

Enhancing Nutritional Quality of Diets Through Pulse Utilization

**Summary of Nutrition Consultation Meeting
held at Michigan State University**

Dec. 5 & 6, 2011

Presented by

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Twenty two scientists, policy makers, and practitioners participated in a two-day workshop to consider the challenges and gaps in knowledge that constrain the use of pulses from being used to improve the nutritional status of people.

Overall Recommendation

It is highly recommend that in the next five years the DGPCRSP conduct trials using pulse interventions and measure multiple nutrition and health outcomes, acceptability and compliance in pregnant women and young children (5 mo to 5 yr of age).

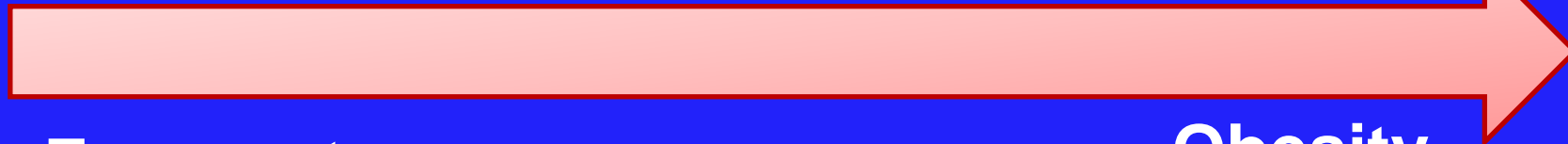
Need to define the desired endpoints (what is the focus population) before rationale nutritional recommendations can be made

**Recommendations will vary
depending on focus population
(although overlaps often occur)**

**Developing
Countries**

**urban populations
of less developed
countries**

**Industrialized
Countries**



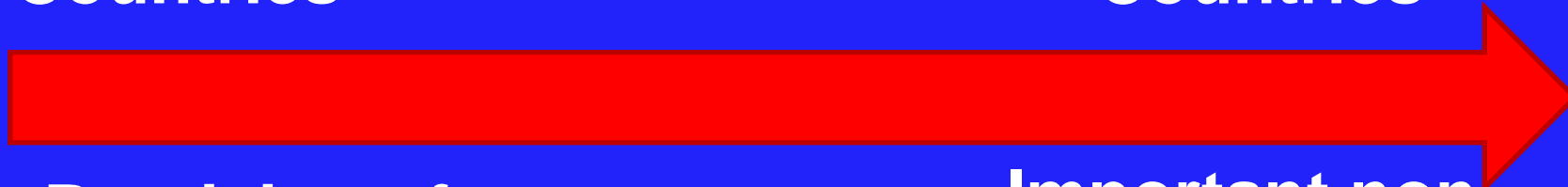
**Frequent severe
Malnutrition and
Death**

**Obesity
and Co-
Morbidity**

Recommendations will vary depending on focus population

**Developing
Countries**

**Industrialized
Countries**



**Provision of
Nutrients**
(an acceptable/
realistic diet)

**Important non-
nutrient substances**
(an optimum diet
to prevent/treat
chronic diseases)

Nutrient need varies according to age, gender, and physiological status

Conception to birth***	-1 yr to 0 yr
Growth***	1 to 15 yr
Reproduction and lactation***	15 to 40 yr
Physical activity (work)***	10 to 85 yr
Prevent/reduce incidence of certain diseases/conditions§§§	-1 to 95 yr

***Nutrient need is known

§§§Amount of important non-nutrient substance needed is not known

What nutrients can pulses provide to fill a dietary void?

It will depend on:

- a. Non-pulse foods consumed;**
- b. Type of pulse consumed;**
- c. Nutrient loss during storage and food preparation; and**
- d. Bioavailability of nutrient.**

continued

- Can use algorithms to compute nutrient adequacy (or non-adequacy) for a specific population
 - Must know type and quantity of foods consumed
 - Must have complete nutrient data base
 - May need to fill in gaps in nutrient data base for pulses

continued

Much less known about how much of the nutrients in pulses are actually absorbed

Nutrient loss during storage, food preparation, and digestibility (bioavailability)

Examples:

Bean iron is ~ 3% bioavailable

Loss of folic acid during cooking is ~ 50 – 75%

Protein digestion ranges from 55 to 85%

Should compute amino acid adequacy.

Sulfur amino acid bioavailability is low

What needs to be done:

- **Assemble and compile databases relative to:**
 - **Nutrient content of cooked/processed pulses of interest, and**
 - **The bioavailability of nutrients in pulses.**
- **Conduct research to fill in the knowledge gaps.**

Great Emphasis on “First 1000 Days” (i.e., conception to 2 yr of age)

Why?

- Specific goal of FtF is to reduce stunting by 20%
- Another goal is to improve pregnancy outcomes

- **Pulses can be used to meet this goal and immediate impact can be made**
- **Need to demonstrate this capability**
- **Need to have nutrition counseling for adolescent females and females likely to become pregnant.**
- **To reduce stunting, the focus should be on conception to 5 yr age span**

- Need pulse-based complementary foods (a pre-cooked rice and de-hulled bean blend for example)**
- Will need to fortify with missing nutrients**
Diet diversity will not be adequate to meet the FtF goals within a short time (5 yr). Food Science can contribute significantly to improve bio-availability.

Breeding/genetic improvement cannot respond quickly enough produce an ideal pulse to help meet the FtF goal to reduce stunting within the next five year period. But, nutrient bioavailability from pulses needs to be improved for certain nutrients via plant breeding and food processing

EXAMPLES:

- 1. Reduce phytate content of pulses via plant breeding and/or food processing to increase trace mineral bioavailability;**
- 2. Increase nutrient content through pulse breeding (biofortification)**
- 3. Increase methionine and (tryptophan?) content of pulse protein through pulse breeding**

- **Improve protein digestibility via plant breeding and/or food processing**
- **Reduce oligosaccharide content of pulses**

Sober reminder

Even when an optimum food ration is provided, it doesn't mean "free living" populations will take advantage of the superior foods to improve physical and mental development

Overall need when free choice is involved

- **Income levels must be such that the most nutritious foods raised are consumed and not sold for other essential family needs**
- **Good food preservation system is essential to capture what is produced and not wasted.**

In Summary

It is highly recommend that in the next five years the DGPCRSP conduct trials using pulse interventions and measure multiple nutrition and health outcomes, acceptability and compliance in pregnant women and young children (5 mo to 5 yr of age).

Thank You!

Other recommended activities are to determine:

- The market costs per unit of nutrient when the various nutrients and energy are provided by pulses;
- The labor and other costs per unit of nutrient and energy associated with growing, harvesting, and storing pulses – production per hectare, production risks, relative storage problems for example;

to determine: (Continued)

- The labor and other costs per unit of nutrient and energy associated with cooking/processing pulses – time and fuel for example;
- If there are less expensive and easier approaches to obtaining the nutrients and energy than through the pulse chain; and
- Expand our understanding of the role of pulse bioactive constituents (non-nutrients) to prevent health problems such as diabetes, heart diseases, and certain cancers.