



POLICY BRIEF

PULSES: A NUTRIENT POWERHOUSE TO COMBAT MALNUTRITION IN SRI LANKA

Pulses are a sub group of legumes with extraordinary nutritional and environmental benefits. Yet, in Sri Lanka, production and consumption of pulses have been hindered due to several factors together with production being concentrated only in a few districts in the country. This policy brief examines these factors, their impact on nutritional status of populations and policy recommendations.

KEY POINTS

- Despite unparalleled nutritional and environmental benefits pulse production and consumption in Sri Lanka are not at its full potential.
- Cautionary actions are needed to increase the production of pulses whilst ensuring an attractive pulse market for farmers and making them affordable for consumers.
- Policies and programmes should focus on developing infrastructure facilities, expanding the geographic areas of pulse production and promoting pulses as a third-season crop.
- Establishment of private/public partnerships plays a vital role in developing the pulse sector in Sri Lanka.
- Improving the knowledge of the public, particularly women, on the importance and uses of pulses is indispensable in enhancing their consumption.



Pulses are essential crops with several nutritional and health benefits as well as economic and environmental benefits. Examples of pulses available in Sri Lanka include all varieties of dried beans such as kidney beans, lima beans, butter beans and broad beans. Chick peas, cowpeas, black-eyed peas and pigeon peas are also pulses as are all varieties of lentils.

Pulses are rich in proteins in comparison with other plant-based protein sources and hence act as major protein sources for vegetarians and in regions where meat and dairy are not physically or economically accessible. While plant-based protein sources often lack one or more amino-acids in sufficient quantities to meet human nutritional needs, combinations of different proteins, including cereal-pulse combinations and supplementation can help to overcome this in strict vegan or vegetarian diets.

The high content of iron (Fe) and zinc (Zn) in pulses is specifically beneficial for women and children at the risk of anemia. Pulses are low in fat and rich in soluble fibre which can lower cholesterol and help control

blood sugar. Thus, the Nutrition Division of the Ministry of Health in Sri Lanka recommends plant proteins over animal proteins for the prevention and management of many non-communicable diseases including diabetes, coronary heart disease and hypertension. Pulses have also been shown to help combat obesity especially because the contribution of protein to healthy ageing is increasingly being recognized.

Environmental benefits of pulses are remarkable as they have a greater genetic diversity than the other crops. Many varieties of pulses are resistant to floods, drought and other extreme and marginal environmental conditions. They can reduce soil pathogens and fix atmospheric nitrogen enhancing soil productivity and prevent soil erosion. This enables farmers to cut down on the application of chemical fertilizers. In addition, pulses can be effectively used in crop rotation and in inter-cropping, increasing yield of the following crop by 20 to 40 percent (Gan *et al.*, 2015). They are also considered as Climate Smart Crops as when pulses are used as feed for ruminants the methane gas emissions from ruminants decrease.

THE PROMOTION OF PULSES IN SRI LANKA

Considering the multiple benefits of pulses, the Government of Sri Lanka has initiated several programmes and projects to encourage further cultivation of pulses. The promotion of pulses is common within several national programmes that are being conducted to address the micronutrient deficiencies which are widespread particularly among women and children. For example, the Ministry of Education recommends foods such as chickpeas, green gram and dhal in school feeding programmes.

The Thripasha programme, delivered by the Ministry of Health, provides triple-nutrients (energy, protein and micronutrients) as a ready-to-eat food for pregnant and lactating mothers and for children from 6 to 59 months of age. In the Thripasha programme, soya bean is the main source of protein, constituting 30 percent of total product ingredient. Given the widespread distribution of Tripasha in Sri Lanka, the total requirement of soya bean production for the programme is approximately 500 Mt per month.



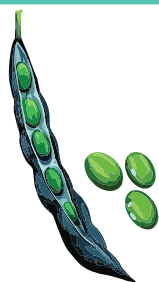
The Field Crop Research and Development Institute of the Department of Agriculture is the mandated agency that conducts research and development programmes on field crops aiming at developing new technology and facilitating technology dissemination for enhancement of production and productivity in grain legumes (mung bean, cowpea, black gram, pigeon pea and chickpea) and oil seed crops (groundnut, soybean).

The Food Production National Programme 2016-2018 implemented by the Presidential Task Force on National Food Production focuses on the following activities for specific pulses:



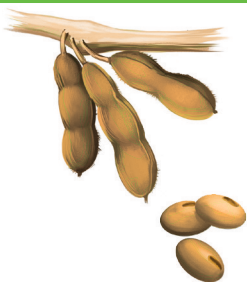
Groundnut:

Expansion of cultivation to new areas, establishment of farmer organizations, distribution of machinery, revolving funds for the sustainability of farmer organizations, training programmes, promotion of effective irrigation methods and soil nutrient management.



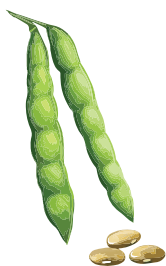
Green Gram:

Establishment of green gram villages, introduction of decortication machineries, establishing storage facilities, and establishing purchasing units for each green gram village.



Soy bean:

Recognizing new varieties, certification and profitable mechanisms, popularization of research activities on soya bean cultivation, productivity enhancement through good management and construction of cultivation wells to provide supply to tubes along the water pumps.



Black Gram and Cowpea:

Popularization of usage of certified seeds, improving quality of harvests and reducing cost of production through introduction of farm machineries, harvesting and processing equipment, protection of soil moisture, establishment of storage facilities and popularization of value added foods.

Whilst the assistance provided through the above programmes has supported to increase the extent of pulse cultivation and total production of pulses, there is room to strengthen pulse value chains through interventions in marketing and expanding domestic demand by raising awareness.

PULSES: FURTHER POTENTIAL IN THE ESTATE SECTOR



The estate sector, established under the British Colonial Government includes tea, rubber and coconut plantations consisting 20 acres or more of land with ten or more resident labourers. When compared with the rest of the country, the estate sector is lagging in terms of development. The Poverty Head Count Index (HCI) is at its highest at 8.8 percent in the estate sector as it possesses the lowest monthly household income compared to urban and rural sectors, making this sector particularly vulnerable (Department of Census and Statistics, 2016). Furthermore, when compared to the urban and rural sectors, the estate sector has larger poverty rates which are measured through a proxy indicator being the proportion who owns a refrigerator (Department of Census and Statistics, 2016).

It is well known that a low monthly household income negatively impacts nutrition status. In Sri Lanka, the

national prevalence of stunting (low height for age) is 17 percent in children below five, although it varies significantly amongst districts, the highest being in Nuwara Eliya with 32.4 percent (Department of Census and Statistics, 2016). Similarly, the national prevalence of wasting (low weight for age) is 15.1 percent although ranging between severe to critical levels across districts, with the highest level seen in Moneragala at 25.4 percent (Department of Census and Statistics, 2016).

Just over four percent of the population is living in the estate sector, with the majority being of Tamil ethnicity. Most Tamils are vegetarian and their diets are mainly based on black gram. According to the monthly household expenditure data, the estate sector spends relatively more on pulses than the rural and urban sectors (Figure 1).

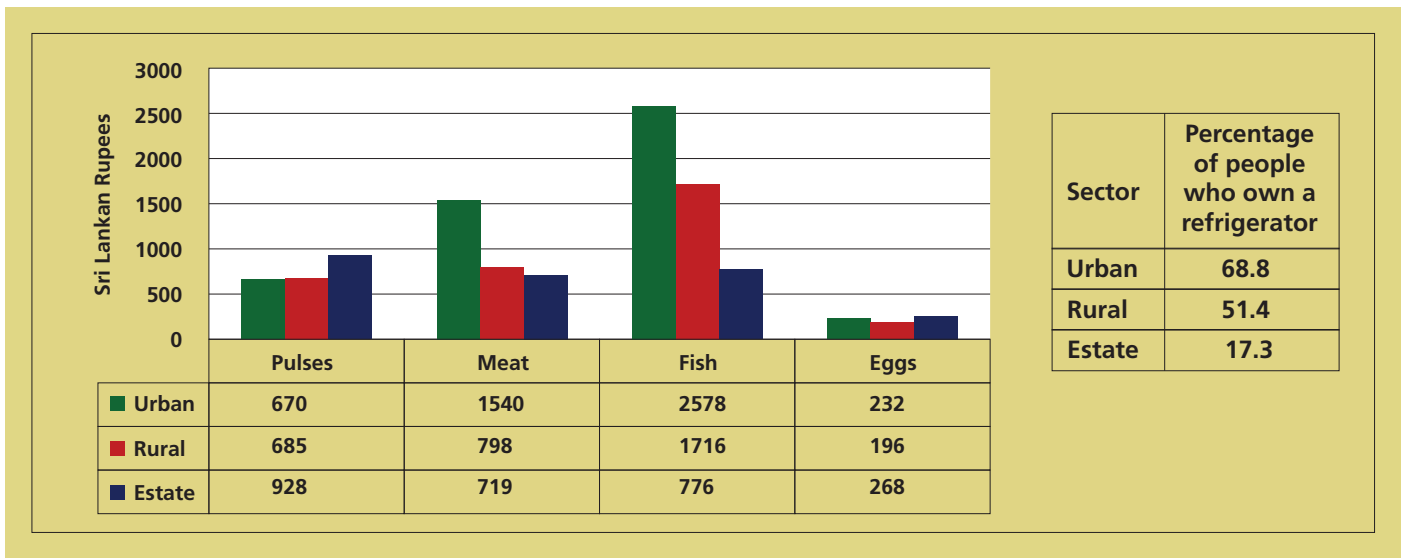


Figure 1: Monthly expenditure on pulses and animal protein sources by different sectors and the percentage of people who owned a refrigerator in different sectors in 2016 (Department of Census and Statistics, Household Income and Expenditure Survey, 2016)

Despite the inflated price of pulses at the retail level, one gram of protein in pulses is much more affordable when compared to one gram of protein from animal-source foods (Department of Census and Statistics, 2016). Affordable protein sources such as pulses can support vegans and vegetarians to meet their protein requirements. Furthermore, the affordable price of pulses in terms of protein source is particularly relevant for the estate sector in Sri Lanka, as household expenditure on pulses is higher than any other animal-source and higher than expenditure in rural and urban areas, signifying a reliance of pulses in this sector (Department of Census and Statistics, 2016).

Finally, whilst consumption of pulses is already high in the estate sector, when compared to the urban and rural sector, the estate sector is particularly vulnerable to poverty and malnutrition. Many who reside in the estate sector are vegetarian and do not own a refrigerator and therefore, pulses are a viable option to reach protein requirements. Given this situation, it is evident that there is an enormous opportunity to further promote pulses as a source of protein in the estate sector.

PULSES: A GOOD CHOICE TO FEED THE NATION



Despite the benefits of pulses, pulse production and consumption in Sri Lanka fall below national production targets. This is due to small scale farmers producing pulses extensively, while large scale farmers are focused on producing vegetables and high value crops (The World Bank Group, 2015). The Department of Agriculture has recommended growing pulses in many geographical regions from dry zone to wet zone; however, the production of pulses has been concentrated to just a few districts in the country. As an example, only four districts, namely Hambantota, Kurunegala, Monaragala and Trincomalee accounted for approximately 60 percent of the total production of green gram and only three districts, Ampara, Monaragala and Anuradhapura accounted for approximately 70 percent of the total production of cowpea in 2016 (Kyai, Mruthyunjaya, Khan, Liyanapathirana, & Bottema, 1997).

However, small amounts of pulses are being grown in all the other districts of the country, indicating that there is still a potential to grow pulses countrywide. Moreover, there is an immense potential to increase the production by promoting pulses as a third-season crop in inter-cropping, crop rotation and in relay cropping. This would not only increase the production of pulses but also increase the yield of subsequent crops.

The major pulses grown in Sri Lanka are black gram, green gram, cowpea and soya bean. Regardless of lentils being a major part of the Sri Lankan diet, requirements of lentils and chickpea is fulfilled through imports. Furthermore, substantial amounts of pulses that are mainly grown in the country are also imported, as displayed in Table 1 where forty to sixty percent of the requirement of pulses is being met by imports.

**TABLE 1: PRODUCTION AND IMPORT VOLUME OF MAJOR PULSES GROWN IN SRI LANKA (2015-2017)
(DEPARTMENT OF CENSUS AND STATISTICS, TRADE MAP, 2017)**

Volume of Production and Imports	Pulse	Year		
		2015 (MT)	2016 (MT)	2017 (MT)
Production	Black gram	11901	11200	7289
	Green gram	15058	14546	9392
	Cowpea	12276	13740	7576
	Soya bean	11901	9830	14296
Imports	Black gram	19613	26548	28308
	Green gram			
	Cowpea	5678	4174	7345
	Soya bean	7293	6083	3176
	Chick peas	23687	30093	32642
	Lentils	147750	139310	114111

> **Unavailability of quality seeds is a factor which has led to yield reductions and inconsistent yield in pulses.**

To produce high quality seed in required quantities, the involvement of the Government and/or the private sector through the production chain is needed. Yet there are very few certified and quality seed producers in Sri Lanka. On the other hand, the lack of production has led to scarcity in quality seeds for cultivation. Furthermore, the hardness of the seeds of pulses results in poor quality seeds, which is a topic discussed in Sri Lanka frequently.

Available at: <http://www.customs.gov.lk/classification/tarrif> [Accessed 2 November 2018].

> **High transaction costs and poor infrastructure facilities have made pulses more expensive for consumers creating an unattractive market for farmers.**

As shown in Table 2, there is a considerable gap between farm-gate price and the retail price of pulses indicating the existence of high transaction costs.

TABLE 2: COST OF PRODUCTION, FARM-GATE PRICE AND RETAIL PRICE OF MAJOR PULSES GROWN IN SRI LANKA

Year	Cowpea		Black gram		Green gram	
	Farm-gate price	Retail price	Farm-gate price	Retail price	Farm-gate price	Retail price
2013	160.03	240.41	134.88	267.71	181.52	283.31
2014	142.80	230.31	163.57	260.76	190.93	300.80
2015	167.61	261.58	155.24	277.99	178.28	245.36
2016	174.86	243.60	222.14	426.52	179.99	210.98

> **The pulse processing industry is not yet extensive in Sri Lanka, which results in high processing costs (cleaning, de-hulling, splitting and milling)** (Kyai, Mruthyunjaya, Khan, Liyanapathirana, & Bottema, 1997)

In Sri Lanka, the pulse processing industry is relatively small and located in rural areas. Processing is mainly performed at a household level using traditional methods which lead to low yield. Because of this, the locally produced pulses cannot compete with imported pulses in terms of quantity. However, one of the favourable qualities of pulses is that they can be stored for a longer period without any nutrient loss. This enables farmers to store pulses during market gluts and sell when the market has a good price thus having the potential to increase profits significantly. In addition, it helps to avoid sudden price rises during inter seasons. However, storage facilities are insufficient and are not up to the expected quality. It is evident that investments on infrastructure related to pulse production, processing and marketing is not satisfactory and needs attention (Karunatilake, 2003).

THE WAY FORWARD: POLICY RECOMMENDATIONS

Reshape the Government agriculture policies related to pulses to achieve pulse production targets

- Effective promotion of pulses as a third-season crop including the use of fallowed paddy lands;
- Introduce pulses in crop rotations and relay cropping. This will increase not only the pulse production but also the yield of other crops.

Enhance pulse consumption and promotion

- Reward development of value-added products (snacks made using pulses, ready-made soup mixtures and juices) of pulses;
 - Enhance awareness of nutritional properties of pulses;
 - Demonstrate culinary preparation of pulses which preserves the nutritional properties
- (Note : Pulses contain anti-nutrients which hinder the absorption of nutrients in the pulses, specifically iron. Soaking and sprouting lower the anti-nutrients in pulses, while consuming with foods containing vitamin C and with cereals, facilitates their absorption. For example, lime juice can be sprinkled on dhal curry prior to consumption).

Facilitate Private Public Partnerships (PPPs) to reinforce the infrastructure development

- Encourage private sector participation in seed multiplication together with the Department of Agriculture to increase the availability of good quality seeds;
- Encourage private sector participation in processing and value addition.

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