Working to Improve Nutrition Through Participatory Cropping Systems Research in Malawi

The Soils, Food and Healthy Communities Project,
Ekwendeni, Malawi

Ekwendeni Hospital

PATH Canada

IDRC

Outline of Presentation

- Background
- Rationale
- Research questions, approach & methods
- Results: 1) community response; 2) food security; 3) nutritional outcomes.
- Challenges
- Implications and future plans
- Questions

Agriculture & Nutrition Links

- Agricultural production improvements alone are less likely to improve nutrition.*
- Interactions with other crops.
- Effects on labor, especially for women.
- Uses of crop sales.
- Nutrition problems linked to other issues *e.g.* sanitation

* Berti, P., J. Krasevec, et al. (2004). "A Review of the Effectiveness of Agriculture Interventions in Improving Nutrition Outcomes." Public Health Nutrition **7**(5): 599-609.

Setting: Malawi

- 92% of households live in rural areas and rely on own-food production.
- Three-fifths of population cannot meet basic daily needs.
- 49% stunting in under-five children in 2001.
- Major food crops: maize, cassava, groundnuts, beans, millet, sorghum, sweet potatoes.

What was (part of) the Problem?

- High rates of child stunting observed in mobile clinics.
- High food insecurity.
- Low N inputs and low maize yields.
- Fertilizer unaffordable.
- Communities expressed interest in alternatives to commercial fertilizer.
- Lack of knowledge or access to alternative N sources (legumes, manure).

A Word about Child Malnutrition

- Malnutrition contributes to approximately 55% of under-five child mortality.
- ~20% of Malawian children do not reach the age of 5 years.
- Poor child growth is associated with decreased cognitive and physical capacity and increased prevalence of chronic disease in adulthood.

Why Legumes As a Solution?

- Edible legumes provide food source while improving soil.
- Legumes are self-pollinating and can add N to soil.
- Legumes already grown by most farmers in region but not optimized.
- Previous research on ‘best bet’ legume options in Malawi.

‘Best Bet’ Legume Options*

- Pigeonpea (*Cajanus cajan*) and groundnut (*Arachis hypogaea)* intercropped
- Pigeonpea and soybean (*Glycine max*) intercropped
- Maize (*Zea mays*) and pigeonpea intercropped
- *Mucuna pruriens*
- *Tephrosia voglii*

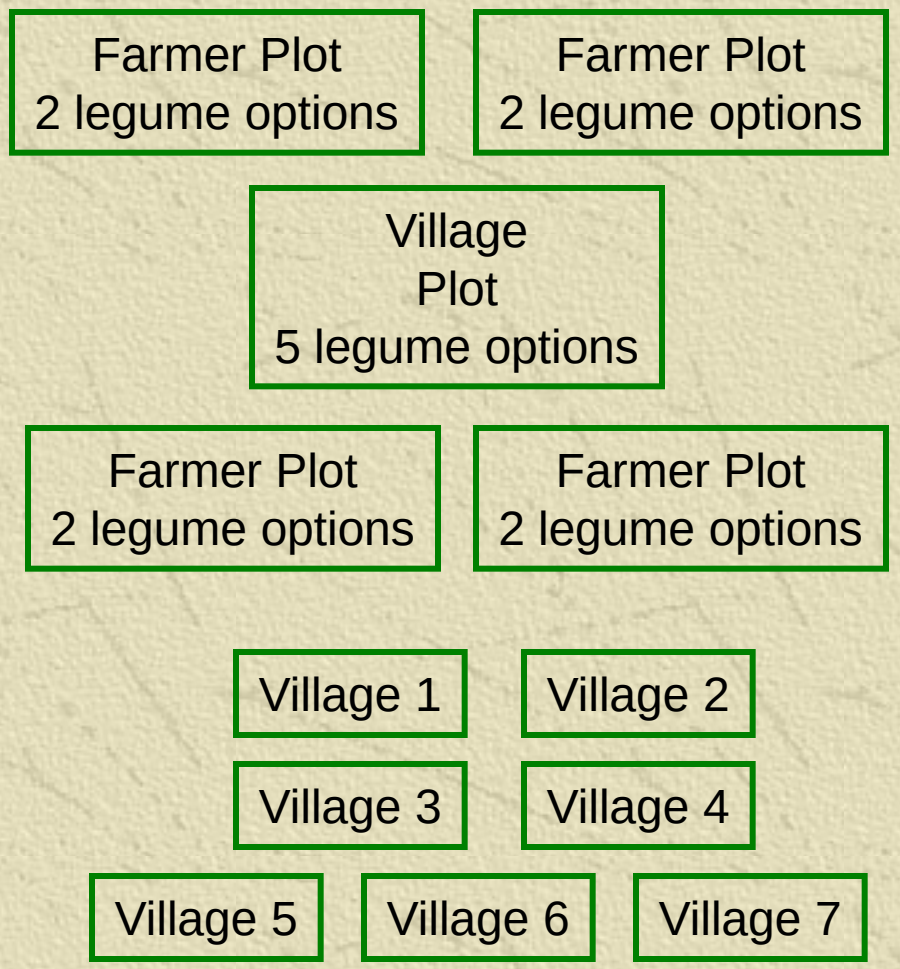
* Snapp, S. S., P. L. Mafongoya, et al. (1998). "Organic matter technologies for integrated nutrient management in smallholder cropping systems of southern Africa." Agriculture Ecosystems & Environment **71**(1-3): 185-200.

How Will Legumes Affect Soils, Food and Healthy Communities?

- *Soils*: Crop residue incorporation improves soil fertility.
- *Food*: Increased legume production/types; increased maize production.
- *Health*: Feeding legumes to young children or selling legumes and buying nutritious food improves child growth.
- *Communities*: Working together on research increases capacity of communities to solve problems.

Research Approach

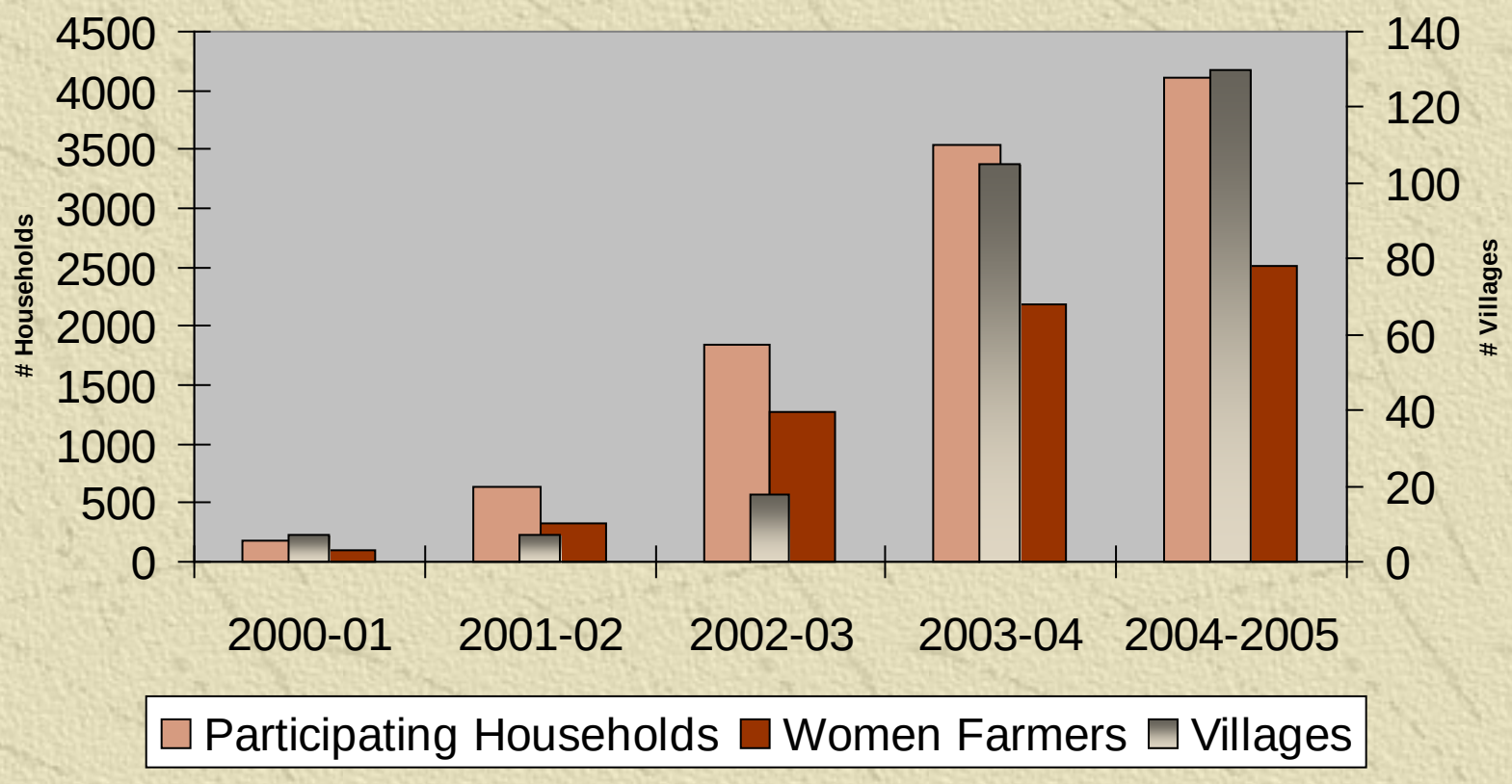
- 7 pilot villages to test legume options
- 10 x 10 m plots
- Farmer Research Team (FRT) in each village
- Mother-baby trials
- Any village member can test legume options
- Interdisciplinary research team work with FRT to assess legume options



Research Methods

- Semi-structured interviews and focus groups.
- Participatory rural appraisal methods such as food security ranking to develop local indicators.
- Pre-post,control-intervention longitudinal survey design of 240 households including anthropometric and dietary data.
- Yield data collected annually by FRT.
- Soil nutrient data on a sub-sample annually.

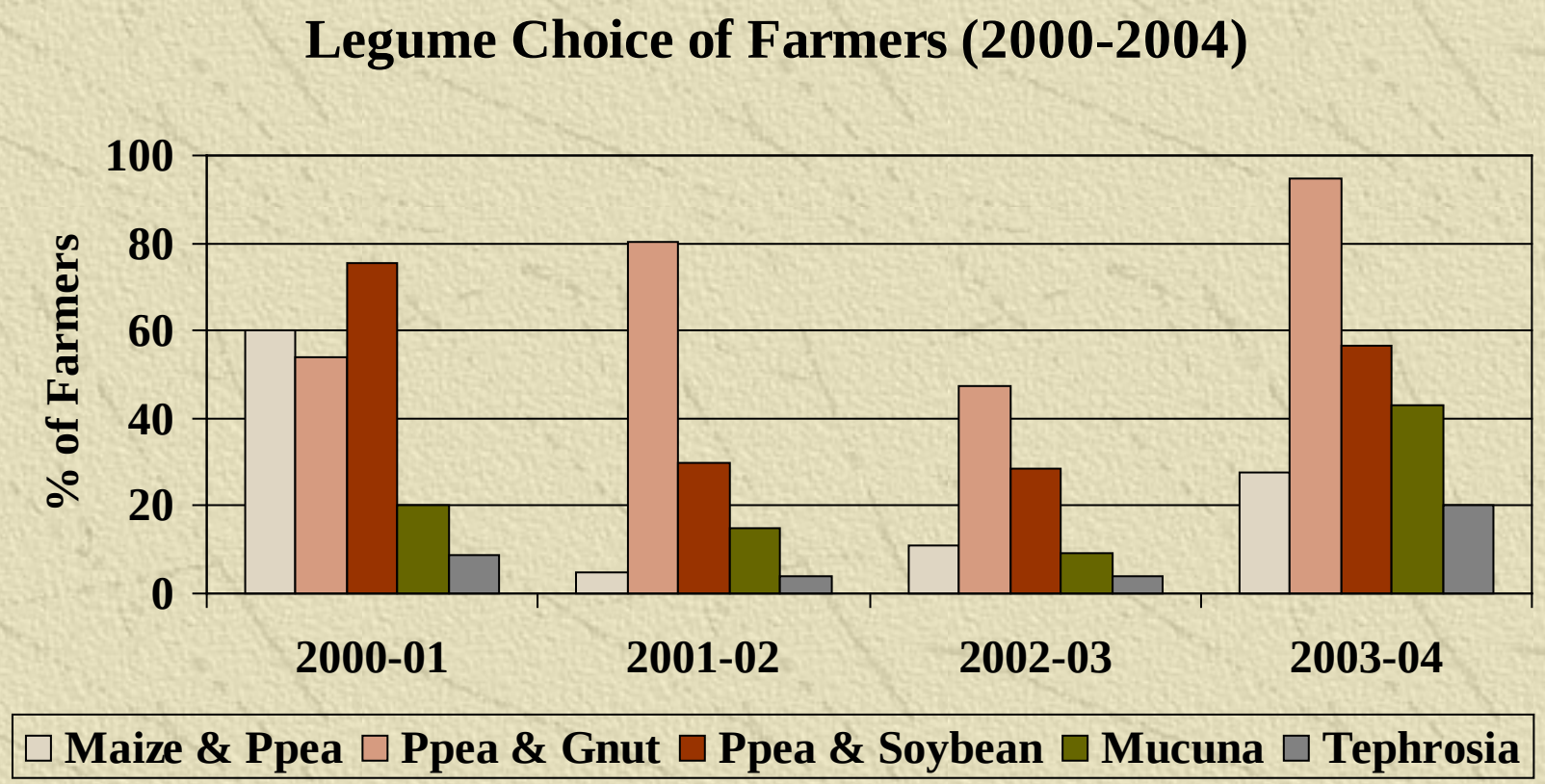
Results I. Community Interest



Farmer Research Team Model

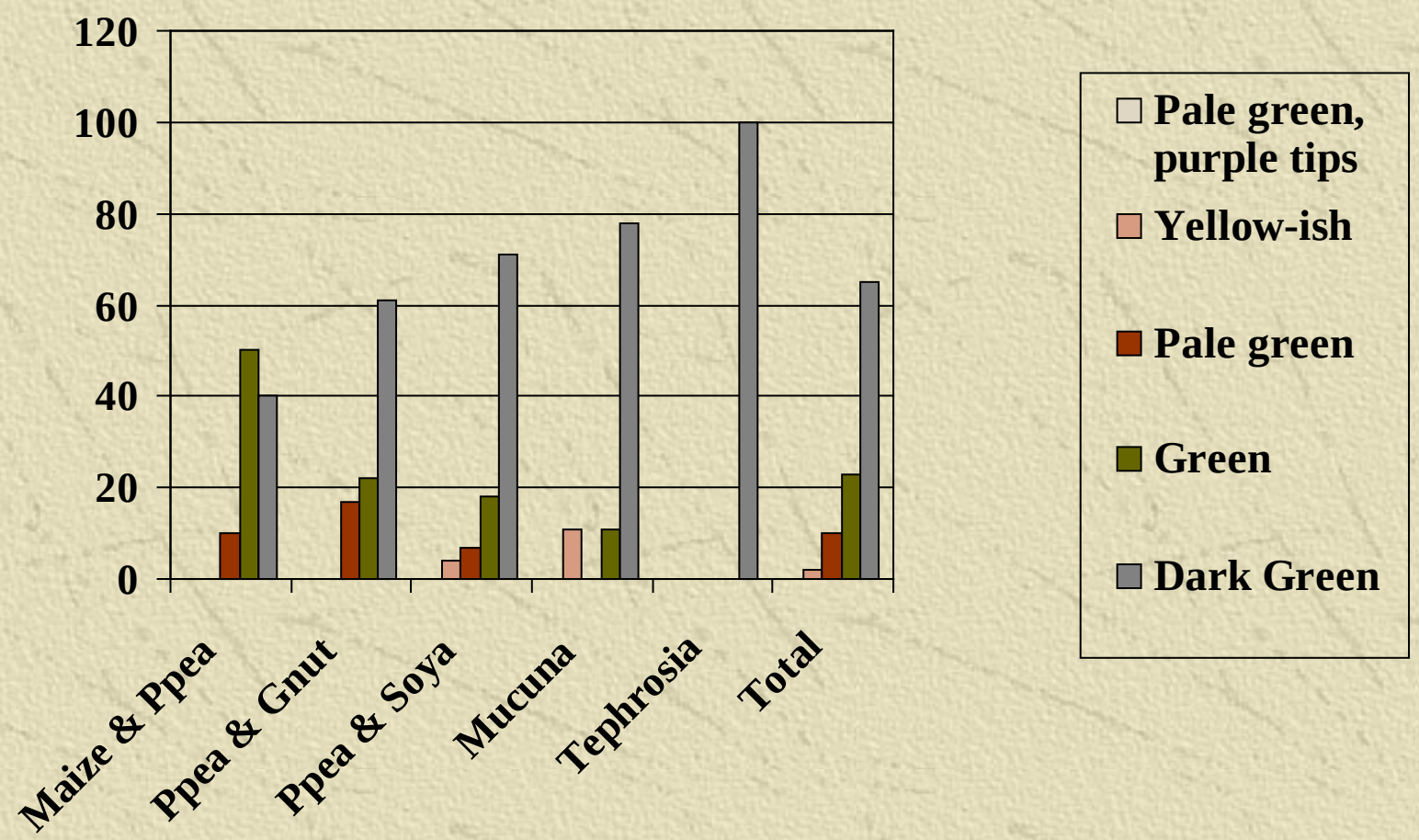
- Effective at spreading information
- Heavy workload
- Village leaders can play critical role
- Link with hospital important to success
- Issue of reporting research results

Results II. Agriculture



Maize Color after Legumes

(August 2002, n=89)



Why Choose Pigeon Pea & Groundnut or Pigeon Pea & Soya Beans?

- Food insecure households need edible legumes!
- Pigeonpea harvested late in dry season.
- Groundnuts are higher yielding than local varieties, high in oil.
- All 3 crops are fed to children in porridges.
- All crops good sources of gifts and bartering.

Results III. Food Security

- Farmers reported increases in food availability in homes.
- Pigeonpea valued especially for late dry season availability.
- Conflicts within the home over use of legumes.

Seed Flows

- 19 out of 21 farmers interviewed in 2004 had shared seed because:
  - ‘Wedding gift’
  - Exchange for labor
  - Help in times of need
  - Try new variety
  - Social obligation

Legume Expansion

(Interviews N=21)

Treatment	# of Farmers	Estimated Area (ha)	Increase (from 10x10 m)
Gnut & Ppea	15	0.5	50 times
Gnuts only	2	0.5	50 times
Ppea & Soya	10	0.5	50 times
Maize & Ppea	10	0.25	25 times
Mucuna	2	0.25	25 times

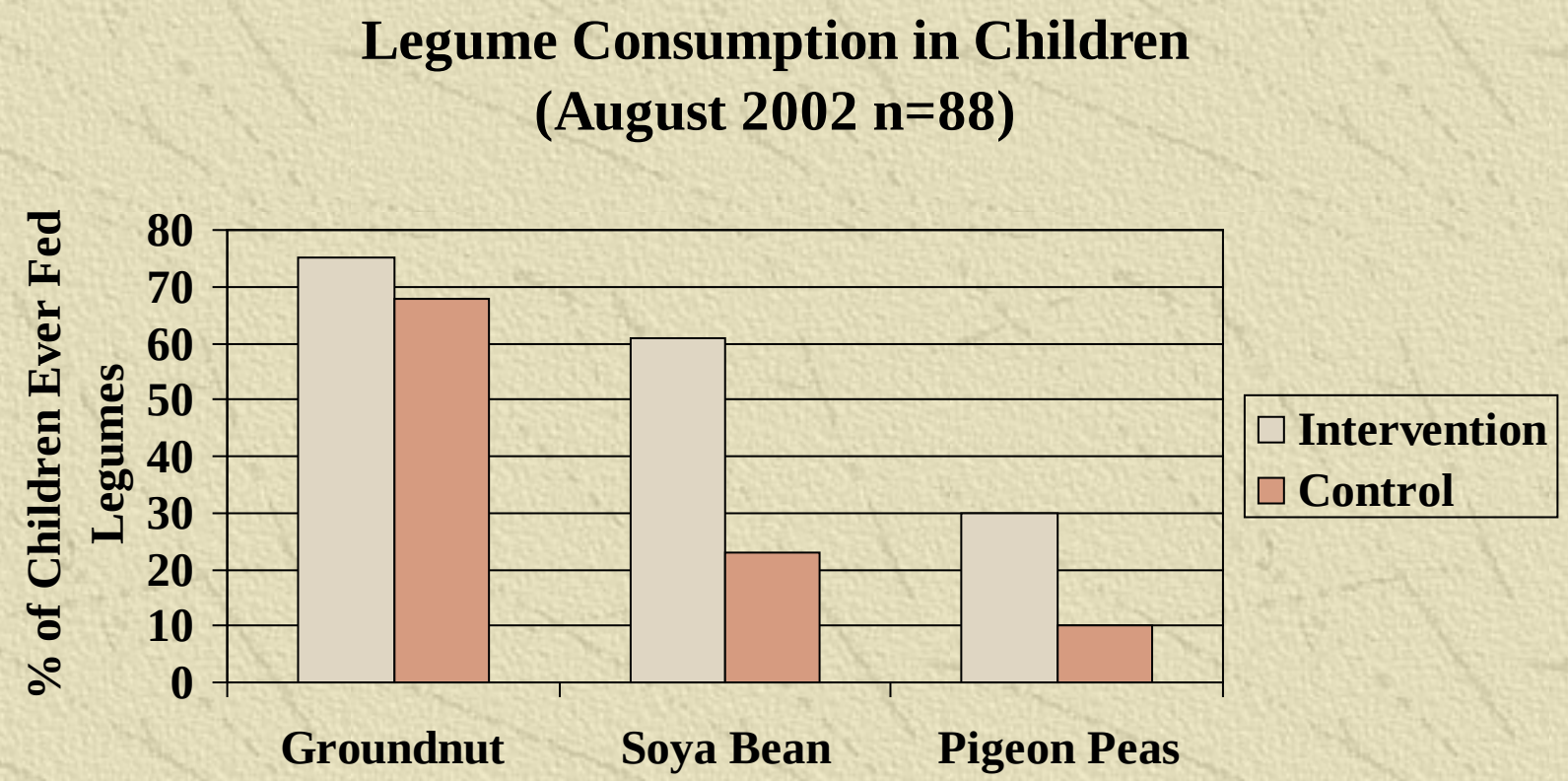
Nutrition Findings I

- Role of grandmothers critical in early child feeding.
- Early introduction of watery porridge.
- Informal chatting as source of knowledge transfer
- Labor shortage in rainy season for feeding young children.

Nutrition Education

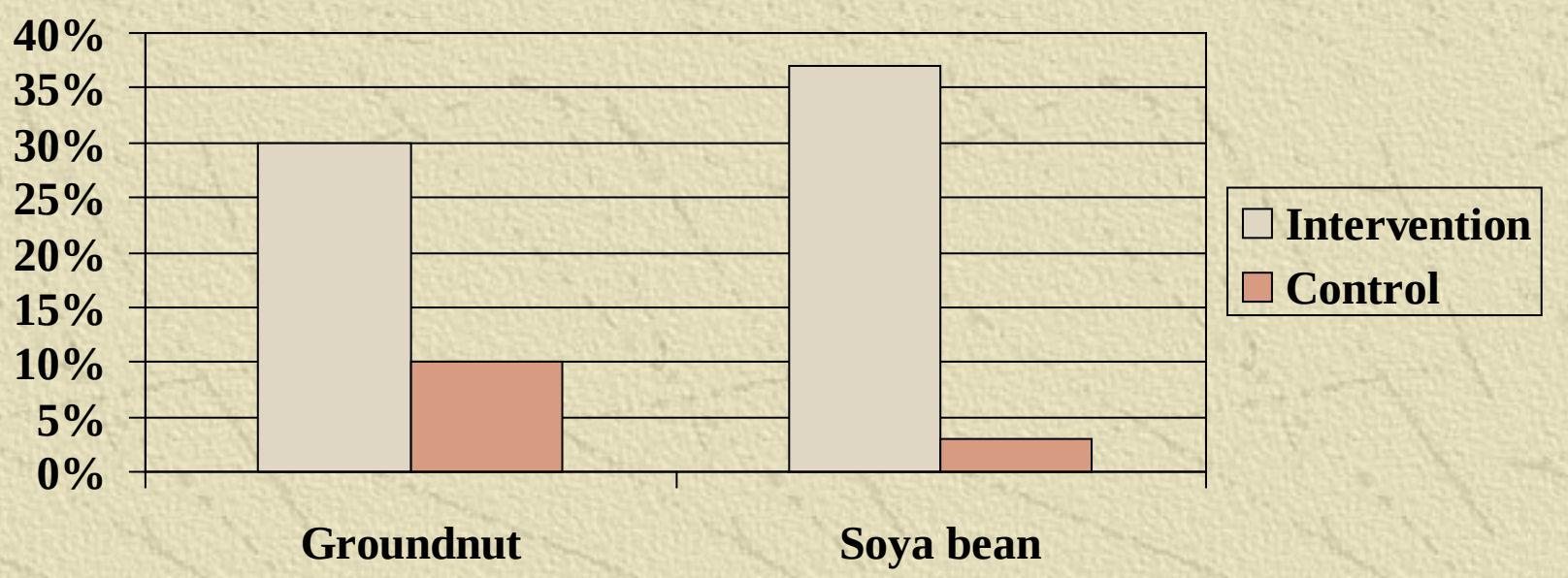
- Nutrition village teams.
- 4 themes: breastfeeding, legume recipes, family cooperation, frequent feeding of young children.
- SFHC community nutritionist provides training on each theme.
- Recipe days, dramas, role plays, informal chatting.

Nutrition Findings II



Frequency of Legume Consumption

Children (%) Consuming Legumes > 3x/week
(August 2002, n=88)



Challenges

- Success of project led to over-extension.
- Involving scientists in community program.
- Maintaining enthusiasm of FRT.
- Addressing ‘gender’ in respectful ways.
- Village-level politics.
- Broader structural factors e.g. 2002 famine.

Research & Development Link Has Challenges & Rewards!

Benefits

- Technologies tested in ‘real life’ and adapted to fit conditions.
- Hospital links facilitated community relationships.
- Information from development activities fed back into research.
- Research information spread quickly to farmers, other organizations & programs.

Conflicts

- Quality of data (e.g. control communities).
- Collection of data can be too time-consuming.
- Reporting research to communities effectively.
- Expansion from testing legume options to promoting them.
- Involving farmers in a meaningful way in research.

Future Directions

- Involving grandparents in nutrition education.
- Linking agricultural topics to nutrition with ‘clubs’.
- Adapting legume options for AIDS-affected families.
- Improved germplasm and management (e.g. pests) of legumes, especially soybeans & pigeonpeas.
- Farmer apprenticeship to maintain FRT enthusiasm.

Conclusion: Agriculture Can Help Improve Nutrition

- Agriculture is only one of many factors that affect food security and nutrition.
- If food security and nutrition are goals, need to build into research design and activities.
- Conflicts between research and development activities need to be considered.
- Participatory research helps shed light on social factors that influence outcomes.
- Participatory research allows community to take ownership of research and development activities.

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