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Pulses: Innovations from the field to the cooking pot

Collection of contributions received

in collaboration with

2016 INTERNATIONAL YEAR OF PULSES

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Topic note

To promote the important role of pulses, the International Year of Pulses (IYP2016) has carried out activities on a national, regional and global scale to help raise awareness on the benefits of pulses for food security, nutrition, soils and sustainable agriculture, and their contribution to climate change mitigation.

FAO has recently published a series of fact sheets providing an overview of the positive features of pulses from a global perspective, which can be accessed on the International Year of Pulses website (available at www.fao.org/pulses-2016/communications-toolkit/fact-sheets/en).

Although many benefits of pulses have been identified in different fields of research related to agriculture, health, nutrition, and environmental sciences, their full potential still remains untapped among producers and consumers.

Participants in the earlier online discussion (www.fao.org/fsnforum/activities/discussions/pulses) pointed out the decreasing consumption trends in some areas where pulses are part of traditional meals but carry a stigma of being a "poor person's food", and are then replaced by meat once people can afford it. In this context, innovation in both preparation methods (including cooking time) and in recipes and the way pulses are presented can play a role in reversing this trend.

On the production side, the earlier online discussion brought up the following issues: competition with cereals, which have traditionally received the most policy attention; low yields; low market value; lack of knowledge on the part of farmers on how to improve productivity; and limited access to quality inputs. Further, it was highlighted that often the production of pulses in developing countries is done in marginal areas and by marginalized groups.

With the conclusion of IPY2016 approaching, and building on the earlier FSN Forum discussion, we would like to invite you to look ahead and explore innovations that may help address some of the challenges still facing these important crops.

1. What can be done concretely to increase the consumption of pulses? How can we introduce them into the diets of countries where they aren't traditionally consumed, and also encourage their continued consumption in those countries where pulses are already part of the diet?

2. Cultivating pulses in multiple cropping systems enriches agrobiodiversity, increases resilience to climate change, and improves ecosystem services. Do modern varieties of legumes provide smallholder farmers with an attractive alternative to other crops? What are the roles that legumes can play in sustainable intensification of agriculture in Africa?

3. What is needed to strengthen pulse value chains, from input supply to consumption? What is the situation in your country?

4. Do you know any examples of countries mainstreaming pulses into national and regional food security policies? Do you think that a policy approach could be beneficial to increasing the role of this crop?

We also invite you to keep sharing your recipes of pulse dishes – we published a few in our summary – and to check out other recipes on the International Year of Pulses website.

The outcomes of this consultation are important for the legacy of the International Year of Pulses; they will help to gain a better understanding on how to move forward and identify possible next steps to take once IYP2016 is over.

We thank you very much for your time and look forward to your comments.

Sieg Snapp and Karen Cichy

Contributions received

1. Pierrette Mubadi, Congo

Original contribution in French

Les populations rurales ont tendance d'abandonner les habitudes traditionnelles (regime) au profit de ceux venant de l'exterieur, je pense que le manque d'information sur les avantages qu'offrent les légumineuses et le niveau d'instuction sont parmis les causes.Pour le cas de la RDC; le gouvernement doit promouvoir l'agriculture en appuiyant et en soutenant les associations,les privés...qui se lancent dans les activités agricoles on ne doit pas toujours attendre l'appui exterieur. Les légumineuses ont une place importantes dans la lutte contre la malnutrition des nos enfants car nos enfants ont besoin d' un aliment équilibré,varié et preparé dans des bonnes conditions, ils sont en période de croissance. Elles servent aussi des moyens de subsistances de nos populations rurales, losqu'on produit en grande quantité on arrive a vendre pour subvenir a d'autres besoins. Pour finir la population doit comprendre les avantages de la production des légumineuses, le gouvernement doit accompagner Les initiatives de développement durable afin de lutter contre la pauvreté dans nos pays. Merci.

English translation

Rural populations tend to abandon their traditional dietary customs in favor of those that come from elsewhere. I think that inadequate information on the advantages offered by pulses and the level of instruction are among the causes. In the case of the DRC, the government should promote agriculture by supporting and maintaining the associations, and the private sector……those that launch into agricultural activities should not always expect external support. Pulses have an important place in the fight against malnutrition in children, because our children need food that is balanced, varied and prepared in good conditions, since they are growing. Pulses also serve as a means of subsistence for our rural population, and if produced in large quantities can be sold to provide for other needs. Finally, people have to appreciate the advantages of the production of pulses. The government must support sustainable development initiatives in order to fight against poverty in our countries. Thank you.

2. Vicki Morrone, Michigan State University, United States of America

From my experience, in Malawi the availability of quality and acceptible legume varieties is a challenge. Specific varieties are often available only through the International Centers and are not very accessible to small holder farmers. The legumes available at local markets are for consumption and often mixed, making production difficult or not suitable in the given environment. Research and extension efforts should focus on farmer selection of appropiate varieties and then follow a course of action that promotes and supports farmers increasing varieties for themselves and local markets. Current regulations in Malawi do not support the Quality Declared Seed Law that has been on the "books" since 2007. The lack of access to farmer friendly laws for seed production makes it very difficult if not impossible for Small holder famers to legally engage in seed production. Collective efforts are slowly being made on regional levels but approaches by other countries that have led success need to be promoted for others to be guided to a reasonable course of action. Perhaps with facilitation by FAO seed specialists success can be increased for small holder farmers to be empowered to produce seed for local community use and not squelched due to lack of access to a feasible seed certification process.

3. Aqleem Abbas, The University of Agriculture, Peshawar, Pakistan

Pulses can be easily introduced into the diets of countries where they are not consumed. People of those countries might prefer meat to overcome protein deficiencies. We have to motivate those countries that pulses are cheaper source of protein as compared to meats. Moreover, much care is needed to consume meat, the reason might be its high perishablity. The mature seeds of pulses (grain legume crops) are cultivated for human consumption. There is no need to apply synthethic fertilizers because of their ability to fix nitrogen. They are component of nitrogen cycle. They are restorative crops, they can restore the fertility of soil. Therefore pulses have many advantages as compared to crops. They prevent the soil from erosion. They may be best experimental tools and genes can be easily transferred. The whole genetics in the begining circles around Peas. Pulses also have high amounts of protein than the cereals crops such as wheat, rice and maize, therefore there is need to raise awarness about the importance of pulses in the diet. The proteins of animals is so expensive as compared to proteins obtain from pulses. Pulses are important food component of our country. Due to urbanizations, diseases and pest attacks and severe floodings have significantly reduced the yield of pulses. The importances of pulses can be highlighted in those countries by arranging seminars, workshops and modern varieties of pulses also be supplied. Setting research laborities for the development of resistant cultivars is also an important step.

4. Aliya Bakry, Morocco

A good approach that has shown its positive impact with other foods would be the integration of pulses-based recipes in mainstream recipes media programs (radio, tv, blogs, facebook, etc.)

The promoted recipes could be based on traditional recipes from historically pulses consuming countries or made in an innovative manner between nutritionists and cuisine chefs. The objective should be to make the new recipe accepted by infants and children. Food habits start at early age and so should the introduction of healthy food preparations.

5. Cynthia Donovan, Legume Innovation Lab, Michigan State University, United States of America

I agree with Vicki Morrone that seed systems policies and implementation are a major constraint to improvements in legume productivity for smallholder farmers, and enabling more options with the seed systems, especially for local quality seed production, is important. Even with relatively modest research investments, the national systems in collaboration with US universities, CGIAR and other partners have released varieties that resist or are tolerant to many biotic and abiotic stresses.

With climate change, the diversity in legumes as well as the advances in varietal development can help reduce risks and provide alternatives, but only with the research and extension systems can partner to get the quality seeds out along with the needed education on options. The State of Food and Agriculture 2016 (http://bit.ly/2exORXO) just released today indicates the role of legumes in reducing carbon emissions, and other research shows that as a human protein sources, legumes use much less water, inorganic fertilizer and land per kilo of protein produced, although they must be eaten with complementary grains for complete proteins.

As mentioned by Pierrette Mubadi, there is a tendency to leave legumes behind as households transition to middle and higher income or shift from rural to urban. The cooking time and convenience issues are important for some, but efforts to make the humble legumes “modern” or “desirable” are needed to change the perception of legumes as the “protein of the poor” or desperation food. In Guatemala the MASFRIJOL program (http://legumelab.msu.edu/associated_projects/masfrijol) of USAID with the Feed the Future Legume

Innovation Lab is working to value consumption based on common beans as a “heritage food” to be treasured for all the nutrients they bring to soils and human health. In Ecuador, a radio campaign was created with one of the champion soccer players from the bean growing area touting how beans make him a great player. For Rwanda, bean songs are available on youtube. Do these efforts have an effect? We need the research to assess! Perception and behavior change is challenging, as we all know.

Then there is the research on infant feeding and possible positive contributions that grain legumes such as common beans and cowpeas can make towards a healthy gut. It is not just the nutrients in the beans that makes the difference in the human microbiome. With the rise of non-communicable diseases such as diabetes and heart disease in developing countries, the "healthy food" aspects grain legumes merit more attention and continued research. Cooking methods and breeding efforts to reduce the anti-nutritional aspects while enhancing the nutritional benefits are well worth the research investments.

As an economist I am only now beginning to understand all the contributions that grain legumes can make when incorporated into a diverse production system as well as diverse diet.

6. Cynthia Donovan, Legume Innovation Lab, Michigan State University, United States of America (second contribution)

Aliya Bakry**,** do you have reports where the approaches have been evaluated for effectiveness? It would be excellent to know what works in urban or rural areas.

7. Lawal Musibau Olajire, Green agriconsult and services, Nigeria

Pulses have to contend with several alternatives such as meat, eggs, and other aniimal sources when importance is narrowed down to being sources of protein and amino acid. Of couse this could only be "true" should it not posses alter nutritional attributes. Moreover, experience in West Africa especially Nigeria, my country is different where some are given more preference than others. Only cowpea is is more recognized domestically than others, Soybean, probably for industrial use while consumers have no awareness about others. To enhance consumption, awareness must be created about others as so was the case of soybean by IITA, Nigeria since 1980s. This have to be followed by value-addition and possibly replacing some wih egg albumin in confectionaries and the likes.

In places where not consumed, create awareness through orientation projects, empower farmers with inputs to encourage production and launch campaign. For those already having it diet, research into breeding for high yield, pest and disease resistance are "key" as well as empowering farmers.

In view of comparison with others in respect of cropping systems, there may be differences in opinion. If soil fertility improvement is the focus, pulses are better for nitrogen fixation, errosion management etc. This may not be so when considering monetary returns comparatively with some common vegetables. However, there must be one comparative advantage or the other on both sides.

I recently personally commenced cropping systems that comprise soybean and three common Nigerian vegetables in intercrop with plantain in this regard.

To strenghten the value-chain, rolles of middlemen has to be checkmated to make price more consumer-friendly in some cases as it is in Nigeria where by virtue of high consumption rates of cowpea, price in recent time have doubled within three months (June -Sept.) owing to economic recession and other socio-economic reasons.

I witnessed the national advocacy for soybean when first introduced to Nigeria. People learned to prepare soymilk, soup, Iru (Local season) and the rest. It latter advanced to use in complementary

foods etc. but I currently have no idea of any country doing such nowadays even Nigeria. This is not too good for global benefits.

8. Mahesh Maske, M S Swaminathan Research Foundation, India

Putting pulses into the farming system for household food and nutrition security

In spite of impressive growth of Indian agriculture, ensuring household food and nutrition security is still a challenge due to imbalanced growth in agriculture. Food and nutrition security is said to be achieved when adequate and nutritious food is available and accessible to all individuals at all times to live a healthy and active life.

Though production of pulses has increased in India in recent decades it has not kept pace with the increase in population. Given that Pulses are a major source of protein in Indian diet and are climate resilient crops suited to rainfed farming conditions, increase in pulse production can be a remedy for addressing undernutrition.

Half of the pregnant women in India are anemic while in the case of children under the age of five years, 74 percent are reported to be anemic and 43 percent underweight (World Bank, 2012). Promotion of Pulses (Red gram Green gram and Chickpea) form an important of the core crop interventions under an ongoing Farming System for Nutrition (FSN) study in Wardha district of Maharashtra, India as part of a research programme on Leveraging Agriculture for Nutrition in South Asia (LANSA). The focus of the intervention is to bring about change consumption pattern of food items over time in smallholder farm families leading to greater dietary diversity and improved nutrient intake in terms of energy, protein and fat; from my experience, the availability of quality seeds of acceptable pulse varieties is a challenge in the region. Specific varieties are often available only through the state governments research institutes and are not very accessible to small holder farmers. Research and extension department's efforts should focus on farmer selection of appropriate varieties and their promotion to increase cultivation and consumption.

Also, considering the fact that there is widespread malnutrition in India, especially among children and women, there is need to increase production and availability of pulses by adopting various innovative measures like institutional and policy support, development and wider adoption of High Yielding Varieties (HYV) and low cost technologies, proper extension services for processing and marketing of pulses. In my view, a major innovation that can facilitate movement of pulses from the field to the cooking pot will be introduction of low cost pulse processing machines in villages and greater nutrition awareness on the benefits of consuming pulses. Also including pulses in social protection programmes like the Mid-Day Meal (MDM) and the PDS will help promote their consumption for better nutrition.

9. Hanna Weber, FAO, Italy

Lots of work has been done to document the role of pulses, their nutritional benefits, improved varieties, traditional diets and farming practices, innovative cropping systems e.g. the doubled up legume technology Sieglinde Snapp introduced in the webinar on pulses last week. However, the impact sometimes remains limited as information is often scattered, presented in a format or language difficult to understand for non-technical people, or simply because the information does not reach those who could most benefit from it.

FAO's online platform "TECA" (Technologies and Practices for Small Agricultural Producers) addresses this issue by providing practical information about innovative and traditional practices to small holder famers. The TECA team has a long-standing history in assisting partners with the documentation of

these practices in a format and language that facilitates their adoption in the field, and guarantees long-term access to these practices through a maintained central repository. At the same time, it is a way of acknowledging and disseminating traditional practices. Technologies available on TECA have all been tested by farmers and have proven to bring positive results and address the challenges faced by farmers today.

For instance, based on the experiences of small holder farmers in Uganda, specifically Mukono (Central region), Kapchorwa (Eastern region) and Masindi (Western region) and in cooperation with Grameen Foundation, the TECA has documented a farmer practice on using Eucalyptus leaves for bean storage (http://teca.fao.org/read/7639). Eucalyptus leaves can be used to store seeds of maize and beans for a longer term, for instance in case seeds are to be stored for the next planting season, because due to the aroma they are less attacked by storage pests. It is a simple, cost effective and safe method of keeping away common storage pests, e.g. weevils, in order to improve storing activities and thus reduce post-harvest losses.

More technologies and practices related to the use of pulses and legumes in agriculture and nutrition that can help rural households to strengthen their livelihoods can be found on TECA:

Intercropping: http://teca.fao.org/technology/green-manuring-sugarcane-production-soil-improvement-and-water-efficiency-tamil-nadu

Crop rotation & water use efficiency: http://teca.fao.org/technology/using-residual-soil-moisture-after-monsoon-rice-crop-mung-bean-production-drought-prone

Post-harvesting/Labour-saving: http://teca.fao.org/technology/labour-saving-technologies-and-practices-manual-and-motorised-cleaning-grains-and-pulses

Seed priming: http://teca.fao.org/technology/participatory-varietal-selection-improved-chickpea-yield

We invite all organizations that generate knowledge or work with farmers to contact the TECA team to share and promote proven practices! The more “good farmer’s practices” reach farmers in need of improved practices and knowledge around the globe, the more they will contribute to improving farmer’s livelihoods and positively influence their production, income and health.

10. Sieg Snapp, co-facilitator of the discussion, Michigan State University, United States of America

Dear all,

Thank you very much for the comments shared so far and thank you also to all of those who participated in last week’s webinar.

I would like to take this opportunity to tackle some of the questions that were left unanswered.

On the question posed by Holly Tripp regarding the gender implications along the pulses value chain, I think that this touches on many different dimensions. Women are often responsible for growing legume crops. Sometimes if a pulse becomes a cash crop men become more involved, but generally, pulses are planted and tended by women, and processed and stored by women. Therefore, women are usually most interested in information about how to grow pulses, and how to process them.

Unfortunately, on the questions by Jaime Pizarro and Tim Gill on where farmers could best acquire seeds for growing pulses and on who is doing research on pest-resistance, I have no exact answers. Maybe someone in the audience knows more on this and would like to share it with the rest of us? For the time being I’d like to share with you the link to a very good pest management technology resource for cowpea, http://www.iita.org/tamo-manuel

I look forward to your ideas on how to make pulses more appealing to the consumer and the producers.

Best regards

Sieg

11. Elizabeth Mpofu, Zimbabwe Smallholder Organic Farmers Forum (ZIMSOFF), Zimbabwe

Roles that can be played by Pulses

Legume crops, which are also called pulses, nourish the land, the people, self-reliance and the economy. They enrich the soil and protect it from erosion and are often intercropped with small grains. Some of them are well-adapted to harsh conditions associated with climate change and variability. Pulses have high nutritional value for consumers and for their livestock and they can be sold at relatively good prices. The productivity of pulses is generally lower than that of maize, especially maize in high potential areas but their nutrition density is superior. In addition, small scale farmers, especially women, control the production and exchange of the seed of most pulses, making them an asset in the struggle for seed and food

Strategies for mainstreaming pulses into production systems and diets for agroecological farmers who (already) include legumes in their farming systems:

1. Mobilise other non-practising farmers to shift towards legume-rich farming systems and let them know the associated range of benefits;
2. Increase the volumes, quality, accessibility and availability of quality legume seed, through getting training seed production and multiplication, working with public gene banks to access seeds not longer available in-situ, developing community seed banks and holding community seed fairs;
3. Form commodity associations that are based on pulses;
4. Run awareness campaigns (in partnership with supportive CSOs) targeting multiple actors, especially consumers, children and youth in schools and colleges to change their attitudes towards consuming traditional food and pulses;
5. Add value to legumes and work with the food and nutrition sector to develop, hold food fairs and promote recipes based on pulses and traditional crops;
6. Lobby government and NGOs to include pulses in their input support programmes;
7. Influence governments to give legumes more prominence and support in its policies and programmes.
8. Put women farmers at the forefront and centre of the struggles for the shift because they grow most of the seed, the pulses, and prepare most of the food consumed;
9. Persuade research and extension services to include agroecological agriculture in the research and training work and work with farmers to better understand and integrate legumes into farming systems under different social-ecological conditions; and
10. Urge technology developers to produce and supply efficient and affordable tools for the production and processing of legumes and small grains that they are often intercropped with.

The reality is that cowpease is considered as originated in West Africa where 70% is from Nigeria and Niger.There are top five producers of pulses in Africa which include Ethiopia,Nigeria, Niger, Tanzania and Kenya but I am not certsin if there are policies supporting these legumes.In Zimbabwe there is a program called The Zimbabee Agenda for Dustainable Socio-Economic Transformation which we hope

can be a provision to support and promote these pulses to the extent of coming up with a policy.So these are areas which need to be worked on

Regards
Elizabeth

12. Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India

Respected FAO FSN Forum Members

Greetings

Please findout my contribution below.

Regards

Bibhu

CONCEPT OF DIABETES FOOD AND DOCTOR'S FOOD FOR MINIMIZING DISEASE AND MALNUTRITION

By Bibhu Santosh, PhD, OUAT, Bhubaneswar

Pulses and Millets are only the Energy foods for both human and animal.Millets may provide the nutrition to diabetes patients. We should take balance food by taking Pulses, Millets, Cereal crops, vegetable crops, and Horticultural edible crops. If we together consume this food then it may give all supplements to our body and help us from diseases. For Doctor's Tonic all hygienic and nutritive food likes Fruits, Vegetables, Non-veg items and Raw edible foods. So recycle, reuse and replicate the food by preserving and conserving the food for the future. Prepare the food with proper recipe. For eradicating Hunger and malnutrition Diabetes food is the best Way and Rural food Hub and Urban Food hub.

So this concept may be the best for India and world.

Regards

Bibhu Santosh,Independent People's Scientist,India

13. Manuel Moya, International Pediatric Association, TAG on Nutrition, Spain

Good nutrition is not evenly adequate in the world because malnutrition is increasing at the expense of overweight and obesity and although its other component undernutrition is receding it is a quanti and qualitatively reality still too important in Low- and Middle-Income Countries (LMIC). The absolute figures and trends are a matter of concern at individual, national and international level.

Another relevant aspect is the specific prevalence of undernutrition in children under five years, a period of special health relevance according to the WHO Global Health Observatory in which infections are a real threat with a higher mortality rate especially in LMIC. The good news is that this pediatric health problem is receding all over the world: In 1960 there were 300 million that in 2015 had gone down to 113 million (-33%), but the problem is still important especially in South Asia with 28.7 million and Sub-Saharan Africa (> 50 countries) with 51.3 million (1) These worrying figures will continue because the world population by 2050 will be of 9.1 billion, whereas the developed countries will increase by 6%, South Asia will do by 48% and Sub-Saharan Africa by 130%. Consequently malnutrition as the present double burden that is the coexistence of underweight and overweight will go on according to the United Nations Population Division (2).

Essential amino acids (not synthesized by humans) are not completely present in plants or crops that are important, if not the only food available for people living in certain wide areas such as Sub-Saharan Africa or South-Central Asia. Basic genetic and genetic engineering technologies initiated in the middle of the past century have evolved at a fast rate allowing the improvement of this lacking problem. This can be the solution at mid or long term but in the meantime mixes of plant foods adapted to local climate arid conditions can be a feasible solution.

Chickpea seeds (3) or flours (4, 5) are a reasonable food resource but their low content in the essential amino acid tryptophan (Table) is a nutritional risk especially for weaned infants and underfives (6). On the other hand sorghum flour a cereal with similar nutritional capacities, has also the very low content of another essential amino acid (lysine) with well stablished consequences in neurodevelopment and growth (7.8). The mixture of both flours (~20/80 %) will provide a complete protein, the fact of small losses (9) of essential amino acids as consequence of food processing (even by microwaves) is an added advantage. Because of the pragmatic idea of this Forum digest the possibility of having both flours or preferably crops, both being resilient to dry conditions, in these vast rural areas of LMIC could help to improve nutrition in general and especially in this crucial age which affects the rest of life.

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14. Sarah Najera, FAO, Italy

It is clear a lot of work has been done around pulses. However, I consider most of it stays within the same community. In my case, I was able to participate in the international lupine conference last year

in Milan, where all the work related to this field was exposed. Contributions and research has been done, but all the new contributions were not shared with the general public.

I consider pulses should be used in specific target groups. For example, some innovations should be looked within athletes. Most of the products athletes consume are not natural and in most cases the end product consumed is not natural based. They are people in need of food sources like pulses, but the lack of education or products reduces the chance for pulses to become their first option in diets.

In a very specific case, lupines (considered as "the food of the poor" just like most pulses), have a very interesting story case in Ecuador. For years this legume was consumed in rural areas, but people within cities would never consider this as an option of food source. Thanks to governmental efforts to promote the nutritional benefits and due to product innovation, the country has reached the level were local production cannot fulfil the countries demand. How did they manage to do this? A big campaign around how nutritious they are, mainly as a snack for kids; doctors started recommending them to women and athletes for its protein and calcium content; and product innovation were chochos (lupines) are presented on a ready-to-eat version in all supermarkets.

I consider pulses need to modernize. The global trend has changed and most people will not take their time to cook them in a traditional way. Finally, global communication with social media will help a lot with this task. Social media together with gastronomical innovation can help pulses become 'the next quinoa'.

15. Brenda Iliana Gallegos López, Universidad de El Salvador, El Salvador

Original contribution in Spanish

Buenas tardes amigos del Foro:

Considero que una de las determinantes del consumo de legumbres, es la cultura alimentaria que cada país tenga con respecto al consumo de ellas, digo esto porque En El Salvador ocurre, que los frijoles rojos de "seda" son parte fundamental de la dieta diaria. Se consumen tanto en el desayuno como en la cena y en áreas rurales es lo que se consume en los tres tiempos. También tiene que ver las formas de preparación y esto va de la mano con el sabor y gusto de las personas.

Para el caso nuestro, los frijoles constituye un alimento esencial de la dieta diaria, nutricionalmente hablando la fuente te de proteina vegetal, dadas las condiciones económicas que no permiten acceso a las carnes o pescado.

Existen iniciativas que pueden popularizar su consumo, como la transformación en otras opciones, por ejemplo el Centro Nacional de Tecnologia Agropecuaria ha elaborado snacks a base de las distintas variedades de frijoles que existen en el país. Esa alternativa podria aumentar el consumo de legumbres en aquellos paises donde no sea parte de la cultura alimentaria.

Atentamente,

English translation

Dear Forum members,

I believe that the food culture of each country is one of the drivers of pulses consumption. In El Salvador, red “silk” beans are an essential element of the daily diet. They are eaten at breakfast and dinner, and also at lunch time in rural areas. The consumption of pulses is also influenced by the preparation methods and this is related to the recipe flavours and the individual tastes.

In our country, beans are a staple food. They are a source of vegetable protein, especially important in nutritional terms, as the economic conditions restrict the access to meat and fish.

Several initiatives, like the transformation into other culinary options, can make the consumption of pulses popular. For example, the Agricultural Technology National Centre has produced snacks based on the different varieties of beans in the country. This alternative could increase the consumption of pulses in those countries where they are not part of the food culture.

Kind regards,

16. Said Zarouali, Haut Commissariat au Plan, Morocco

Original contribution in French

L'avenir des légumineuses doit être revu parce que les régimes alimentaires de nos jours n'encouragent pas beaucoup la consommation des légumlineuses. Et en outre les légumineuses sont toujours traités comme repas des pauvres.

A suivre sur l'article ci joint. Merci.

Importances des légumineuses dans l'Afrique du nord

La consommation des légumineuses en Afrique du nord les reste toujours très limiter notamment pour les lentilles. Les résultats des enquêtes de consommation et des dépenses des ménages le montre. Cette situation est due essentiellement aux habitudes alimentaires basée sur les céréales.

En effets les gouvernements interviennent dans les marchés des céréales à travers la fixation des prix d'une certaines quantités de la farine du blé tendre soit pour protéger les producteurs nationaux (droits à l'importation).

En outre, la consommation des légumineuses, notamment les lentilles, constitue le principale repas pour les couches sociales pauvres. Cependant, pour les couches sociales riches, les légumineuses sont introduites dans les « repas d'entrée ».

Il faut dire que la culture des légumineuses reste encore limiter et sa part dans les assolements est très faible avec des rendements très faibles. En outre les agriculteurs préfèrent de vendre les produits légumineuses verts avec des prix élevé c'est le cas des petits pois et la fève qui sont plus couteuses.

L'exemple du Maroc en 2016 est très important. Sous l'effet de la sécheresse, les superficies cultivées par les légumineuses sont très limitée avec des rendements assez faible ce qui a engendré une faible production et par conséquence les prix des lentilles ont multiplié par deux à trois fois durant une période de 3 à 4 mois. Dernièrement, le gouvernement a décidé de suspendre les droits à l'importation des lentilles jusqu'à le mois du Juin 2017.

Pour l'avenir, il est important de revoir les habitudes alimentaires des populations avec les changements démographiques que connue la région en agissant sur la sensibilisation des populations, à travers les nutritionnistes, la recherches, les fabricants des biscuits pour qu'ils introduisent les légumineuses dans leurs produits à travers l'innovation de nouveaux produits spécifiques en particuliers pour les enfants les plus âgés.

1. Que peut-on faire concrètement pour accroître la consommation de légumineuses ?

- Il faut suspendre les subventions pour les farines à base du blé, ou au moins avoir les mêmes aides pour ceux qui font les légumineuses à la production et à la consommation;

Comment pouvons-nous les introduire dans les régimes alimentaires de pays où elles ne font pas partie des aliments traditionnels, et encourager leur consommation constante dans les pays où elles font déjà partie du régime alimentaire ?

- Il est introduit dans les habitudes alimentaires chez les enfants et les plus âgés à travers les régimes spécifiques ;

2. La culture de légumineuses dans le cadre de systèmes de cultures multiples permet d'enrichir l'agro biodiversité, d'accroître la résilience aux changements climatiques et d'améliorer les services éco systémiques. Les variétés modernes de légumineuses assurent-elles aux petits exploitants agricoles une alternative intéressante à d'autres cultures

3. Les légumineuses jouent un rôle important dans la fixation de l'azote dans les sols. Les variétés cultivées, dans sa grande partie, sont des variétés non sélectionnées et avec des rendements assez faibles et les agriculteurs choisissent de faire les céréales 2 à 3 fois alterné avec la jachère et même quelque fois ils ignorent totalement les légumineuses.

Quels rôles peuvent jouer les légumineuses en faveur d'une intensification durable de l'agriculture en Afrique ?

- Il y a une possibilité de faire les légumineuses juste pour la fixer l'azote et enrichir les sols pendants les périodes du printemps en particulier la fiche. Dans ce sens des aides peuvent avoir des effets positifs pour l'adhésion des agriculteurs.
- « Quelles mesures faut-il adopter pour renforcer les chaînes de valeur des légumineuses, à partir de l'offre d'intrants jusqu'à la consommation ? Quelle est la situation dans notre pays ?

Les produits des légumineuses sont moins valorisés. En général les produits sont vendus dans les marchés locaux sans aucune introduction de toute nature.

Nous vous invitons également nous faire connaître vos recettes de légumineuses (nous en avons publié quelques-unes dans notre synthèse) et de vous informer d'autres recettes sur le site Web de l'année internationale des légumineuses :

Une soupe à base de la farine des lentilles (spécifique pour les enfants et les plus âgés :

Les gradients : farine des lentilles (lentilles sont écrasées avant d'avoir grillé sans enlever les couches extérieures des graines) + eau + sel + gonion.

Comment : mélanger tous dans une marmite mette sur le feu pendant une durée de 20 mn. Les épicés sont facultatifs.

Servez vous ? Mettre dans des boules avec des morceaux du pain.

Attachment:

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Importances%20des%20l%C3%A9gumineuses.doc

English translation

The future of pulses must be re-examined because today´s food diets do not greatly promote the consumption of pulses. Moreover, pulses are always treated as the food of the poor.

To be followed up in the attached article. Thank you.

The importance of pulses in North Africa

The consumption of pulses in North Africa continues to be limited, in particular for lentils. The results of research into consumption and expenditures of households show this. This situation is essentially due to feeding habits being based on cereals.

Indeed, governments intervene in the cereal markets by fixing prices of certain quantities of common wheat flour, this being in order to protect national producers (import duties).

In addition to this, the consumption of pulses, in particular lentils, represents the main meal for the poor social classes. However, for the wealthier classes, pulses are used as an appetizer.

It must be said that cultivating pulses is still limited and, its part in crop rotation is very weak, with very low yields. Additionally, farmers prefer to sell green pulses products at higher prices, as in the case of green peas and broad beans which are more expensive.

The example of Morocco in 2016 is very important. As a result of the drought, the cultivated areas for pulses are very limited with very low yields, which has led to low production and therefore the prices for lentils have multiplied two or three times during a period of 3 to 4 months. Recently, the government has decided to suspend duties on importing lentils until June 2017.

For the future, it is important to revise the population's feeding habits with the demographic changes seen in the region, by taking action on population awareness, through nutritionists, researches, and biscuit manufacturers so that they introduce pulses into their products, through the incorporation of new specific products, in particular for older children.

1. What can be done concretely to increase the consumption of pulses?

- It is necessary to cancel the subsidies for wheat flour, or at least have the same help for those who work with pulses in production and consumption;

How can we introduce them into the diets of countries where they aren't traditionally consumed, and also encourage their continued consumption in those countries where pulses are already part of the diet?

- They are introduced into the eating habits of children and elderly people through specific diets;

2. Cultivating pulses in multiple cropping systems enriches agrobiodiversity, increases resilience to climate change, and improves ecosystem services. Do modern varieties of legumes provide smallholder farmers with an attractive alternative to other crops?

3. Pulses play an important role in nitrogen fixation in soils. The varieties produced, to a large extent, are non-selected and low yielding varieties, and the farmers choose to produce 2 to 3 cereals crops alternating with fallow land and sometimes they totally ignore pulses.

What are the roles that legumes can play in sustainable intensification of agriculture in Africa?

- It is possible to grow pulses only for nitrogen fixation and to enrich the soils during the spring periods, in particular the wasteland. In this sense, the help provided can have positive effects on farmers´ participation.
- What is needed to strengthen pulse value chains, from input supply to consumption? What is the situation in our country?

Pulses products are undervalued. In general, the products are sold in local markets without any kind of introduction.

We also invite you to keep sharing your recipes of pulse dishes – we published a few in our summary – and to check out other recipes on the International Year of Pulses website.

A soup based on lentil flour (specifically for children and older people)

The ingredients: lentil flour (the lentils are crushed before being roasted, without taking off the grain's external skin) + water + salt + onion

Method: mix all the ingredients in a saucepan, and heat for 20 minutes. Spices are optional.

How to help yourself? Form into balls with pieces of bread.

17. Professor Kadambot Siddique, UN FAO Special Ambassador for the International Year of Pulses 2016, Australia

Pulses offer a food-based solution to decreasing risk of certain diseases such as pre-diabetes and diabetes management as well as diabetes-associated complications, especially cardiovascular disease. Since diabetes is a major risk factor for several cancers and neurodegeneration, the future health of ageing populations may be dependent on a food system that provides pulses in an affordable, palatable and sustainable way. Most benefits from pulses are achieved at an intake of about 30 g per day, but lesser amounts are also beneficial.

Global demand for pulses is increasing. Around 70 million tonnes of pulses were consumed in 2011-13 period compared to 42 million tonnes in 1980-81. In developing countries more than 80% of the pulses are consumed as food; however in developed countries <40% as food. However per capita consumption of pulses declined from 10 kg in 1961 to 6.5 kg in 2011. Easy to cook high quality branded pulse products are required to promote and increase the consumption of pulses especially among city based consumers.

Nutritional and health befits can be promoted to address malnutrition and several non-communicable diseases. Government and nutrition experts must develop policies and strategies to enhance the consumption of pulses both in developing and developed countries. Urgent investment in research, development and extension is required to enhance pulse production, improving value chain, enhancing nutritional properties and overall consumption of pulses.

18. Lal Manavado, University of Oslo, Norway

My purpose here is to outline a framework of action to increase the production and consumption of pulses. It leaves lacunae, into which one can fit specific actions suitable with respect to an area's geography, climate and the food culture as well as the other area specific requirements. The high dietary value of pulses and its role in several food cultures are too well-known to be described.

Let me first look at some policy measures that could facilitate the achievement of our two-fold objective. I envisage here a raft of policies acting in harmony towards the same goal. But, before we undertake any suitable policy formulation and implementation, it is crucial to device an appropriate strategy to ensure that there will be little or no intra- or inter-policy disharmony among them.

Without this, our failure is certain, even if everything else needed for success is there. I believe we need to invite the ministers and their departmental heads of a country to agree at least not to make policies that will hinder us from achieving our objective, viz., increased production and consumption of pulses. Once we can be certain of this, and the information required for ascertaining the land area available to cultivation of pulses, species best suited for local conditions and food culture, and human and other material resources needed, one may consider the following policy options:

Agriculture policy:

1. Appropriate institutional or on-the-job training on the cultivation of suitable pulses. It is important that modernization should not be capital-intensive as our purpose is not to increase the unemployment rate among the farming population.
2. Mechanism to establish and expand sound agriculture extension services.
3. Making seed of suitable species available to growers at affordable prices.
4. Support growers of pulses to establish local cooperatives to carry out basic processing of their crops like husking etc., and selling it as a fair price.

Trade Policy:

1. Restrictions on import/manufacture and sale of industrial food injurious to health and threatens the local food culture.
2. Financial and/or other incentives to cafes and restaurants that serve certain minimal quantity of pulses-based food.

Education policy:

1. Incorporation of compulsory health education into school curricula, where sound dietary habits could be taught. Consumption of pulses could be included here where it is appropriate.
2. Practical examples of sound dietary habits may be taught at school as was demonstrated by EU programmed, "We Love Eating."
3. General public education on the merits of pulses accompanied by free recipes and food exhibitions. This educational effort may be a coordinated action by agriculture, health, trade and education ministries.
4. School cafeterias and canteens ought to serve more pulse-based dishes.

Health policy:

1. Medical profession and other relevant health personnel ought to be required to advise patients and public on the merit of local pulse dishes whenever dietary issues are discussed.
2. Greater use of tasty pulse dishes served at meal times in state run hospitals.

Legal policy:

1. Development of a benign tax law applicable to growers of pulses and caterers who base certain percentage of their food on pulses. Further, laws to prohibit imports deleterious to cultivation and use of pulses. The first suggestion here may be only of theoretical value in areas where tax collection remains an abstract notion.

Financial policy:

1. No interest loans to those who wish to begin or extend growing of pulses, or pulse based catering.

Of course, this list is not exhaustive, but I think it provides a very clear holistic approach to our problem, which is flexible enough to accommodate actual conditions of a country or a region. What is important is not the comprehensiveness the policies considered, but selecting the most important ones and to strive for harmony within and among them.

Once we have come this far, we will have to design a suitable strategy to implement our policy. To facilitate the ease of its implementation, let us do it in two logically linked steps.

The first step:

Here, we will ascertain the following:

1. Best deployment of the available instructors/field trainers/ and agro-supplies to the growers.
2. Best areas where catering outlets may profitably expand their use of pulses.

3. Best practical methods of incorporating pulses in hospital diets, civil service and school cafeterias.
4. Types of most effective publicity campaigns which may include exhibitions, recipe competitions, etc.
5. Best way of targeting concrete incentives like tax rebates, zero interest financing, etc.
6. Agricultural research to improve pulses without gene modification and does not require capital-intensive methods to increase their yield.
7. What concrete support ought to be given to pulse growers to enable them to establish cooperatives to process and sell their produce to retailers, caterers and even end-users at a fair price.
8. What basic improvements in infra-structure would have the most significant effect on pulse production?

Once again, the above list is not exhaustive. One may add the strategic considerations pertinent to one's area into it, or remove what is superfluous from it.

Once this step is undertaken, we can move on to the next stage of policy implementation, viz., doing it on the field. Here, not all the people needed to carry out the 8 steps above are required to participate in the actual growing of the crops. Their purpose is to publicize the benefits available to pulse growers, provide the relevant technical support, and serve as a source of seed, agricultural information, equipment, finances, etc.

Perhaps, it might repay enrolling farmers willing to expand their cultivation of pulses, wish to go over to their cultivation and youth who want to do so into suitable on-the-job training courses where they may be paid a modest allowance and taught exactly how to do it.

On successful completion of such training, the landless trainees may be granted a secure tenure on an adequate plot of land so that they might start as pulse growers. However, this requires careful supervision and a long follow-up with a built-in social security

Although this is somewhat less structured than one might wish, I hope it would be of some use.

Best wishes!

Lal Manavado.

19. Sieg Snapp, co-facilitator of the discussion

It is very encouraging reading the detailed commentary and action plans outlined here for promoting pulses. From Zimbabwe, Australia and Norway there is clearly tremendous commitment to how we can support greater investment in agricultural education and policies that support growing pulses, and in nutrition education to enhance the demand for pulses. I am interested in any experiences from members of this forum in terms of working with ministries of education, or ministries of nutrition and health, as novel means to support awareness of pulses, nutritional benefits and understanding of the wide range of environmental services that pulses provided.

As an agriculturists I am very interested to see ideas about expanding the range of pulse varieties so that farmers and consumers have more options. I have worked with some plant breeders who have been committed to releasing many different types of varieties that meet both local and market preferences for taste and other seed traits. This has been been my experience based in work with bean breeders, I have seen much less investment by public research institutions in other pulse breeders,

such as pigeonpea breeding as only a few varieties have been released for African smallholder farmers. Beside bean breeding, which has included participatory approaches, molecular tools and long-term, sustained efforts on seed systems, is there other examples of pulse breeding efforts and agronomy that has expanded pulse production options, and supported widespread adoption? I would really like to see such examples highlighted.

Another area that requires more attention is agricultural statistics which are rather poor for pulses, including aggregated combinations of different bean species and inaccurate reflection of what is grown on the ground in many countries. How might we support greater attention to documenting legume species and varieties, and consumption, so that we know that agricultural statistics accurately reflect what pulses are grown, and where.

I am interested to hear of others experiences with legume statistics or documentation of impact from adoption of growing or eating more pulses.

20. Karen Cichy, co-facilitator of the discussion, USDA-ARS, United States of America

Thank you everyone for great discussion and insightful comments. I would like to follow up on some of the issues raised in regards to pulse consumption levels. Since pulses are rich in nutrients and an eco-friendly source of dietary protein, we would expect them to be utilized to a greater extent. I agree with the point made by Sarah Najera that pulses need to modernize in order for consumers to adopt them, especially in regions where they are not a dietary staple. I would like to hear thoughts from others on how to approach this. In some cases updating the packaging and highlighting the nutrition label may go a long way. Adding pulses to new products also has the potential to increase consumption, especially if care is taken in regards to taste, convenience, and nutritional value of the products. Also, what about creating excitement around traditional recipes by reintroducing them in an updated way? I also would like to ask people's opinions on what approaches should be used to increase consumption in places where pulses are a dietary staple but people are moving away from them for various reasons.

21. Dorian Kalamvrezos Navarro, FAO, Italy

Dear Sieg,

You raise a very important point, one which FAO has been focusing on since the beginning of the year. The International Year of Pulses has indeed brought to light some shortcomings of global statistics on pulses. We are now in the final stages of preparing a *Global Pulses Economy* report, and this issue is a recurrent theme in the publication. Legumes experts in FAO`s Plant Production and Protection Division and experts in the Statistics Division have also been working together continuously to improve the classifications of pulses since the beginning of the year, whereas a tremendous effort is also being made to improve the accuracy and timeliness of the data, which however also depend to a large extent on the quality of data supplied to FAO by countries themselves. Bear in mind that the data received from countries are annually solicited through our production questionnaire where in addition to production quantity data, and areas harvested, we also ask information on 'availability' for consumption (the commodity codes in our production questionnaires are CPC based, whereas the detailed trade data are HS based). Most gaps in our time-series are due to the limited provision of data from member countries, where, in any case, we attempt to fill the gaps in with expert estimations. FAO has just launched a new and improved version of the FAOSTAT Web Site, which is the primary

instrument for the dissemination of global agricultural statistics, and we expect that improvements to the data on pulses to henceforth be incorporated on a more regular basis.

Dorian

22. Patricia Siwajek, Nestlé, Switzerland

Here is a best in class example for increasing consumption of pulses. It is based on educating influencers who are reaching consumers to help change their dietary behavior.

In October, the Food and Nutrition Conference and Expo (FNCE), in Boston USA, was attended by over 10K nutrition professionals. It featured a successful representation of Pulses through a robust communication platform. This conference provided the knowledge and clarity to the term 'pulses' and defined their role in a healthy diet through exhibits, scientific sessions and culinary demonstrations. This influential group of registered dietitians , will now be able to make specific dietary recommendations, including pulses for healthier eating.

Now they have the most updated science on pulses as a protein source, how to be creative in preparing tasty menus through culinary arts and the facts of the many nutrition benefits, we can expect to see pulses in social media and consumer targeted publications.

Registered dietitians are educating other proefessionals who are inlfuencing consumers. Let's do more of these events to make sure pulses is a common household food.

23. Michelle O. Fried, Slow Food, sustainable cookbook writer, public health nutritionist, Ecuador

Rather than the customary overnight soak, a one hour soak is an effective tool to increase the consumption of pulses in countries south of the equator. Perhaps in northern countries such a technique is not effective, but in countries where the majority of the population cooks from scratch what they eat and easily spends over an hour in cooking the main meal, diminishing the soaking time and thus the necessity to remember to put the pulses on to soak the night before, presents a viable option to the cook. In my work in WFP in school feeding programs, once the community members learned to soak pulses for one hour in water in which they had boiled for merely two minutes, pulse consumption increased significantly.

USAID´s and US universities are justified in their reservation to promote pulse consumption through the one hour soak technique WHEN THINKING OF THE US POPULATION. However, when considering the world´s population who can benefit through increased pulse consumption, the one hour soak technique can be a very effective tool. It requires no additional research time. All that is necessary are communication campaigns.

24. Ebrahim Eldeeb, Egypt

Dear colleagues. First of all I am glad to welcome all participants of this discussion.
My name is Ebrahim Eldeeb and I'm Nutritional Research Specialist from Egypt.

I started working on the choice of more than ten food rich in essential nutrients of carbohydrates and proteins and fats, and even fiber.

I found that one of the most useful is "lentils"

One serving of lentils contains 18 grams of protein, 0.1 g fat, 40 g carbohydrates, 16 grams of fiber, as it contains both types of fiber, soluble and insoluble, also it cholesterol and is also low in salt, and at the same time it does not contain saturated fat.

Lentils is a good source of iron, manganese, potassium, phosphorus, copper, zinc, calcium and selenium. And lentils contain vitamin A, thiamine, riboflavin, vitamin B6, vitamin B12, choline, niacin, vitamin C, vitamin K, and vitamin E.

The benefits of lentils :

1. The fiber helps to lower cholesterol levels and maintaining the stability of blood sugar and prevent constipation.

2. A good source of potassium is important for heart health, which also reduces the risk of coronary heart disease and prostate cancer.

3. A cup of lentils contains 38 mg of calcium, which supports healthy bones and teeth.

The price of a kilogram of lentils in the local market = two dollar.
Kilogram suffice for a meal for a family of 5 members for two days as lunch.
So we can say that "a family of 5 members for two days will not cost more than 2$".

I also suggest to add tomatoes, carrots, potatoes, garlic and breadcrumbs in small quantities in order to become a very high nutritional value as well as taste delicious.

Finally, I wish my contribution may be effective and efficient.

25. Priya Rampal, MS Swaminathan Research Foundation, India

Throughout the world, production trends give an indication of what comprises the consumption basket of a country. India produces about 19 million tonnes of pulses and has to import around 4 million tonnes to meet the demand deficit in 2014. Yet, we just about met the daily requirement of 40 grams per day starting 2011.

A few states in India such as Tamil Nadu, Andhra Pradesh, Telangana and Chhattisgarh provide pulses in the Public Distribution System (PDS) to promote a balanced food consumption basket. However, for a majority of states, pulse distribution through the PDS still remain s a challenge. In the PDS, the poor households are provided essential food items at subsidised prices. This is important because pulse prices are very volatile in India primarily due to a late announcement of the Minimum Support Price (MSP), thereby not providing an incentive for increase in their production. On the other hand, once imports also reach the market, prices start to fall.

In order to increase the consumption of pulses, it is important as mentioned earlier in this discussion to increase awareness about the nutritional benefits of pulses. Till date, they are referred to as poor man's meat and along with millets as orphan crops. In India where almost half the population is vegetarian, increasing the consumption of pulses in the diet is extremely important to fight micronutrient deficiency. Pulses can be cooked in innovative ways such as a pulse patty or a pulse burger which might seem tastier for children and young adults. Production of pulses should also be encouraged by timely announcement of the MSP and proper procurement procedure. This will help the country meet the minimum daily requirement of pulses in the diet.

26. Salvador Peña, Sinú Verde, Colombia

Original contribution in Spanish

Para aumentar el consumo de legumbres debemos enfocarnos en la preparación. El común de las personas está acostumbrada a las pocas recetas tradicional las cuales no han evolucionado a través del tiempo. Se necesita darle un grio a la preparación de las legumbres, preparaciones con recetas y técnicas modernas. Es necesario introducir nuevos ingredientes y acompañantes para hacerla más atractiva al consumidor.

Para fortalecer la cadena de valor, es necesario que los transformadores de alimentos (chefs, restaurantes, mercados, industria) compren directamente al productor y eliminar el intermediario. También reconocer un valor adicional a los productores que se esfuerzan por la sostenibilidad, lo orgánico, el cambio climático y demás indices sostenibles.

Saludos,

English translation

To increase the consumption of pulses we should focus on the cooking process. Most people are used to few traditional recipes that have remained unchanged over the years. We need to change the way in which pulses are cooked, embracing modern recipes and techniques. New ingredients and side dishes must be introduced to make pulses more attractive to consumers.

To strengthen the value chain, food processors (chefs, restaurants, markets, industry) must avoid middlemen and should buy their food products directly from the producers. Acknowledging the additional value of producers pursuing sustainability, organic agriculture, and climate change adaptation would also contribute to this reinforcement.

Regards,

27. Kafilat Oloyede, Global Initiative for Community Development Awareness (GLIDA), Nigeria

Pulses are benevolent crops with many advantages for both man and his land. Pulses are redeeming, nourishing the soil back to fertility for other crops to grow in successfully thus sustaining humanity. Its rich store of fibre, protein and other essential nutrients make it stand out in the food chain.

They can be combine with other food categories to make delicious dishes. In my country they go well to make grain puddings delicious and easy to take. We combine them to make tuber food more tantalising and nutritious. In other instances they are made into sweet smelling, nice tasting soups that make one request more wraps of locally processed tuber or grain solids. Indeed, their affordability, compared to animal protein, reduces the incidence of malnutrtion in low resource setting.

We emphasise generous consumption of well prepared pulses (in the form they prefer) together with the bulky carbohydrate foods in our positive living training programs to boost the nutrtional status of our clients.

So much has been written about this ubiquitous category of food and so much shall still be discovered as knowlede expands on it!

28. Kafilat Oloyede, Global Initiative for Community Development Awareness (GLIDA), Nigeria (second contribution)

As regards increasing consumption of pulses, in my own part of the world, Nigeria, one of the things that discourage the working woman from its consumption is the tedious process it takes to get it ready to be eaten. The "local" woman does not have this type of challenge. For instance, sitting down to hand pick the dirts from the whole after a day's work and also varieties around here take longer time to cook. If one wants to process it into other dishes, dehusking it too takes time as well.

There are many points in the towns where pulses are cooked in different forms and sold; again,it is the "local" people that patronise them. The educated elite would not "stoop so low" as to patronise these sellers. (Except in eateries where their prices could be prohibitive)

There isn't much problem with green peas as they are readily cooked without much hassles but then, the quantity eaten is usually small. They are often cooked with rice etc. i.e. hardly eaten alone on their own.

29. Peter Steele, Independent Consultant Agricultural Engineer, Italy

Hello Everyone,

Industrial planning is essential – but followed by action

Pre-amble
It is not often that FSN provides a second opportunity for covering much the same subject but, given that this is the International Year of Pulses, perhaps no surprise. Sure '*innovation'* is what you make of it, but it conveniently provides a platform for all kinds of novelty and information exchange from a host of enthusiastic FSN networkers. We are, as many will know, the converted (and largely target each other in debates of this kind); here are the people who continue to promote, for example, the importance of choice of foods, focus upon (understanding) value chains that link producers to consumers, the importance of efficiency throughout the value chain, and waste reduction. Notwithstanding the lack of quality statistics that help determine improve focus and investment within pulse/legume industries, everyone knows the background that helps with better understanding the socio-political-economic factors that currently impact food production and consumption. There are close on one billion people food insecure, another two billion malnourished, the tragedy of under-five deaths, insufficient focus upon nutrition for adolescent girls and pregnant women and, paradoxically, the estimated two billion obese people worldwide.

The value of vegetable proteins is well-understood by the FSN network, but not always by the wider population where pulses (and cereal staples) are frequently considered foods for the poor; the messages being that rising incomes provide a shift to more desirable and interesting foods derived from livestock – with the inherent risk of resource allocation, inefficient conversion ratios, competition for land, insufficient infrastructure and more. Issues become critical as more people worldwide shift to 'western/modern' diets.

This kind of summary was highlighted by the Global Panel (on agriculture & food systems for nutrition) in their report: *'Food systems & diets'* published in September 2016. It's a good read and available at: http://glopan.org/news/foresight-report-food-systems-and-diets.

Value chains
In my contribution in June 2016 I highlighted the value chain as a means of boosting the efficiency of production, and providing viable livelihoods for the many millions of small-scale producers involved. I used a study[1] undertaken earlier to promote the need for greater investment in the services required of producers. Insufficient qualified people, lack of infrastructure, weak producer

organizations, slow industrial growth and poor politico-economic leadership in producer countries have led to marginalization of pulses/legumes and those who grow these crops.

Planning model

Sure, there is only so much that can be covered within a debate of this kind, but my contribution this time is to highlight the planning model developed in the report; and to encourage further scrutiny and application within low-income producer countries.

The model had two objectives: 1. Socio-economic investment – in skilled people, technologies, services, etc. that will boost the welfare of rural communities; and 2. Regional agro-industrial investment – in value chains, infrastructure, etc. that will provide for long-term development – more fresh & processed foods, improved diets, higher national earnings and more.

Choice of priority investment clearly rests with those involved with national management in the main food pulse/legume growing countries, those representing the different parts of the value chain and those providing external services. Frequently the regional context applies where basic foods are typically traded across national boundaries.

The model separated investment into eight sectors that impact upon national and/or regional production and consumption, and further sub-divided these into >20 sub-sectors where action could be taken.

Models always have a limited life – as key factors such as markets, access to new varieties, tipping points come into play and/or new technologies evolve - but models are also readily modified, and this helps provide clarity and stimulates thinking.

The model was developed from a study that explored the Southern Africa region. Given the impoverished nature of the majority people that live within the 10 focus countries a boost in investment for national food legume/pulses industries complies neatly with strategic pro-poor, pro-rural and pro-agricultural development planning that typically feature in all national five-year roll-over plans.

End note

Investment in food legume/pulse industries development represents a *'win-win'* situation for everyone concerned – those in the national value chains, consumers in regional countries and those providing services. Food legumes/pulses are the most benign of foods - they hold a valuable and traditional role within food industries Africa-wide, and people are familiar with the foods that are produced. These foods are prepared in kitchens across the continent each day and, mixed with cereals, provide the sustenance required for work, school and play. Whether as beans, cowpeas, groundnuts or lentils, food legumes/pulses - quite literally - feed Africa protein.

Peter Steele

Agricultural Engineer

Melbourne, Australia

04 November 2016

[1] Steele, P.E. (2011). *Southern Africa Region - Legumes and Pulses: Appraisal of the Prospects and Requirements for Improved Food Industry Value Addition and Technical Efficiency of the Regional Food Legumes Industry.* FAO. Rome. Italy. *(Unpublished).*

Attachment:
http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/FoodLegumesSouthernAfricaReportVersionModExAGSJune16.docx

30. Mariam Jorjadze, Biological Farming Association Elkana, Georgia

Dear all,

Please find attached three stories of pulse growers in Georgia giving insights into their production methods and sharing recipes on how they prepare meals with the pulses they grow.

In addition, I would like to share with you a presentation on the recovery and conservation of pulses in Georgia.
Best regards,

Mariam Jorjadze

Attachments:

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/PresentationElkana_World%20Food%20Day_Tbilisi_20%2010%202016_0.pdf

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/pulses%20grower%20farmers%20from%20Samtskhe-Javakheti%20Region%2C%20Georgia_October%202016_1.pdf

31. Hakan Bahceci, Hakan Foods, United Arab Emirates

Forging a New Future for Pulses
The International Year of Pulses (IYP) creates a unique moment to showcase transformative research investments that would allow pulse crops to deliver on their full potential as a critical player in the global food system. The current level of research funding into pulses is too low. This may be handicapping efforts to improve food security and agricultural sustainability. The 'Global Pulse Productivity & Sustainability Survey' conducted by the Global Pulse Confederation for the International Year of Pulses suggests that annual investment hovers at only $175m per annum for the 13 crops in the pulse category. With over 800 million people suffering from acute or chronic undernourishment, increasing pulse research is vital. We can only meet the world's protein needs with better varieties of chickpeas, peas, beans, and lentils.

The large gap between the potential of pulse crops for meeting global sustainability challenges, and the current capacity to seize this potential, has inspired a new and innovative project for GPC; the 10-Year Pulse Research Strategy. The 10-Year Research Strategy, funded by the IDRC of Canada, will be used to set an agenda for global discussion and mobilize champions to advocate for accelerated pulse research investments. This strategy will aim to:

- Mobilize and establish global and regional networks of leading scientists and industry players to accelerate collaboration toward improved productivity and sustainability of pulses.
- Convene public and private researchers to clarify major knowledge gaps and to establish a shared research agenda across international and national scientific efforts.
- Develop an internationally coordinated pulse crop productivity and sustainability research strategy, which increases the visibility of all pulse research domains, through engagement with governments, researchers, NGOs, associations, and others.
- 'Expand the pie' by attracting new types of research investment / investors (e.g. industry funds; public-private partnerships) to achieve adequate funding for both existing research programs and essential but marginalized research issues (eg, orphan crops; integrated approach to productivity, sustainability, nutrition and food security).

The International Year of Pulses has been a huge success, but there is still a long way to go to increase investments in pulse research globally. The Global Pulse Confederation also calls for pulses to be

prioritized in future agronomic research programs and placed at the heart of governments' nutrition and food security strategies. Let's work together for Pulses: the Food of the Future.

32. Huseyin Arslan, AGT Foods and Ingredients, Turkey

New guide created by a nutritionist, for nutritionists: pulses and weight loss

Obesity is a major risk factor for developing heart disease, hypertension, type 2 diabetes and several cancers. It's become a major global concern, with worldwide obesity rates more than doubling since 1980. Yet, obesity and overweight can be prevented by making healthy lifestyle choices, in particular through proper nutrition and diet.

Mounting evidence suggests that eating one daily serving of pulses — beans, peas, lentils and chickpeas — is a useful weight control strategy. The Global Pulse Confederation published a nutrition guide to highlight the weight-loss benefits of beans, peas, chickpeas and lentils. Under the guidance of leading nutritionist Leslie Beck RD, it flags some of the important science on the role of pulses in weight management.

There are many ways pulses are an effective weight management tool, including:

- Pulses have a low glycemic index value, making people feel full and less likely to overeat
- Protein in pulses stimulates gastric hormones that cause the feeling of fullness
- Fibre in pulses increases chewing time and delays gastric emptying, reducing food intake

We hope the guide will encourage professional dieticians and nutritionists to look afresh at these ancient, affordable and highly nutritious crops. You can promote and raise awareness of Pulses and Weight Management and the weight-loss benefits of beans, peas, chickpeas and lentils by using the hashtag #LoseWeightWithPulses on social media.

Click HERE to download the guide.

33. Dhanya Praveen, Environment Protection Traning and Research Institute, Hyderabad, India

For increasing agricultural growth through enhancement of production and productivity of crops; Government of India is implementing, through State Governments various Crop Development Schemes/ Programmes viz National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), National Mission for Sustainable Agriculture (NMSA) etc.

Pulses production in our country relies largely on rainfall as pulses are mostly grown in rainfed areas. Pulses witness huge fluctuations in prices depending upon rainfall. Even with lots of awareness programmes for promoting pulses, our country imports pulses to meet the gap between domestic production and demand. The Government promotes production of pulses through National Food Security Mission and pulses promotion programmes and announces Minimum Support Price (MSP) for pulses every year to support farmers. However MSP needed to be locally referenced as the many risks including climate related that the farmers are facing have local connotations. This will also encourage farmers to take up pulses production on a larger scale and will enable India to help achieve self-sufficiency in pulses in a few years.

Even though Pulses have been in our traditionally diet, in the form of 'Idly, Dosai, Vada (Snack), Sambhar (Vegetable Curry) , Kheers (Sweets), changing consumption patterns, the introduction of new snacks like breads etc. has paved ways for ignoring this rich nutritional seeds.

Two very famous Pulses Delight recipes have been added here.

Recipe for 'Sukhiyan'

- Put Green gram (Mung Bean) in the Pressure cooker with a pinch of salt by adding around 2 cups of water.

- Heat the Ghee in a heavy bottomed pan,

- Add the grated coconut, mix well.

- Add the cardamom powder and the green gram mix to the pan.

- Saute it well for a couple of minutes and then remove from the stove.

Recipe for Green Gram Kheer (Parippu Pradhaman)
Ingredients:
Cherupayar Parippu/Moong dal: 200 gm
Jaggery (sharkara): About 400 gms (increase or decrease according to your sweet tooth)
Ghee: 1 heaped tsp.
Thick coconut milk: 1 to 1 1/2 cups.
Thin coconut milk: 3-4 cups.
Dry roast spice garnish:
Dry ginger/chukku: 1 small piece, lightly crushed.
Cardamon: 10-15.
Jeera: 1/2 tsp.

Spice for seasoning:
A tsp of rasins, cashewnuts, and about a handful of finely sliced coconut pieces
One tsp of ghee for roasting.

Method:

- Heat a pressure cooker and add a heaped tsp of ghee ,Lightly roast the parippu and pour 3-4 cups of thin coconut milk into the cooker. Pressure cook for 5-6 whistles.

- Meanwhile, put the jaggery into a deep bottomed pan, add 1/2 to 1 cup water and melt it. Once it boils, it will foam out, so pls stay close and once it boils, simmer and switch off the fire....allow it cool slightly and strain it into a metal strainer....this is to remove the dirt, if there are any. Incase if you are very sure that your jaggery is clean....just melt it in 1/2 cup water and keep aside

- Open, the cooker and mash the green gram lightly, some like it really mashed up add the melted jaggery and mix well. Bring it to a boil and simmer it for 20-30 minutes....stirring all the while and taking care that it does not stick to the bottom.....melted jaggery will be reduced by half. While it is simmering away, dry roast the cardamon, jeera, and the dry ginger

- Cut coconut pieces into thin strips. Powder the dry roasted spices. Add the thick coconut milk into the cooker, after adding the thick milk, do not allow it to boil as this might make it curdle....once it starts to boil switch of the fire and add the grounded spices. Finally, heat a tsp of ghee in another pan and fry the coconut pieces until they are lightly browned, then add the cashewnuts, and raisins..... Sprinkle them on top of the payasam. Kheer is ready.

34. Lawal Musibau Olajire, Green agriconsult and services, Nigeria

The attached documents are my research findings till date about some pulses. Organic approach though the utilization of of amendments shows promises on ways of managing nematode pests mitigating against large-scale soybean production.

Attachment:

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/My%20research%20findings%20on%20legumes%20till%20date.pdf

35. Randy Duckworth, Global Pulse Confederation, United States of America

How will Mapping PULSE GENOMES Help Feed a Global Need?

Pulses are the edible seeds of plants in the legume family, such as peas, beans, chickpeas and lentils. Scientists are sequencing the genomes of several pulse crops to help meet the changing needs and challenges of feeding the world. Just like the human genome was mapped, mapping crop genomes allows scientists to know how they work.

People around the world need science to innovate and improve. With a growing population, climate change, and people's taste for delicious pulses, understanding more about this healthy sustainable crop is important..

Want to learn more about how pulses benefit people, farmers, and the world? Explore our infographic on pulses.org to learn more about this process, and the importance of pulses as a global food.

36. Them Phiri, South Africa

The role of pulses cannot be underestimated across the globe, with climate change effects threatening the world food security it is time for development workers/experts and farmers to work together hand in a glove and come up with the best drought resistant cultivars of pigeon peas, cow peas, dolichos lab lab, as these take a very short period to mature.

A case in point was witnessed in Mozambique, where an International organization Joint Aid Management in 2010-2014 introduced cow pea leaves and beans in children's diet in schools and the innovation was adopted by farmers in the vicinity of the schools. I was one of the pioneers by that time who witnessed school children growing cow peas and consuming them with other grains.

The benefit was immense both in protein and calorific intake. In a nutshell that's my comment.

Regards,

Themba Phiri

Livelihoods Advisor

37. Professor Kadambot Siddique, UN Special Ambassador for the International Year of Pulses 2016, Australia

Pulses are usually grown as secondary components of cereal-dominated cropping systems. Consequently, but understandably, pulses receive less research attention than the cereals they share land with. This is despite pulses generally being exposed to a plethora of biotic and abiotic stresses. Further, their cultivation must adjust to the primary requirements of the cereal crop, as well as other components of the farming system (e.g. animal husbandry), often displacing pulses from their

optimum growing environment. Nevertheless, there is a considerable bank of component knowledge on how to maximize pulse productivity, but not enough of this knowledge is translated to farmers, especially resource-poor ones.

Improvement in pulse production necessarily requires a holistic approach, not only to tackle the multiple stresses directly affecting the crop but also to integrate external factors ultimately affecting production, like competition with other crops, input availability and market opportunities. These factors can interact in ways ranging from synergism to antagonism. For example, application of a limiting nutrient may induce better root growth that would enhance soil water extraction, but the resultant improved vegetative growth may attract pests and diseases. Thus an integrated crop management (ICM) approach is required, which the National Resources Institute of the University of Greenwich, UK, usefully defines as "a system of crop production which conserves and enhances natural resources while producing food on an economically viable and sustainable foundation". This necessitates "a good understanding of the interactions between biology, environment and land management systems" and "is particularly appropriate for small farmers because it aims to minimize dependence on expensive inputs and to make the fullest possible use of indigenous technical knowledge and land use practices".

Human population growth—and the subsequent increased demand for food and declining area of agricultural land which is often degrading in soil health—puts even more pressure on pulses. There is ever-growing pressure to increase the production of staple cereal crops thereby further threatening the area that can be allocated to pulses. Another factor of growing importance is climate change, which modifies local plant growth conditions, disrupts traditional cropping patterns and increases the riskiness of cropping. This presents further constraints but also some opportunities for pulses.

A top-down approach to disseminating the potential solutions for increasing pulse cultivation and yields has had limited success, especially for resource-poor farmers in rainfed environments. Therefore, a more enhanced farmer-participatory approach than has so far been implemented is advocated. An understanding of yield gaps, the difference between the yields realized by farmers and the potential yield under "ideal" cultural conditions, is necessary to assess the scope for improving on-farm yields. The potential yield of rainfed crops is usually limited by sub-optimal soil moisture, mostly deficit but sometimes excess, at some time during the growing period. Therefore, knowledge of soil water content through the growing season is crucial as this sets the yield ceiling for that season. It is therefore evident that potential rainfed yield is a year-to-year moving target, depending on pre-season and growing season rainfall. An important aspect of the on-farm approach to agronomic improvement is to focus on feasible solutions within the resource limitations of the farmer. This requires the inclusion of farmers throughout the experimental process. The testing of identified solutions requires comparison with controls on multiple farmers' fields, under farmer management but with researcher guidance in layout and data collection. There are existing and evolving ways of statistically analysing these types of multi-location trials, to provide more information about the usefulness of an improved technology than could be obtained from traditional, multi-replicate randomized block trials at a few locations. The involvement of farmers in all stages of the process creates a sense of their ownership of any improvements identified and therefore increases the likelihood of widespread adoption.

Much more needs to be done in moving from an on-station to an on-farm focus for pulse production technology research. This could be best achieved under the framework of Farmer Research Networks. These would be, essentially, groupings of farmers and researchers using emerging developments in ICT to scale up on-farm participatory practices that have so far evolved. This would facilitate more widespread collection of data at the farm level, including that from iterative on-farm trials, its more rigorous analysis and interpretation, and effective communication of outcomes back to farmers. It would permit more rigorous analysis of 'option x context' interactions, which ultimately determine whether or not a new technology is adopted. 'Option' refers to features such as technological innovation and resource requirements and 'context' to biophysical conditions, farming system and social, policy and market aspects.

Implementation of the above approach proposed by would require a massive reorientation of current agricultural R, D & E focus for resource-poor agriculture. This is now still biased towards replication of simple, comprehensive recommendations rather than confronting the realities of local adaptation in diverse environments and investigating this complexity. Roles of agricultural researchers and agronomists in particular would need to change, from being assessed primarily according to their academic publication record to their contribution to effective outcomes for farmer groups. Funding amounts and project lengths would need to be increased to permit adequate baseline characterization, multi-location and multi-year on-farm trials and built-in outcome and impact analysis. More enduring partnerships need to be established between national and international research bodies, non-government organizations, community-based organizations and commercial entities interacting with farmers. ***Only then can we expect that smallholder farmers will practically implement the extensive knowledge we have so far to increase the production of pulses***.

38. Jane Sherman, FAO, Italy

"Innovations from the field to the cooking pot" *What does the second FSN forum on pulses tell us about consumer education for better diets?*

From the field to the cooking pot … The forum title was right. The shaping questions in this second FNS forum on pulses (http://www.fao.org/fsnforum/activities/discussions/pulses2) did indeed have an eye on consumers and consumption as well as on production. They brought the two ends of the food system together and closed the circle. This is joy to food educators.[1] We know from both research and experience that consumers' practices and attitudes, the influences on their food choices, and the interaction between their environments and their outlooks are generally crucial in impacting diet. But we are also very aware that until recently the international focus has been far more on supply and access than on consumer behaviour, expectations and attitudes: they have concentrated on field and market and not on the path to the cooking pot.[2]

The Year of Pulses is a unique phenomenon in many ways, perhaps unprecedented. It integrates nutrition and agriculture; it takes a step towards sustainable diets; it confronts a problem common to many societies, yet different in all of them; it has the single (though complex) task of promoting just one food group with a rich nutrition profile; it brings together a diverse body of professionals (economists, agronomists, nutritionists, extension workers, policy-makers, not educators unfortunately), and it aims to improve food consumption in the general public, not only in one needy segment. For food educators, a special feature is that *it has the explicit purpose of improving consumption as well as access*.

The forum opened up the question of how this is done. With its consumption-oriented questions and its call for responses grounded in experience, it opened a window on dietary promotion where contributors involved in the program across the sectors were drawn to analyse the situation on the ground empirically and call on their working experience to propose strategies which they saw as necessary and appropriate. The resulting picture was complex but coherent.

What influences people's consumption of pulses?

Several posts discussed this basic question. Influences were seen as culture and habit, knowledge and understanding, time and convenience, but above all food status and taste. Existing food cultures determine what people are ready to accept – for example red "silk" beans are popular in El Salvador, while in Nigeria the only pulses seen as normal food are cowpeas. Hence simple lack of familiarity with the foods available may be a barrier, as may "inadequate information on the advantages of pulses", i.e. ignorance of nutritional value or value for money. More frequently mentioned, however, was the move *away* from consuming traditional pulses, sometimes because of time-consuming preparation, but

more often because of their perceived status as "the protein of the poor" or "desperation food". Lupines in rural areas of Ecuador, for example, were seen as the food of rural poverty. City dwellers or the educated middle class would not "stoop so low" as to eat dishes made with pulses. If incomes rose, or food choices widened as people moved to cities, these traditional foods tended to be abandoned in favour of more prestigious foreign foods, meats, or highly processed fast foods. Poverty, it seems, also has a taste. Traditional pulse dishes were often unvarying and unvaried. "Being a poor man's food, there are only a few traditional recipes, which have not evolved over time."

What strategies are needed?

Ideas for tackling these barriers grew out of these observations. They converged on two strategies: one was to make pulses attractive (delicious, convenient, healthy, modern/trendy, valued); the other was to get a lot of people into the act. A top priority was to update recipes, widen the range, add vegetables and flavourings and develop new products, give value to "heritage foods", "create excitement around traditional recipes" and promote them on the media. Contributors proposed ways to make preparation easier and quicker, for example by introducing low-cost pulse processing machines in villages and developing "easy-to-cook high-quality branded products" and ready-to-eat meals. Information would be available on packaging and labeling, and through government campaigns, backed by the media (testimonials from soccer champions and video rap music, to be evaluated for impact). A new image was felt to be essential "to make the humble legumes *modern* or *desirable*": "social media together with gastronomical innovation" could help pulses become "the next quinoa".

Society, it seemed, had to be taken by storm – but slowly. Many groups would interact with or influence consumers: chefs, restaurants, food services in public institutions; producers, markets and the food industry; policy-makers in agriculture, trade, health and education; and "influencers who are reaching consumers to help change their dietary behavior", such as nutritionists, dieticians, health professionals, health workers and food industry representatives, who would "make sure that pulses are accepted as a normal household food".

What does this say about consumer food education?
The ideas about the process of dietary change are not new, but neither are they widespread in food security discussions. What is interesting is that

- they all accept that consumers are main actors in the process
- their coherence springs from confronting the same question in many different contexts and cultures
- they come from several sectors which do not generally meet to discuss consumer capacity in food.

They therefore carry a certain conviction born of direct observation and experience. Underlying them there is also some consensus on a cluster of guiding principles in food education. They recognize for example that:

- responses to dietary needs should be shaped by analysing what matters to consumers;
- attitudes and established habit (as well as poverty and ignorance) are forces to be reckoned with;
- convenience, appetite and social food status are strong incentives;
- change often has to contend with competing values (e.g. red meat or junk food);
- *how-to* (where to buy, what to cook) is as important as *why* (good low-cost nutrition);
- shared food cultures mean that change also has to be socially shared, and at many levels;
- policy and regulation, quality food supply and consumer behaviour must interact;
- health and nutrition professionals are key and also need educating;
- (implicitly) this is a long-term process.

Many of these principles are not recognized in "nutrition-sensitive" initiatives which rely only on improving supply or regulation and do not see the need for consumer capacity to respond to the

supply. The Year of Pulses seems to be in a position to blaze the trail to the pot. It should trumpet its conclusions.

[1] In "nutrition education" we include SBCC, health promotion for good diets, nutrition counseling, social marketing and behavioural economics aiming at healthy eating.
[2] Most major International papers on nutrition and food security have focused on the supply side – examples are (see second blog). The latest of these was the GLOPAN brief on food systems and nutrition (link), an exemplary paper except for the total neglect of consumer behaviour. After the launch Lawrence Haddad commented in his blog: "Perhaps the most glaring omission in the report is the treatment of consumers as shapers of food systems. It is true that we don't spend much time in the report on nutrition education and behaviour change of consumers. This is definitely an important area and one where we need more answers."

39. Stella Kimambo, FAO, United Republic of Tanzania

Pulses: innovations from the field to the cooking pot

Tanzanian production and exports of pulses have both increased rapidly in the last decade. However, the country faces serious challenges in this sector. The lack of innovative recipes, seeds, poor agricultural practices, and the presence of pests and diseases, poor marketing strictures, all end up affecting yields, quality and consumptions.

Iron deficiency anemia is one of the most serious significant public health problems among children of 6 to 59 months and women of child bearing age (15 to 49 years) in Tanzania. According to available data, the national prevalence of anemia is at 59% for children under five years of age and 41% for women of reproductive age (TDHS, 2016). There have been various remarkable nutrition interventions in the country since 1999 aimed at decreasing the prevalence of (Iron deficiency anemia) IDA; however the problem in the country has persisted and remaining as a public health problem. Iron deficiency anemia impairs the growth and learning ability of children, lowers resistance to infectious diseases and reduces the physical work capacity and productivity of adults. Severe anemia during pregnancy increases the risk of maternal death and of having a low birth weight infant.

The average per capital consumption in 2007 was only 6.8 gm/day/household while the recommended intake is at least 30 gm/day/household (TNBS, 2010). Moreover, the consumption trend has been declining over time. Statistics show that between 2000 and 2009 per capita consumption decreased by 1.4% and the decrease was almost two folds (3.5%) after two years (FAOSTAT, 2014). This trend reflects changes in consumer preferences and failures by suppliers to align pulses attributes to consumer preferences.

Global demand is growing for pulses as a heart-healthy food, however in many cultures, pulses are considered as 'protein for the poor'. There are a number of reasons why they are underestimated. The most common ones are: they can cause bloating, flatulence, and; unless they are soaked for hours, pulses take a long time to cook.

Despite its nutritional importance, pulse consumption trends in Tanzania has been decreasing from time to time and the factors underlying these could be the household characteristics such as food habits, household size and access to resources among other factors, which can potentially lead to their low consumption. For this reasons above we need to promote interventions to increase intake of pulse rich foods to reduce micronutrient malnutrition and NCDs.

What can be done concretely to increase the consumption of pulses?

Pulses contain some anti-nutrients, which are substances that reduce the body's ability to absorb the various minerals that pulses contain. Fortunately, many of these issues (bloating, flatulence, anti-nutrients and length of cooking time) can be overcome using traditional cooking techniques, such as

soaking, germination (sprouting), fermentation and pounding. Traditional methods can also help to reduce the content of the anti-nutrients. When other foods are combined with pulses, the nutritional value of pulses is further enhanced, as other foods help to ensure that the body is able to better absorb all the nutrients found in pulses; for examples, when beans are eaten with other foods such as grains, the nutritional value of pulses is even greater as the body is better able to absorb iron and other minerals found in pulses.

- Increase knowledge on pulses utilization for example combine pulses with vitamin C rich foods (a good example is to sprinkle some lemon juice on lentil curry) to increase absorb iron
- Design cooking techniques to reduce time of cooking
- Promote foods which when eaten with pulses can complements in nutrients
- Promote skills building along the value chain development sector
- Develop a network of institutions to improve sector coordination
- Strengthen market development capacities of the sector
- Capacity-building of key institutions in the "pulses network" to provide support services and
- Promote pulses as a viable and growing agricultural sector also improve products quality
- Develop a network of institutions to improve sector coordination
- Strengthen market development capacities of the sector
- Involve PPP from production processing, finance, technology transfer, farmer support services, trade and seed development.
- Unleash the power of pulses by publishing recipes based on pulses and innovative complementary food recipes for children of underfive years old (Greens, Soyee milk, seeds)
- Develop an efficient storage, warehousing and logistics system as a trading platforms
- Develop an efficient input distribution network for higher-yielding varieties
- Improve access to finance along the value chain

- How can we make pulses an attractive option for farmers?

Consider different models of production along the pulses value chain such as smallholder subsistence agriculture and commercial agriculture. Each of these models have their specificities. Smallholder famers normally are less efficient and relies on intercropping based on lower-yielding seed varieties, produce only for household consumption, rely on rainfall for production, and faces volume consistency challenges. In addition to that, they face a lot of challenges in productivity, postharvest losses, inadequate access to finance, and difficulties in commercialization. Nevertheless, it is an important means of food security in numerous rural regions where almost half of the production is used for household consumption and nutrition security (protein). For, medium-to-large-scale producers generate larger volume of pulses due to more efficient production techniques and easier access to inputs and finance. Large-scale producers focus on the export market. These two models are currently both essential and actually complementary for the development of the pulses sector in the United Republic of Tanzania.

- What is needed to strengthen pulses value chains?
- The future value chain need to be characterized by improved input distribution, improved overall coordination and governance, enhanced forward planning and trading capacities, and increased market development and investment attraction
- Improved seed quality and availability by improve provision of quality seeds, ensure the availability of seeds for increased production, stimulate PPPs and investment in higher-yielding seed

development; promote research, develop a number of demonstration plots; and ensure a more accessible knowledge base for pulse cultivation. Moreover, provide a concessional loan scheme for farmers to procure high quality inputs.

- Improved input distribution network– linked with access to finance, ensure that farmers and farmers' associations have easy access to relevant inputs to maximize production. Increasing local distribution and production of seeds
- Development of large-scale agribusiness and contract farming –enable and stimulate the development of agribusiness services to support smallholder farmers to increase their production area, volumes and quality. This is a priority area for investment attraction in the pulses value chain. This will need to be achieved by providing agribusiness services with the status of a strategic investment area. The development of partnerships with agribusiness services in the pulses sector will be essential to ensure easier access to mobile units, mechanization, hermetic cocoons, silos and threshers. Examples such as Quality Food Products for farm mechanization services will contribute to growing the agricultural sector in sophistication.
- Development of storage, warehouses and logistics-A key success factor of the future value chain is to ensure adequate storage to handle the increasing production of pulses. These storage units of different sizes, most probably connected to structured trading platforms, will act as reserve stocks for supplying large orders or as collateral with the commodity exchange. The development of these storage units will be achieved by proposing the refurbishment of local and regional warehouses through the establishment of rehabilitate, operate and transfer; or rehabilitate, own and operate PPPs
- An effective pulses network to plan the sector development-The primary objective of the network will be to develop partnerships with other key associations such as the Indian Pulses and Grain Association, Pulse Growers. The network is also foreseen to act as an easy entry point for traders and investors interested in the pulses sector.

- What successful policies do we know about?

United Republic of Tanzania is the result of the union between the Republic of Tanganyika and the People's Republic of Zanzibar, every part has its own policies on area agricultural, food security and nutrition, for that reason, there are many designed policies in a country, which when in counted by poor coordination and multi-sector strategies and interventions, confusing implementation process.

The development policies policy framework which are related to agricultural priorities are;-

1. The Tanzania Development Vision (TDV) 2025
2. National Strategy for Growth and Reduction (MKUKUTA & MKUZA 1&2)
3. Five Year Development Plan 2016-2020
4. Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP)
5. BIG RESULTS NOW (BRN)
6. Sector Plan

- The Agriculture Sector Development Strategy (ASDS) contribute to medium-term and long term objectives as outlined in Vision 2025.
- Private Investment Framework; Agriculture Sector Development Strategy Kilimo Kwanza (Transforming Agriculture) 2009 National Irrigation Development Plan TAFSIP National Agriculture Policy

Others

- District Agriculture Sector Investment Project (DASIP)

- Agriculture Market System Development Program (AMSDP)
- Rural Financial Service Programme (RFSP)
- Marine and Costal Environment Management Project (MACEMP)
- Comprehensive Africa Agriculture Development Programme (CAADP)
- Tanzania Agriculture Food Security Investment Plan TAFSIP 2011/12-2020/21

Nutrition policies and strategies

·National Multisectoral Nutrition Action Plan (2016-21)
·National Food and Nutrition Policy

- Zanzibar Food Security and Nutrition policy
- The Zanzibar Food Security and Nutrition Situational Analysis (ZFSNSA)
- Zanzibar Agricultural Transformation for Sustainable Development (2010-2020)
- Tanzania's National Food Fortification Programme.

40. Sieg Snapp, co-facilitator of the discussion, Michigan State University, United States of America

Dear FSN Forum members,

The perspectives from many parts of the world shared during this discussion has been very informative.

I found deeply inspiring the experiences from sustained efforts to support pulse value chains, such as from Australia, and the case studies from several sites around the world of nutritional and recipe education, including, among others, from Tanzania, South Africa, Turkey, and Georgia.

I sincerely hope these efforts continue and that we find ways to continue to learn from each other.

I believe that interdisciplinary initiatives particularly in the area of agriculture and nutrition education working together are particularly important for a more sustainable future.

Sieg Snapp

41. Karen Cichy, co-facilitator of the discussion, USDA-ARS, United States of America

Dear all,

I reiterate Sieg's thanks for everyone's participation and comments. It was a very interesting discussion that hit upon many research needs and extension/outreach opportunities with pulse crops.

Thank you

Karen

42. Byomkesh Talukder, McGill University, Canada

McGill Centre for the Convergence of Health and Economics (MCCHE) (https://www.mcgill.ca/desautels/mcche) introduced Pulse Innovation Platform (https://www.mcgill.ca/desautels/mcche/research/pip/what-pip) as an open invitation forum where members network and connect to identify bottlenecks hindering innovation, and develop

solutions beyond what individual members can achieve alone. PIP takes a convergent innovation approach for a game-changing multistakeholder partnerships (MSPs) model, targets the behavioral change and ecosystem transformation required in both the industrialized world and emerging economies and targets a sweet spot, considering agriculture, health, and wealth outcomes together and leveraging them in a holistic manner to better harness the power of business and jointly target economic growth and human development. This PIP model has the potentiality to develop policy approaches that could be beneficial to increasing the role of this crop in different regions.

Attachment:

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/PIP.pdf

43. Dhanya Praveen, Environment Protection Training and Research Institute, Hyderabad, India (second contribution)

I would like to add a few points to my contribution

Cultivating pulses requires a mission mode initiatives not only on Climate Smart Crops but **Climate Smart Soils which is more sustainable and is the need for** increases resilience to climate change, and improves ecosystem services.

44. Sarah Najera, FAO, Italy (second contribution)

Please find below two recipes using pulses.

Vegan Beany Brownies

Brownies, who does not know what they are? They are originally from the USA, however, this recipe is a variation from the usual brownie recipe to offer a healthier sweet dessert. This delicious combination of beans with chocolate is low fat, loaded with fiber, and with some other rich nutritents that allows you to eat them with no guilt! Everything you know about brownies will change after trying this recipe!

- **Ingredients:**

  - 2 cups of beans (red kidney beans or black beans - Can or freshly cooked)

  - 2 tbsp Flaxseeds

  - 4 tbsp water, boiled

- 1/2 cup peanut butter

- 1/4 cup unsweetened cocoa powder

- 1/2 cup quick oats (flakes or pulverized, either work great)

- 2/3 cup coconut sugar

- 1/4 cup coconut oil

- 1 tsp vanilla extract

- 1 tsp baking powder

- Dash of salt

* If the dough is too dry add 1/4 cup of bean water

*Optional for Frosting:

- 1/3 cup unsweetened chocolate, chopped

- 1/4 cup almond milk

- 1/2 tsp Margarine

- 1 tbsp powder sugar

- **Method/directions**

1. Preheat oven at 350° C and let the magic begin.
2. Mix together the flaxseeds and water. Set aside.
3. For this step, using a food processor is optional but highly recomended since it helps the dough become creamier.
   Combine all the ingredients in the food processor: beans, peanut butter, cocoa powder, quick o ats, coconut sugar, coconut oil, vanilla, baking powder and salt.
   Pulse until smooth and creamy (if your food processor is too small, make sure you divide the in gredientes to mix them up equally).
4. Add into the dough, the flaxseed mixture.
   Pulse the food processor again until everything is well mixed.
5. Grease a 8-inch cake pan and pour in the beany dough.
6. Bake for about 15-20 min until set.

* Optional directions for Frosting:

1. Mix together all the ingredients: chocolate, almond milk, margarine, powder sugar.

2. Microwave for 40 seconds.
Stop every 10 seconds to stir the mixture until you complete the 40 seconds (If prefered, you m ay melt the chocolate and butter over a hot-water bath; and then add the rest of ingredients)

3. Cover your beany brownies with the chocolate frosting.

- **Total cook time:** 30 minutes
- **Servings:** Serves 6 or 8
- **Type of dish:** dessert
- **Tools and equipment:** Food processor

Cevichochos

Cevichochos is a typical dish prepared in the Ecuadorian Andean highlands. This dish can be found either in parks or restaurants, and it is consumed by locals as a snack or main dish during lunch time. The name of this dish (*cevichochos*) stands for '*cevi*' from ceviche and '*chocho*' for its main ingredient: the andean lupine, known as Chocho in the region.

To complete the dish it is combined with lemon juice, together with tomatoes, onions and cilantro. Once it is prepared, people can decide to acompany it with chifles (fried plantains), toastado or chulpi (fried maize), avocado and/or ají (spicy sauce).

- **Ingredients**

- 1 ½ cup chochos* (with seed-hull: all the important minerals are here)

-2 Medium tomatoes: 1 chopped in squares; 1 to make juice

-6-8 lemons, juice

-1 medium red onion, chopped thin slices

-1/3 cup cilantro, chopped

-1 Teaspoon Olive oil

-1 cup water, boiled

-1 Tablespoon Salt

-Salt and pepper to taste

- **Method/directions**

1. Wash chochos throughtly and set aside.

2. Combine onions, boiled water and salt; set aside for at least 10 min. This process will remove the strong flavour of onion.

3. In a blender, add one tomato with the juice of 3 lemons. Blend until a juice consistency.

4. Strain onions and wash them throughly.

5. In a separate bowl, combine the remaining lemon juice, tomatoe juice, chopped tomatoes, strained onions, olive oil, cilantro and chochos.

6. Add salt and peper to taste. Set aside for 15 min either in the fridge or a fresh area.

7. You may serve this dish with chulpi, tostado, chifles, avocado and/or ají.

- **Total cook time:** 30 minutes
- **Servings:** Serves 4
- **Type of dish:** Starter or Soup
- **Tools and equipment:** Blender, Strainer