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Pulses: Innovations from the field to the cooking pot

About this online discussion

This document summarizes the online discussion *Pulses: innovations from the field to the cooking pot* which was held on the FAO Global Forum on Food Security and Nutrition (FSN Forum) from 14 October to 4 November 2016. The discussion was organized in the context of the International Year of Pulses, and was facilitated by Sieg Snapp from Michigan State University and Karen Cichy from the United States Department of Agriculture.

In this second discussion on pulses, participants explored innovations to encourage and sustain pulse production and consumption. In addition, they discussed the roles pulse can play in the sustainable intensification of agriculture, and what is needed to strengthen pulse value chains. Furthermore, some participants used this discussion as a chance to share pulse recipes.

Over the three weeks of discussion, participants from 22 countries shared 44 contributions. The topic introduction and the questions proposed, as well as all contributions received, are available on the discussion page: www.fao.org/fsnforum/activities/discussions/pulses2

Pulses: challenges and opportunities

Although the global demand for pulses has increased, per capita consumption has seen a significant decline in recent decades (Kadambot Siddique). The low level of pulse consumption has mainly been attributed to their status as "the protein for the poor" (Said Zarouali, Stella Kimambo, Peter Steele, Jane Sherman, Cynthia Donovan, Sarah Najera, Priya Rampal). In general, rural populations tend to abandon their traditional dietary habits when other products become available and accessible (Pierrette Mubadi), and rising incomes lead to shifts toward food derived from livestock (Peter Steele, Cynthia Donovan, Jane Sherman). In addition, inadequate information on the advantages of pulses (Pierrette Mubadi) and their long preparation time (Stella Kimambo) – which is especially discouraging for working women (Kafilat Oloyede) – limits their consumption. Also, existing food cultures determine what people are ready to accept, and thus a lack of familiarity with pulses and their different types may play a role (Jane Sherman, Lawal Musibau Olajire). Furthermore, cereals have traditionally received more government support, which has promoted cereal production and, consequently, cereal-based diets.

In general, pulse cultivation is limited, and yields are low – farmers prefer to sell green pulse products, such as broad beans, at higher prices (Said Zarouali). Limited access to quality inputs like seeds keeps productivity from improving (Cynthia Donovan). In India for instance, seeds are often only available at state research institutes, which are not very accessible to smallholders (Mahesh Maske). In Malawi, pulses are mainly available at local markets, but these have often been mixed for consumption, making them unsuitable for production (Vicki Morrone).

However, pulses can be crucial in addressing a number of challenges. First, they have substantial beneficial characteristics in terms of environmental impact. The most important aspects are their potential for adapting to changing climatic conditions, and also the fact that they nourish the soil by naturally fixing nitrogen (Elizabeth Mpofu, Kafilat Oloyede, Aqleem Abbas, Said Zarouali) – also for crops to be cultivated subsequently, and in this way contributing to securing future food supply (Kafilat Oloyede). In addition, their beneficial nutritional characteristics – inter alia being a source of protein, having a low glycemic index and a low fat content – can offer a food-based solution to malnutrition and decrease the risk of non-communicable diseases (Peter Steele, Kadambot Siddique, Cynthia Donovan, Stella Kimambo).

Hence, in order to fully tap the potential of pulses, policies and strategies to enhance their production and consumption in developing as well as developed countries are needed (Kadambot Siddique). However, the current level of research funding into pulses is only US$175 million per year (Hakan Bahceci); urgent investment in research, development and extension is needed to increase production, improve the value chain, and enhance the nutritional properties and overall consumption of pulses (Kadambot Siddique).

Promoting and sustaining consumption

Until recently, the international focus has been on supply and access rather than on consumer behaviour – hence concentrating more on the field and the market (Jane Sherman). Yet, in this discussion, participants also focused on the "path to the cooking pot", and shared the following suggestions to promote pulse consumption:

- **Strengthen awareness-raising efforts on the different types of pulses and their benefits** (Said Zarouali, Lawal Musibau Olajire, Mahesh Maske, Aqleem Abbas, Elizabeth Mpofu, Lal Manavado, Priya Rampal). Pulses have to compete with alternative animal-based foods when only proteins and amino acids are considered. Yet they also have other important nutritional characteristics (Lawal Musibau Olajire). Awareness-raising efforts should particularly target children and youth in schools (Elizabeth Mpofu), and also entail educating influencers who are reaching consumers to help realize behaviour change (Patricia Siwajek). The Global Pulse Confederation has for instance published a nutrition guide for dieticians and nutritionists to highlight the weight loss benefits of pulses (Huseyin Arslan).
- **Develop new pulse-based recipes**, especially in regions where they are not a dietary staple (Karen Cichy). Most people are used to a few traditional recipes (Salvador Peña); these could be reintroduced as updated versions (Karen Cichy), but modern recipes and techniques should also be considered (Salvador Peña). These recipes should then in turn be integrated into mainstream culinary-oriented media. The objective should in particular be to introduce and promote the use of pulses in the diets of children (Aliya Bakry).
- **Invent ways to make the cooking process of pulses easier**, especially in order to increase the use of pulses among city-based consumers (Kadambot Siddique). In particular, techniques to reduce pulses' cooking time deserve attention (Stella Kimambo). Especially for developing countries, the "one-hour soak" could be an effective tool to increase pulse consumption (Michelle O. Fried).
- **Increase knowledge on healthy pulse utilization**. Research could for instance focus on cooking methods and breeding efforts to reduce the anti-nutritional aspects of pulses and enhance their nutritional benefits (Cynthia Donovan). Regarding informing consumers, knowledge on traditional cooking techniques such as soaking, germination, fermentation and pounding, which help in addressing the issue of anti-nutrients, could be promoted. In addition, information on combining pulses with other foods that enhance the nutritional value of pulses as well as the capacity of the body to absorb their nutrients should be disseminated (Stella Kimambo).
- **Invest in product innovation** (Brenda Iliana Gallegos López, Aliya Bakry, Stella Kimambo), in particular high-

quality branded products (Kadambot Siddique). Pulses could be added to current and new products, especially when taking into account taste, convenience and nutritional value (Karen Cichy). Biscuit manufacturers could for instance use pulses (Said Zarouali), and pulses could replace egg whites in confectionaries (Lawal Musibau Olajire). In addition, one could focus on specific target groups, like athletes. Most of the products athletes consume are not natural; however, limited pulse product availability has limited the possibility of pulses becoming a first option for them (Sarah Najera).

Pulse promotion initiatives

ECUADOR

A big campaign was held around the nutritious benefits of lupines, and doctors have started recommending them to women and athletes. Product innovation allowed lupines to be made available in a ready-to-eat version in all supermarkets. Currently, domestic production cannot fulfil the country's demand (Sarah Najera).

EL SALVADOR

The Agricultural Technology National Centre has produced snacks based on the different varieties of beans in the country (Brenda Iliana Gallegos López).

GUATEMALA

The USAID MASFRIJOL programme works with the Feed the Future Legume Innovation Lab to promote the consumption of common beans, emphasizing that this "heritage food" should be treasured for the nutrients it brings to soils and human health (Cynthia Donovan).

INDIA

Promoting red gram, green gram and chickpea is part of the Farming System for Nutrition study of the Leveraging Agriculture for Nutrition in South Asia programme. The aim is to realize greater dietary diversity and improve nutrient intake among smallholder families (Mahesh Maske).

Pulses' role in agriculture and their potential for sustainable intensification

With regard to production, there is a large gap between pulses' potential for meeting global sustainability challenges and the current capacity to realize this (Hakan Bahceci). In particular, the issue of climate change was mentioned: while posing a challenge, it simultaneously offers opportunities for pulses (Kadambot Siddique) inter alia because of their role in reducing carbon emissions, their relatively low water footprint, the use of inorganic fertilizer in their cultivation, and their ability to adapt to changing climatic conditions (Cynthia Donovan). In this regard, the importance of mapping the genomes of pulse varieties was emphasized, as this will allow for innovations to respond to challenges like climate change (Randy Duckworth). In addition to considering pulses as "climate-smart crops", their contribution to "climate-smart soils", increasing climate change resistance and improving ecosystems services should also be valued (Dhanya Praveen). Specifically, pulses' ability to fix nitrogen was mentioned (Aqleem Abbas, Said Zarouali, Lawal Musibau Olajire). With regard to sustainable intensification of agriculture, pulses can be grown only for nitrogen fixation and to enrich the soils during spring, in particular on wastelands. However, farmers often choose to produce cereal crops alternating with fallow land, thereby ignoring pulses (Said Zarouali).

The fact that pulses are not given significant attention is also reflected in the poor state of pulse statistics: much is unknown regarding where they are grown and which varieties are cultivated (Sieg Snapp, Dorian Kalamvrezos Navarro). What is however well known is that the varieties produced are largely non-selected and low yielding (Said Zarouali), and that they are usually grown as secondary components of cereal-dominated production systems. Consequently, they are often displaced from their optimum growing environment and receive less research attention. Knowledge on how to maximize pulse productivity does exist, but it has not sufficiently reached farmers (Kadambot Siddique); information is often scattered or presented in a format or language that is difficult to understand (Hanna Weber).

Hence, in order to increase pulse cultivation and yields, an enhanced farmer-participatory approach is needed (Kadambot Siddique). This also implies a shift from an on-station to an on-farm focus for pulse research; an important aspect in this regard is focusing on feasible solutions within the resource limitations of the farmer. Farmers should be included in the research process, also to increase the likelihood of widespread adoption of successful practices. A group of farmers and researchers could for instance be created, one that uses ICTs to facilitate data collection, analysis, interpretation and communication of outcomes back to farmers. However, this holistic approach would require a massive reorientation of current agricultural R&D regarding resource-poor agriculture, from the replication of simple, comprehensive recommendations to confronting the realities of local adaptation in diverse socio-ecological environments (Kadambot Siddique, Elizabeth Mpofu). In addition, taking a holistic approach also means integrating external factors affecting production (Kadambot Siddique). For instance, it was suggested that the support the cereal sector receives should be also provided to the pulse sector (Said Zarouali). In addition, input availability and market opportunities should be considered (Kadambot Siddique, Stella Kimambo, Lawal Musibau Olajire).

Policy initiatives in India

A few Indian states such as Tamil Nadu, Andhra Pradesh, Telangana and Chhattisgarh have included pulses in the Public Distribution System (PDS), which provides poor households with food items at subsidized prices. Yet for many states, distributing pulses through the PDS remains a challenge. These subsidies are however very important because pulse prices are very volatile primarily due to a late announcement of the Minimum Support Price, which does not incentivize an increase in their production. In addition, once imports reach the market, prices start to fall (Priya Rampal).

Strengthening pulse value chains

In thinking about how pulse value chains could be strengthened, different models of agricultural production should be taken into account; in particular, smallholder subsistence agriculture and commercial agriculture should be considered (Stella Kimambo). Participants also identified gender as a dimension to be looked at: especially with regard to smallholders, women control the production and exchange of pulses (Elizabeth Mpofu, Sieg Snapp). Hence, they are usually most interested in information about how to grow and process pulses (Sieg Snapp).

The following specific actions were suggested in order to strengthen pulse value chains:

- **Establish an effective pulse producers' network** to plan sector development and coordination, and to develop public-private partnerships. The network would also serve as an entry point for traders and investors; capacity building of members and strengthening the market development capacity of the sector as a whole are crucial (Stella Kimambo).
- **Form pulse commodity associations** (Elizabeth Mpofu).
- **Enable and stimulate the development of agribusiness services to support smallholders** to increase production and improve quality. Partnerships with agribusiness services will be essential to ensure easier access to mobile units, mechanization, hermetic cocoons, silos and threshers (Stella Kimambo).
- **Improve input distribution linked with access to finance** for farmers (Stella Kimambo).
- **Improve seed quality, availability and accessibility** by focusing on farmers' selection of appropriate varieties for local quality seed production (Mahesh Maske, Cynthia Donovan, Vicky Morrone, Elizabeth Mpofu, Lal Manavado, Stella Kimambo), providing trainings in seed production and multiplication, developing community seed banks, and holding community seed fairs (Elizabeth Mpofu). Investment and public-

private partnerships regarding the development, local production and distribution of higher-yielding varieties are especially crucial (Stella Kimambo).

- **Encourage the development and supply of tools for producing and processing legumes** (Elizabeth Mpofu), such as low-cost pulse processing machines (Mahesh Maske).
- **Develop storage warehouses and logistics**. Storage units could be connected to structured trading platforms and serve as reserve stocks for supplying large orders or as collateral with the commodity exchange (Stella Kimambo).
- **Control the role of intermediaries** to make prices more consumer- and producer-friendly (Lawal Musibau Olajire). In particular, food processors should avoid intermediaries and buy their food products directly from producers (Salvador Peña).
- **Add value to legumes** (Lawal Musibau Olajire) and collaborate with the food and nutrition sector to develop products, hold food fairs and promote pulse-based recipes (Elizabeth Mpofu).

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