

SEED SYSTEM CHANNELIZATION IN PULSES

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Paper presented during the Seminar-Workshop on 'Strategies of improving pulse productivity for sustainable intensification and diversification of production systems'.

Bihar Agricultural University, Sabour, Bhagalpur, Bihar, India.

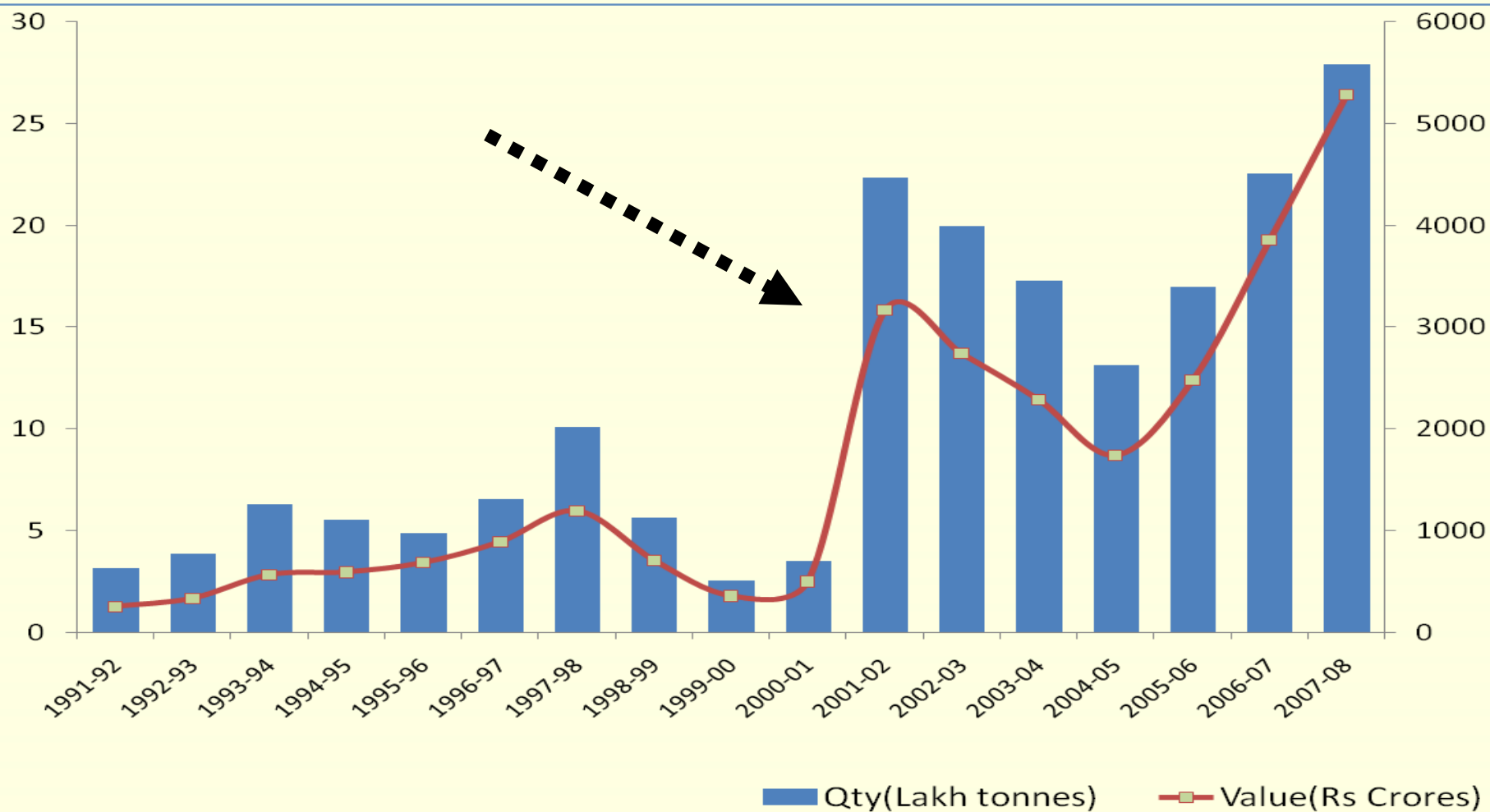
February 23, 2013

The Fact: In the wave of
Green Revolution

THE PULSES WERE NEGLECTED

- Recorded only 0.9% growth over 50 yrs
- Production increment for
pulses = 32% ; cereals = 280%
- Protein availability reduced
90 g protein/person/day TO < 10 g protein/person/day

India: Import of Pulses



Why Seed System? *Because ...*

- ❑ 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?

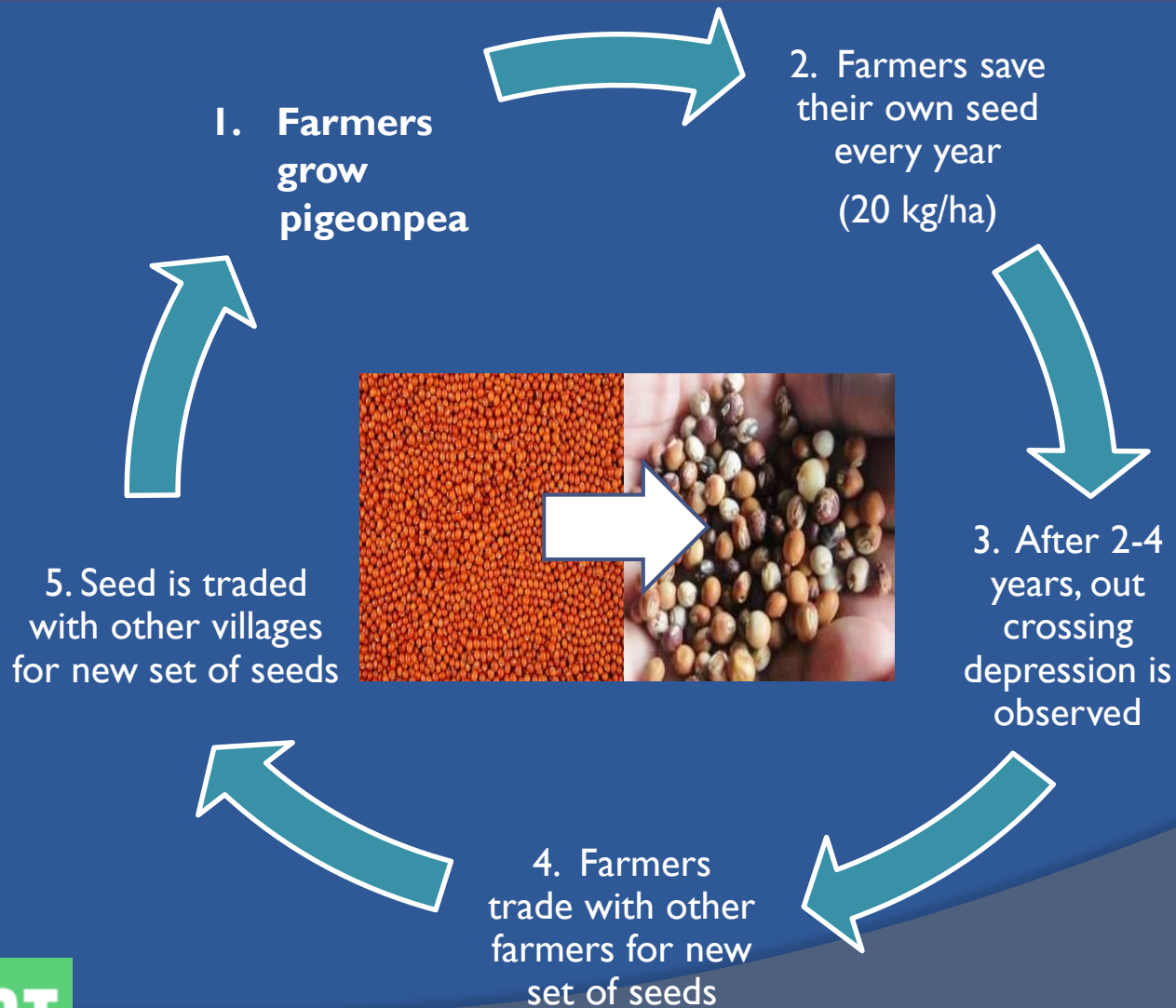
“a process through which a cultivar is bred, produced, certified, stored, marketed and used that includes all the channels through which farmers acquire genetic materials and in interaction with the commercial seed industry”

(Tesfaye et al, 2005)

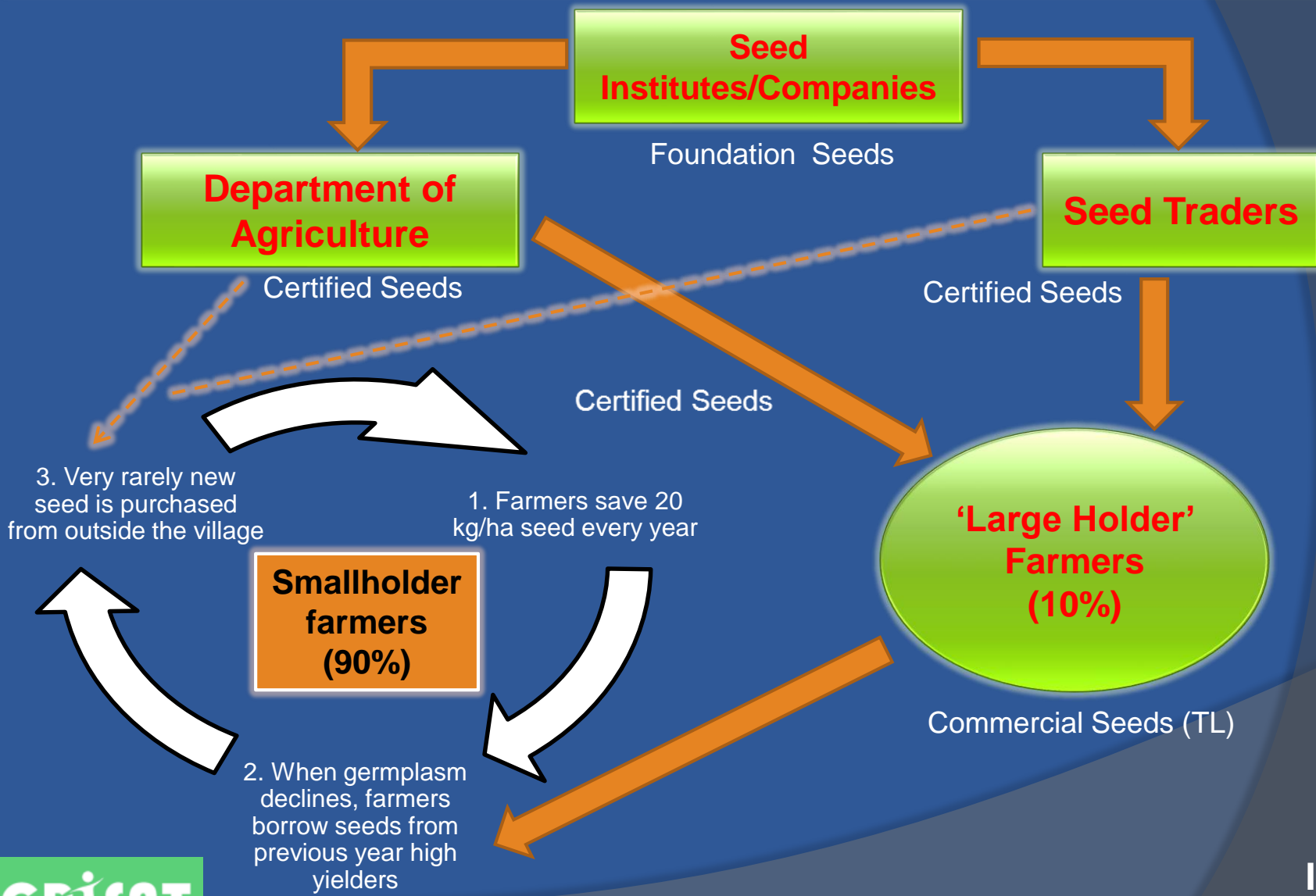
Seed Systems in Legumes are complicated due to these reasons:

- ❖ 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 to farmers 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.

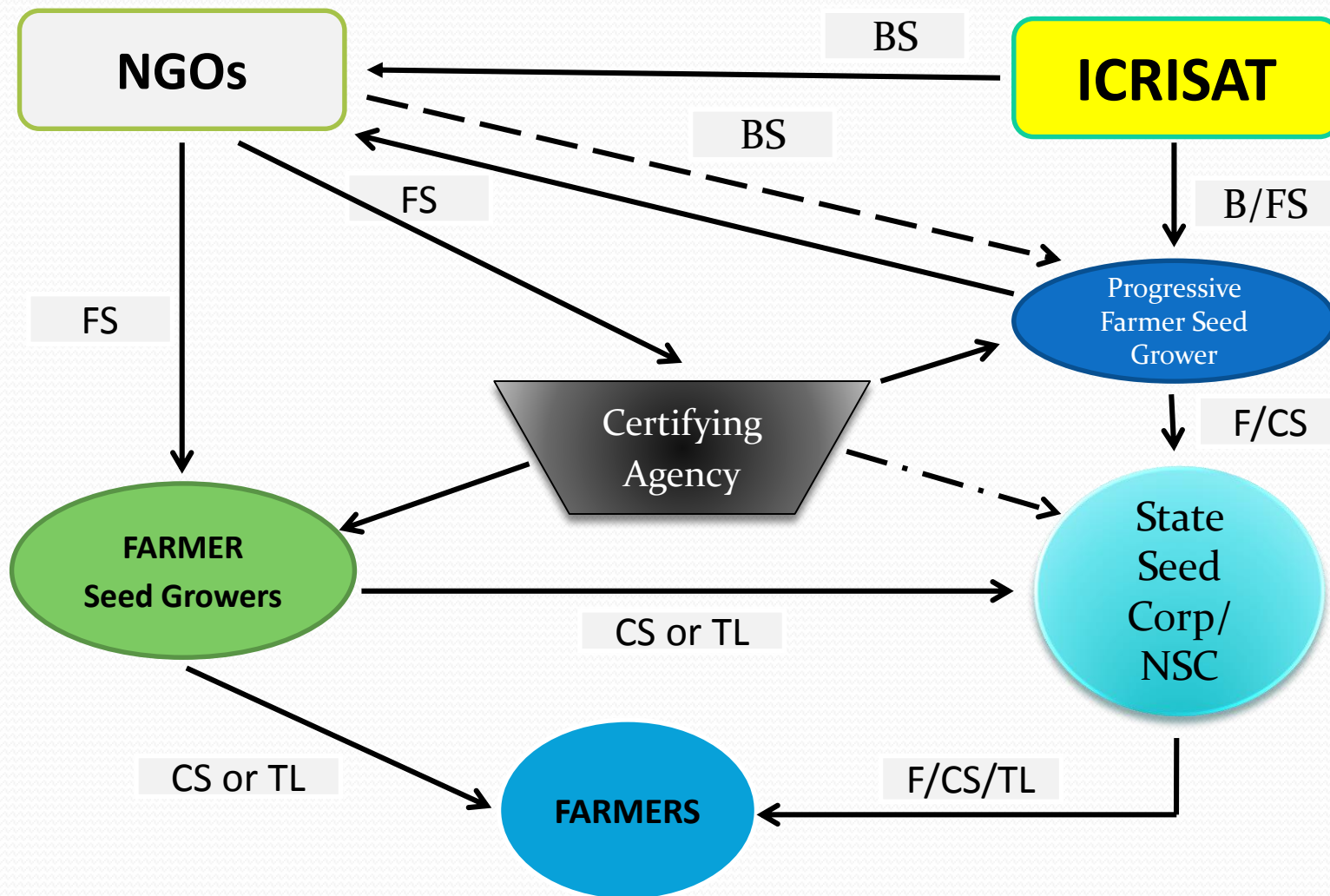
Existing Smallholder Farmer Seed System



Seed System Model in AP, India



Seed Delivery System in Odisha, India



Note: Odisha project

3 Types of Seed System

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

Formal Seed System

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

Informal Seed System

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

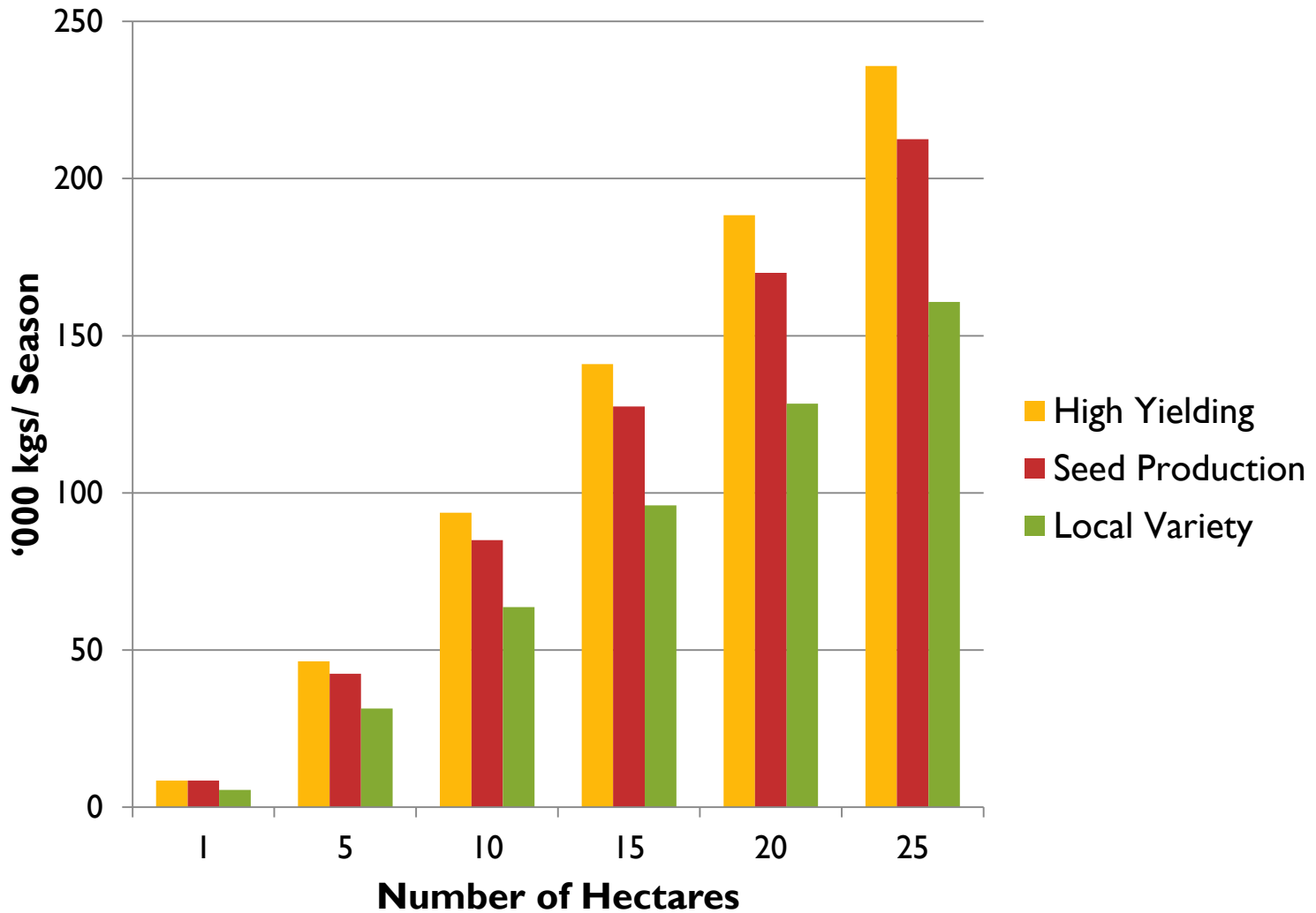
Strategy in the Informal Seed System

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

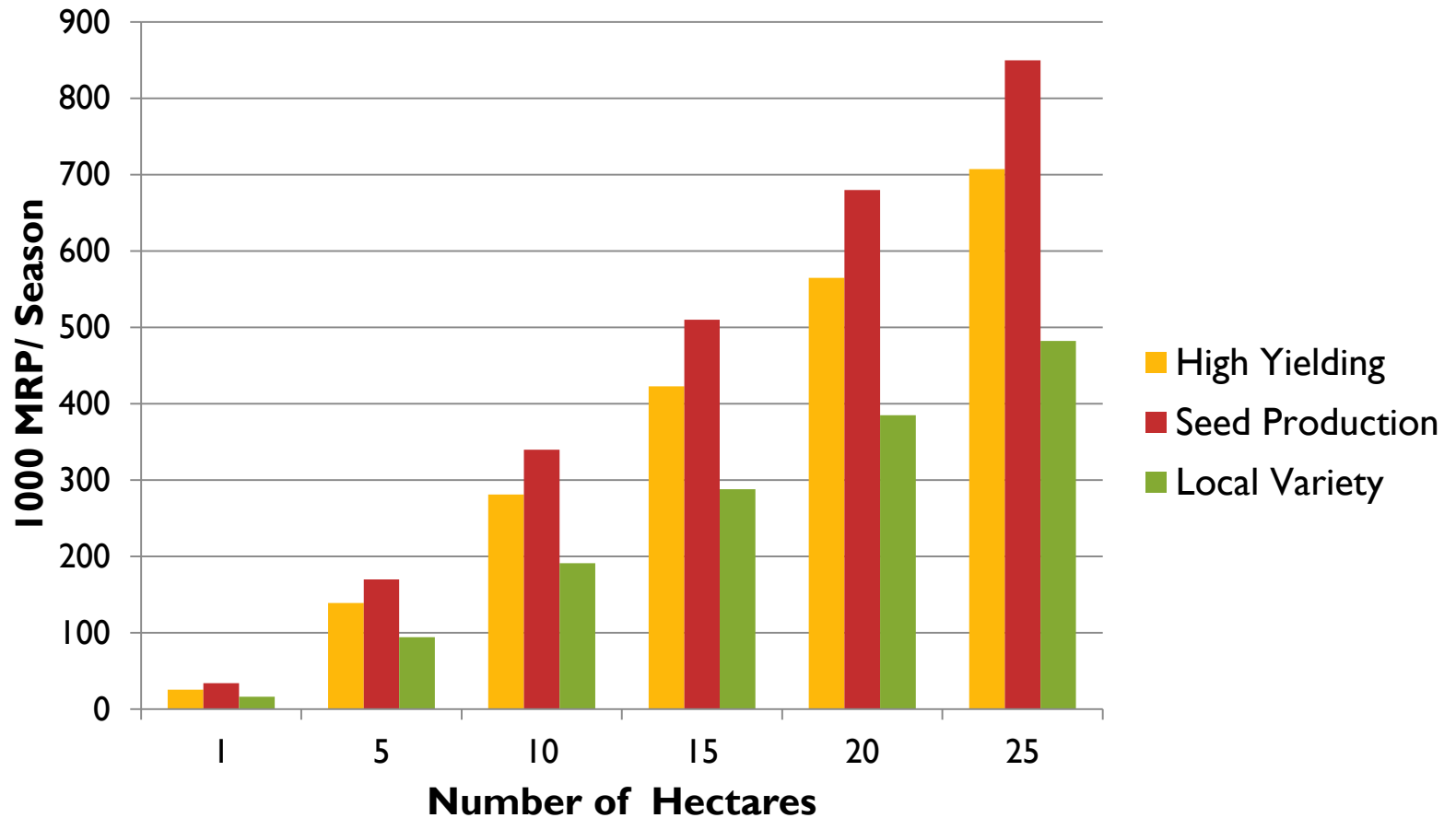
‘One Village One Variety’ Model

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

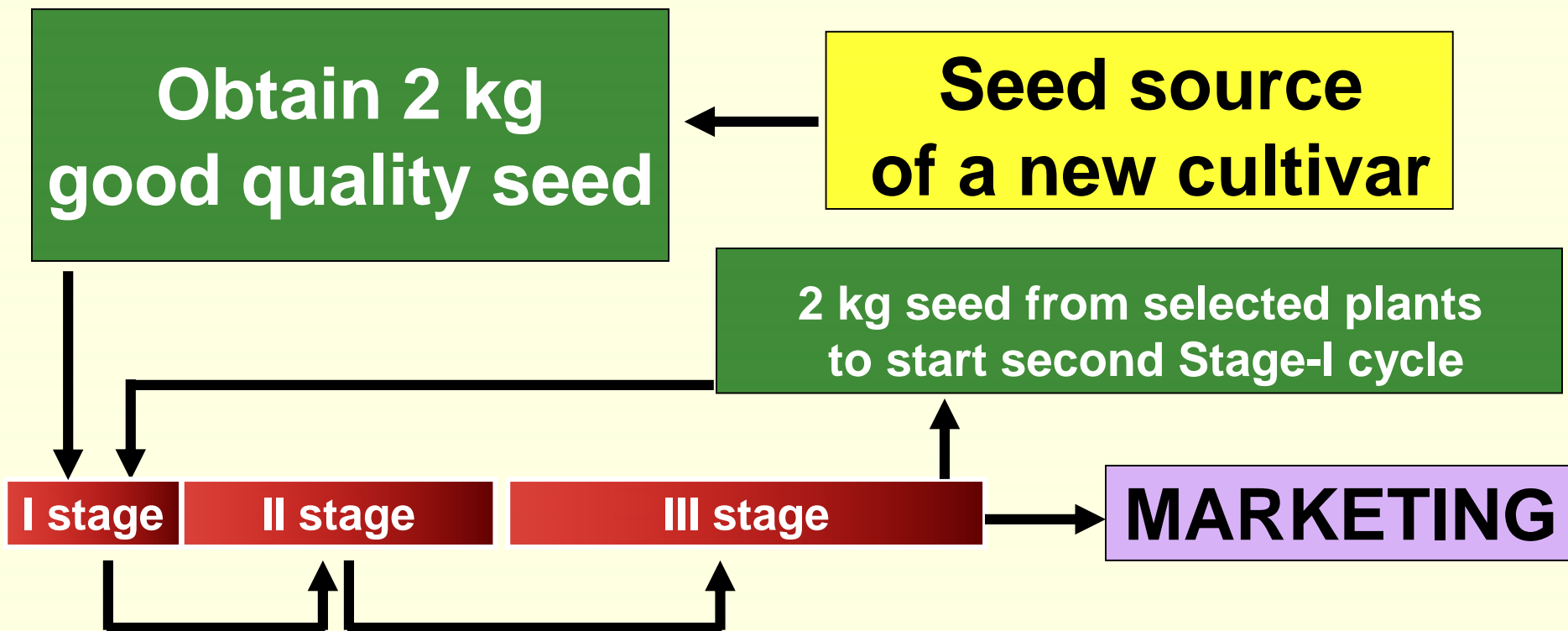
Yield According to Variety or Production Type



Market Return According to Variety and Production Type



Community Based Seed Production Model *i.e. Groundnut*



Stage-I seed plot 0.01 ha (1st season)

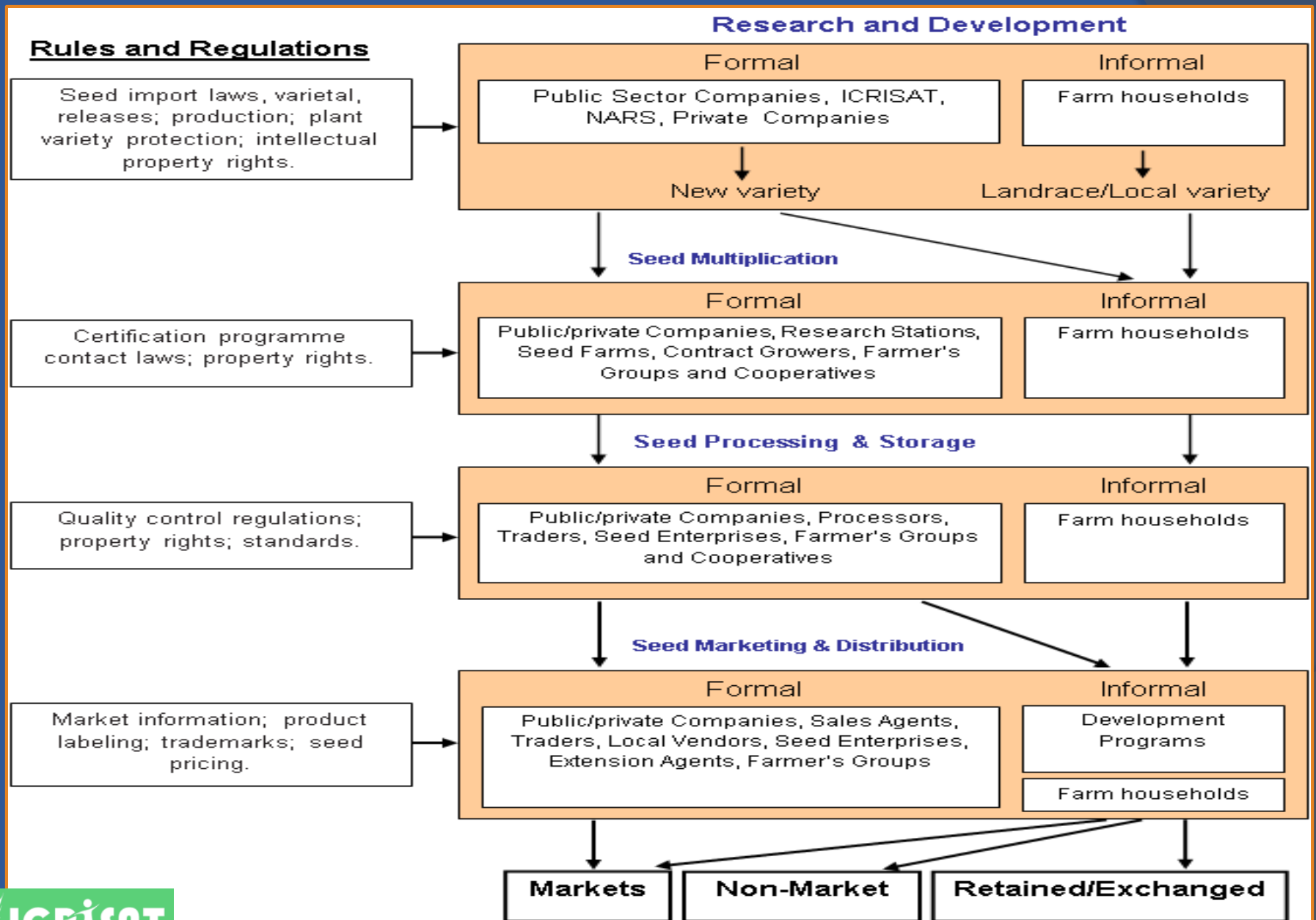
Stage-II seed plot 0.10 ha (2nd season)

Stage-III commercial plot 1 ha (3rd season)

Integrated Seed System: Formal + Informal

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

Integrated seed system organizational and institutional schema



Strategies in Improving 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**

Strategies...

- **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 = 0.5 MT

Foundation = 6 MT

Certified = 74.8 MT

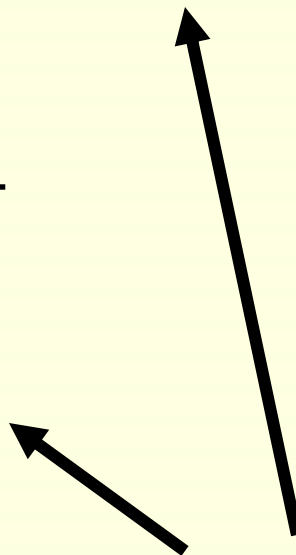
Pigeonpea seed

Breeder = 0.5 MT

Foundation = 2.2 MT

Certified = 9.2 MT

**ARE
WE
READY
???**



Diversify & Simplify the Systems

Seed Production and Multiplication Strategy (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
Remarks		Breeder		Foundation		CS	

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
Note: 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	<ul style="list-style-type: none"> • Productivity (1500 kg/ha) • Production (37,500 kg) 		
			Kabuli	18	<ul style="list-style-type: none"> • Productivity (2000 kg/ha) • Production (36,000 kg) 		
Year 3			Desi			625	<ul style="list-style-type: none"> • Productivity (1500 kg/ha) • Production (937,500 kg)
			Kabuli			327	<ul style="list-style-type: none"> • Productivity (2000 kg/ha) • Production (654,000 kg)
		Total		43	Production (73,500 kg)	952	Production (1,591,500 kg)

Basic guidelines for the concept note on seed system

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

Thank you!



ICRISAT is a member of the CGIAR Consortium



**International Crops Research Institute
for the Semi-Arid Tropics**

