

# DIFFUSION PROCESS IN NETWORKS

---



**Project : The impact of biotechnology on Argentine production**

# ARGENTINA'S PRODUCTIVE PERFORMANCE

## REMARKS

- Local production of grains and oil seeds in 2002 doubled 1990 figures.
- Soybean production in 2002 tripled 1995 figures.
- Land devoted to soybean production grew 200% between 1995 and 2002.
- Soybean represents almost 50% of total grain and oil seeds cropped in 2002.
- Argentina's share in the international market of soy oil and pellets amounts to about 40%.
- Soybean (oil, pellets and other forms) accounts for almost 30% of Argentine total exports.

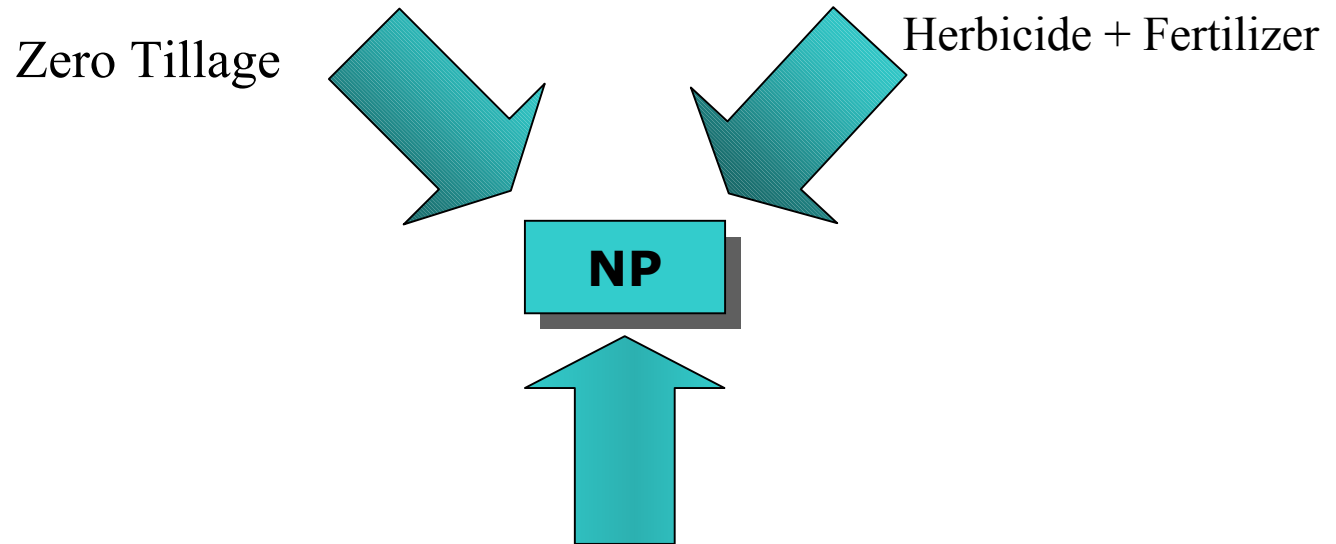
## Why?

**A. A quick diffusion process of a new technological package**

**B. Structural changes → Networking**

# SOYBEAN: BUILDING A NEW TECHNOLOGICAL PACKAGE

---



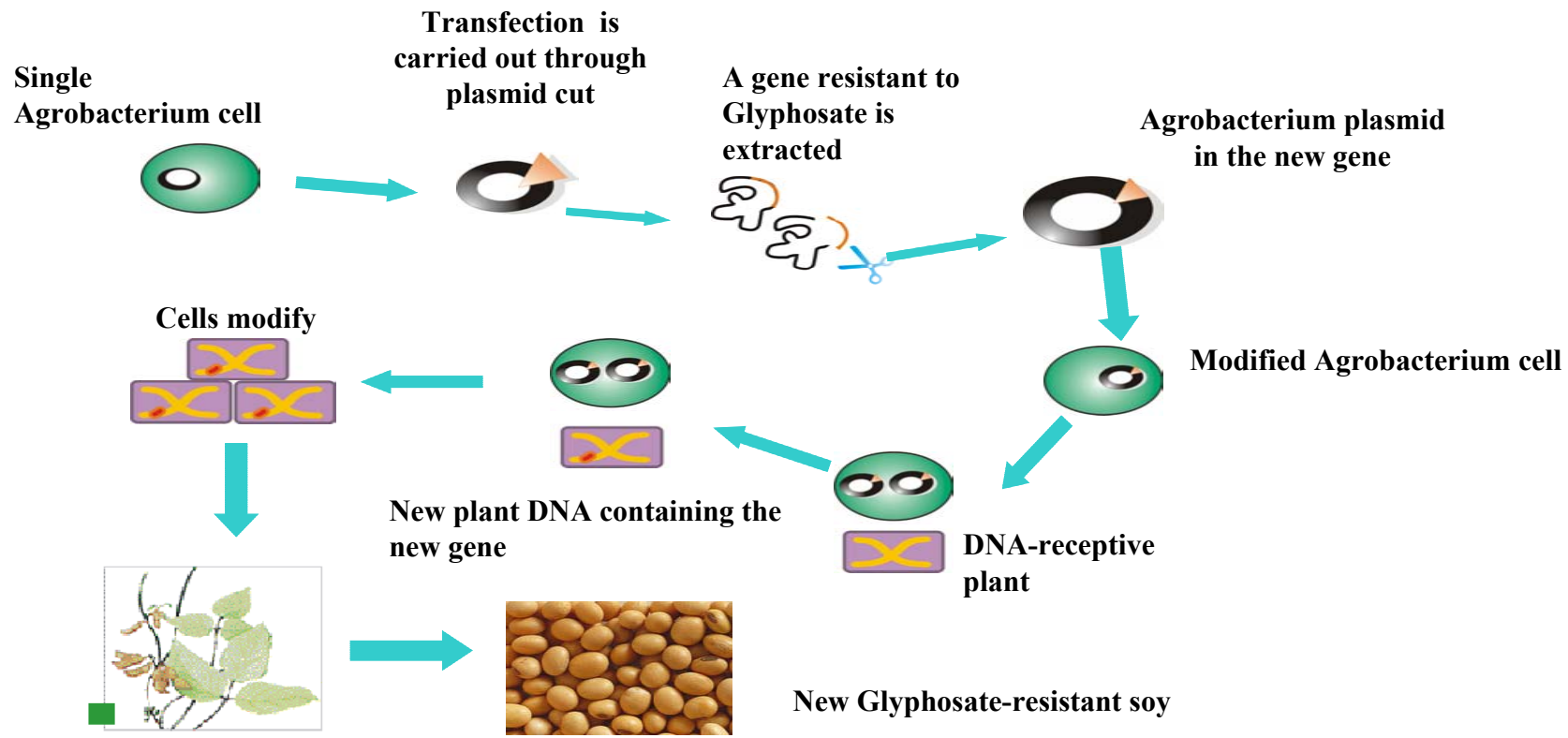
Seeds = Conventional Genetics + Biotechnology

## Effects:

- o Cost reduction
- o Improved land use (double cropping)
- o Easy handling
- o Higher yields
- o Lesser fuel consumption
- o Erosion control

# GMO SOYBEAN

## ○ First Generation On process



## ○ Second Generation → On Product

# TILLAGE

---

## CONVENTIONAL

1. Seed-bed preparation 2/3 steps
2. Seeding 1 step
3. Covering 1 step
4. Fertilizer
5. Weeds control

## ZERO TILLAGE

1. Seed-bed preparation 1 step only
2. Seeding + Fertilizer 1 Step
3. Weeds control



# TECHNOLOGICAL PATH

## HERBICIDES

## MACHINERY

## SEEDS

70'S

PARAQUATT  
(by ICI)

Conventional  
Drill Seeding  
(Private + Public Agency)

Introduction  
(INTA/Private)

80'S

GLYPHOSATE

First Mechanic  
Zero Tillage  
Drill Seeding

Local varieties  
of seed  
(INTA + Local Breeders)

Seeds  
+  
Gene  
(1985)  
+  
Biocides

GMO  
Seeds  
(Nidera)  
(Monsanto)

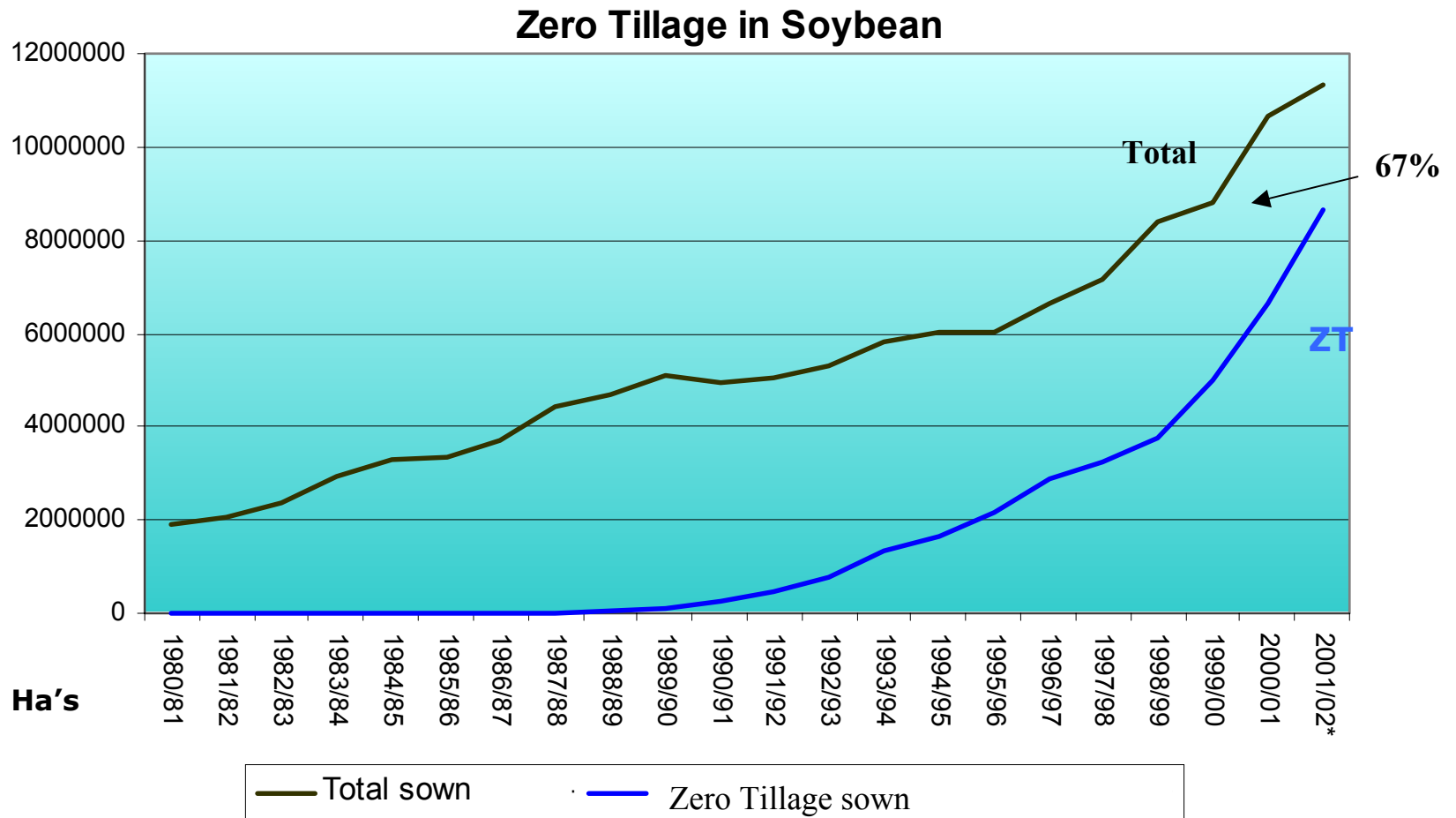
90'S

Automatic  
Zero Tillage  
Drill Seeding

RR Soybean  
(Nidera Monsanto  
Syngenta)

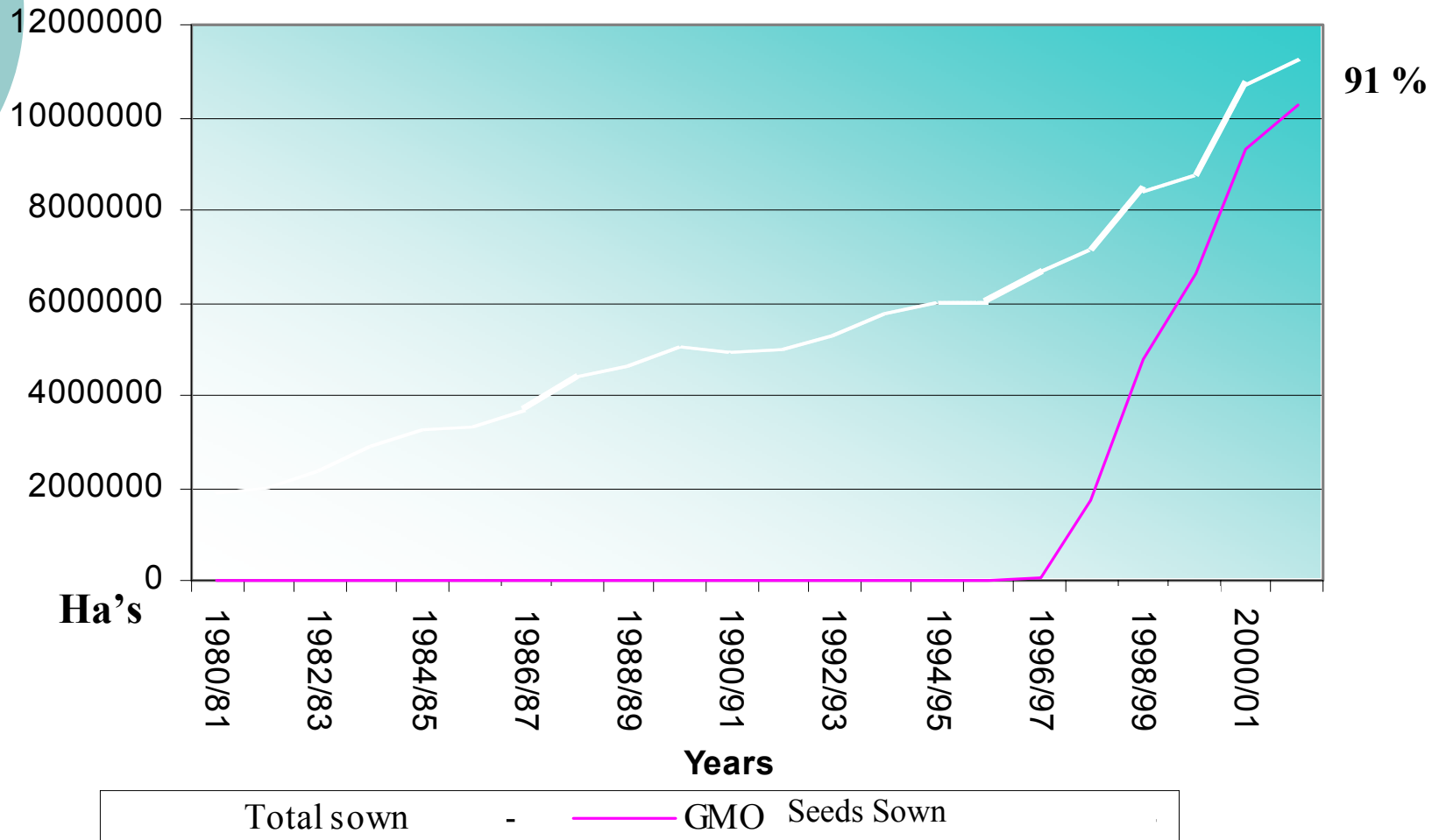
NEW PACKAGE

# DIFFUSION OF NEW TECHNOLOGICAL PACKAGE



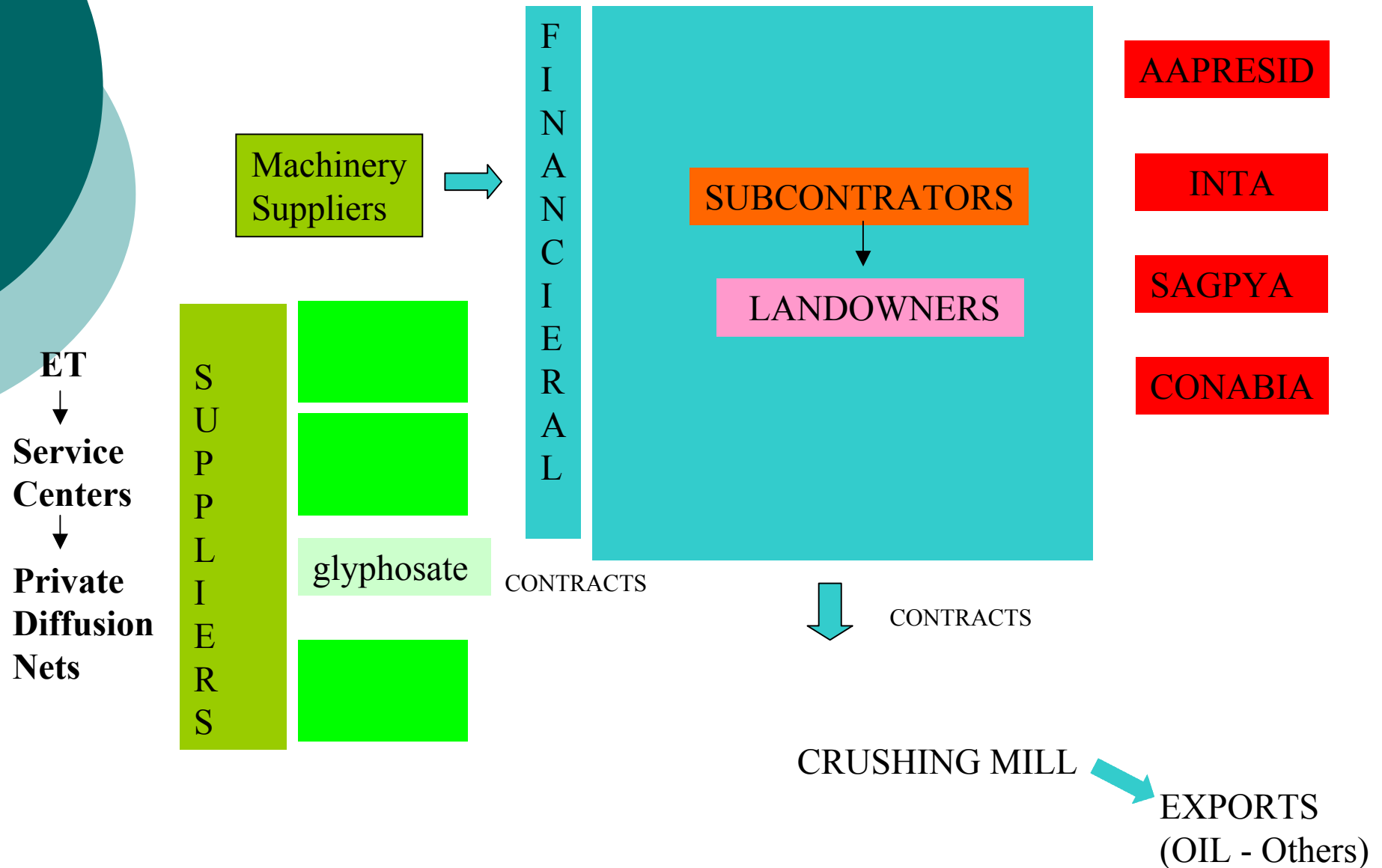
# DIFFUSION OF NEW TECHNOLOGICAL PACKAGE

## GMO in Soybean





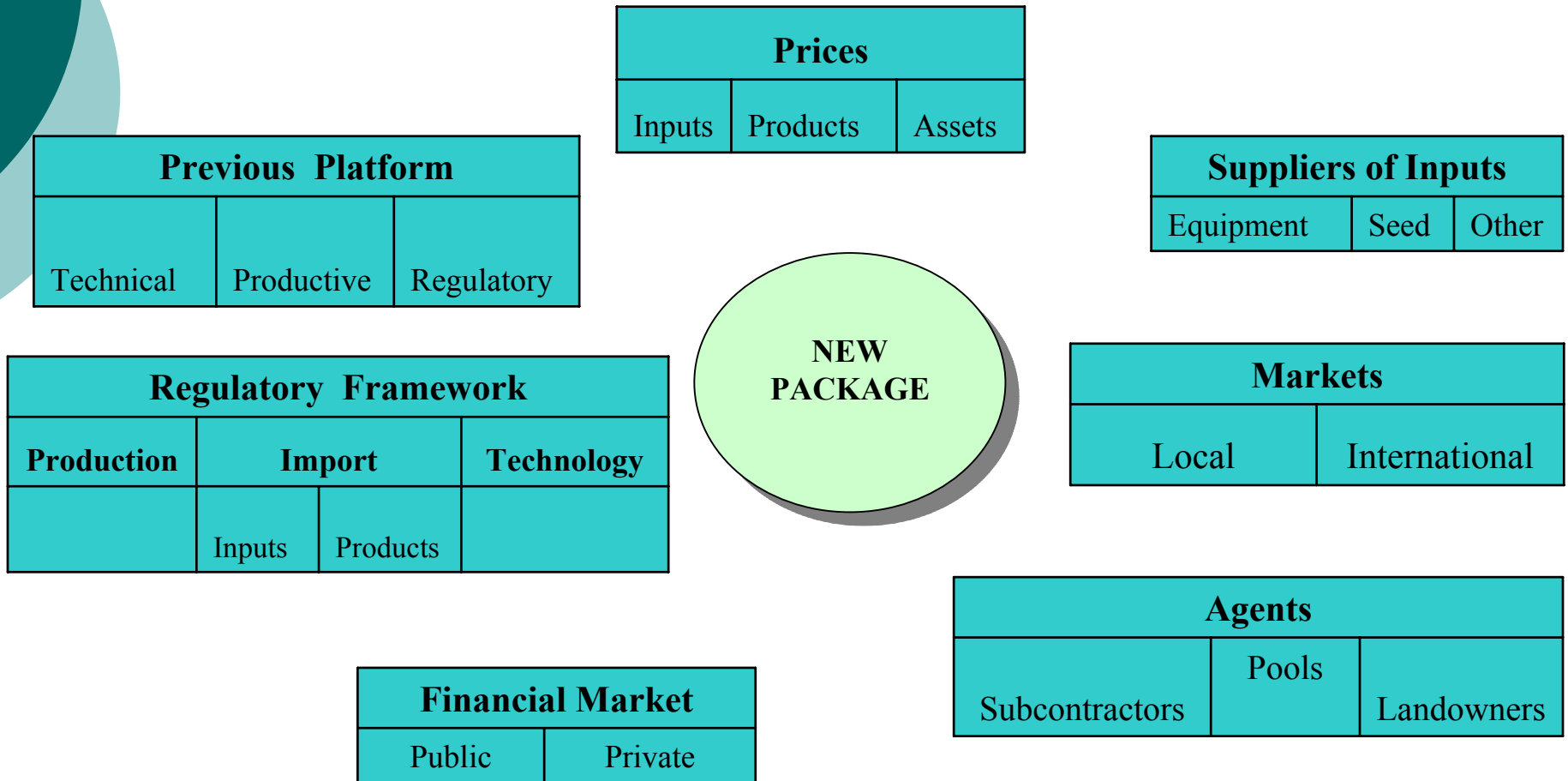
# NETWORKS IN SOYBEAN



# THE DYNAMICS OF DIFFUSSION

## I

---



# THE DYNAMICS OF DIFFUSION II

- Why networking?
- How to improve benefits? (flux effects)
- How to revalue fixed assets? (stock effects)

} **How to cooperate in order to compete?**

## A. FROM AN INDIVIDUAL TO A COLLECTIVE UTILITY META-FUNCTION

### ○ **GMO seeds and inputs suppliers**

- . Improve demand
- . Full use of installed capacity

### ○ **Local seed breeders**

- . Increase demand for marginal varieties

### ○ **Service Centers**

- . Improve sales
- . Generate tacit knowledge as a commercial surplus

### ○ **Subcontractors**

- . Subcontractors set themselves up in business
- . Full use of fixed assets



○ **Landowners**

- . Reduce risk
- . Lesser capital uses
- . Higher rotation of fixed capital
- . Revaluation of land prices

○ **Crushing industries**

- . Full capacity use
- . Low risk in raw material supply

○ **Government**

- . Increased tax base (on flux or capital)

## B. EXTERNALITIES

○ **GMO seeds and inputs suppliers**

- . Same process and gene applied to different varieties

○ **Subcontractors**

- . Tacit knowledge on land/weed managing

○ **Landowners**

- . Lower risk
- . Environmentally friendly

**Tacit knowledge in nets**

- . Soil management
- . Building up of the production function

**Development of conventions or contracts**

- . Land-working routines

## **D. THE PROMOTING AGENT (CONTROL NODES)**

- Public in pre – competition
- Private → Market/Price