

The Export Potential of Nepali Black Gram to Canada

Introduction

Black gram (*Vigna mungo*) is a pulse from the legume family domesticated in India [1]. The plant grows 30-100 cm with large hairy leaves and 4-6 cm seed pods [1]. Black gram popularity is increasing in Nepal as demonstrated by a 273% increase in acreage and a 473% production increase in the 25 years between 1984/85 and 2009/2010 [7]. Black gram production in Nepal had an average yield of 818 kg/ha in the 2011/2012 growing season, and was the third highest produced pulse in Nepal, only being surpassed by lentil and soybean production [2]. In the 2011/2012 growing season black gram was predominantly produced in the midhills region but was also produced in the Mountain and Terai regions [2].

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The annual average retail price of black gram in Nepal more than doubled between 2001/02 and 2010/11, and if this trend continues this will provide increased returns to Nepalese farmers [2]. Black gram seeds are de-husked and then used to create curries known as dal and dal makhani or consumed as part of lentil patties like wo or bara. Canada imported 465,562 kg of black gram from India in 2002/03, which demonstrates that there is already demand in Canada [1]. Currently Nepal imports black gram from India so production will have to increase to account for Nepali and Canadian demand [1].

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Growing conditions

Black gram is a legume that improves soil fertility through nitrogen fixation [7]. Rice yields improved 15-20% when planted in the same field as black gram during the following growing season [6]. Black gram yields increase when using crop rotation due to decreased pathogen levels in the soil [3]. Seeds are sown into ridges and furrows typically spaced 1 foot apart [3]. Farmers in the midhills and Terai region sow their fields in the 2nd week of June and 2nd week of July respectively to receive maximum yields [7]. Black gram is harvested when the seed pods turn black 55-65 days after planting [3].

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Black gram is suitable to intercrop with cotton, sorghum, pearl millet, green gram, maize, soybean and groundnut [1]. Crop rotation cycles of rice, wheat, and black gram have been proposed for the Lowlands, and crop rotation with summer maize in the uplands [7].

Agronomic Issues

Black gram is a drought tolerant crop which experiences a 2.46% yield loss during post harvest practices [1]. Yield losses can be reduced by improved threshing practices, proper storage and reduced seed loss during transportation from fields [1]. Table 1 examines a number of pests and diseases of black gram along with symptoms and treatment options. Black gram yields increase by 49% when fields are inoculated with Rhizobium strains which are collected, produced and distributed by the Nepal Agricultural

Research Council [7]. Fertilizer use is recommended at a ratio of 20:40:20 N:P:K, rhizobium inoculation of 5g/kg of seed and irrigation of crops will improve black gram yields [6][7]. Table 2 provides the contents of a nutrient solution used to treat seeds to increase drought tolerance and disease resistance for black gram.

Many areas of Nepal do not have water treatment facilities, and industrial wastewater is released directly into the environment [5]. Black gram has higher germination rates when exposed to industrial effluent than crops such as rice and may be a potential crop used in areas with high exposure to industrial effluent [5].

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Nutrition

Black gram is very nutritious as it contains high levels of protein (25g/100g), potassium (983mg/100g), calcium (138mg/100g), iron (7.57mg/100g), niacin (1.447mg/100g), Thiamine (0.273mg/100g), and riboflavin (0.254mg/100g) [8]. Black gram compliments the essential amino acids provided in most cereals and plays an important role in the diets of the people of Nepal and India [1].

Post-Harvest

Black gram storage structures should be elevated in a well drained area, inspected for cracks and holes, cleaned and dried before storage, well aerated and regularly inspected [1]. Black gram should be stored at less than 9% moisture to discourage insect pests and is typically packaged in jute bags, polyethylene bags or poly pouches [1]. Increasing the access of proper storage facilities and packaging materials for subsistence farmers will decrease the occurrence of distress sales and post harvest yield losses.

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Elimination of Distress Sales

Most farmers do not have access to produce storage facilities and are therefore forced to sell their produce directly following harvests. When black gram is harvested and brought directly to the market by many farmers the price is driven down due to the influx of product into the market space [1]. Farmers can suffer from distress sales by bringing their produce to the market and having no option but to sell it for too low of a price or return home where they are unable to properly store seeds [1].

There are a number of methods used in India to decrease the occurrence of distress sales and provide farmers with adequate compensation for their labour such as pledge finance systems (PFS) and contract marketing [1]. PFS is a system that provides farmers with an immediate loan of up to 75% of the value of their stored produce until they sell their produce at a fair market price [1]. Contract marketing occurs as a buy back contract between farmers and a corporation where the farmer receives a set price for the commodity and may receive technical guidance [1]. PFS and contract marketing are potential strategies to put in place in Nepal to stabilize prices and ensure farmers are properly compensated.

Grading

Grading of the black gram seeds will provide increased revenue for farmers as it allows them to charge a higher price point due to the insured quality of the produce [1]. Grading is a simple system that is recommended to improve income to farmers and quality to consumers.

Export Potential

Exports of black gram will need to follow the Sanitary and Phytosanitary measures from the GATT agreement of 1994 [1]. Government of India (2006) provides an example of the processes required to export black gram from India and can be used as a model for Nepal.

It will be niche product and can be marketed as healthy alternatives that support Nepalese subsistence farmers. Unfortunately there is no Canada-Nepal organic trade equivalency so Nepalese black gram could not be certified organic. This product will take advantage of the upward health trend in Canada and the rapid growth in health food stores. The brand name and marketing can utilize the mystic and positive image of Nepal (Example: Shangri La Lentils, EverPeak Lentils).

It would be useful to first apply for Fairtrade Canada certification (<http://fairtrade.ca/>) and the Non GMO Project (<http://www.nongmoproject.org/>). Fairtrade certification is a beneficial marketing strategy to promote products [4]. The next step would be to test the product in local health food stores to prove market capability. Once listed in several health food stores then distributors and nationwide brokerages could be approached to get products into specialty food stores across the country. A number of potential distributors and brokerages are included in Table 3 and 4.

Additional export potentials could be the production of frozen lentil patties (wo and bara). It does not appear that any similar products are currently in the Canadian marketplace and there would be demand from Nepalese Canadians and the healthy eating community.

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Literature Cited

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Tables

Table 1. Pests and diseases that are common to black gram in India and control methods (3).

Pest or Disease	Symptom	Physical Control	Chemical Control
Stem Fly	Dry and withering plants in early growth	N/A	Mehyldematan, Phosphomidan or Dimethoate application of 2ml per Litre
Aphid, Leaf Hopper or White Fly	Insects on Plants, Holes in leaves	N/A	Mehyldematan, Phosphomidan or Dimethoate application of 2ml per Litre
Yellow Mosaic Disease	Yellow Mottled appearance	Remove Plants	Insecticide application as above to control for White Fly which carries the disease
Root rot	Yellowing of leaves and decay of roots	Remove Plants	Spray 0.1% Bavistin Solution
Wilt	Wilting of leaves and stem	Remove Plants	Spray 0.1% Bavistin Solution
Powdery Mildew	White Powder on Leaves	N/A	Spray 1% Bavistin Solution
Cercospora Leaf Spot	Brown Spots on leaves	N/A	Spray 1% Bavistin Solution
Bruchid Beetles	Pest of stored seeds, infect the seeds	Destroy Infected Seeds	Spray Quinalphos 2ml per litre ten days before harvest

Table 2. This is a recipe for a nutrient solution to enhance the drought tolerance and disease resistance (3). Planting a one acre field of black gram will require 8 kg of seed which should be soaked in 2 L of this nutrient solution for three hours. Following the three hour soaking the seeds should be dried in the shade for 8 hours.

Chemical	Amount added (gm) per Litre of Water
Succinic acid	2
Cobalt nitrate	100
Ascorbic acid	2
Sodium molybdate	10
Manganese sulfate	10
Zinc sulfate	10
Potassium chloride	10
Potassium sulfate	10
Indole-3 butric acid	20

Table 3. The following distributors focus on specialty natural foods and would be beneficial to partner with.

Distributor Name	Expertise	Website	Contact
Ontario Natural Food Co-op	Natural, fairtrade, organic and non GMO products	www.onfc.ca	intake@onfc.ca
United Natural Foods Inc.	Natural, organic, fairtrade and non GMO products	www.unfi.ca	Info.canada@unfi.com

Table 4. The Nationwide brokerages listed below have sales representatives across Canada and would be beneficial to partner with.

Brokerage Name	Expertise	Website	Contact
Higgins Cohn	Natural and Specialty Food in Canada	www.higginscohn.com	info@higginscohn.com
MTB Brand Management	Natural Health and Organic products in Canada	www.mtbi.ca	info@mtbi.ca
Marsham International Food Brokers Inc.	International natural and organic products with a large presence in Canada	www.marsham.ca	Phone: (905) 881-4762
Villa Anna	Organic and Natural Products	www.villaanna.ca	info@villaanna.ca
New Age Marketing	Natural Foods in Canada	www.newagemarketing.ca	info@newagemarketing.ca
Lebeau Excel	Natural Food and Health Products in Canada	www.lebeauadvance.com	info@lebeauadvance.com