



Food and Agriculture Organization  
of the United Nations

## Cassava Development in Guyana

Report from a workshop and a joint mission undertaken by the National Agricultural  
Research Institute of Guyana, the FAO Trade and Markets Division, and the  
International Trade Centre

April 2009



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All ACP Agricultural Commodities Programme



## Highlights

Agriculture in the ACP countries is transitioning from the focus on bulk crop production facilitated by the trade preference regime to more diversified and higher value added production systems. The All ACP Agricultural Commodities Programme (AAACP) is supporting this effort in commodity dependent countries. Within this context, the Government of Guyana has asked FAO and the International Trade Centre to support the development of cassava production chains in the country. A scoping mission, jointly organized by the Government of Guyana, FAO and the ITC, was carried out on February 3<sup>rd</sup> to 11<sup>th</sup> 2009, including a one-day workshop and a number of field visits and meetings with key cassava stakeholders. This document reports the main results of the mission.

Cassava is the most important root crop grown in Guyana, and an important staple. Most cassava is consumed locally after little processing. Product development is constrained by lack of knowledge and appropriate technology, especially in the interior areas.

The workshop held during the mission highlighted that cassava has considerable potential as an input in processed food, livestock feed, and as a biofuel stock.

The mission reached the following conclusions.

- Product and productivity development can be directly beneficial to all cassava growing areas, and especially poor communities in remote regions.
- There is a great technical potential for increasing cassava production in Guyana, and for product development in terms of food, feed and biofuel.
- Demand is considered to be present, and the promotion of improved production processes should be consistent with market requirements.
- Intensifying cassava production in the Rupununi implies environmental benefits and improved livelihood systems.
- Supporting the collective organization of cassava production in subsistence communities has positive effects on food security and gender balance.
- Current cassava cultivation does not use chemicals, hence it may qualify for an organic label. However, access to improved inputs is still needed to improve productivity.

The following actions were identified with a view to promoting development of the cassava industry in Guyana.

1. Training of trainees – such as extension agents and development personnel -- through technical demonstrations of cassava cultivation and processing technologies.
2. Training of farmers on improved cassava production and processing systems.
3. Technical demonstrations and testing of cassava as feed for the poultry and cattle industries.
4. Organization and enterprise development promotion in Amerindian communities growing and processing cassava.
5. Study assessing the size of the potential domestic market for cassava products in Guyana.
6. Study on finance, risk and risk management along the cassava value chain in Guyana.
7. Cassava industry investment and financing options analysis.

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## **1. Background**

Agriculture in several ACP countries is struggling to transition from the traditional bulk tropical crop production facilitated by the trade preference regime – such as sugar and bananas– to more diversified and higher value added production systems. This transition requires a wide diversification of land uses, implying technical challenges and investment, but also dealing with new markets. For several products, this also implies that farmers have to engage in more complex vertical co-ordination mechanisms, involving producers located around agriculture, such as input suppliers, traders, processors, retailers; also, the increased complexity of market relation often makes the policy environment more important in shaping outcomes. Commercial production that has proven to be potentially successful in many developing countries require sophisticated systems, allowing a set of entrepreneurs, located along value chains spanning from primary producers to final consumers, to operate in a co-ordinated fashion, as much as possible as a single entity.

Actions aimed at supporting and strengthening integration along the value chains - including primary production together with post harvesting handling, agro-processing, marketing, logistic, packaging, and all the other activities leading to final consumption – have been considered as a priority agricultural development in the Caribbean on a number of occasions, including the Jagdeo Initiative, and the Up-Scaled Regional Programme for Food Security.

The All ACP Agricultural Commodities Programme (AAACP) is aimed at improving incomes and livelihoods of producers in the ACP countries based on traditional or other agricultural commodities and reduce income vulnerability at both producer and macro levels. The programme is motivated by the shared political will to address poverty and to further the MDGs in ACP states, with special focus on commodity dependent countries beset by a long term downwards trend in international commodity prices. Under the Programme, FAO is committed to provide services in three areas: (i) Support to Sectoral Policy, Strategy Development and Risk Management; (ii) Support for Producer-Market Linkages; (iii) Support to Value Chain Development. The design of the AAACP programme entails a strong collaboration among different international agencies, including the World Bank, the United Nation Conference on Trade and Development (UNCTAD), the International Trade Centre (ITC), the Common Fund for Commodities (CFC) and FAO.

Within this context, the Government of Guyana has recently asked FAO and the ITC to support the development of cassava production chains, especially in the interior regions of the

country. More specifically, the Government of Guyana requested FAO and the ITC to focus on the following four areas.

- Strategy, enterprise, investment and market development for the cassava industry.
- Development and training to meet standards and certifications required for cassava products in the target markets.
- Identification of opportunities and analysis of cassava based investment options and possible sources of finance for each of them.
- Analysis of risks, with emphasis on mechanisms that can help mitigate and manage risk.

For this particular task, and given the specific request of the Government of Guyana, it was agreed that FAO-EST would take the lead in this activity, with support from the ITC in terms of participation in relevant meetings and missions.

A scoping mission on cassava, jointly organized by the Government of Guyana, FAO and the ITC, was carried out on February 3<sup>rd</sup> to 11<sup>th</sup> 2009. The purpose was a) to gain a deeper understanding of the condition of the cassava value chain in Guyana, particularly in the interior regions; b) to discuss and identify a set of combined and synergistic actions aimed at promoting the development of the cassava industry, especially in the interior regions of the country.

In order to accomplish these objectives, a one-day workshop in Georgetown, was jointly organized on February 5<sup>th</sup> in the framework of the mentioned mission; a set of meetings took place with key public and private stakeholders of the cassava industry; and a number of field visits were undertaken to cassava production areas.

This document reports the main result of the mission, which is twofold: firstly, a number of observations on the conditions of the cassava industry in the country and its likely development opportunities; and, secondly, the description of a set of activities that can be undertaken to promote the development of the industry<sup>1</sup>.

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<sup>1</sup> Participants in the mission included Mr. O. Homenauth (Director, NARI) technical representative of the Ministry of Agriculture of Guyana, and co-ordinator of all activities; Mr. P. Conforti (Economist, FAO-EST), Mr. D. Ford (Senior Economist, FAO-TCI), A. Lopes Montes (CIAT-CLAYUCA, consultant to FAO).

## 2. The cassava industry in Guyana: present condition and possible developments

Cassava is the most important root crop grown in Guyana, and a staple food of hinterland communities, especially the Amerindians. Cassava is classified as “Sweet” or “Bitter”.

Boiling sweet cassava root is the more general method employed for preparing it as food. In the coastal areas, the crop is also prepared as chips and ponies for the local market. In the interior areas, bitter cassava is processed to produce tapioca (flour), bread (including flavored bread, farine and casareep, beverages (such as Paiwari, Kari, and others). From an agronomic point of view, cassava is known to be drought tolerant, water efficient, tolerant to acidity and to low levels of phosphorous. In Guyana, it is produced in all regions, especially on soils rich in organic matter, including loamy soils and sandy loam. About 21,000 tonnes were produced in 2007.

**Cassava production in Guyana (thousand tonnes)**

	region 1	region 2	region 3	region 4	region 5	region 6	region 7	region 8	region 9	region 10	Total
Sweet	1.60	0.38	1.00	0.94	0.77	0.38	0.12	3.40	0.91	0.53	10.03
Bitter	3.20	0.84		0.47	-	0.21	0.14	2.70	3.60	-	11.16
Total	4.80	1.22	1.00	1.41	0.77	0.59	0.26	6.10	4.51	0.53	21.19

Source: NARI

Regions with highest production are 1, 8 and 9, and bitter varieties are in larger quantities.

Cassava is produced mainly on small-size farms, from 0.1 to 2.0 hectares - as a monoculture or intercropped with pineapples. There are more than 70 local varieties such as Four month, Butterstick, Uncle Mack, Bad woman and others. Planting materials are mostly cuttings of the crop itself. Acoushi ants are the main pest, which is seldom treated with chemicals.

Approximately 2000 hectares are cultivated each year; production is mainly manual; or partially mechanized. The average yield was 11.02t/ha in 2004.

Most cassava is consumed locally; exports are negligible and mainly in the form of cassareep.

A highly limiting factor affecting the marketing and consumption of cassava in its fresh state is its poor shelf life and high rate of deterioration and spoilage occurring during storage.

Practices have been developed to assist in improving the postharvest quality characteristics of this perishable commodity. Given the low use of chemicals, Guyanese cassava production could qualify for an “organic” label, which however requires a certification in order to be translated into an asset in marketing.

The simplest method of food preparation is boiling; grating cassava is also frequent, especially in the interior regions. A major constraint in cassava processing has been the acquisition of appropriate technology. Especially in the interior areas, traditional cassava graters - made by punching holes in sheet metal; but mechanized graters – and squeezers<sup>2</sup> are still in use, and manual processing cassava still occupies a high proportion of Amerindian women's and girl's time. Increasing the availability of hand powered mechanical graters and farine pans would, therefore, have a profound effect on the efficiency of cassava processing, allowing women to be relieved from such time-consuming activity. With improved technology, production of farine - an easily stored staple - would probably increase, given that processing is considered to be the major constraint, more than primary production (Radzik,2004). This would have a positive effect on food security and gender balance, especially in subsistence communities. Moreover, improved processing would open up the possibility of commercialization of cassava products, for both the domestic market and, potentially, foreign markets, both in CARICOM and in Brazil.

Cassava has to be considered a promising product also due to its potential as a processed food and livestock feed. However, primary production is today extremely volatile: potential consumers, such as feed processors, food processors, and livestock entrepreneurs, tend to purchase the inputs they require from a variety of sources located far away from processing plants and utilization points. This results often in increased cost of final products in the food and livestock industry. For farmers, the volatility of market demand translates into reduced prices; and there are a number of instances in which they could benefit from an increased vertical co-ordination with processors and feed buyers.

At the workshop on cassava -- jointly organized by FAO-EST, the ITC and the National Agricultural Research Institute (NARI) on February 5<sup>th</sup> 2009 --. the presentation by A. Lopes Montes introduced technical aspects of cassava cultivation and processing for human consumption, feed, biofuel and starch, showing different avenues for making more efficient use of the potential of the crop in Guyana. A. Lopes Montes benefits from the experience of CIAT and the CLAYUCA network, for which he has worked extensively, in natural environments which are similar to that of Guyana.

In the reports of the discussion groups held as a part of the workshop it was highlighted how the crop could be effectively used as feed for the poultry industry in the coastal areas. Further,

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<sup>2</sup> Traditional squeezers, known as matapi are long fiber pipes in which the roots are placed for extracting the syrup.

its potential as livestock feed (for cattle, pigs and poultry), staple food and possibly biofuel should be further explored, especially in the interior regions. Group discussions also highlighted the need for developing simple processing methods to increase the storability of the product.

The field trips provided an opportunity to verify key points directly with the communities involved in cassava production and processing throughout the country, especially in the interior regions. In essence, the following conclusions were reached.

- Product and productivity development can be directly beneficial to poor communities cultivating cassava, especially those located in remote regions, whose subsistence depends almost entirely on this product. Interest and willingness to improve productivity, which was evident in most meetings and discussions, stems from the sense of ownership communities show of this product.
- There is a great potential for increasing cassava production and for product development in terms of food – both as traditional staple foods and as inputs into high value added processing – food, feed and biofuel. Especially in the interior regions, much change could be achieved by adopting simple inexpensive technologies, such as small size engines allowing the mechanization of grating and squeezing, replacing the traditional techniques.
- In the Rupununi savannahs, the intensification of cassava production implies moving the cultivation from the forest located on the hills to the lowlands. This is a major beneficial change, which is already taking place to some extent, and needs to be promoted. Cultivation in the savannahs requires mechanized ploughing, which is currently problematic given the high cost and low availability of mechanical equipment and energy.
- Given the abundant availability of land some of the communities visited have started cultivating the savannahs in view of increasing demand from nearby Brazil and from the gold miners operating in the interior of Guyana. Currently the product is still used mostly for direct consumption as “farine” (baked flour) and “casareep” (syrup). These traditional production processes should be supported and promoted, as it implies potential economic and environmental benefits: ploughing the savannahs implies a reduction of the traditional slash and burn cultivation which is practiced in the hills.

- Cassava production in the savannahs is managed by informal women's groups, which divide up the workload and share the product. Supporting this collective organization could bring about improvements in food security, gender balance, and contribute to community development.
- The cultivation is presently run without any fertilizers or pesticide. While this is a potential advantage, some communities reported that on some occasions they could not control severe and unexpected pests attacks; and that this caused significant losses. Hence they would probably benefit from better access to improved inputs, such as pumps and chemicals, at least in emergency.

A number of contacts were established with stakeholders interested in receiving technical support, and in accessing the information base and experience developed by CIAT and CLAYUCA in cassava cultivation and processing.

Meetings with entrepreneurs managing large scale businesses - – such as Mr. P. DeGroot and Mr. V. Oditt – confirmed the interest of private investors in the cassava value chain, both in the coastal areas and in the interior regions, as feed and fuel.

### **3. Actions to be undertaken**

Following the outcome of the workshop and the field trips, and further discussions with Ministry of Agriculture – including the Minister himself - a number of actions were identified, to be undertaken soon, with a view to promoting development of the cassava industry in the country. These actions are meant to converge into the preparation of an integrated development plan and projects, centred on cassava, to be implemented primarily in the interior regions of the country, targeting especially the Amerindian communities of that area, including facilitation and promoting the establishment of linkages with larger private sector activities. Funding opportunities for these projects and investment activities are being explored. Identified actions are the following.

8. Training of trainees through technical demonstrations of cassava cultivation and processing technologies, based on the experience of work undertaken at CIAT and CLAYUCA; these involve especially village-level technologies, allowing rural communities to increase productivity while storing and marketing more of their surplus.
9. Training of farmers and extension agents on improved cassava production and processing systems, in close collaboration with CIAT and NARI.
10. Technical demonstrations and testing of cassava as feed for the poultry and the cattle industries, in close collaboration with the private sector.
11. Organization and enterprise development promotion in Amerindian communities in the cassava industry.
12. Study assessing the size of the potential domestic market for cassava products in Guyana (as traditional food, processed foods, feed, fuel, starch).
13. Study on finance, risk and risk management along the cassava value chain in Guyana, taking into account food, feed, starch and biofuel uses; this will be based on an adaptation of the questionnaire that was recently developed by FAO within the AAACP project, to be administered to a formal sample of stakeholders.
14. Cassava industry investment and financing options analysis, both from an enterprise and institutional standpoint.

Actions are described in more details below.

### *3.1. Technical demonstrations and training for cassava cultivation and processing technologies*

Identify where the cassava crops should be cultivated to obtain competitive yields; how and where processing for both feed and value-added products should be best organized. This activity will be undertaken both in the coastal areas and in the interior regions, taking into account the cultural dimension of development. A GIS tool will be employed to evaluate soils capability as well as its complementarities with farmers' and communities' cultural environment.

From the field trips, it was evident that there are a large number of cassava varieties cultivated in the country, often planted in the same field. This calls for efforts in terms of selection.

Farmers' agro-ecological knowledge about sweet and bitter cassava production and processing for feed, food and other possible uses -- such as starch and biofuel – should be elicited. Cassava in Guyana has been grown for centuries; hence the country is part of the main diversity and variability center of the specie. As a consequence, many clones are currently cultivated, which are more than a mere biological resource: rather, they are a combination of the environment, the genetic resource, and the knowledge developed by farmers which should be used in planning interventions. Considerations should also be given to the intellectual property dimension.

Participatory variety selection trials for matching cassava varieties with different market requirements – cassava for starch, cassava for feed, cassava for flour and other products and all the cassava value chain in Guyana and the Caribbean. This implies evaluating local varieties (clones) farmers as a multi-clonal variety in different environments, and including both sweet and bitter clones in a participatory selection process which includes farmers' training during the process.

Participatory trials to determine the most appropriate integrated crop management in each region Coastal and Interior. Integrated crops include germplasm for different end uses, agronomic practices, intercropping, multiple cropping, relay cropping, pests (diseases, insects and weeds) and post-harvest practices. Participatory trials include farmers' training during the process

Supply of a limited number of improved pieces of equipment to small-size communal processing plants, especially in the interior regions. Specifically small size engines to be employed for mechanical squeezing and grating of the cassava roots.

### *3.2. Training of farmers on improved cassava production and processing*

Training of professional extension agents and community cassava development workers should be undertaken on a number of topics, including: processing (evaluation and promotion of drying, processing and storage facilities), tissue culture and propagation systems; cassava breeding and agronomy, product development, finance. Training should emphasise practical applicable improvements and also involve the communication of the research results, as well as visits to International institutions specializing in cassava.

Training of small scale processors for more value added products. Part of such training can be organized on-site, and where appropriate as visits to sites such as CIAT and CLAYUCA facilities and model factories in Colombia.

### *3.3. Testing cassava as feed for poultry and cattle*

In the coastal areas, cassava as a feed, involving both root and leaf, needs to be validated for the poultry sector; and costs need to be compared with those of alternative feed sources. Such validation is expected to inform investment decisions in the private sector, to be undertaken in the medium term. This information will also provide the necessary support to public policies aimed at developing the cassava value chain.

In the interior regions, small and large scale cassava feed sector development should be pursued along with livestock development. The savannah is an agro-ecosystem that can host both small and large scale livestock operations, that can integrate cassava (roots, leaves and stems) in a silvo-pastoral system, as a supplement for cattle and minor species.

### *3.4. Cassava community organization and enterprise development*

The effect of developing the cassava industry in the interior regions of Guyana should be analyzed in terms of community development, with reference to the Amerindian communities. The extensive knowledge of cassava existing in such communities should be employed and promoted, as a means to achieve higher and better distributed incomes. At the

same time, the consequences of developing the cassava value chains in such communities should be analyzed in terms of gender balance and the role of women's groups.

### *3.5. The actual and potential market for cassava in Guyana*

The objective of this work is to prepare an in-depth quantitative assessment of the size of the potential domestic market for cassava products in Guyana.

The starting point will be existing data and information on production and consumption and its distribution across the areas of the country and the different uses. The study will also discuss the likely developments in cassava use that may arise from improvements in current products, and from the development of new products. In this respect, the study will assume a reference time span of approximately one decade from today.

Particularly, the study will consider and quantify the demand for cassava and cassava products, as follows:

- the actual and possible uses of cassava as an industrial food product, including use in industrial preparations, high value added foods, fast foods; uses as a substitute or complement to other flours in food preparations;
- the actual and likely uses of cassava as a food root crop directly, and in the preparation of traditional staple foods, such as “farine”, “hotpot” “casareep”, “tapioca”, “kari” and other relevant products;
- the actual and likely uses of cassava as feed; including both the present use of flour, and more in general the use of roots and leaves; consideration should be given to the long term viability of cassava compared to rice and maize;
- the actual and likely uses of cassava in biofuel production;
- actual and likely uses of cassava as industrial starch, and compared to competitive products
- actual and possible uses of cassava to substitute for imported feed and food products, and the likely competitiveness of cassava with imported products.

When possible, data and qualitative information should be provided on the location of the identified actual and potential cassava producers and consumers in the country; and on the

constraints preventing the development of consumption, such as, for instance, difficulties in reaching consumption areas; or cultural obstacles.

To the extent possible, the study should provide indications on the long run sensitivity of cassava the cassava market to changes in prices and incomes, possibly with reference to specific areas of the country and uses. Whenever allowed by the availability of data, income and price elasticity values should be computed.

Finally, the study will offer recommendations in terms of specific cassava products whose use could be promoted and how this might be best achieved.

### *3.6. Risk management and finance along the cassava value chain in Guyana*

The objective of this study is to

- highlight the existing and potential risks involved in the operation of the cassava value chain in Guyana;
- assess the major risk management mechanisms currently operating in cassava value chain;
- suggest ways of enhancing existing risk management mechanisms, also in view of the likely developments in the industry.

The study will take a value chain approach, and consider what are the actual and anticipated risks and how they are distributed across stakeholders operating in the food, feed, starch and – where relevant - biofuel cassava production, and how such risks interact among each other and across stakeholders.

Emphasis will be given to financial risks, access to credit and business risks in general, as well as to weather, pests and diseases and other natural risks. As possible, a classification should be provided of existing risks in terms of retainable, insurable, and non-insurable risks; this will inform the discussion on the possible role of the public sector in risk management.

In considering risk management mechanisms, the study will take what may be called a “holistic” approach, by which Government policies and the strategies of private stakeholders are explicitly taken into account as factors that shape the risk profile of private agents.

Reference will be made to the extent to which the presence of risk can be addressed through the use of market-based risk management mechanisms, such as credit and contract arrangements and insurances.

The study will be based on a revised and adapted version of the questionnaire developed by FAO-EST in the framework of the AAACP programme. This will be administered to a formal sample of stakeholders, possibly stratified across the different areas of the country.

In analyzing the results, qualitative analysis of the evidence made available will be supplemented by simple exploratory multivariate statistical techniques – such as the Clusters analysis and/or the Principal Component Analysis – to assess relations among variables, and specifically between stakeholders' characteristics and types of risks and risk management mechanisms.

### *3.7. Cassava industry investment and financing options analysis.*

This analysis is composed of two related parts. Firstly, it will investigate at a micro level investment indicators for production and processing activities along the cassava value chain. Results will provide quantitative profit centre estimates, economic returns to different enterprise activities as well as comparative cost and return efficiencies in the use of different input options at specific value chain points. This information will be essential to investment decisions across different enterprises as a whole and within the management of a specific enterprise itself. The information provided will be input-output benchmarks along the value chain, costing them for farmers, demonstrating competitiveness in different market segments and presenting them as business and management plans that farmers could use to access financing where needed to modify/upgrade/revitalize their operations.

Secondly, the analysis will focus on financial options for the development of the cassava sector. This includes exploring and evaluating financing available and how it might be combined to meet all of the investment needs and synergies required for successful development of the cassava industry as a whole. Also, an assessment will be made of the facilitating policy/investment environment - investment incentives, investment codes, public/private partnership procedures required to mobilize the investments needed. Further, the action will provide an improved understanding and evaluation of financing options on at least four fronts as follows - (a) International Finance Corporation (IFC) lending/equity practices with the large private sector, linked to Government investment that might be

supported by the World Bank; (b) World Bank loans to Government for infrastructure (road) linked directly to large private sector investment, whose usefulness will be determined by use of the infrastructure; (c) International Fund for Agricultural Development (IFAD) financing for poor/small farmers, to assist in them being linked to the supply chain generally and especially to the large scale processing unit. Success at this linkage would solve the problem of market/demand small farmers are so quick to indicate is their problem. However, the critical input from IFAD would be on getting small farmer supply side issues resolved; and (d) a commercial bank like Trinidad Agri Bank that would lend to commercial farmers who are too small for IFC and too big for IFAD type activity. These financing options need evaluation, dissemination and facilitation to make the investments at the different levels of the cassava value chain.