

Introduction

In India, seed potato production is largely confined to north India, especially Punjab. The seed growers in Punjab are entrepreneurial, skilled, and have captured India's seed market. Of late, conditions in Punjab are becoming less suitable for seed production which has resulted in a shift in the time of seed potato planting in Punjab. The ideal time for planting is in October, however many farmers are not able to take up planting because of delayed paddy cultivation. As a result of this late planting, the crop is more prone to vectors which transmit viruses, resulting in faster degeneration, and therefore less reliable seed coming from Punjab.

(About Green Innovation Centre)

The Challenges faced by Farmers in Hassan district of Karnataka

- Area under Potato cultivation in Hassan district has drastically reduced from 50000 hectares to 8000 hectares, in 8-10 years.
- Productivity is as low as 10 tons/ha in Karnataka state (National average is 25 ton/hectare). Poor quality seed is one of the main reason for low productivity in Karnataka.
- Majority of the potato seed production happens in Punjab state which is about 2000 km from Hassan, Karnataka. Apart from huge transportation costs, many logistic issues are involved in transporting this huge quantities of seeds every year.
- Farmers have limited access good varieties. Though many good varieties are available but unfortunately it is not reaching farmers. With existing seed production system, it requires at least six seasons of multiplication to multiply any new variety. Understandably seed growers in Punjab do not take risk.
- Exploitation by the local seed traders is very common. Farmers are being exploited with respect to quality, price and even on quantity, that is they sell in 50kg bags but most of the time it is underweight.
- Seed price is always unpredictable and high.

There is a urgent need to revive the Potato sector through developing alternate seed system which ensures good quality seeds at affordable prices to farmers.

In order to strengthen the potato value chain in Karnataka state, International Potato Centre (CIP) has been promoting Apical Rooted Cutting (ARC) technology to support small-holder farmers to produce seeds locally) under GIZ's Green Innovation Centre project.

What is Apical Rooted Cutting?

Apical cuttings are rooted transplants produced in a screenhouse from tissue culture plantlets. Rather than allowing tissue culture plantlets to mature and produce minitubers, cuttings are produced from the plantlets. Once rooted, the cuttings are transplanted into the field to produce seed tubers.

Apical cuttings are an alternative to minitubers in current production seed systems for potato. While minitubers are more versatile – they can be stored until ready to plant and are easy to transport, productivity of cuttings to produce seed tubers surpasses that of minitubers and are profitable after two seasons of multiplication, whereby seed produced from minitubers requires 3-4 seasons of multiplication to be profitable.

How it Works?

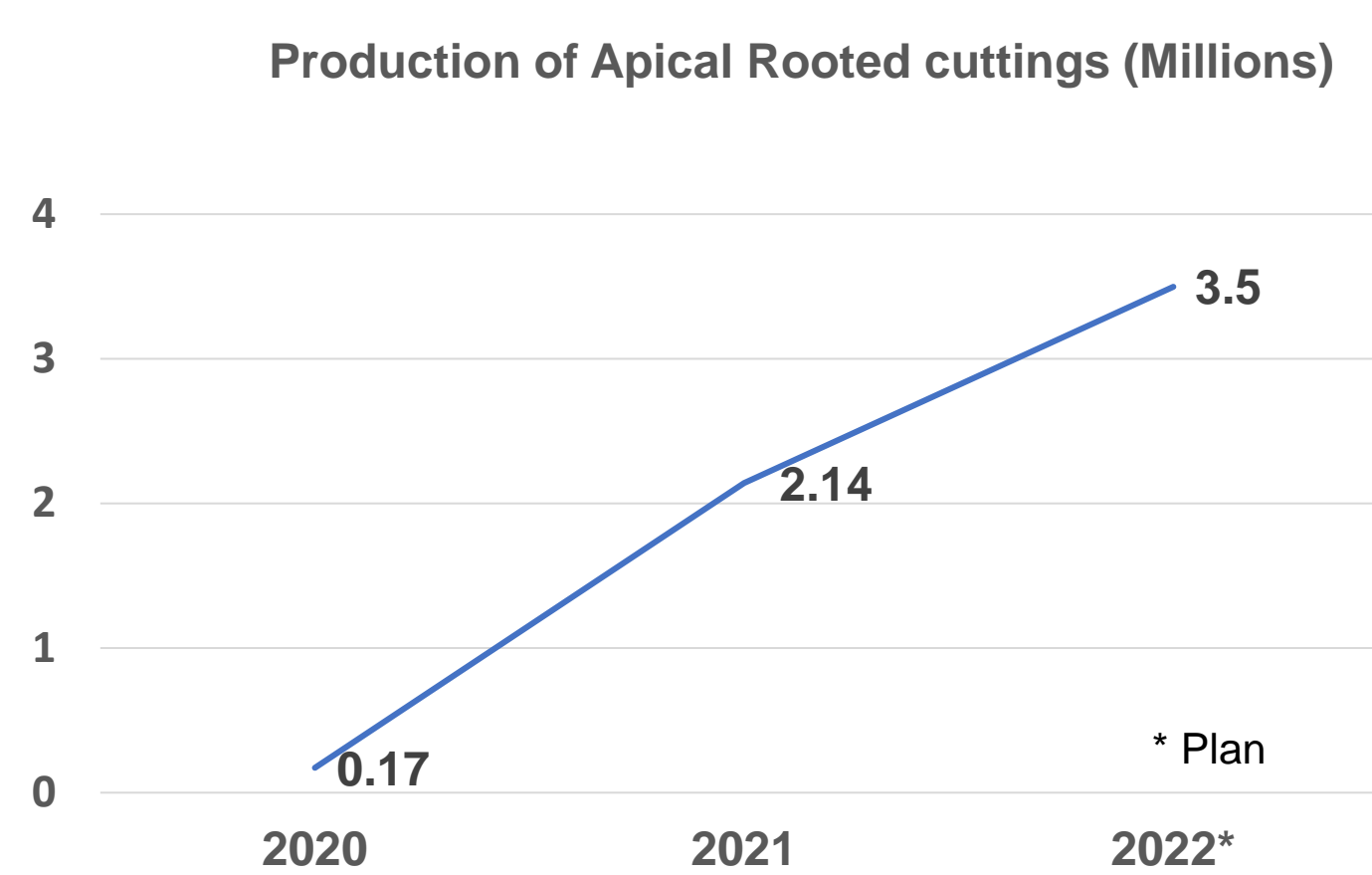
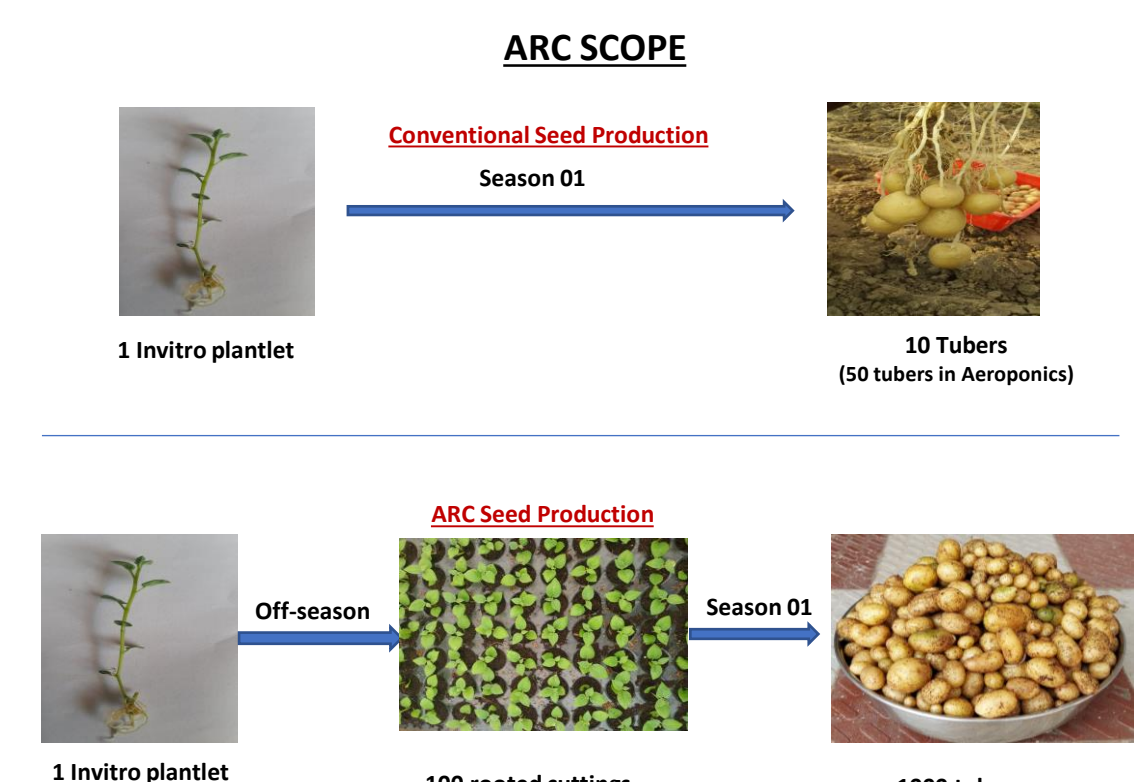
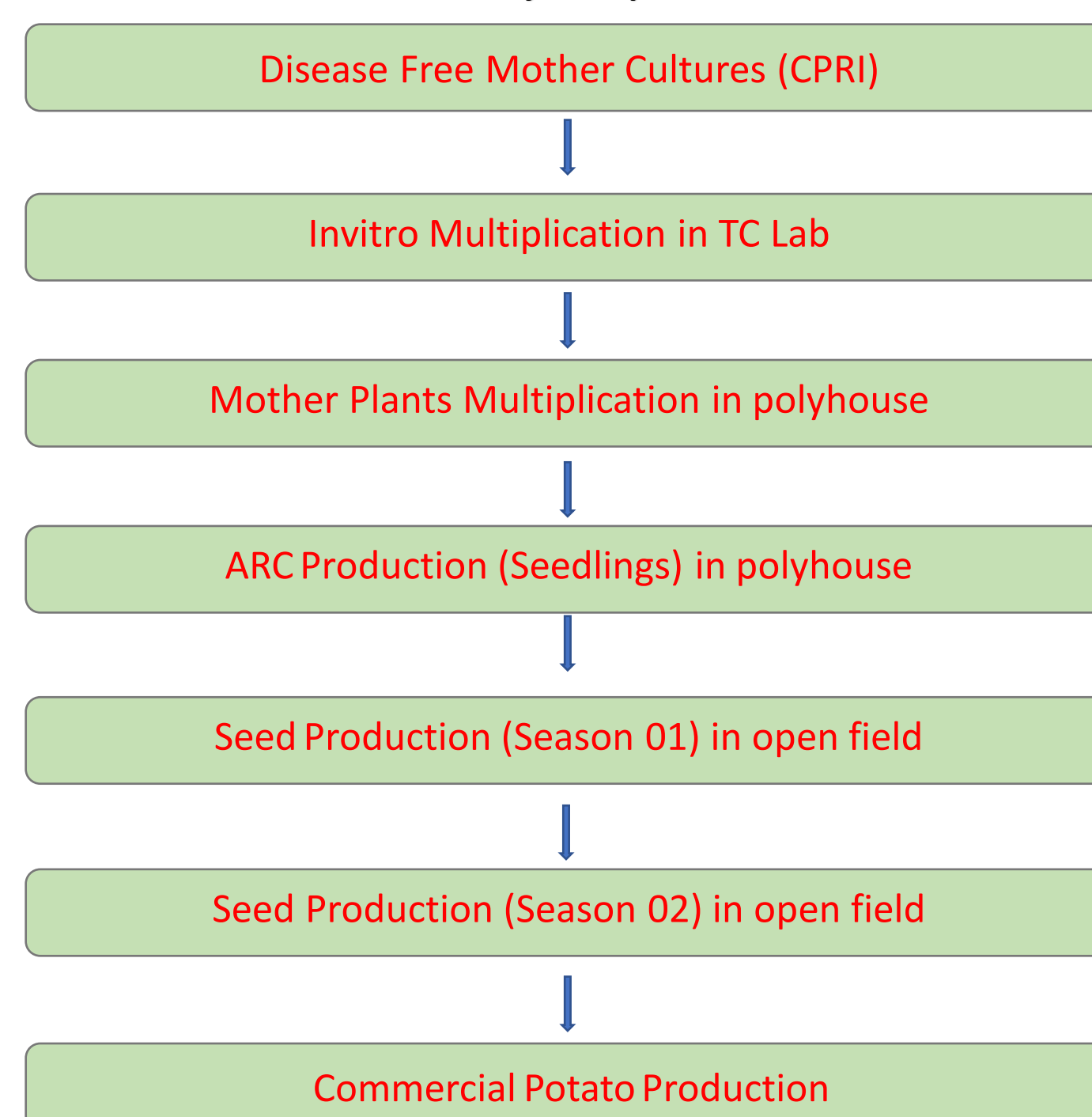
The first rounds of cuttings expand parent material in the first months of production with the remaining months dedicated to commercial production of rooted cuttings. Mother plants are produced up to 3 months until the first cuttings will be planted in the field. Thus, any new shoots forming after this cut off time will be placed into plugs for transplanting – the commercial product which will continue to be produced over a 2-4-month period. Thus, apical cuttings involve: i) production of rooted cuttings (transplants) originating from tissue culture plantlets in the screenhouse ii) production of seed tubers in the field from transplants.



Comparison Conventional v/s ARC Seed production system		
Particulars	Conventional Seed Production	ARC Seed Production
Investment	Cost Intensive	Low cost
Technology	Complicated	Simple
Suitability	For only large-holding resource rich farmers	Even small-holders can become seed producers
Gestation Period	At least 6 seasons are required	Only two seasons
Risk	High	Low
Scope for expansion	low	high
Seed System	Centralised	De-centralised

APICAL ROOT CUTTING Technology

Major Steps



How it benefits small-holder Farmers?



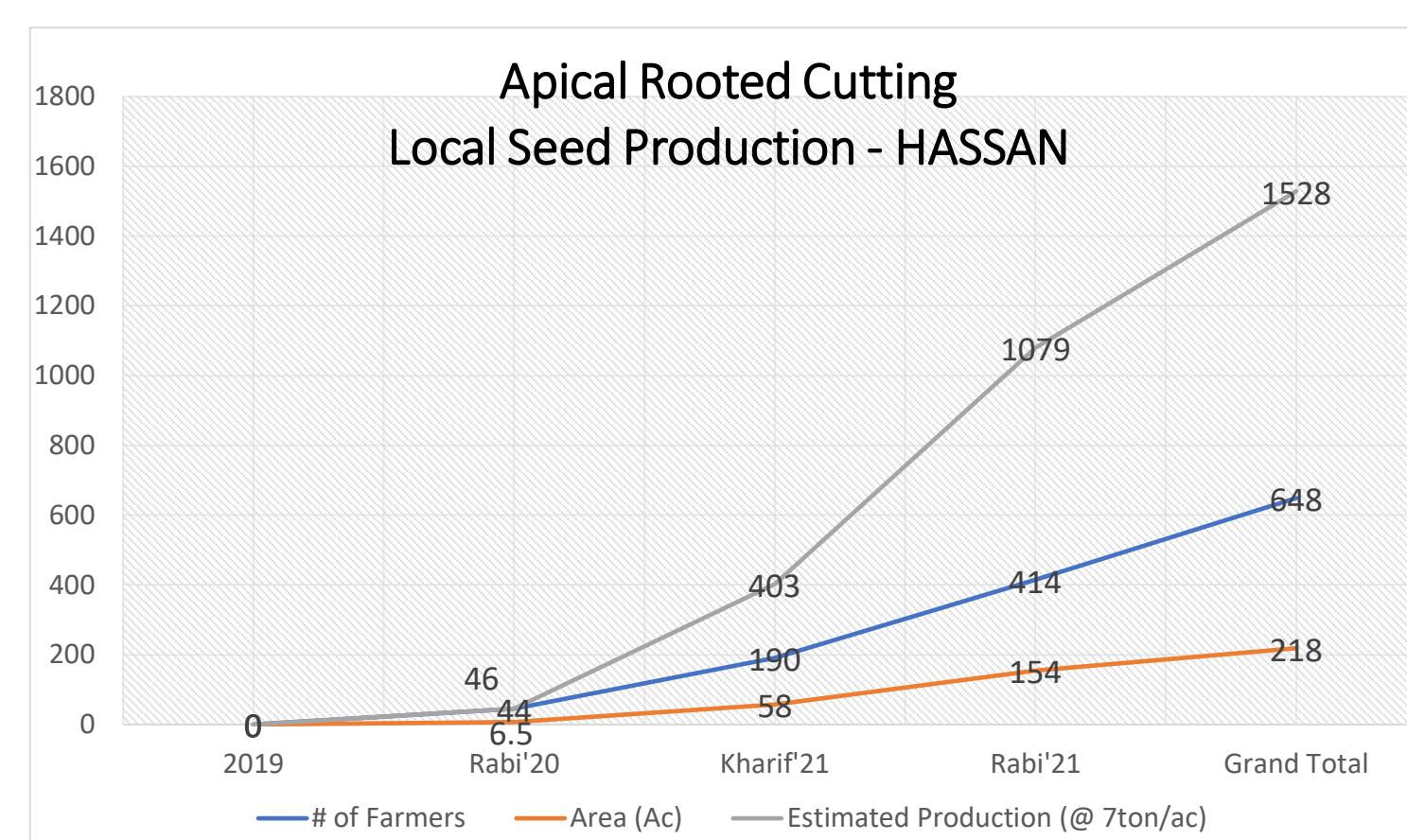
Planting 10000 ARC cuttings



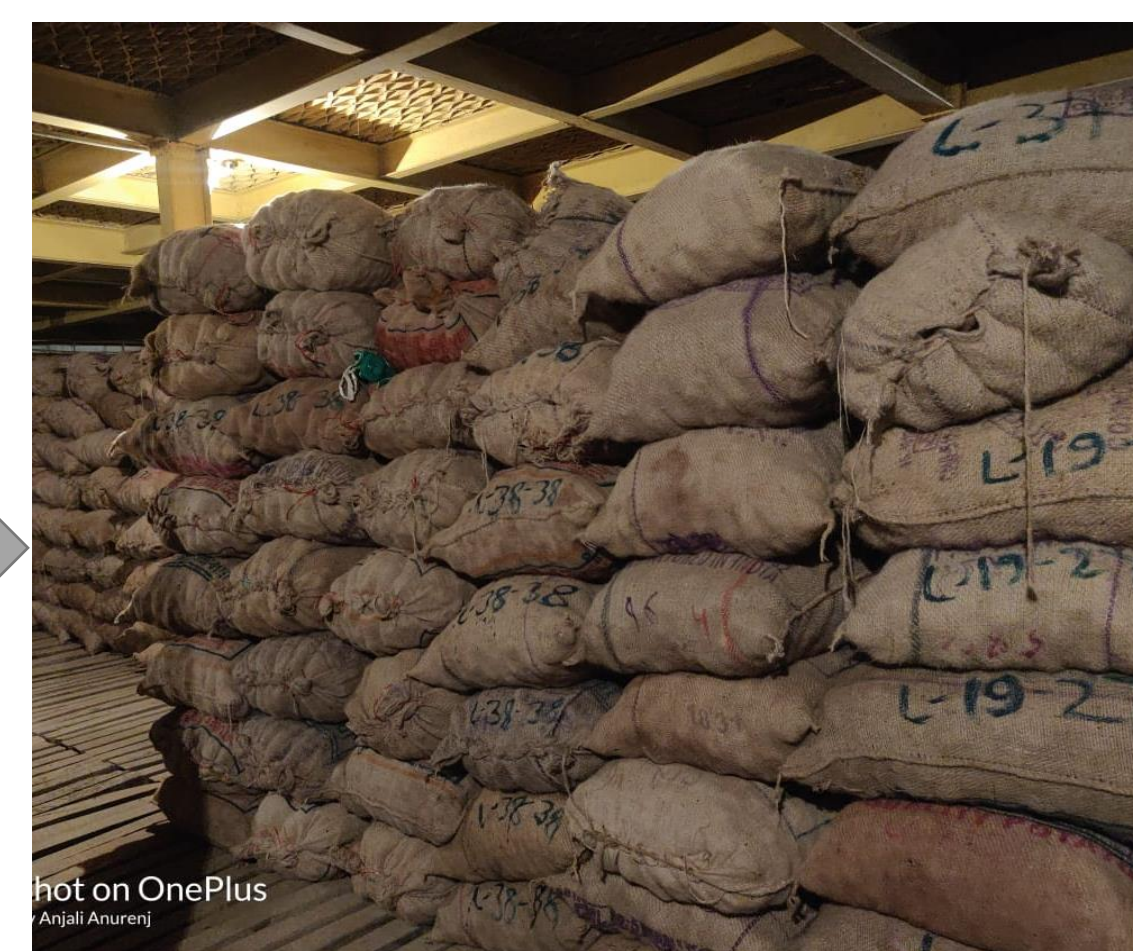
Production of 100000 seed tubers

Some Facts...

- Average Yield (G0): **8.3 tons/ac** (Range: 3.8 to 13.8/ac) (State avg- 4.5ton/ac)
- Avg. Number of tubers/pl: **7.9** (Range: 5.6 to 30)
- Avg. Tubers weight/pl: **0.42kg/pl** (Range: 0.26 to 0.54kg/pl)
- Crop stand: **80%** (Range: 63-88%) - Scope for Improvement
- Negligible incidence of viral diseases (less than 1%)
- Off-types and volunteer plants (less than 1%)



Seed Multiplication (One Hectare)



Quality Seeds for 10 hectares

Outcomes

- Farmers managed decentralized **local seed production**.
- Saving '**Seed Miles**'- Local seed production avoids transportation of large volume of seeds from long distances.
- Additional **employment generation** through seed production.
- **More returns** to farmers and seed growers.
- Availability of **desired seeds locally**.
- Strengthened '**Seed Potato Value Chain**'

