Promoting Nepalese Agrifood Exports: Dried chickpeas

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Dried Chickpeas in Nepal

Introduction

Chickpeas are a major pulse legume grown in Nepal, either by themselves or as an intercrop with maize or rice (Acharya, Shrestha, Sharma, & Lama, 2015). Chickpeas are an important legume to Nepalese population, as it is the primary protein source for nearly 2 million Nepalese people (Pande et al., 2005). In 2013, Nepal imported approximately 10.1 million dollars in dried shelled chickpeas, mostly from Australia but also from Canada, creating a need to increase production not only for its own people, but also to balance bilateral trade ("Import Origins of Chickpeas…", 2013). Chickpeas are an excellent source of protein, especially when compared to other legume pulses. They are also high in unsaturated fatty acids and minerals, including calcium, magnesium, phosphorous and potassium (Jukanti, Gaur, Gowda, & Chibbar, 2012).

Agronomic Issues and Potential Solutions

There are a number of Agronomic issues, both biotic and abiotic, that have considerably reduced the production of chickpeas in the Terai of Nepal (Pande et al., 2005). Botrytis gray mold (BGM) was the main cause of the rapid decline in production of chickpeas, as it completely devastated crops in 1997-1998, especially in the humid eastern part of the country causing farmers to switch to a more stable, albeit less profitable legume, such as lentil (Pande et al., 2005). This devastation has given chickpeas a very negative reputation of being a risky crop and has likely delayed the spread of new technologies and cultivars to increase production (Pande et al., 2005). Fusarium wilt is another major biotic problem to chickpea production in Nepal. Abiotic issues include boron deficient soils, as well as infertile land due to soil acidity and drought (Pande et al., 2005). However, these issues can be dealt with by a number of low cost techniques without having to rely heavily on expensive alternatives such as fungicides. Larger spacing between rows can decrease leaf wetness to decrease BGM. Intercropping with mustard also seems to significantly reduce the disease (Khadka, Joshi, & Chaudhary, 2013). Coating the seed with Rhizobium or mixing the rhizobium into the soil can combat poor nodulation and therefore improve the nitrogen fixing capacity of the chickpea (Pande et al., 2005). Poor soil fertility can be combatted with vermicompost, along with fertilizers in order to increase root length, grain yield and further nodulation (Bajracharya & Rai 2014). Ideally, an Integrated Crop Management strategy using genetically resistant seeds incorporated into local varieties, the use of fungicides, along with the simpler strategies mentioned could allow for sustainable and profitable production of chickpeas for Nepalese farmers (Pande et al., 2005).

Sustainability in Nepal

Although Chickpeas are only suitable to be grown in the Terai region of Nepal (Pande et al., 2005), the selection and technology of new landraces would allow for proper chickpea production from the humid and acidic soils of the east to the drier western parts of the country (Gurung, 1998). In the dry western parts of the country,

seeds have been formulated with short durations in order to escape potential long droughts. In the eastern and central part of the Terai, seeds have been formulated with increased disease resistance, and earlier maturity in order to escape the potential fungal threats in these moist and humid environments (Gurung, 1998). Thus although these crops can mainly be grown only in the Terai region, it is not segregated to one geographical area, and can thus improve distribution of this quality protein to a large portion of the population.

Labour Required and Cost as well as Potential Strategies to Maximize Costs

Chickpeas are a relatively low input crop that is also quite drought resistant, and can be fairly easily intercropped with cereals such as maize or rice (Pande et al., 2005). Nepal imports a huge amount of rice from India ("Import origins of Chickpeas…", 2013), therefore intercropping with chickpeas could be a more economical option for a subsistence farmer, rather than purchasing these products from overseas.

Research has also shown that seed priming can have massive effects on chickpea production in rice fallows, increasing chickpea yield by 41% by seed priming alone (DB et al., 2014). As well, due to chickpeas high water efficiency, it can be planted after rice in the dry season, using the residual moisture to grow (Pande et al., 2005). This also keeps the farmers land from being bare when the rice has been harvested, which could lead to improve organic material in the soil as well as less need for nitrogen fertilizer in subsequent rice seasons. Despite its good drought tolerance, irrigation of chickpeas in the vegetative stage has been shown to increase yields (Acharya et al., 2015).

Impact on Nepalese Families

Planting Chickpeas can have a huge impact on the life of poor, subsistence farmers. Using integrated crop management strategies, including use of fungicides, larger distances between rows, rhizobium inoculants and some improved cultivars of native landraces (Avarodhi cultivar over Dhanush and Trishul) can increase family income by 80 to 100% (Pande et al., 2005). Although the cost to implement these strategies is 13% higher, which may not be possible to obtain for a poor subsistence farmer, the profits per hectare could be nearly doubled. Protein intake for a farmer's family can increase by 40%, and increases in livestock ownership can increase by 30%. This can result in an increase of 45% extra income for the family (Pande et al., 2005). This extra income for a family can help send a child to school, or teach a daughter how to read and empower them in Nepalese society. Additionally, there is additional wealth generation in the selling of these improved disease resistant Avarodhi desi seeds over the local cultivars (Pande et al., 2005). There has also been an improved variety of Kabuli chickpeas called Kosheli (DB et al., 2014). Kabuli chickpeas generally go for higher prices, as in Canada they are sold for nearly 60% more money (Gowda, Upadhyaya, Dronavalli, & Singh, 2006). Further economic benefit includes the decreased use of fertilizer in subsequent rice crops as well as decreases in urea requirement and compost due to its extensive root system and nitrogen fixing capacity (Pande et al., 2005).

Export Potential

There is certainly potential for chickpea products to be exported from Nepal. Rice fallows make up more than a million hectares in Nepal and if only 30% of these rice fallows were intercropped with chickpeas, it would be sufficient for the growing need in Nepal as well as extra for export (Pande et al., 2005). In 2012, dried chickpea exports totalled nearly 73,000 metric tons, and are used in many parts of the world (Huntrods, 2013). In 2013, Canada imported dried chickpeas from a dozen different countries, indicating the potential market for Nepal to seize as well as the United States ("Import Origins of Chickpeas…", 2013). Another potential product that could be made from Nepali chickpeas that could address the South Asian Market in Canada is *Besan,* which is when the smaller desi chickpeas are ground into a flour ("Chick Peas", 2013). This can be used in a variety of dishes, such as roti or chapati and has also shown to be effective in skincare ("Chick Peas", 2013). The government may need to help in informing subsistence farmers on various ways to store, transport and export these products to neighbouring countries as well as western countries (Pande et al., 2005). Unfortunately, there is a problem with storing chickpeas long term, as the quality deteriorates over time especially when in a warmer climate ("Chickpea - harvesting and storage", 2012). Thus, chickpeas need to be cooled in order for long-term storage, which could be a potential concern in terms of export to a geographically distant country. Future studies should focus on the different tastes and textures of the various improved landraces of Nepalese chickpeas, in order to see if they could truly be a unique chickpea to market worldwide.

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Some potential interested parties in Canada

- http://www.canadiangrocer.com/top-stories/sobeys-launches-first-south-asian-focused-discount-store-57073
- http://www.kathmandurestaurant.ca/
- http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/by-product-sector/crops/pulses-and-special-crops-canadian-industry/chick-peas/?id=1174598188373
- http://www1.shoppersdrugmart.ca/en/Home?gclid=CLjqw4nYqckCFZGMaQodjVEBog&gclsrc=aw.ds&dclid=CJXlyonYqckCFUhrMAodITsODQ (for potential skin care uses of chickpea flour)