

# Regional workshop on Conservation Agriculture

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## Investing in Sustainable Agriculture: The Case of Conservation Agriculture and Direct Seeding Mulch- Based Cropping Systems

### DMC, a tool for the raise of new forms of family based agriculture in Cambodia

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Développement



Ministry of Agriculture, Forestry  
and Fishery

Dep<sup>t</sup> of Agronomy & Agricultural  
Land Improvement



Agence Française  
de Développement

# **Five years of “*adaptative*” research for upland DMC based cropping systems creation in Cambodia**

## **Plan**

### **1<sup>st</sup> PART**

**Agriculture and territory occupation**

### **2<sup>nd</sup> PART**

**Current agricultural dynamics in the “*full*” and “*empty*” Cambodia**

### **3<sup>rd</sup> PART**

**Potential input of DMC technologies for a reviewed agricultural Development**

## 1<sup>st</sup> PART

# Agriculture and territory occupation

# 1/ Agriculture and territory occupation

## 1.1/ 4 major Agro-ecosystems ... cropped or “crop-able”

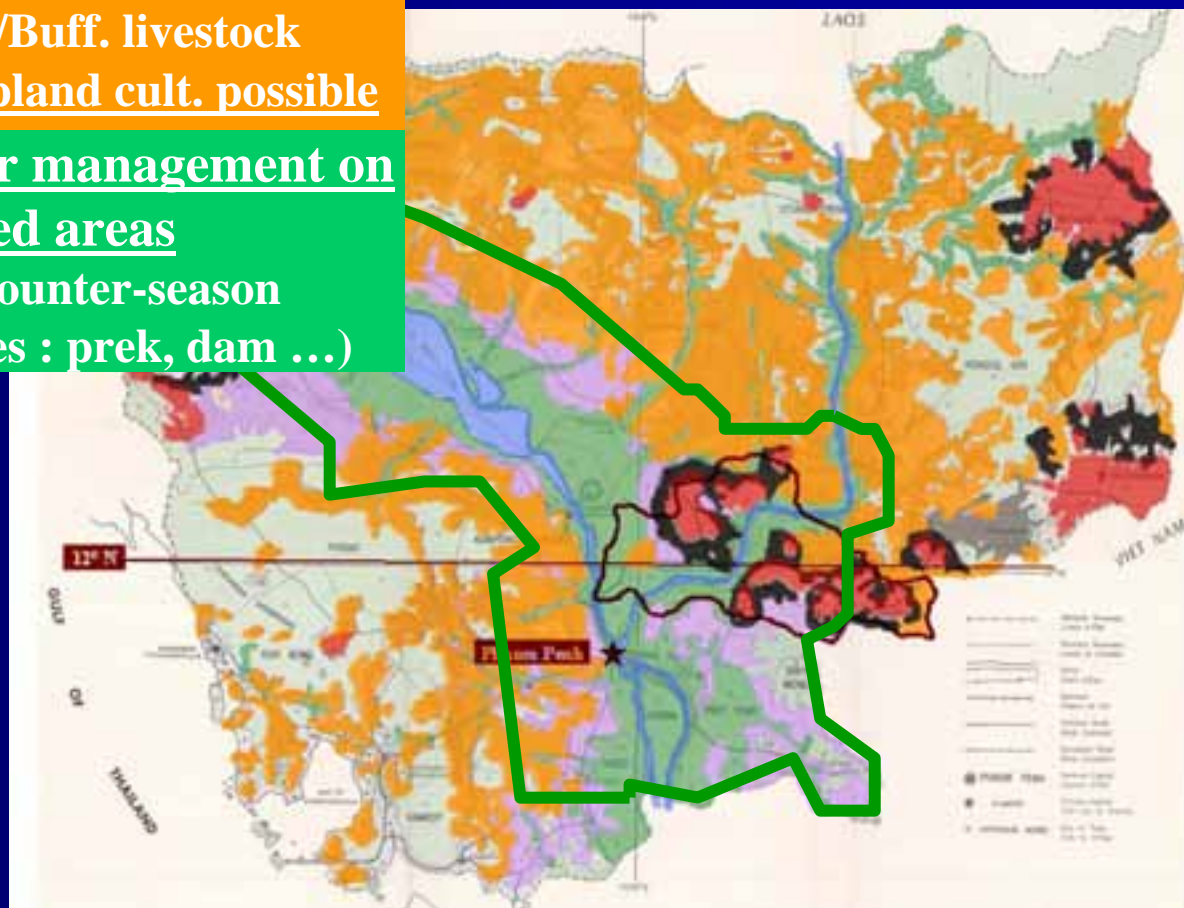
### Rainfed lowland rice on

Sandy plains (strictly rain dependant)

Rice, associated to Cattle/Buff. livestock  
Ann. / Perennial based upland cult. possible

### Floating Rice or Water management on deeply flooded areas

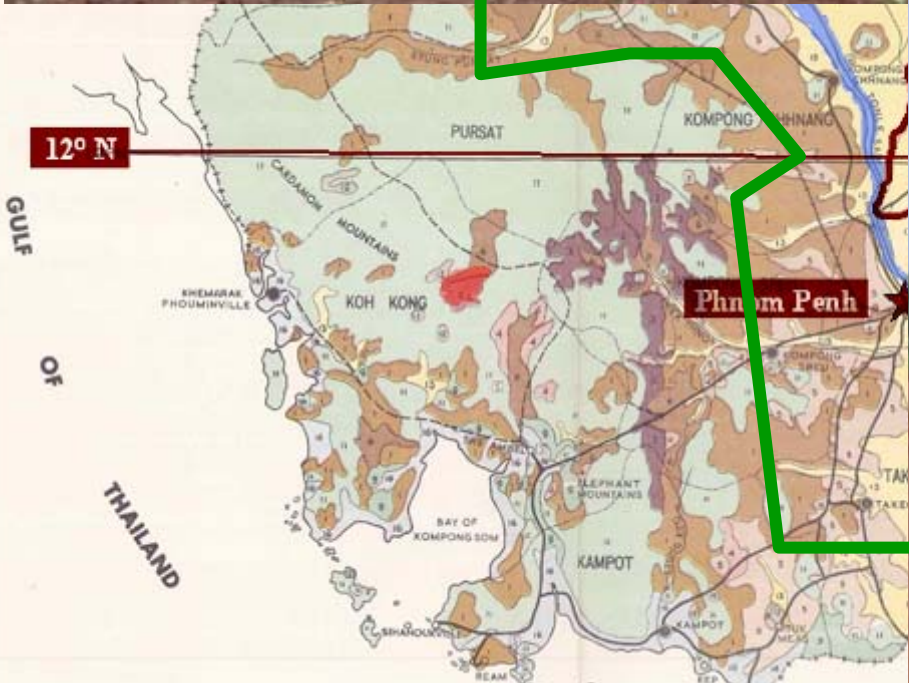
Water management for counter-season  
cultivation (different types : prek, dam ...)





# 1.1/ 4 major Agro-ecosystems

## Upland cultivation on Red and Black soils



# 1.1/ 4 major Agro-ecosystems

## Rainfed lowland rice on Sandy plains





# 11/ 4 major Agro-ecosystems

## Rainfed lowland rice on hydromorphic plains

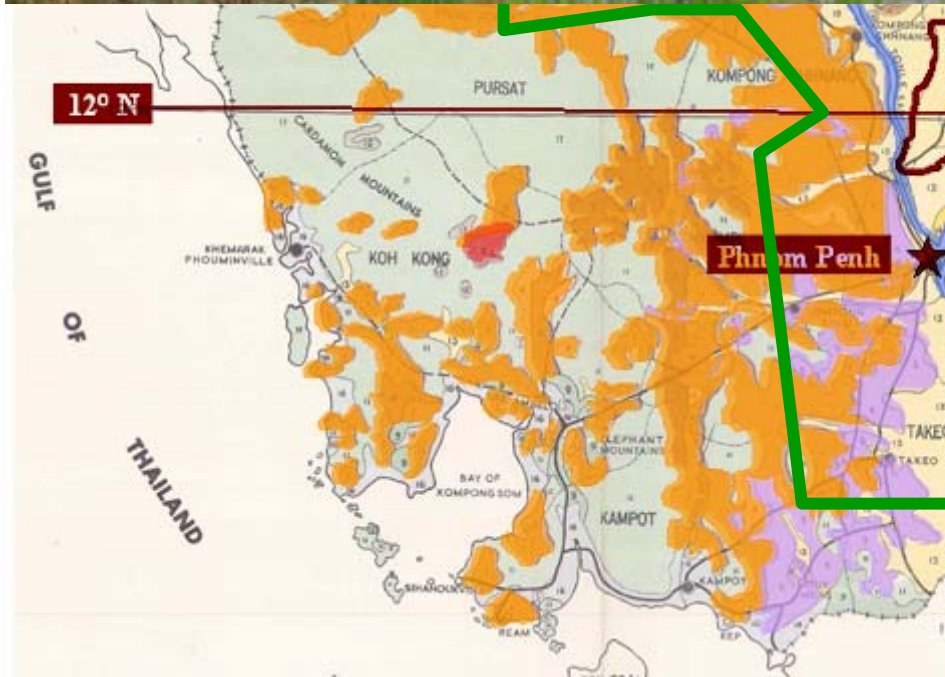
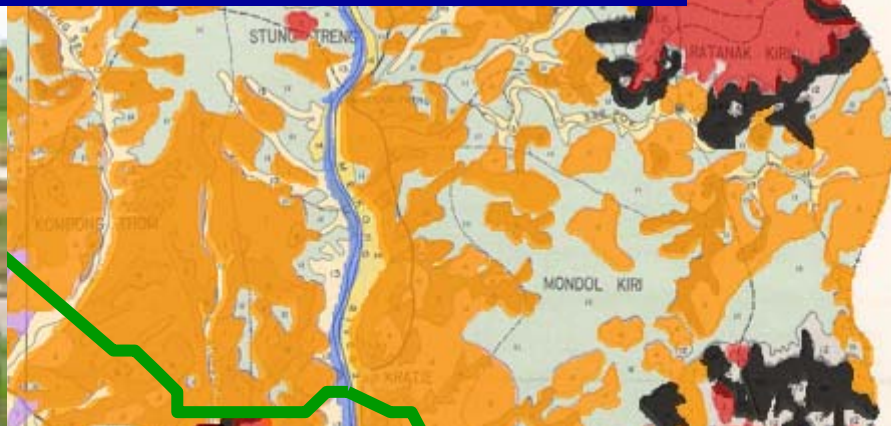


THAILAND

Document obtenu sur le site <http://Agroecologie.jirad.fr>

# 1.1/ 4 major Agro-ecosystems

## Counter-season rice with water management in deep flood area

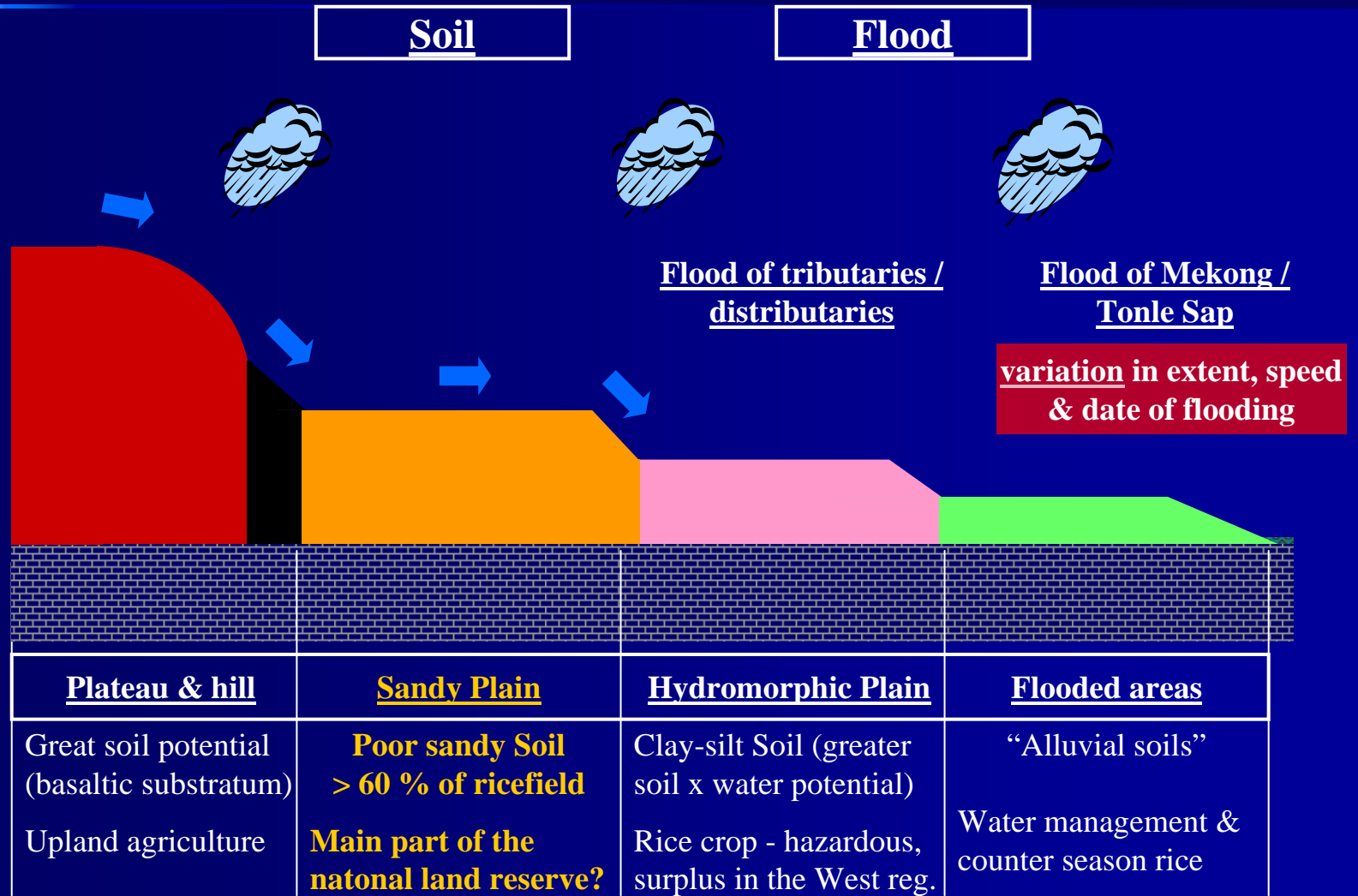




# 1/ Agriculture and territory occupation

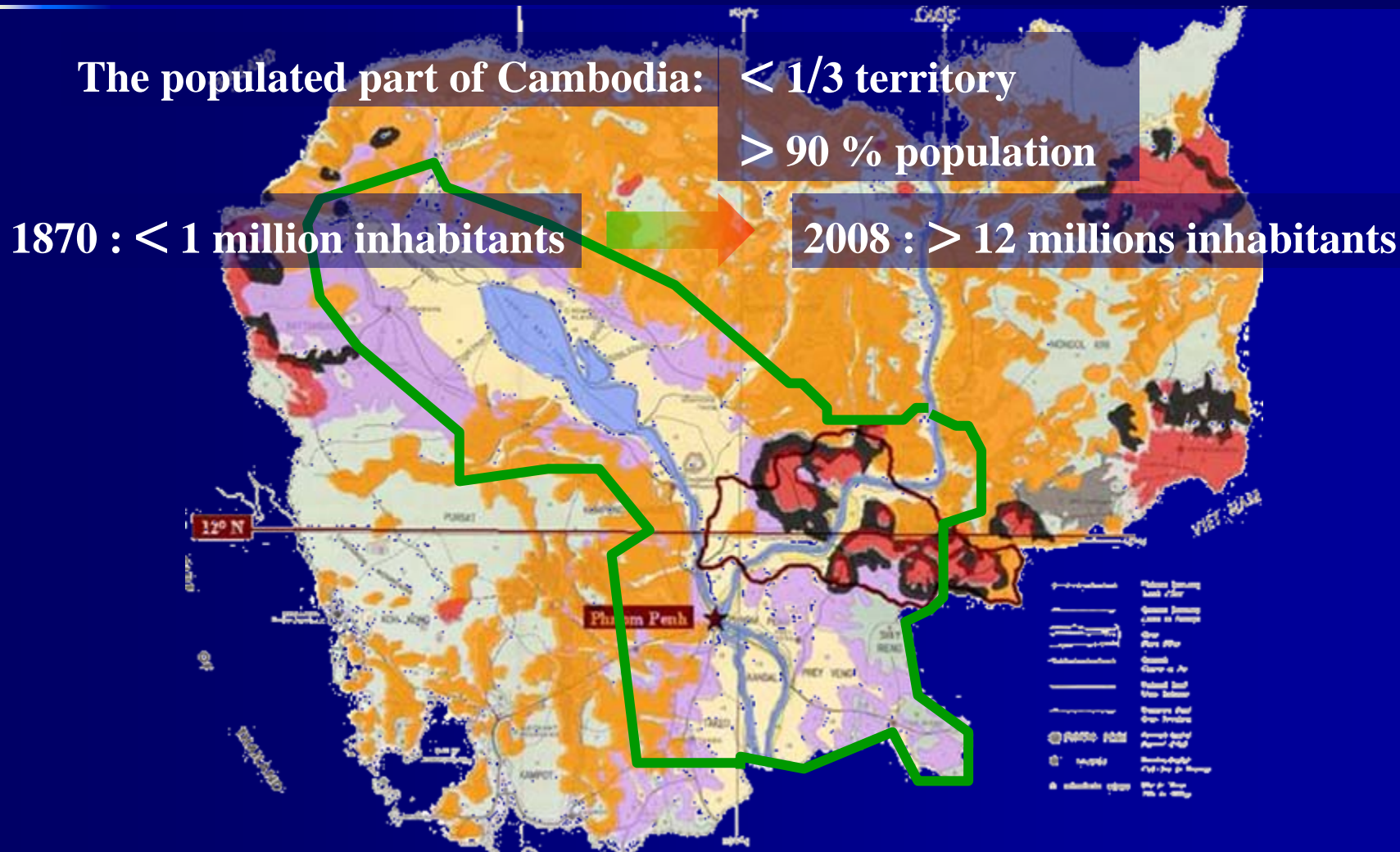
## 1.1/ 4 major Agro-ecosystems

Some constraints of the physical conditions: soils and flood



# 1/ Agriculture and territory occupation

## 1.2/ An unequal population distribution on the national territory



# 1/ Agriculture and territory occupation

## 1.2/ An unequal population distribution on the national territory

“Rice & central Cambodia” vs “Forest & peripheral Cambodia”

### a central and populated Cambodia

> 12 millions inhabitants  
> 250 inhab./km<sup>2</sup>  
agriculture > 55 % of the territory

### a peripheral and “empty” Cambodia

< 2 millions inhabitants  
< 15 hab./km<sup>2</sup>  
agriculture < 5 % of the territory

### Consequences on agriculture

Cropped area < 20 % of the country surface

Fragmentation of land holdings  
in the populated area :

# 90 % of the plots < 0,5 ha  
# 75 % of the farms < 1,0 ha

Rainfed lowland rice as  
subsistence farming  
in the populated area

Commercial farming and natural  
resources exploitation  
in the “empty” area

An increasing land concentration :

15 to 20% landless farmers  
10 % of the owners hold 40 % of the land



## 2<sup>nd</sup> PART

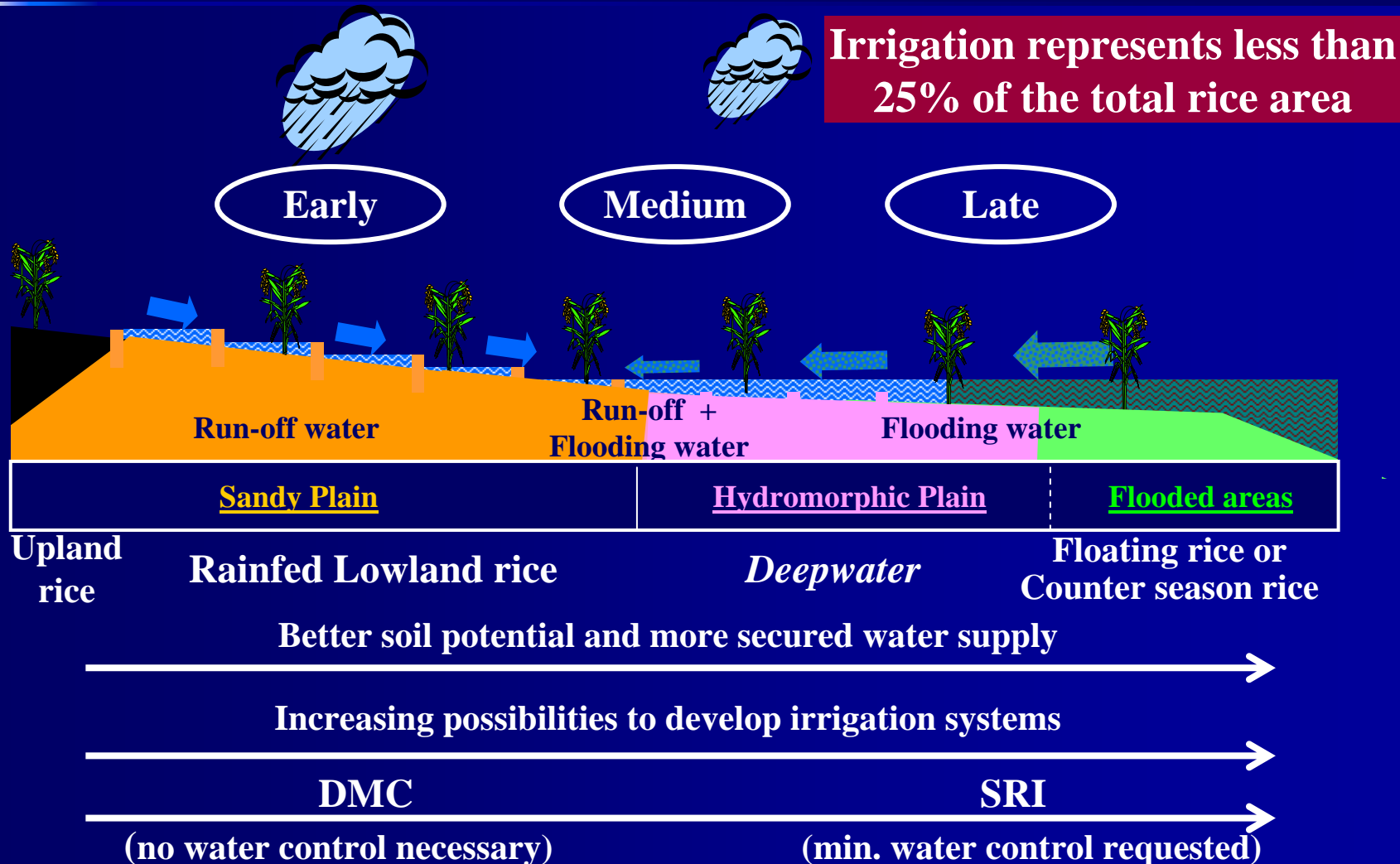
# Current agricultural dynamics in the “*full*” and “*empty*” Cambodia

# 2/ Current agricultural dynamics in the “full” ... Cambodia

Document content source: <http://www.agriculture.com/cambodia>

## 2.1/ Central plain

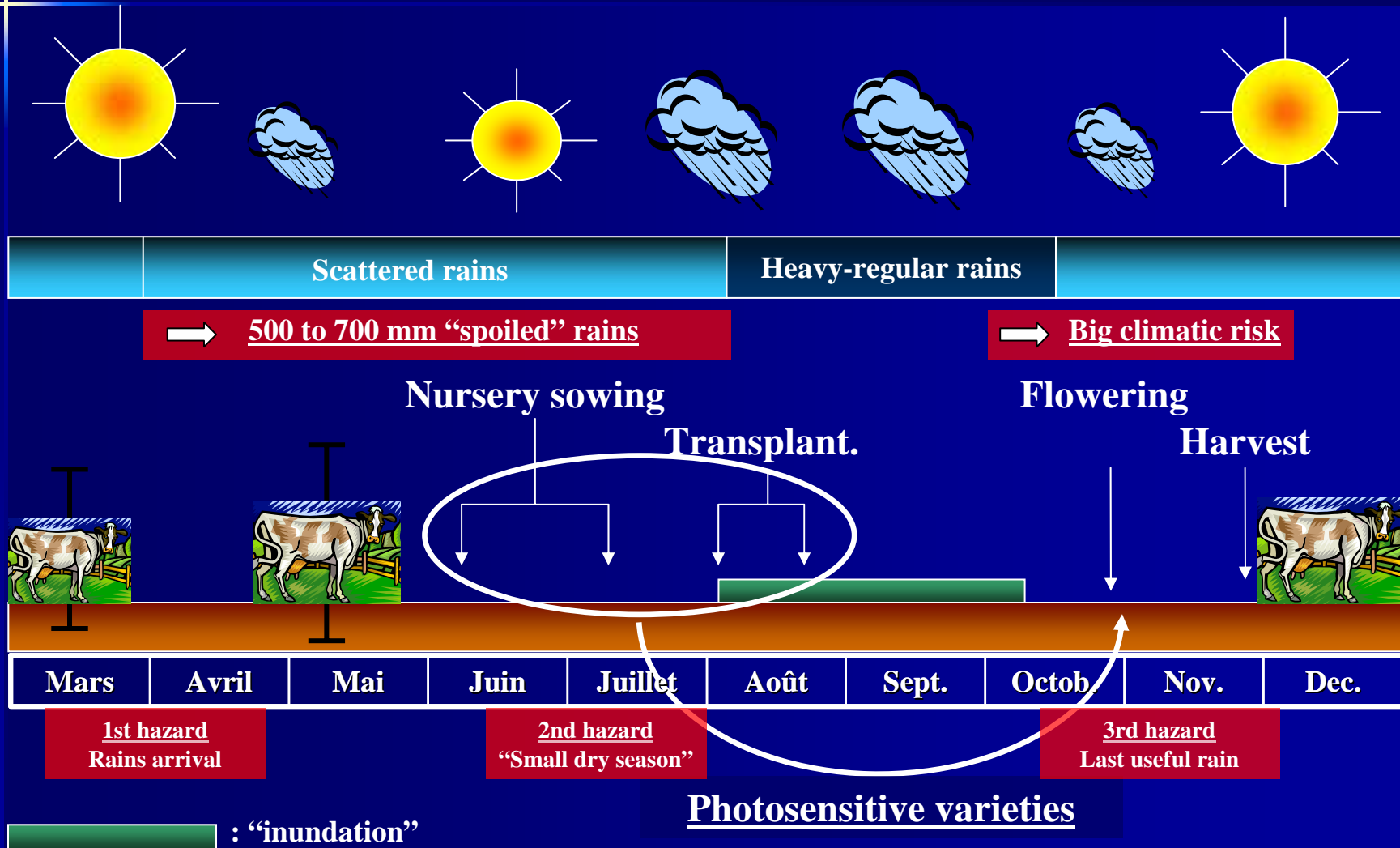
### Simple typology of the rice production systems



# 2/ Current agricultural dynamics in the “full” ... Cambodia

## 2.1/ Central plain

### Main technical features of the rainfed lowland rice cropping system





## 2/ Current agricultural dynamics in the “full” ... Cambodia

### 2.1/ Central plain

#### Land intensification ... a response to an extreme land fragmentation ?

General problem of farm size: often < 1,0 ha ... split in many small plots

X

High climatic risk in the traditional Rainfed Lowland Rice cropping system

→ Poor prospective for any Labour and/or Input-capital based forms of intensification within current crops calendar

→ Search for off farm activities  
Seasonal migrations (cities or abroad)  
Permanent migrations (peripheral regions)

→ Land price increase background  
high temptation to sell





**Upper terraces ... > # 1,5 million ha**



**Hydromorphic plain ... # 0,7 million ha**





## 2/ Current agricultural dynamics in ... the “empty” Cambodia

### 2.2/ Peripheral Cambodia

A huge “land reserve” ... for which purpose ?

Total area of Cambodia	Agricultural area	Great Lake	Protected area	
18,0	- 3,0	- 1,5	- 3,5	= <u>10,0 millions hectares</u>

Complementary characterization requested

**Agricultural potential ?** (soil type, forest, land legal status ...)

Key political choices for Cambodia, *e.g.*

**Estate x perennial monocropping** *via* **Economical Land Concession**

**Smallholders x mix UPLAND farming** *via* **Social Land Concession**

vs  
“Hot spot”  
of biodiversity

10 millions hectares

... a national asset of primary importance

# 2/ Current agricultural dynamics in ... the “empty” Cambodia

## 2.2/ Peripheral Cambodia

What kind of Agricultural development in the low populated areas ?

### 2 contrasted scenarios are possible

#### 1/ “Status quo”

- Land access mainly by large private interests
  - Economic Land Concessions
  - Cambodian investors (PP)
  - + increasingly marginalized poor people (survival, pressure on NR, land insecurity)
- Agriculture dominated by plantations of perennial crops (mono-cropping)
  - reduced diversification (limited choice)
  - under-valorization of the production potential (knowledge, rigidity)
- Increasing conflicts

#### 2/ “Planned development”

- Land access planned and secured to meet multiple objectives
  - Environment Conservation
  - Family agriculture (Social conc. ...)
  - Community based management of NR
  - Estate based agriculture (Economic conc. / Cambodian private investors)
- Diversified agriculture
  - industrial products for international markets (estate / family)
  - food products for national / regional markets (grain/livestock, quality)
- Conflict manag<sup>t</sup>. “a priori” (consultation)

# 3/ Input of DMC for a reviewed agricultural development

## 3.1/ A double necessity of annual crops development for the uplands

### Perennial crops

- a limited choice of species (rain, soil)
- rigidity of the production systems
- poor people excluded if no support (cost, immature period, land access/security...)
- Rubber, Cashew (low-med. tech.)
- Fruits (“high tech.”)
- Bio-energy (Jatropha ? ...)
- Wood (FGT, quality timber)

### AND sustainable annual cropping systems for

- Development of a land based agro-industrial sector

### tropical uplands ...

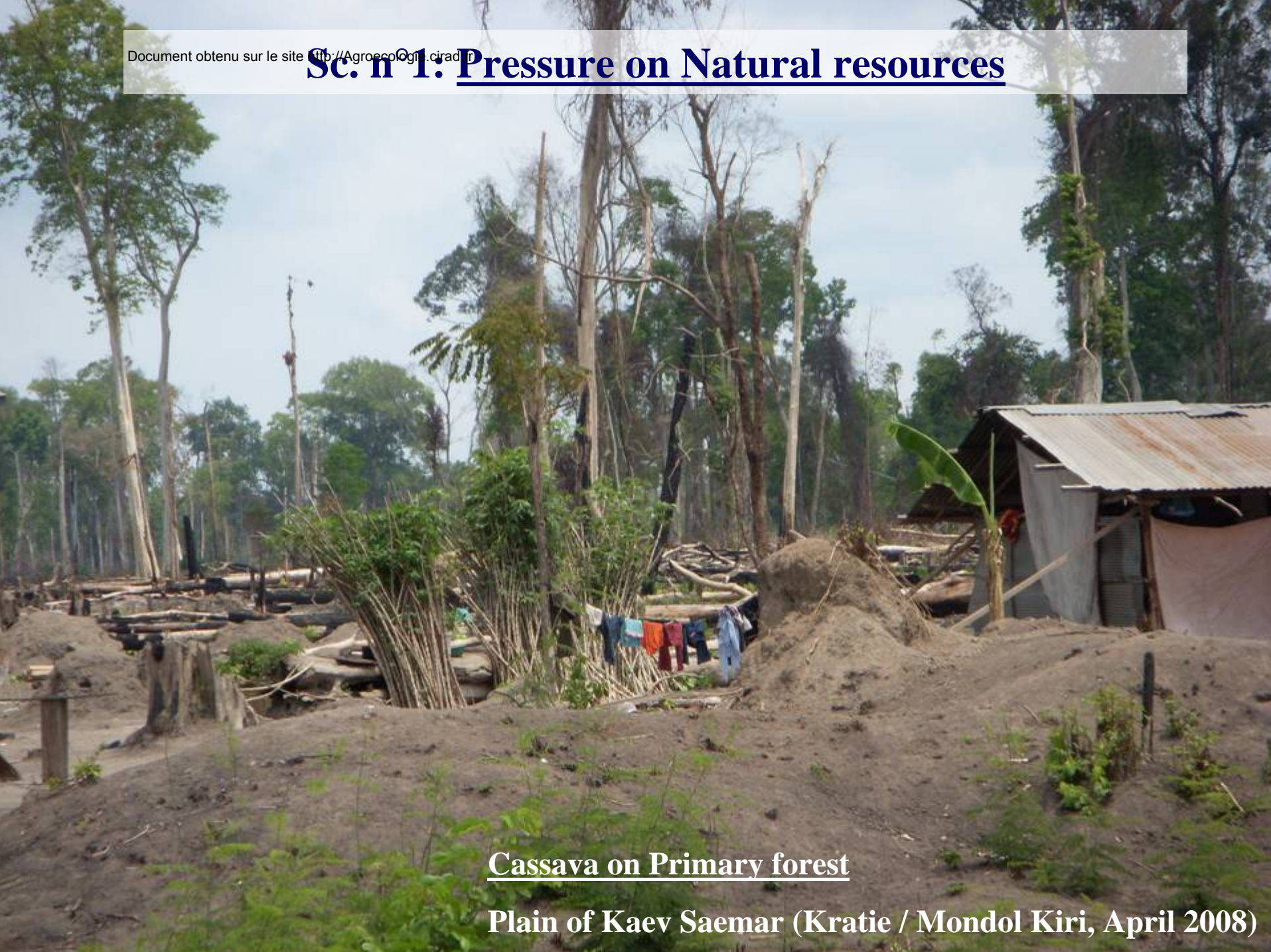
### Annual crops and livestock

- high diversification of possible species
- flexibility of production systems (/ market)
- more accessible for poor people (reduced cost, no immature period,...)
- close association with livestock possible
- **means and only means DMC!**
- Principal: Maize, Rice, Cassava, Soy.
- Secondary: Sesame, pulse sp., field veggies, Sorghum ...
- Tertiary: Cotton, Sunflower ...
- **Cattle rearing** (via fodder-cover crop), **Pig and Poultry** (via grain)

- Development of an off-plantation agro-industrial sector



# Sc. n° 1: Pressure on Natural resources



Cassava on Primary forest

Plain of Kaev Saemar (Kratie / Mondol Kiri, April 2008)



## **Sc. n° 2: Secured land access to smallholders**



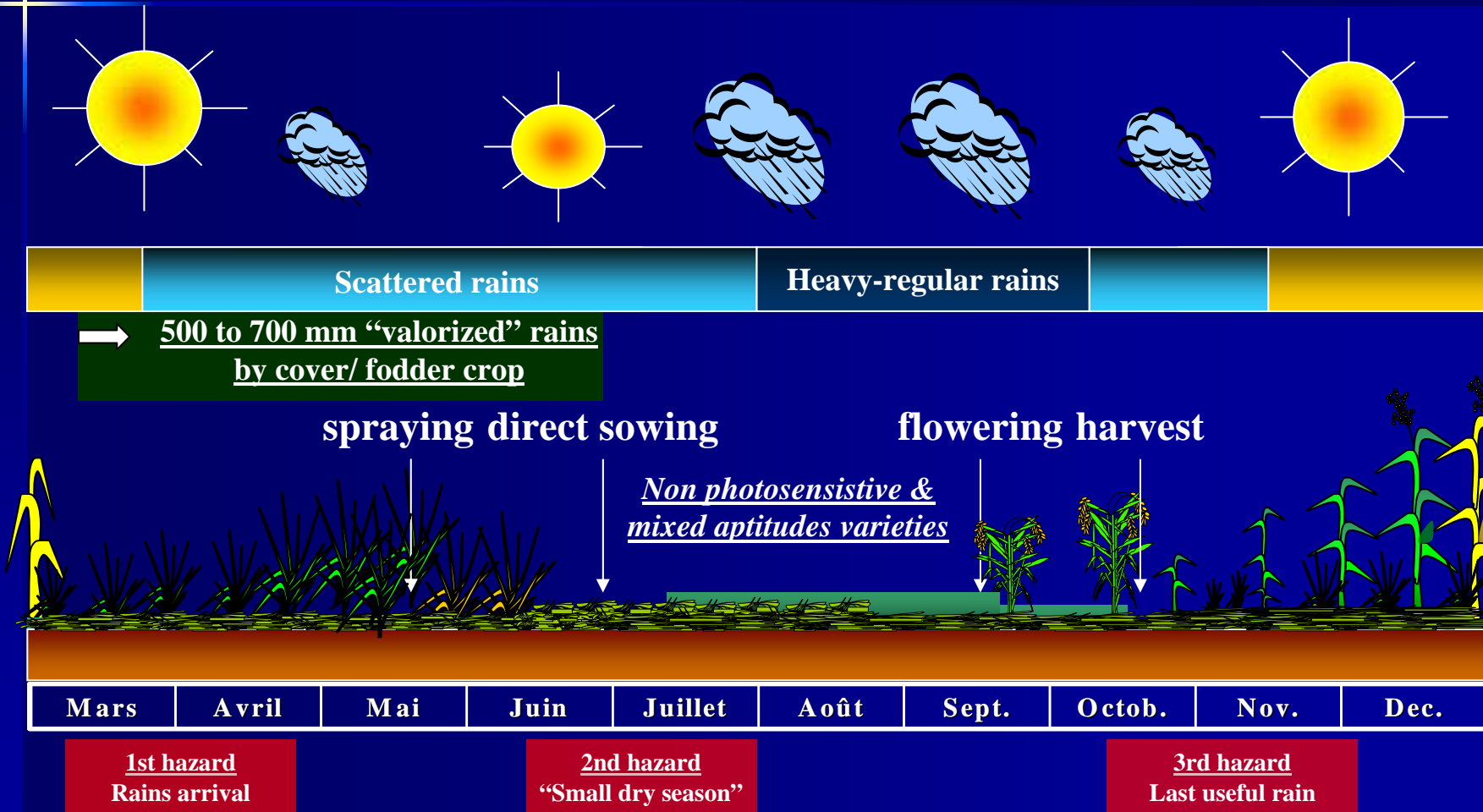
**Maize and Soybean crops in connection with Thai market**  
**(Pailin/ West Battambang, June 2005)**

## 3<sup>rd</sup> PART

# **Potential input of DMC technologies for a reviewed agricultural development**

# 3/ Input of DMC for a reviewed agricultural development

## 3.2/ Preliminary highlights on DMC application for rainfed lowland rice



: cover crop/ mulch + inundation (in low landscape unit)



### 3/ Input of DMC for a reviewed agricultural development

#### 3.3/ Necessary combination between DMC proposal and “land deal”



**Land arrangement in central plain**



**Land access in peripheral regions**



**Thank you for your kind attention**

