

Characteristics of a sustainable seed system: Application of the principles of sustainability to two models used in Central America

Byron Reyes
Mywish K. Maredia
Michigan State University

*Session on: Innovations in Sustainable Seed Systems for Grain Legumes
Legume Innovation Lab Global Meeting, Athens, May 14, 2014*

Outline

- What is 'sustainable seed system'?
 - Basic elements of the seed system
 - Principles of sustainability
- Focus on two principles of sustainability (cost-recovery and price) and apply them in the context of two models used in the BTD project
 - Centrally coordinated (Guatemala)
 - Community based (Nicaragua)
- Derive implications and lessons for broader applicability to other countries

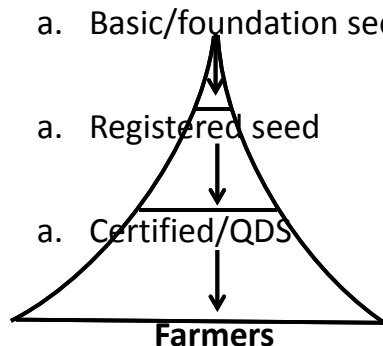
Basic elements of a seed system

1. Production and multiplication of seed (three major types)

a. Basic/foundation seed

a. Registered seed

a. Certified/QDS



3. Seed laws and regulations

2. Distribution/delivery of seeds from one stage to the next to ultimately reach the farmers at the end of the seed value chain (with quality planting material)

What do we mean by a **sustainable seed system**?

- 'Sustainable seed system' refers to a **system** of seed multiplication, production and dissemination that is characterized by **six principles**



Principles of a Sustainable Seed System

- **Cost-recovery:** The ability of the 'system' to recover the cost of producing, multiplying and distributing seeds
- **Quality:** The ability of the 'system' to supply quality seeds to farmers
- **Quantity:** The ability to supply enough quantity of quality seeds to meet the needs



Principles of a Sustainable Seed System (2)

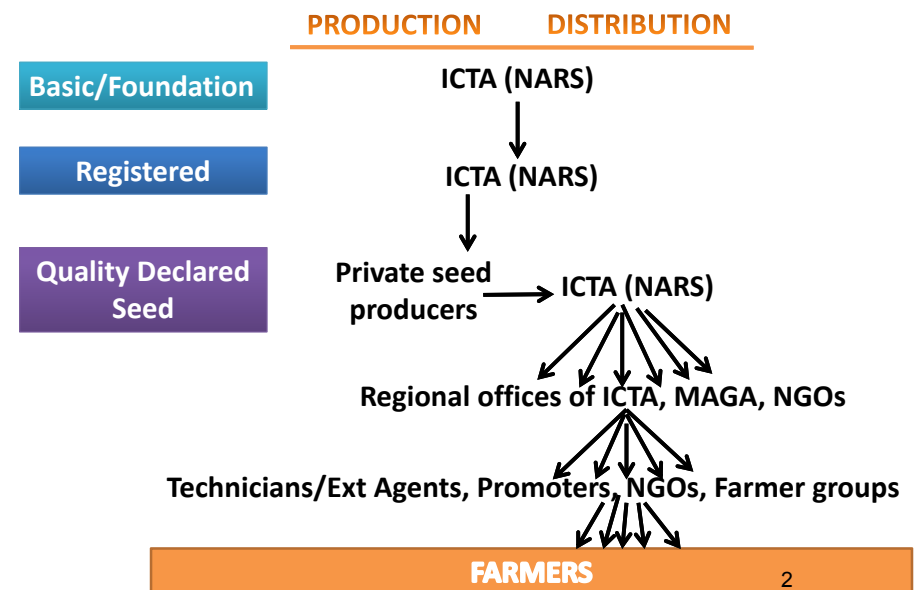
- **Diversity:** The ability of the 'system' to supply adequate quantity and quality of diverse varieties of seeds to meet the needs
- **Service/accessibility:** The ability to deliver these seeds in a timely manner in locations that are accessible to farmers
- **Price:** The ability of the 'system' to supply these seeds at an **affordable price!**



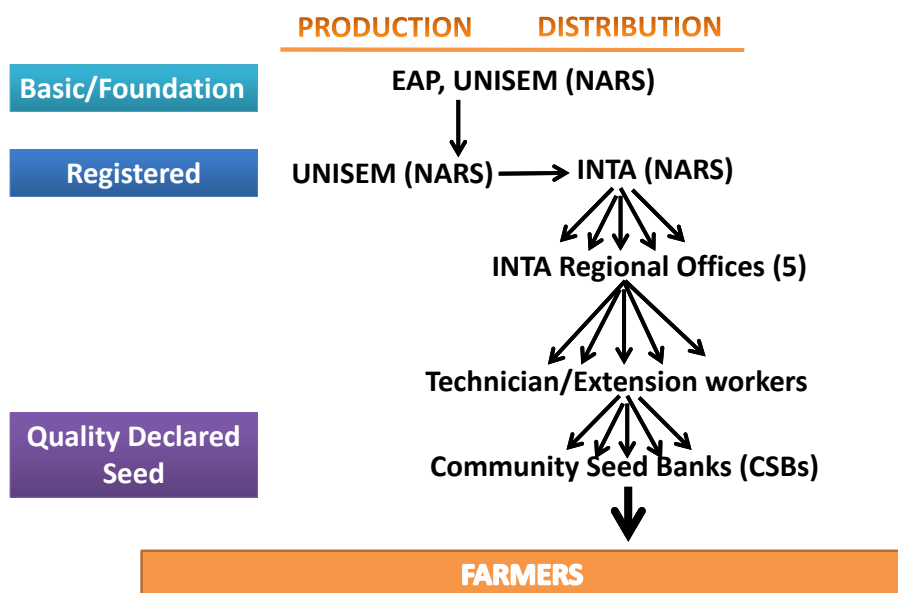
Operationalizing the seed system for a legume crop (Common Beans) in Central America

Focus on two principles (**cost recovery and price**) under two public sector supported systems (**centrally coordinated vs. community based**)

Example 1: Guatemala (Centrally coordinated model-Year 2)



Example 2: Nicaragua (Community based model)



Salient features of the two models

- Both share **similarities** in stage 1 (FS) and 2 (RS) production system
- But **vary in** operationalizing stage 3 – QDS seed production and distribution

Centrally Coordinated

- Production of QDS is **outsourced** to private seed producers
- But ICTA took **responsibility** to condition, pack and distribute the QDS seed to government (ICTA, MAGA) and NGOs' regional offices
- Within these organizations, a multiple-tier (hierarchical) system was used to reach the farmers at a **SCALE**

Community Based Approach

- INTA **distributed** RS to regional offices, which in turn used their network of technicians/extension workers to reach hundreds of CSBs
- Production of QDS occurred at the **community level** by the CSBs and distributed to 100s of farmers in or near the community

Implications of the two models on the cost of bean seed production/distribution

What are the costs to reach (for e.g.,) 10,000 farmers with Q amount of QDS seed/farmer?

Cost components	Centrally-Coordinated	Community Based
Seed Production		
Foundation seed	X	X
Registered seed	Y	Y
Quality-Declared seed	Z	W
Seed distribution		
Foundation seed	A	A
Registered seed	~0	B
Quality-Declared seed	C	~0
Capacity building and supervision costs		
Cost of providing technical assistance to QDS producers	R	S
Total cost (TC)	TC= f(X,Y,Z,A,C,R)	TC= f(X,Y,W,A,B,S)

Costs of reaching (for e.g.,) 10,000 farmers with Q amount of QDS seed/farmer under the two models? (2)

- The cost of **producing QDS** under the two models (**Z** and **W**) remains **ambiguous**
 - On the one hand private seed producers may gain from the economies of scale and specialization which can lower the unit cost of producing QDS
 - On the other hand, CSBs operate on the principle of voluntarism and self-help, which may imply lower economic (cash) cost of producing QDS
 - **Assume W ≈ Z**
- If assumption correct, the **total cost depends** on the cost of distributing the QDS vs. RS (**B** vs. **C**) and the cost of technical assistance to QDS producers (**R** vs. **S**)

Costs of reaching (for e.g.,) 10,000 farmers with Q amount of QDS seed/farmer under the two models? (3)

- The cost of distributing (i.e., transportation, logistics) [Q *10,000] quantity of seed from **a central location to reach 10,000 farmers** across the country **(C)** is **LIKELY** to be much **higher than** the cost of distributing **0.05Q to 100 CSBs across the country (B)**
 - **Ceteris paribus, B is likely to be < C**
- However, there are costs to the NARS system to establish hundreds of CSBs (i.e., training, capacity building, technical supervision to ensure quality seed is produced) **(S)**, which can be substantially more than training a few farmer seed producers **(R)** to produce QDS in bulk on a contract basis
 - **Ceteris paribus, S is likely to be > R**

Which model is **better**?

- **Will depend on:**
 - How big is the difference between **(C+R)** and **(B+S)** (may be country specific)
 - How do the TC of seed **production and distribution** compare with the **willingness to pay for seed** by the farmers (i.e., the possibility and rate of cost recovery)
 - If full cost recovery is not possible and (partial or full) subsidy is required, then the desirability of a model will depend on whether the public sector and the NARS institutions have mechanisms to better absorb/cover (i.e., subsidize) the cost of “logistics” vs. “personnel”

What is the **evidence** of farmers’ willingness to pay for quality seed?

- We use data from the BTD project **beneficiary surveys** conducted in 2012 (Nicaragua) and 2013 (Guatemala) to examine this question

About the surveys:

- A snap shot approach with a focus on Yr 1 (NIC) and Yr 2 (GUA)
- Sample size (# of farmers): 500 (GUA) and 480 (NIC)
- Geographic coverage: 5 FTF Departments (GUA) and all 5 regions (NIC)

Note: Data are **not representative** of the BTD project across **all 3 years**

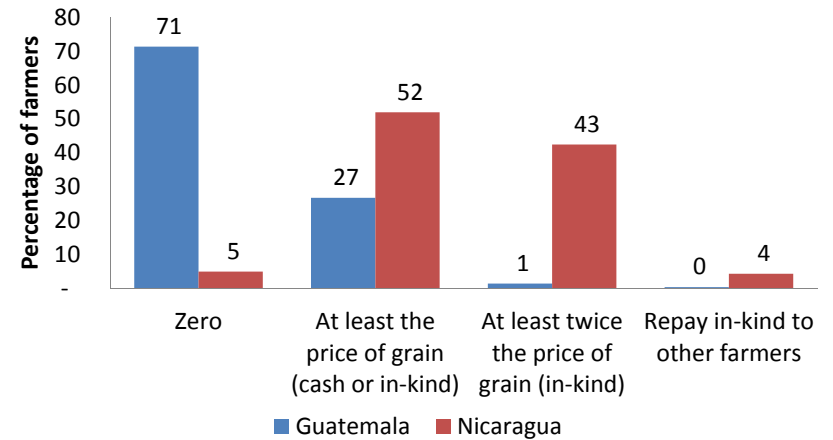
About the surveyed sample of beneficiaries

- The socio-economic profiles of beneficiary HHs in Guatemala fall more on the **disadvantaged end** of distribution than the average HH beneficiaries in Nicaragua. For e.g., compared to sampled farmers in Nicaragua, surveyed farmers in **Guatemala**:
 - Are Less educated
 - Have less land holding (0.6 mz vs. 9.8 mz)
 - Live in a densely populated area
 - Are less bean secure
 - Do not have easy access to certified bean seed (19% vs. 32%)
 - And purchased certified bean seed less frequently (13% vs. 30%)

Method

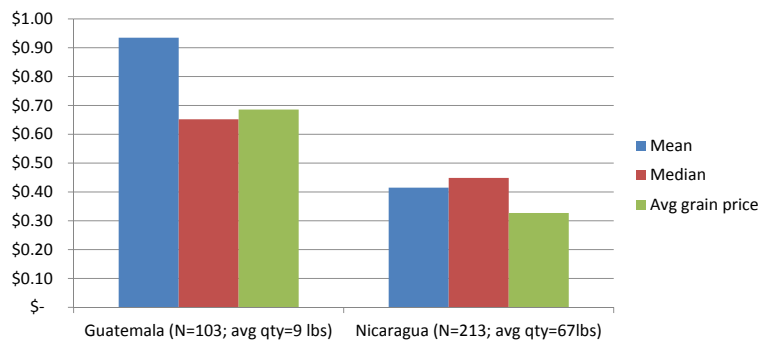
- Since bean 'seed' **competes with** bean 'grain' as planting material, we measure farmers' willingness to pay (WTP) for 'seed' **RELATIVE** to grain price
- WTP data are based on farmer elicitation on their **opinion on the payment agreement** (cash or in-kind) and how much they would be willing to pay for any additional seed **after** they had planted and gained experience growing the bean seed of improved variety distributed by the BTD project

What is farmers' willingness to pay for seed and type of payment?



Source: BTD Beneficiary Survey data, 2012-13

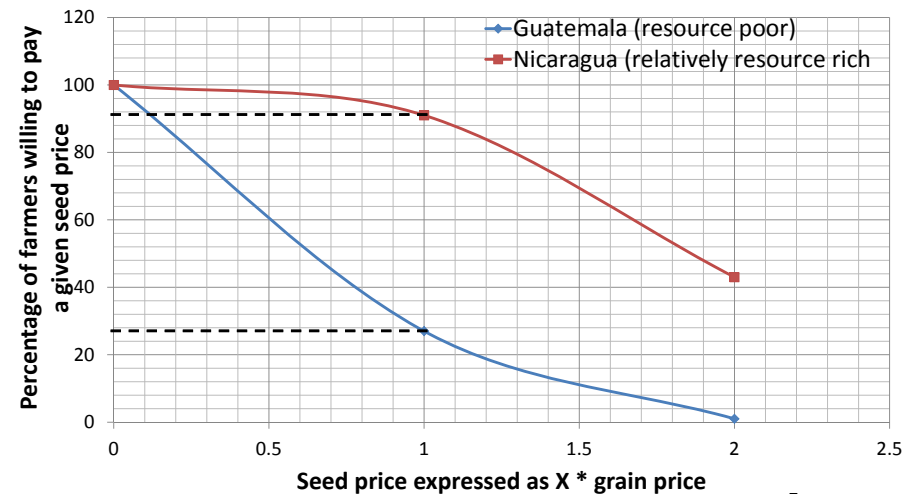
Those that needed additional quantities of seed, their **willingness to pay for seed (both cash and in-kind) in relation to the average bean grain price (US\$/lbs):**



Source: BTD Beneficiary Survey data, 2012-13

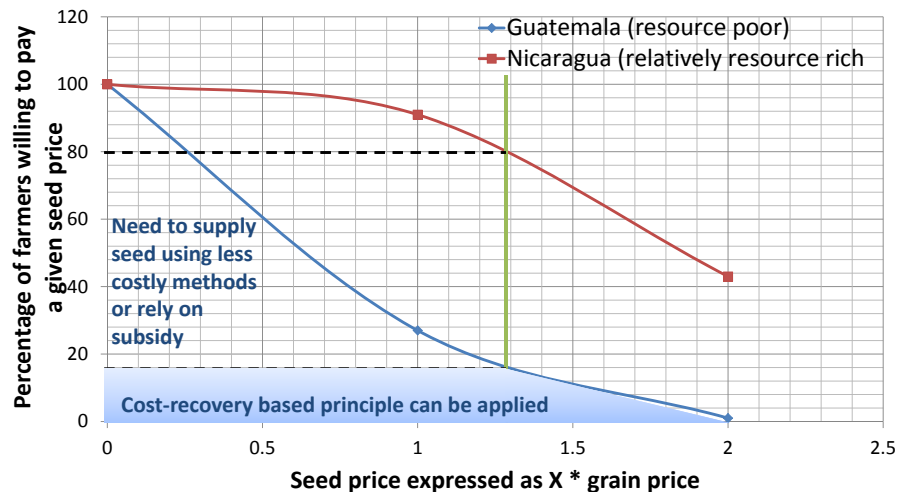
	Guatemala	Nicaragua
Average seed price premium willing to pay (in relation to grain price)	36%	27%
% of farmers WTP for seed more than the average price of grain	41	75
% of farmers WTP for seed more than twice the average price of grain	7	7

Percentage of farmers willing to pay for seed X * grain price



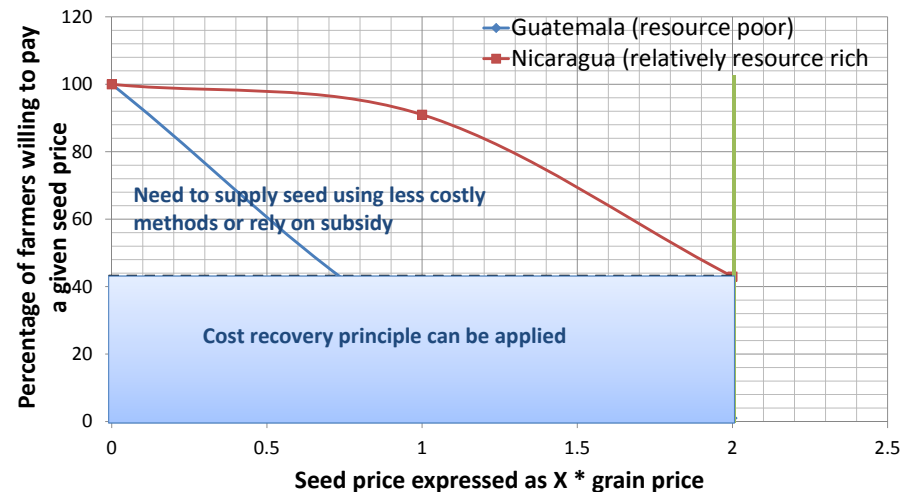
Source: BTD Beneficiary Survey data, 2012-13

Applying the principle of **cost-recovery** (Guatemala)



Source: BTD Beneficiary Survey data, 2012-13

Applying the principle of **cost-recovery** (Nicaragua)



Source: BTD Beneficiary Survey data, 2012-13

Main Message(s)

- There is WTP for quality seed with a **premium** over the grain price; but the amount willing to pay is **highly correlated** (not a surprise) with the **economic status** of bean farmers
- Meeting the seed needs of the farmers across the spectrum based on **100% cost-recovery principle** and private sector led model **will not be a viable** option for legume crops in many developing countries
- **Scaling up** efforts must be **based on** a two (or multi)-pronged approach of **subsidies and cost recovery** (where possible)
- Models based on **seed production closer to the end users** (i.e., community based systems) may have **better chance of recovering the cost** of QDS production in the form of **in-kind payment**

Thank you

Welcome your thoughts/feedback