Cocoyam Chips: An Export Opportunity for Nepalese Farmers

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Cocoyam is a tuberous root crop cultivated in many regions of South Asia [5]. Since cocoyams share many of the same nutritional and agricultural characteristics as potatoes and other root crops such as cassava and yams [2,7], this crop would be ideal for producing a type of gourmet potato chip. "Cocoyam Chips" are an ethnic chip variety created from the cocoyam root crop grown in Nepal, and have the potential of being sold in the Canadian snack food market as a gourmet chocolate flavoured potato chip.

Industry Status and Opportunity

In 2013 root and tuber crops made up 21% of all cash crop production in Nepal [6]. Great potential lies in the expansion and commercialization of the cocoyam industry, enabling this subsistence and cash crop to become a source of economic stability for many hillside farmers [2].

Cocoyams have a tuberous root (corm), which is surrounded by potato-size tubers referred to as cormels [2]. The cormels are consumed as food and the leaves and shoots eaten as a nutritious vegetable in many stews and ethnic dishes, while the corms are used for replanting and animal feed [2]. Due to the crop's versatility, investing in the production of Cocoyams would not only provide Nepalese farmers with a source of income from selling the cormels for Cocoyam Chip production, but would provide sustenance for themselves as well as feed for their livestock [2].

Cocoyams are capable of yielding 30 to 60 tonnes of cormels per hectare [14], while cassava yields 20 to 40 tonnes per hectare [15]. The high levels of productivity of cocoyams show the potential of sustaining mass production of the crop. With the breeding and selection of

high yields as well as the development of agro practices and technology to allow mass production [2], cocoyam agronomy has the potential of increasing even further.

Sustainability Analysis

Culture

In rural Nepal, women are responsible for up to 80% of agricultural production [11]. Cocoyams are largely produced by female subsistence farmers, thus the crop is commonly associated with low socio-economic status [7]. As cocoyam production is generally an informal activity driven by women on small scale farms [7], the commercialization and investment in this crop would significantly impact the most vulnerable groups in Nepal [7]. According to a 2005 study carried out by the FAO, women in the high mountainous regions of Nepal contribute more in agricultural production than their male counterpart [11]. In order to benefit female hillside farmers, the commercialization of cocoyam would require an increase in women's access to development opportunities [11] in order to maintain their control over farms.

In the high hills and mountainous regions of Nepal the cultivation of land and transport of crops is carried out by livestock such as oxen [13]. This practice is associated with the cultural practices of the Tibetan's that reside in these regions [13]. By promoting the mass production of cocoyam for export, new technologies of agricultural cultivation would be required [16], eliminating the tradition use of livestock for farming and undermining indigenous practices.

Economics

In 1990 the price per tonne of cocoyam was shown to be 75.7% higher than cassava and 38.2% higher than sweet potato [12]. For a Nepalese hillside farmer, selling surplus cocoyam to locals presents challenges due to the crop's higher selling point. However, if cocoyam was to be

commercialized and exported overseas, the higher value of the crop would instead benefit Nepalese farmers as they would experience higher revenues than the previous mentioned root crops [1].

Due to current land ownership and tenancy rights in Nepal, land rents require 50% of all agro production to be given to the landowner [13]. According to Hindu law, male offspring come into ownership of parental land holdings [11]. In order for cocoyam cultivation to be economically sustainable and beneficial to female farmers, land reform and public policy would have to shift towards a more gender equal practice of agriculture [11].

Environment

In a commercialized setting where cocoyams require mass cultivation, the problem of pests and diseases will increase in severity [2]. *Cocoyam root rot disease* and *Taro leaf blight* are common to cocoyam crops [7]. These diseases can exceed one growing season due to the cocoyam's propagation method of transmitting diseases onto the next generation [7], sometimes resulting in yield losses of up to 100% [12]. Therefore in order for cocoyam to become commercialized, Nepalese farmers need to be educated in disease prevention and given the proper inputs to eliminate the occurrence of the spread of disease [12].

Cocoyam grows best in the Mountainous and Hill regions of Nepal, accounting for a combined 65% of all arable land [13]. Although inputs such as fertilizer are increasingly important for intensive crop cultivation in these regions, manure remains the central source of soil fertility and nutrient replenishment [13]. The mass production of cocoyam in this region would require chemical fertilizers rather than manure [13].

The current system of land ownership in Nepal produces a short-term focus on land investment and production, ignoring long-term investments such as terracing and tree planting to

avoid soil erosion and the use of fertilizers [13]. The commercialization of cocoyam would require long-term investment in land and soil to enable mass production and sustainability.

Export Potential

Market

By the end of 2016, Canada's potato chip industry is expected to increase to a value of $1.7 billion [10]. The domestic market for potato chips currently absorbs 84% of Canadian production in this area, however imports of potato chips have increased from 11.9% in 1999 to 16% in 2009 [3]. In order to successfully launch Cocoyam Chips into such an aggressive market, the focus of the product should be on its ethnic origins. Ethnic shoppers currently represent 31% of all Canadian consumers [10], increasing the demand for specialty foods with diverse flavours.

Increased consumer interest in weight loss and healthy eating [3] provides marketers with the opportunity to focus on the health benefits of Cocoyam Chips as an alternative to regular potato chips. Cocoyams are rich in vitamin B6, magnesium and dietary fiber, promoting lowered blood pressure [5]. In addition, Cocoyam Chips can be advertised as an organic alternative to mainstream potato chips. Internationally imported products are required to be certified by CFIA, regulated under the Organic Products Regulations Act [9].

Economics

In 2009 Canada imported $374.6 million in potato chips and other snack foods [3], however increased transportation and energy costs have influenced profitability of the industry [3]. In 2006, potatoes in Canada cost $194.2 USD/tonne [1], while root and tuber crops (including cocoyam) cost $166.9 USD/tonne [8]. Although Nepalese cocoyam appear to be

cheaper, the cost of transportation, packaging, and manufacturing the chip in Canada would result in a higher price than the domestic chip varieties being sold in Canada [3]. However because of the ethnic origins and uniqueness of the Cocoyam Chip, the price discrepancy should not affect consumers.

Logistics

The two major importers of cocoyam are currently the United States and Japan, the vast majority of imports to the United States coming from Caribbean and Latin American countries due to their close proximity [12]. In order to promote the export of cocoyams from Nepal into Canada special efforts would be required in order to intentionally support hillside farmers, as the price to import from Nepal would be significantly higher than a country closer [12].

Harvested cocoyam cormels can be stored in a cool dry place for 2-3 months, making them an ideal food product to be exported far distances without the risk of spoiling [2]. Raw cocoyams contain the toxin calcium oxalate before they are cooked, thus in order to export Cocoyam chips into Canada the chips would need to be cooked prior to shipment [4].

Potential Importers

Cocoyam Chips could be imported to various chain grocery stores across Canada as well as independent ethnic food grocers, appealing both to Canadian staple food shoppers as well as ethnic communities.

1. Loblaw's Canada

   1 President Choice Circle
   Brampton, Ontario L6Y 5S5
   1-905-459-2500

2. Sobeys National

   115 King Street
   Stellarton, Nova Scotia B0K 1S0

1-902-752-8371

3. Nations Fresh Food

2 King St W #445
Hamilton, Ontario L8P 1A2
1-905-525-8188

Conclusion

The export of cocoyams from Nepal to be manufactured into Cocoyam Chips and sold in Canada has great opportunity to create sustainable economic growth and development for Nepalese farmers while becoming a successful product on the Canadian snack food market. Although there are apparent difficulties in transforming subsistence based farming practices into a mass-produced export product, with government cooperation and initiatives cocoyams could become a significant export product for Nepal.

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