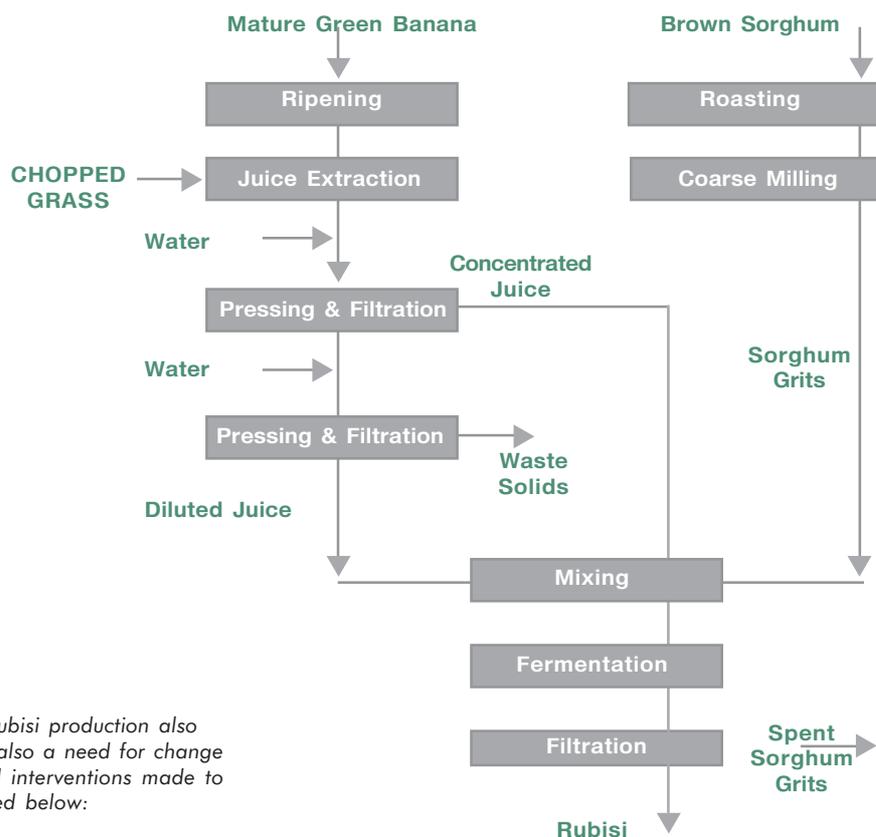
Rubisi

Rubisi production involves juice extraction from riped banana using bare feet in a large container and fermenting a mixture of the juice and coarsely milled sorghum. Banana ripening is done by "rack" and "pit" methods. The latter is faster than the former but the resulting juice is limited to rubisi production due to its characteristic smell of soil.

Good quality rubisi contains about 6% alcohol, 6% or less sugar and a pH of about 4.5. As far as alcohol content is concerned, rubisi is comparable to Lager Beer. Shelf life of rubisi is 48 hours, and there are no proper preservation methods available.

As in the case of mulamba production, rubisi production also lacks hygiene and water safety. There is also a need for change in current production process. Suggested interventions made to change the current process are mentioned below:

Current production processes of banana brew (rubisi)



Critical points	Suggested interventions
Selection of banana type for juice production	Identification of common and successful banana types producing good quality juice with high yield.
Ripening of banana	Develop alternative ripening method to the pit method to eliminate soil character smell in the juice while maintaining fast ripening.
Type and quality(cleanliness) of grass	<ul style="list-style-type: none"> Identify the best suitable local grass for juice extraction and improve on its cleanliness. Identify alternative juice extraction material to improve cleanliness and hygiene.
Quality and quantity of water	<ul style="list-style-type: none"> Determine optimum water quantity for rubisi production to save water and maintain a standard quality. Raise awareness of the communities on proper water quality and safety. Produce and distribute water testing kit to selected communities. Train selected local community members to monitor water quality and safety by using local make water testing kits. Use locally made ceramic filters to produce safe water.
Large scale juice extraction method	Develop an alternative juice extraction method to local extraction method using bare feet (e.g. using special feet boots/gloves).
Quantity and preparation of sorghum	<ul style="list-style-type: none"> Determine effect of degree of sorghum roasting on the alcohol content on rubisi and optimize degree of roasting. Determine effect of particle size of sorghum grits on the alcohol content on rubisi and optimize milling particle size.
Sugar content and other nutrients (e.g. Yeast Available Nitrogen) of fermentation mixture	<ul style="list-style-type: none"> Determination of optimal sugar content in order to standardize rubisi brands. Determination of yeast available nitrogen and other nutrients in fresh mulamba and sorghum.
Fermentation temperature and duration	Establish optimum temperature and duration of fermentation.
Type of fermentation culture	Assess performance of commercial yeast in fermentation with respect to rate of fermentation and quality of rubisi.

Potential of mulamba for industrial preservation and commercialization

Mulamba is traditionally produced by farmers and processed & packed by Jakana, a fruit juice producing factory in Kampala, Uganda. It is successfully sold at about US \$ 1.36 per litre in Kampala city supermarkets whereby a farmer makes more than 300% profit from selling *mulamba* at the factory. *Mulamba* was also once produced at Muleba Project for Agriculture and Local Industries (MALI) Juice factory in Muleba, Kagera region, Tanzania. The juice had a shelf life of at least one year and found a good market at about US \$ 0.8 per litre in Muleba, Bukoba rural and Bukoba urban districts. Due to concerns about tendencies of poor hygiene in the case of using feet for large scale juice extraction, the juice was not approved by the Tanzania Food and Drugs Authority and production was discontinued. The economic analysis of the venture was also not done.

Gender Dimension

Gender dimension during production processes of the drinks:

There are well defines roles for each gender when it comes to the production of *mulamba* and *rubisi*. Although communal type of life is still common, the lifestyle is giving way to a more individualistic type of life, consequently there an overlap in terms of gender responsibilities.

Proposed Outcome of the Project

- 1 Raised community awareness on good hygiene practices.
- 2 Availability of locally made water quality test kits for water quality by communities.
- 3 Locally made water filtration ceramic kits available to selected communities.
- 4 Selected members of the community trained in water quality monitoring.
- 5 Optimal parameters for storage of the drinks known.
- 6 Cultivation of suitable banana cultivars for *mulamba* promoted, *mulamba* and *rubisi* preserved at factory level.
- 7 Logistics/process for buying and collecting *mulamba* from farmers established.
- 8 Demand and markets for preserved *mulamba* and *rubisi* identified.

The Brochure has been developed with the professional inputs of the Urban Economy Branch, UN-HABITAT, Nairobi and the Report on the Feasibility Study for Community Demonstration of the Optimization of the Production and Preservation of Haya Local Drinks 'Mulamba' and 'Rubisi', prepared by Prof. Amelia Kivaisi, Applied Microbiology and Dr.O.Kibazohi, Chemical and Process Engineering of University of Dar es Salaam, Tanzania.



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