

# **SEED SYSTEM: THE KEY FOR A SUSTAINABLE AGRICULTURE FOR SMALLHOLDER FARMERS IN THE PHILIPPINES**

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# Why the Need for Seed System?

Seed is the life blood of Agriculture

Low productivity @ <700 kg/ha (legumes)

Good quality seeds will increase productivity by 20-30%

Farmers save seed of local varieties and use this continuously for 3-5 years

80-90% seeds are sourced from farmers' own-saved seeds

Low seed replacement ratio @ 2-3%

Only 10-12% of quality seeds is available each year

Access to quality seeds by smallholder farmers is a recurring problem

Inadequate transfer of technologies appropriate for smallholder farmers

# What is a Seed System?

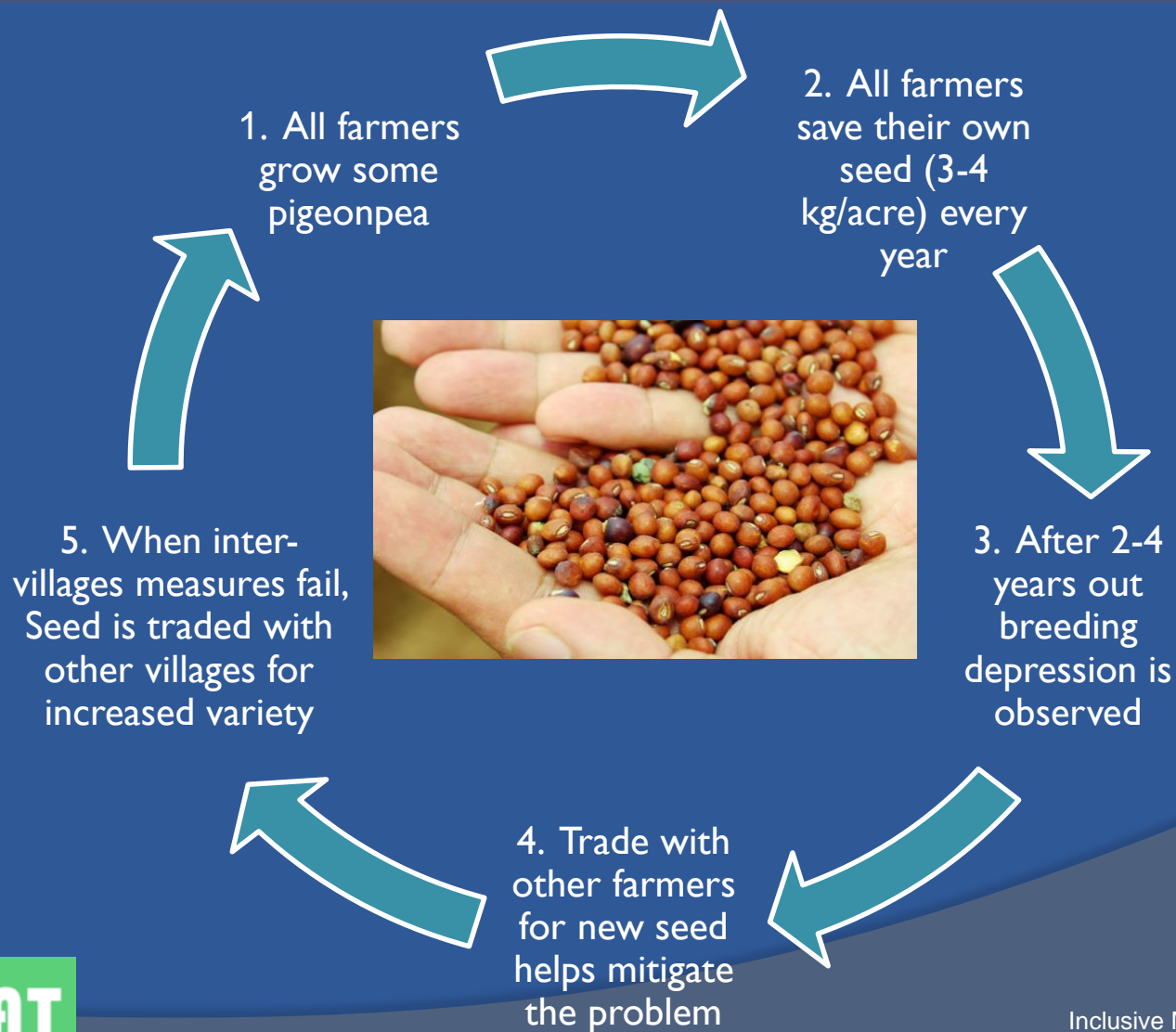
“all the channels through which farmers acquire genetic pure materials in interaction with the commercial seed industry.”

(Tesfaye et al, 2005)

# Seed Systems in Legumes are complicated due to these reasons:

- ❖ Economics of legume seed production not attractive enough to encourage private seed sector, mainly due to large seed volume and high transportation and storage costs.
- ❖ Public seed sector (responsible for legume seed production) largely failed to meet their obligation due to lack of accountability, poor quality control, low yield and profit.
- ❖ Subsidized government seed supplied is often not delivered in time, and quality is inconsistent.
- ❖ Farmers are left at the mercy of local traders who hardly care for variety integrity and quality.
- ❖ Stringent seed certification requirements and accompanying bureaucratic hassles discourage farmers' participation in the formal seed system.

# Farmer Pre-Market Seed System





# Seed System consists of . . .

- ◎ Formal seed system
- ◎ **Informal seed system**
- ◎ Integrated seed supply system

# Formal Seed System

Formal seed system operates within specified quality standards

- ◎ International Agricultural Research Centers
- ◎ **Government agencies**
- ◎ Government-assisted cooperatives
- ◎ **Multinational corporations (MNC)**
- ◎ Domestic private sector companies
- ◎ **MNC + domestic companies**



# Formal Seed System Framework

**National**

**International**

**Government,  
Universities,  
Research  
Institutes, and  
Seed Companies**

**Multinational  
and Bi-lateral  
Development  
Agencies, Seed  
Companies**

**IARC**

**Informal Seed Sector: Coops, Farmers'  
Org, NGOs, Govt. Org, Farmers**

# Formal Seed Systems Limitations for Smallholder Farmers:

- Only a limited range of varieties are available, and operates within specified quality standards
- **Seed transactions are in large quantities (volume)**
- The existence of even a relatively developed formal sector at the national level certainly cannot guarantee smallholder farmer seed security at the community and household levels

# Informal Seed System

- NARES
- Farmer Cooperatives/Associations
- Self Help Groups
- Individual Farmers
- NGOs

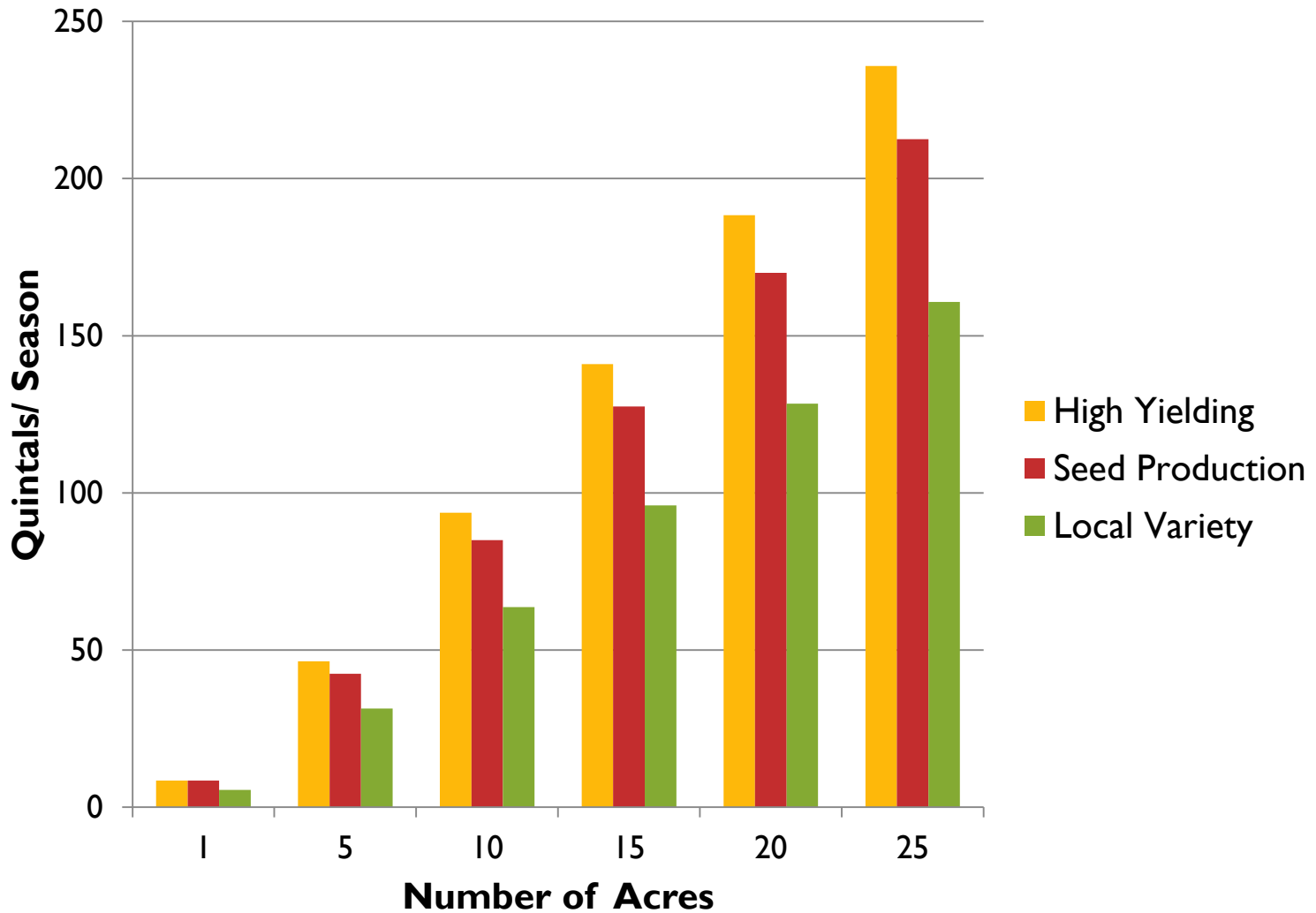
## Types of Informal Seed System

- ❖ ‘One Village One Variety’ concept for OPV
- ❖ Community Based Seed Production Model

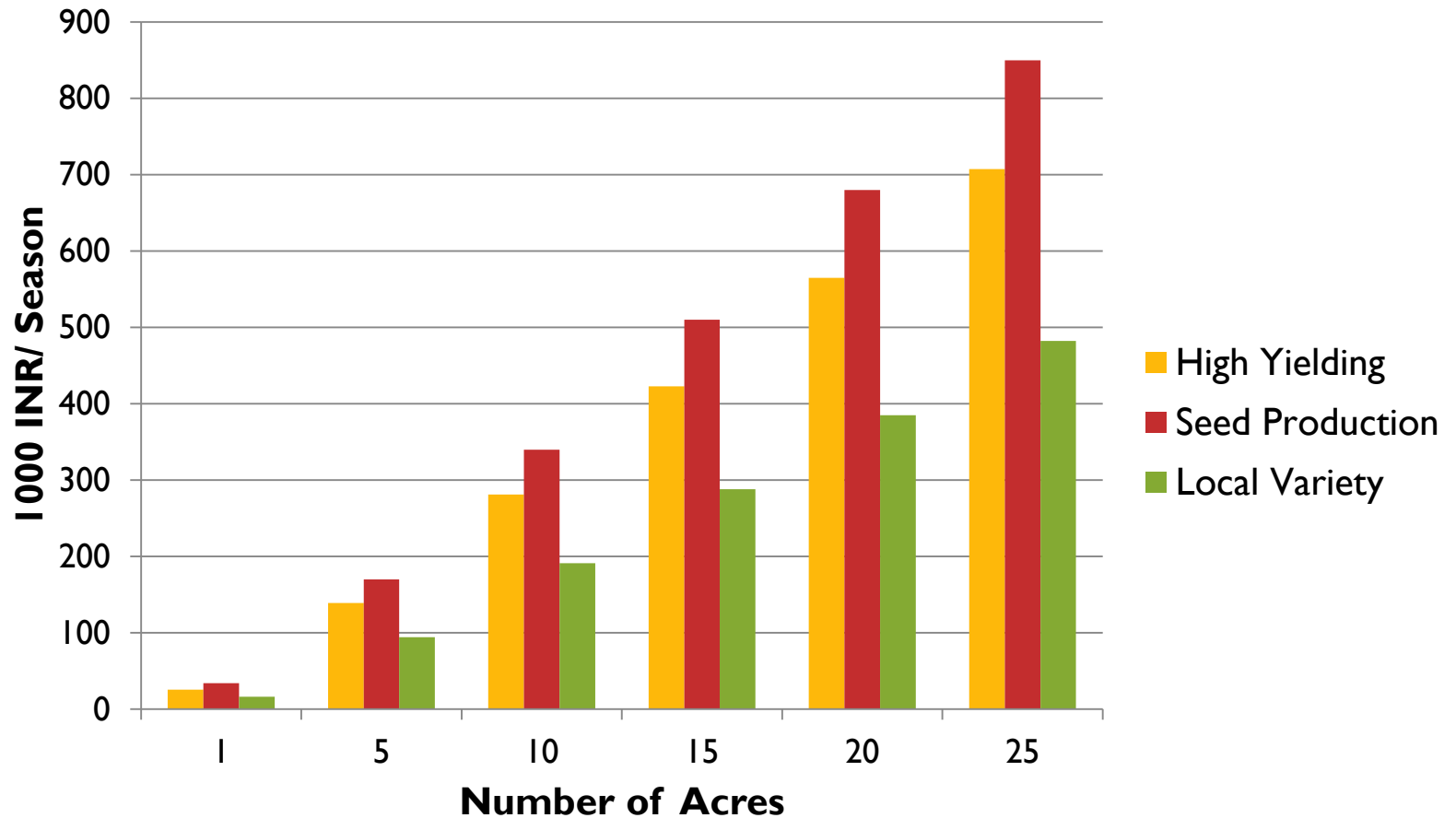
# ‘One Village One Variety’ Model

- Ability to do seed production (exponential market returns) by smallholder farmers
- Purity of seed is maintained in subsequent years by avoiding out-crossing.
- Farmers maintains desirable varietal traits (high yields, wilt resistance, etc.)
- Farmers will become entrepreneurs

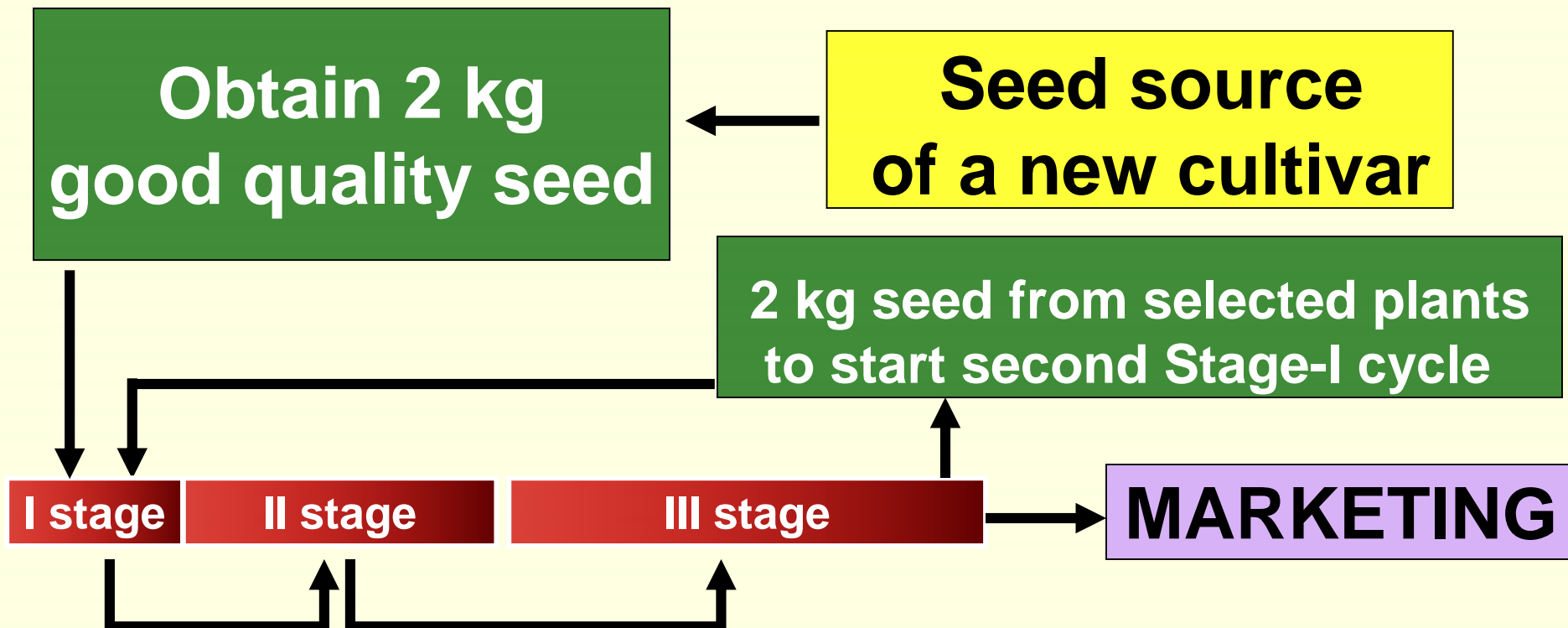
## Yield According to Variety or Production Type



## Market Return According to Variety and Production Type



# Groundnut and Chickpea Seed Production Model



**Stage-I seed plot 0.01 ha (1<sup>st</sup> season)**

**Stage-II seed plot 0.10 ha (2<sup>nd</sup> season)**

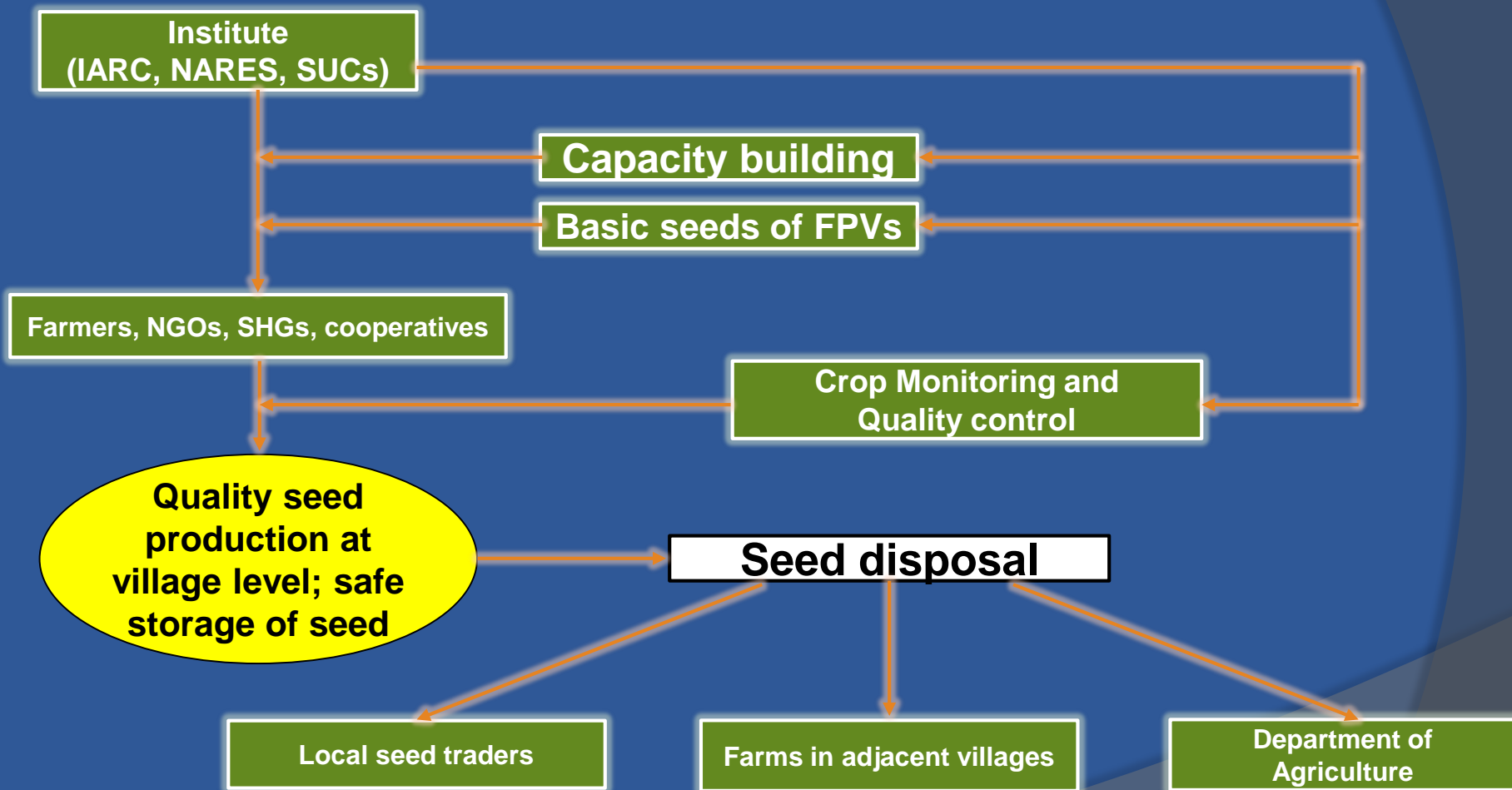
**Stage-III commercial plot 1 ha (3<sup>rd</sup> season)**

# Informal Seed System Limitations

- Regulatory and legal framework adversely affect the informal seed system
- **Seed standards may be incompatible with farmers' needs**
- Seeds used for sowing come from own farm, exchange, or traders are sub-standards
- **During crop failures, the seed supplied by the Government, may be insufficient in quantity and not in good quality**
- **Seed transaction of new varieties are limited**
- **Traditional varieties**



# Community-based Seed Production Model of the Informal Seed System



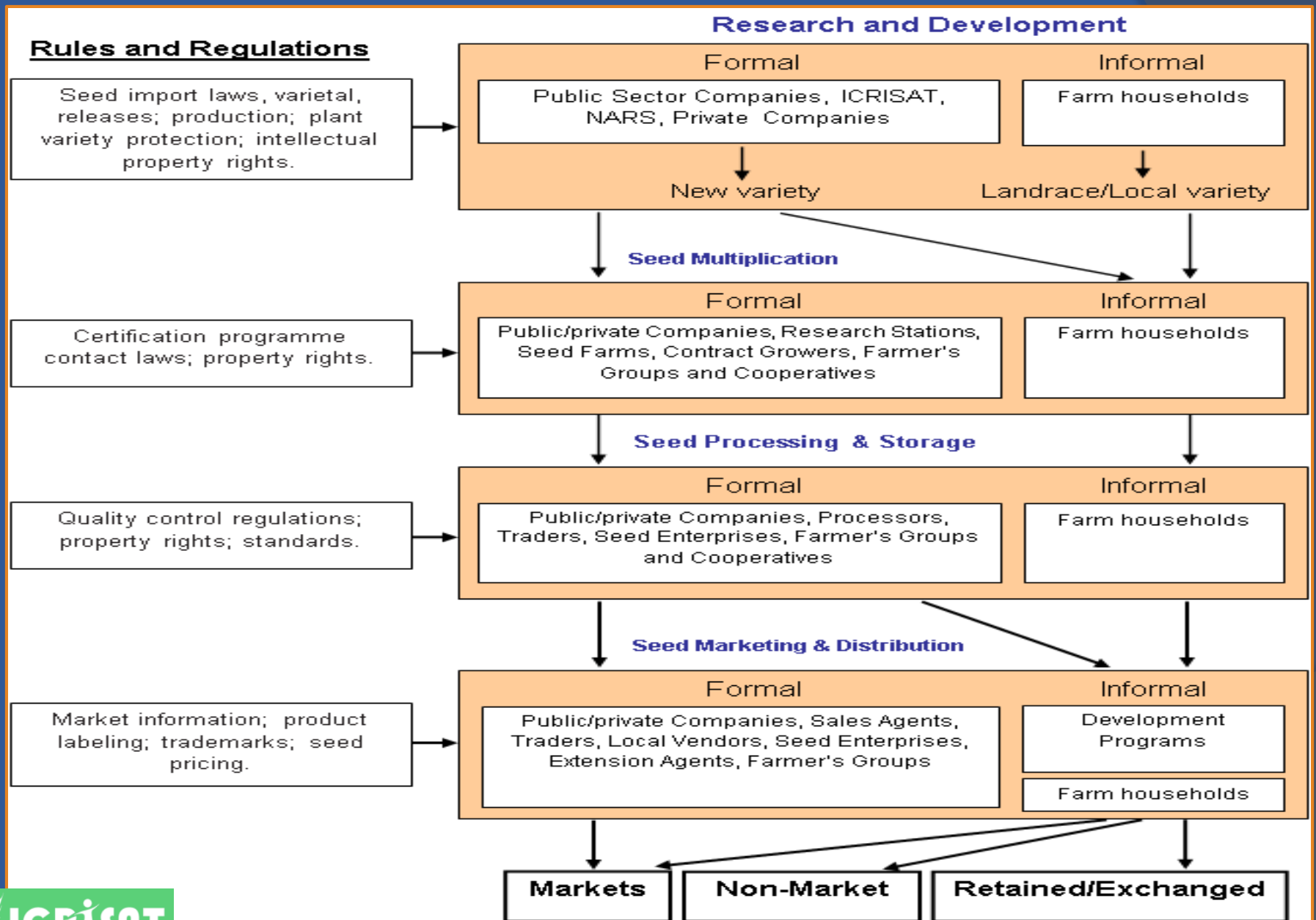
# Community-based Seed System Limitations

- Poor infrastructure in rural areas
- **Shortage of seed & other resources**
- Lack of awareness for new technology
- **Poor assessment of potential adoption of new varieties**
- Inadequate participation of farmers
- **Weak local seed exchange networks**
- Inadequate cropping systems
- **Inadequate institutional support**
- Exploitation by middlemen

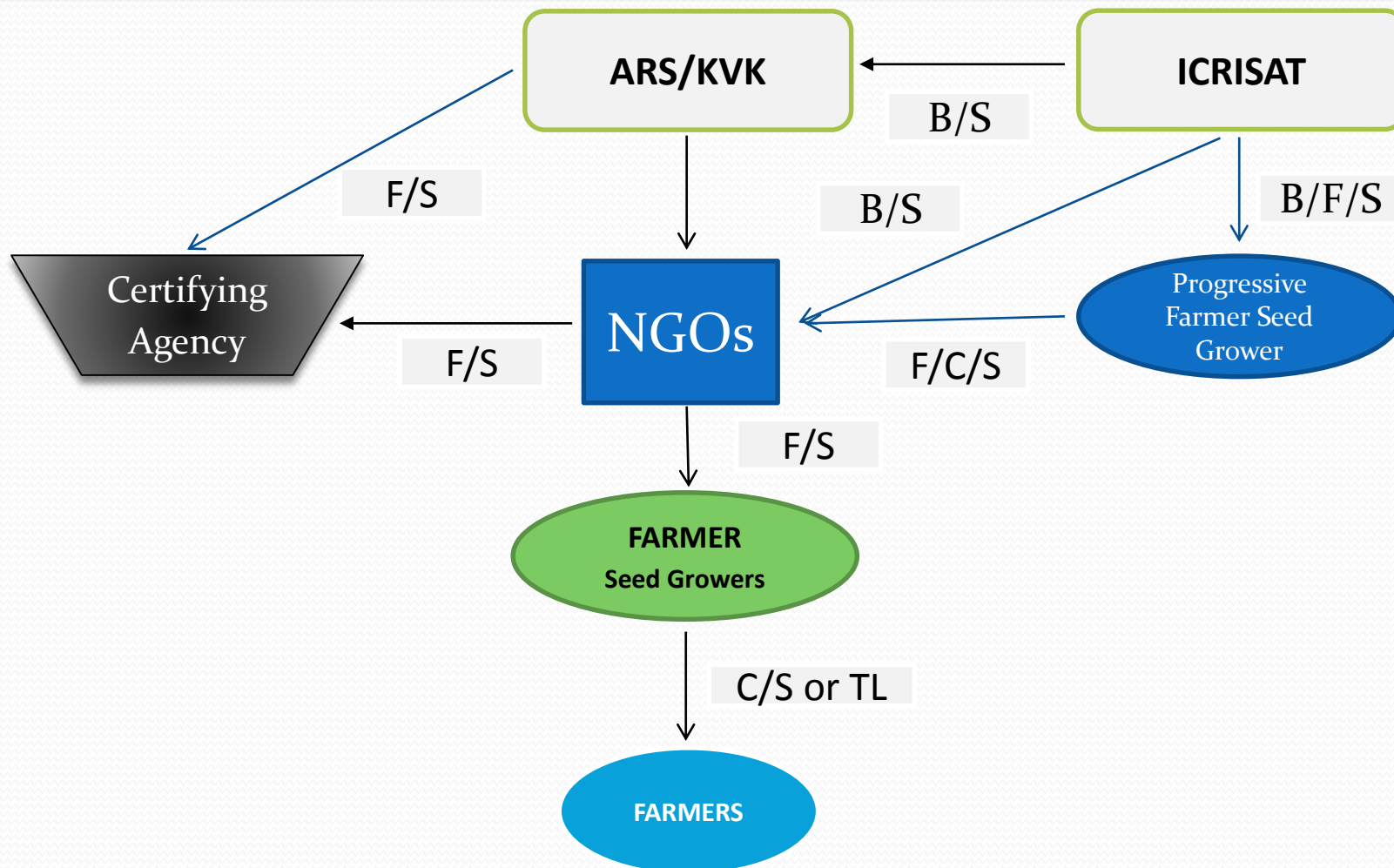
# Integrated Seed System

- Promotion of new varieties
- Integrate breeding, seed production, & distribution
- Farmers involved at some stages
- Shown promise in improving seed supply to smallholder farmers
- The strengths and weaknesses of local seed systems and the formal seed systems are complimentary

# Integrated seed system organizational and institutional schema



# Odisha, India: Formal - Informal Seed Village Model Framework (Pigeonpea 'one variety one village' concept)



# How to Improve Farmers' Participatory Seed Systems

- **Develop strategies to produce, test, & market**
- **Backup institutional support & crop insurance**
- **Agreements between farmers & seed agencies**
- **Help farmers in adoption of new technology**
- **Develop specific models based on geographic and ethnic considerations**
- **Implement self-reliance seed programs to decentralize seed business**
- **Identify and promote farmer preferred cultivars through varietal trail and field demonstration**

# Continuation...

- **Encourage or partner with seed companies to involve in pulses**
- **Encourage policy makers to support pulses seed programs**
- **Strengthen capacity of self-help groups (associations and cooperatives)**
- **Incentives to participating farmers (buy-back scheme)**
- **Develop a quality seed backup program through government and private sectors**

# Quality Seed Required By 2025

## Chickpea seed

Breeder = 448,720 kg  
Foundation = 5,983,830 kg  
**Certified = 74,800,000 kg**

## Pigeonpea seed

Breeder = 4,940 kg  
Foundation = 220,100 kg  
**Certified = 9,174,000 kg**

**ARE  
WE  
READY  
??**

**Diversify & Simplify the Systems**



# Role of Philippine Agencies Involved in the Seed System

Agency	Role
DA	Lead Institute
IPB, BPI	Continuously produce or develop nucleus, breeder seeds
SUCs	Backstop in providing breeder and foundation seeds
PHILMEC	Provide cold storages, and other post harvest facilities i.e. thresher, harvester, seeder, dal mill etc.
DA-RFU/RIARCs	Develop nucleus and breeder seeds and mass produced foundation and certified seeds
ATI	Provide capacity strengthening to stakeholders
DA-AMAS	Provide market study and market linkage to farmers domestically and internationally
LGUs	Coordinate all the activities and provide financial and physical support
Farmer Seed Growers	Mass produced certified and good seeds

## i.e. Responsibility of partners in the seed production program

<b>Crop</b>	<b>Type of seeds produced</b>	<b>Responsible institute</b>
Groundnut and Chickpea	Nucleus and Breeder seeds	ICRISAT, IPB, SUCs
	Breeder and Foundation seeds	SUCs, ROS (DA), IPB, BPI
	Certified, Registered and Good seeds	Registered farmer seed growers
Pigeonpea and Sorghum	Nucleus and Breeder seeds; Hybrid parent material	ICRISAT, IPB, SUCs
	Breeder and Foundation seeds, Hybrid seeds	SCUs, ROS (DA), IPB, BPI
	Certified, Registered and Good seeds	Registered farmer seed growers

# Seed Production and Multiplication (3 year development plan)

Crop	Estimated Yield/ha (kg)	Year 1		Year 2		Year 3	
		Area planted (ha)	Total Yield (kg)	Area Planted (ha)	Total Yield (kg)	Area Planted (ha)	Total Yield (kg)
Pigeonpea	500/ha	5	2500	125	62,500	3125	1562500
Chickpea	800/ha	3	2400	30	24,000	300	240,000
Sorghum	2000/ha	3	6000	1000	2000000	333333	
Remarks		Breeder		Foundation		CS	

Seed and area requirement for the 1<sup>st</sup> year of breeder seeds provided by ICRISAT

- Pigeonpea – 100 kgs @ 20 kg/ha = 5 ha (ICPL88039- early duration variety)
- Chickpea – 216 kgs @ 80 kg/ha = 3 ha
- Sorghum – 20 kgs @ 6 kg/ha = 3 ha

# Pigeonpea Seed Production & Multiplication of Medium Duration Cultivars

Year	Area Planted (ha)	Yield Assumption	Area Planted (ha)	Yield Assumption	Area planted (ha)	Yield Assumption
Year 1	1 ha	• Production (500 kg)				
Year 2	2 ha	• Production (1000 kg)	41 ha	• Productivity (500 kg/ha) • Production (20,500 kg)		
Year 3	3 ha	• Production (1500 kg)	83 ha	• Productivity (500 kg/ha) • Production (41,500 kg)	1,708 ha	Year 3 production is estimated at 854,000 kg
Year 4	4 ha	• Production (2000 kg)	125 ha	• Productivity (500 kg/ha) • Production (62,500 kg)	3,458 ha	Year 4 production is estimated at 1,729,000 kg
Year 5	5 ha	• Production (2500 kg)	166 ha	• Productivity (500 kg/ha) • Production (83,000 kg)	5,208 ha	Year 5 production is estimated at 2,604,000 kg
Year 6			208 ha	• Productivity (500 kg/ha) • Production (104,000 kg)	6,916 ha	Year 6 production is estimated at 3,458,000 kg
<b>Note:</b> Planting distance: 75cm x 30xm                      Seed Requirement: 12 kg/ha                      Productivity: 500 kg/ha						

# Chickpea seed production & multiplication

Planting distance: 30x30cm or 60x10cm

Seed requirement: Desi – 60 kg/ha; Kabuli – 100-120 kg/ha

Year	Area (ha)	Assumption	Var	Area (ha)	Assumption	Area (ha)	Assumption
Year 1	1 ha	• Productivity (1500 kg/ha)	Desi				
		• Productivity (2000 kg/ha)	Kabuli				
Year 2			Desi	25	• Productivity (1500 kg/ha) • Production (37,500 kg)		
			Kabuli	18	• Productivity (2000 kg/ha) • Production (36,000 kg)		
Year 3			Desi			625	• Productivity (1500 kg/ha) • Production (937,500 kg)
			Kabuli			327	• Productivity (2000 kg/ha) • Production (654,000 kg)
		<b>Total</b>		<b>43</b>	<b>Production (73,500 kg)</b>	<b>952</b>	<b>Production (1,591,500 kg)</b>

# Basic guidelines for the concept note on seed system

- Review existing resources (area, manpower, budget) to complement external funding.
- Review requirements/needs for the proposed seed system project
- Sustainability issue (impact - commercialization)



THANK YOU!