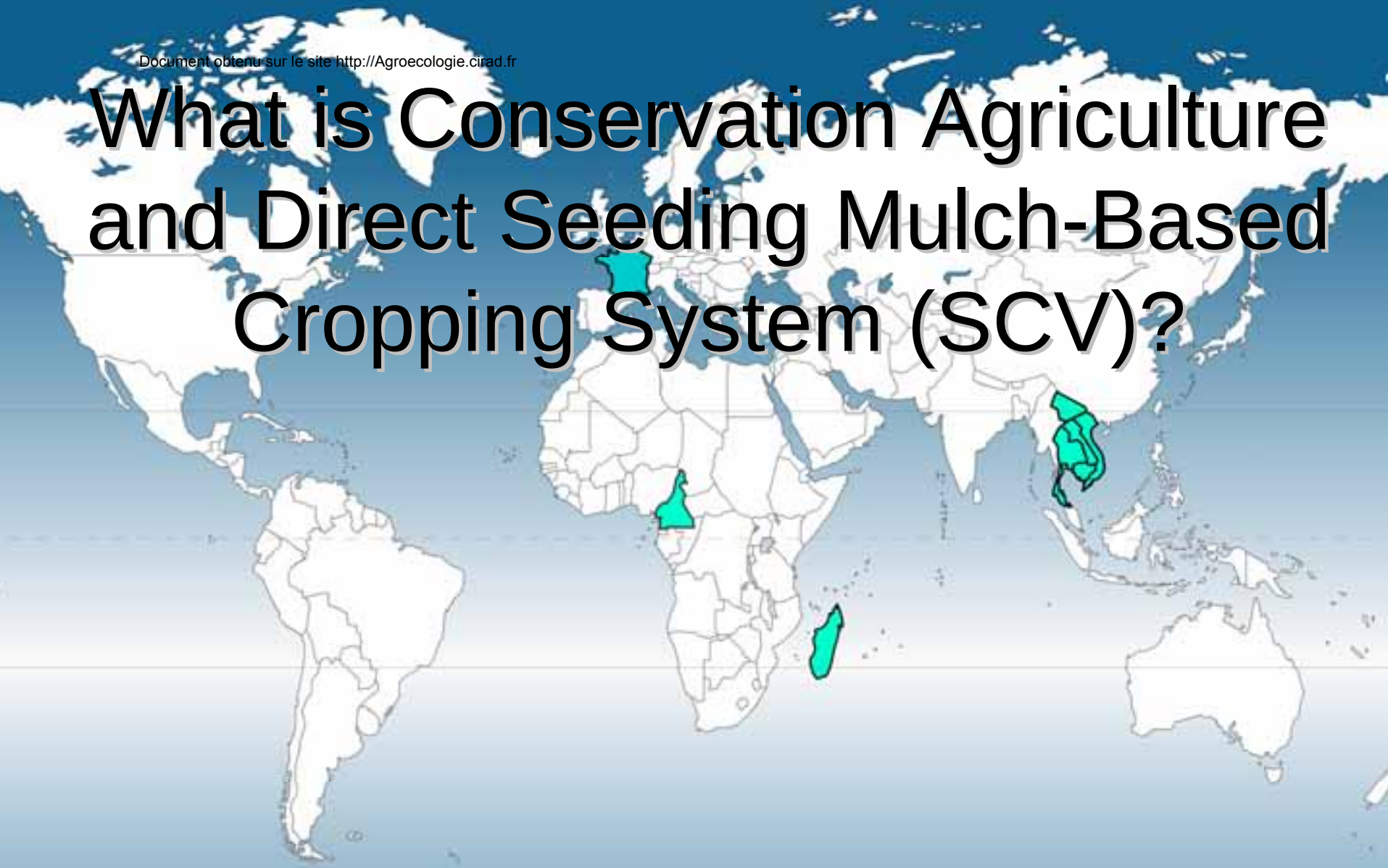
What is Conservation Agriculture and Direct Seeding Mulch-Based Cropping System (SCV)?



Adapted from Lucien Séguy, João Carlos de Moraes Sà and Rolf Derpsch





I. Main principles and functions

II. The Extent of CA Adoption worldwide

III. CA on large farms

IV. CA on small farms





What is Conservation Agriculture and SCV?

<u>Permanent Cover,</u> No-till and Cropping Systems for Sustainable Agriculture, based on three principles:

Permanent soil cover

Minimum soil disturbance and no burning

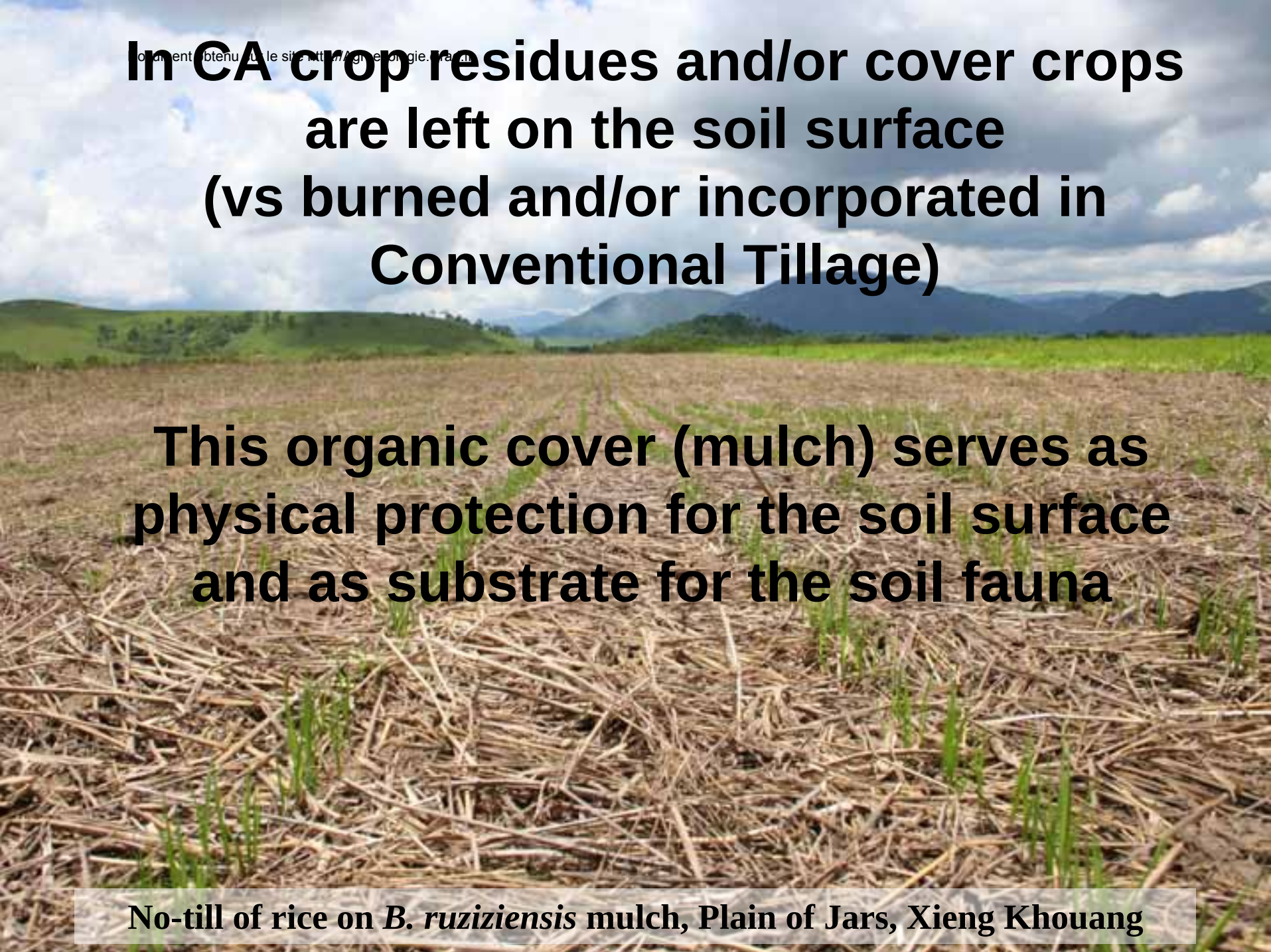
Diversified crop rotations

No-tillage is a “cornerstone” of Conservation Agriculture

and can be practiced in any crops and for any farming systems

In CA crop residues and/or cover crops are left on the soil surface (vs burned and/or incorporated in Conventional Tillage)

This organic cover (mulch) serves as physical protection for the soil surface and as substrate for the soil fauna



No-till of rice on *B. ruziziensis* mulch, Plain of Jars, Xieng Khouang

HOW CONSERVATION AGRICULTURE CAN BENEFITS FARMERS, AND COMMUNITY?

When the three principles (eliminating tillage, permanent soil cover and efficient crop sequences) are properly applied, farmers and the community will reap a number of agricultural, environmental and socioeconomic benefits.

It is a means to reconcile agricultural production, enhanced living conditions and environmental conservation.

AGRICULTURAL AND ENVIRONMENTAL BENEFITS OF CONSERVATION AGRICULTURE

Soils better protected from erosion

Enhanced soil structure and biological activity

Reduction in disease and pest pressure

Better water management

Contribution to biodiversity conservation

ECONOMIC BENEFITS OF CONSERVATION AGRICULTURE

- Reduction in production costs
- Yields comparable to or higher than those under conventional agriculture
- Agricultural production diversification
- Cumulated economic benefits on regional, national and global scales





Mains functions of DMC systems

Nutritional function via continuous mineralization of residues

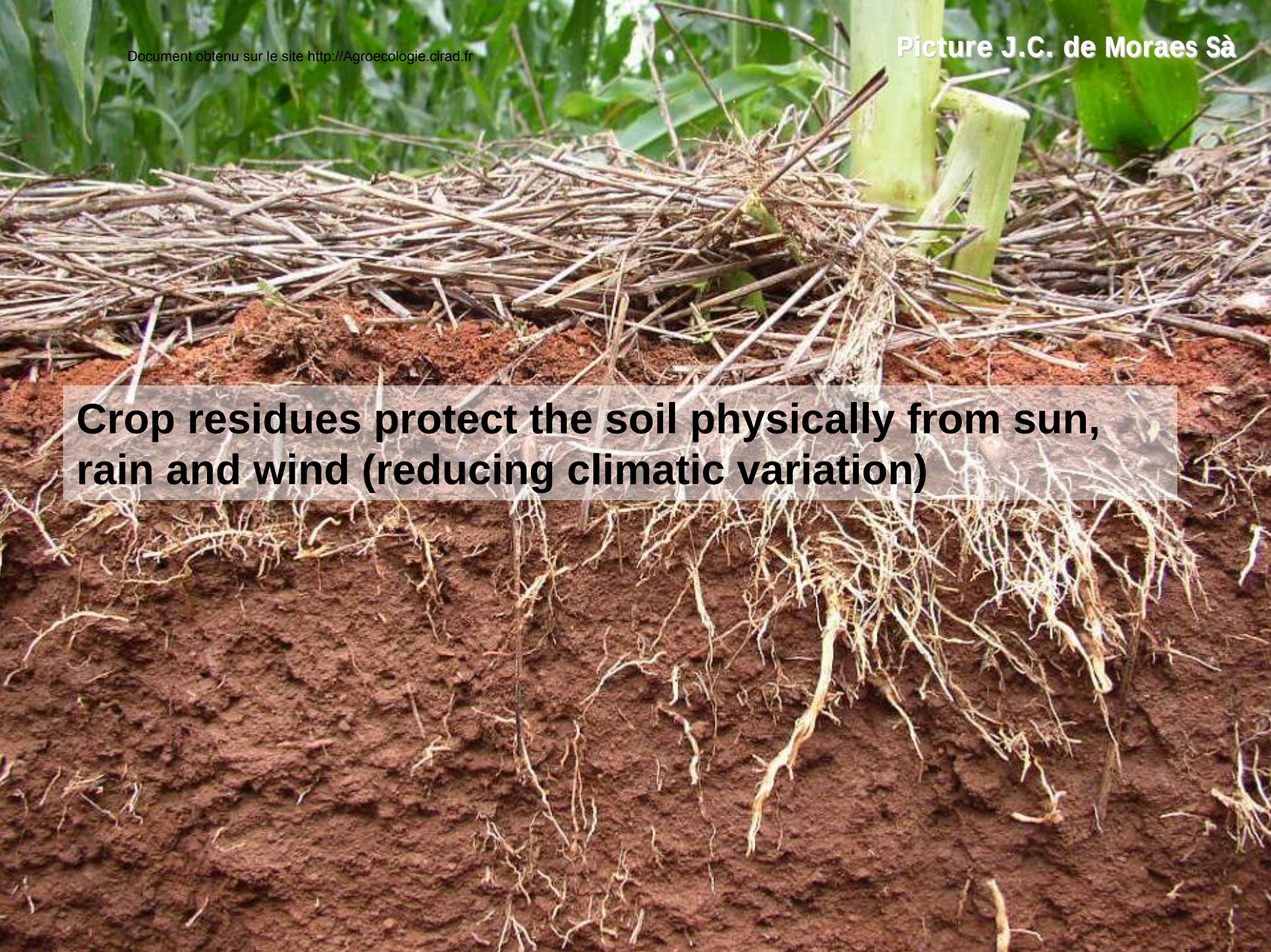
Rice-bean on maize residues, September 2007, Paklay, Xayabury

Nutritional function for livestock by rational use of fodder

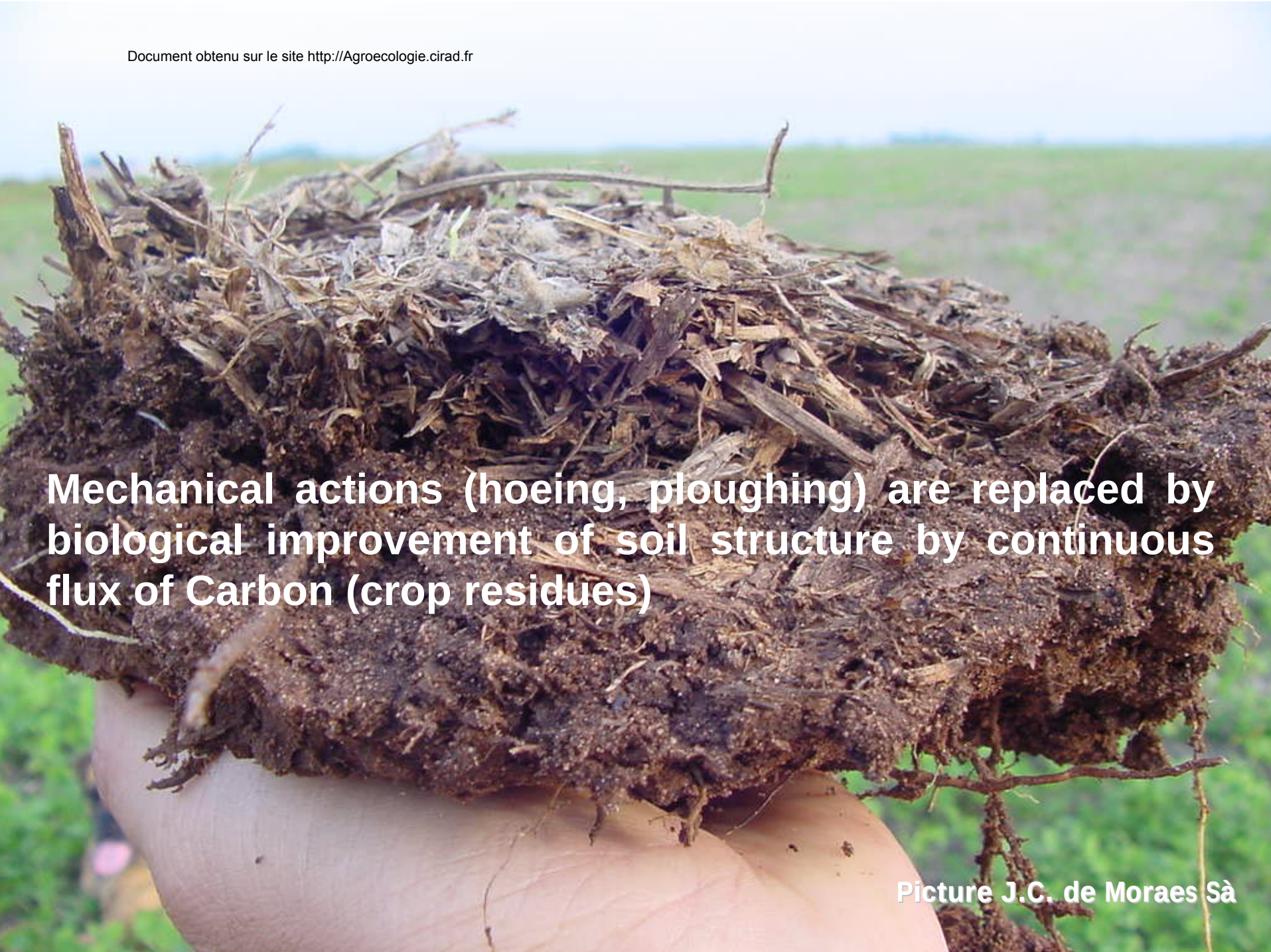
Improved pastureland, Pek district, Xieng Khouang

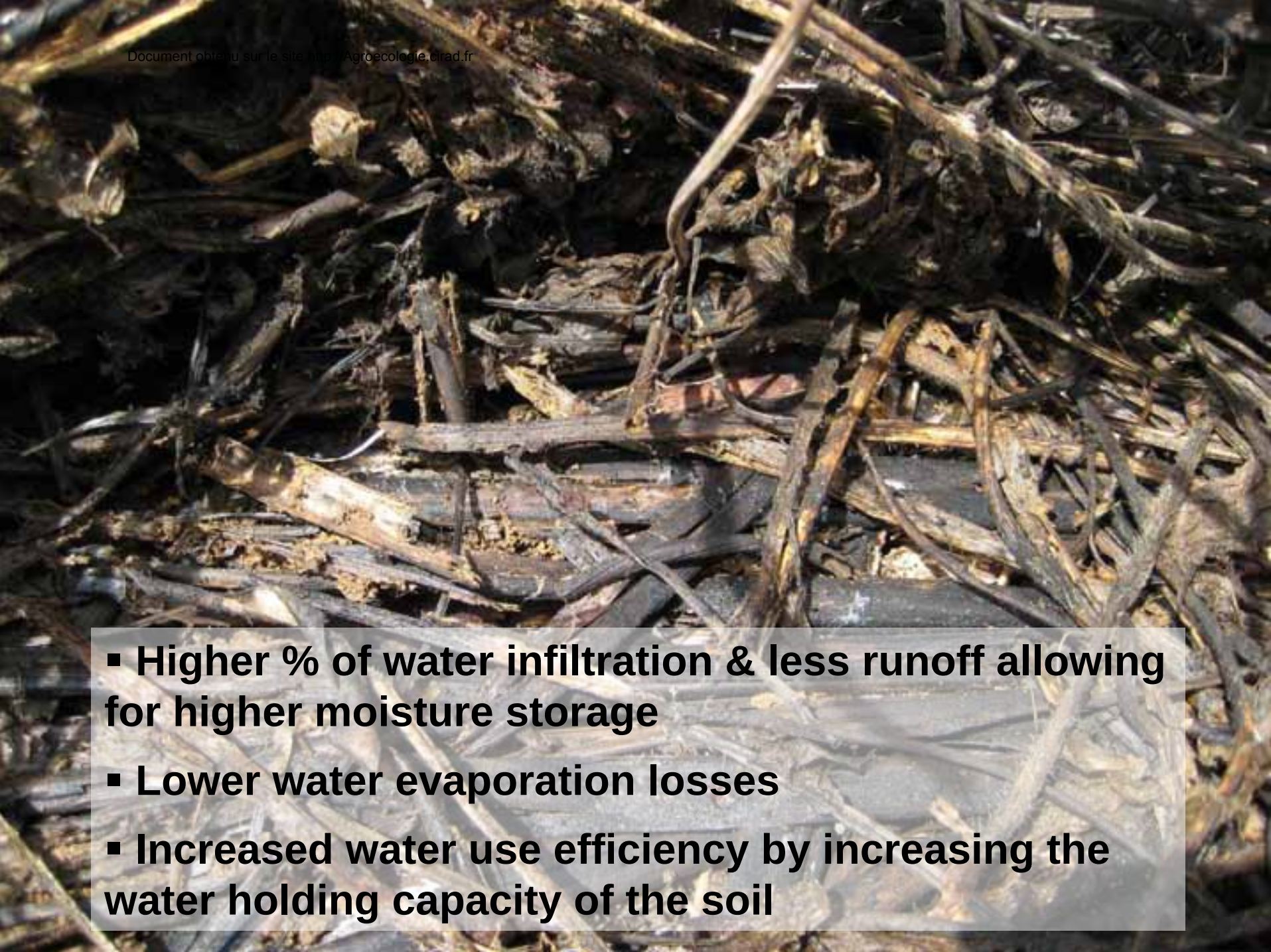
Integrated management of weeds through shade and/or allelopathic effects

No-till of maize on rice bean (*Vigna umbellata*) mulch. Kenthao, Xayabury



Crop residues protect the soil physically from sun, rain and wind (reducing climatic variation)





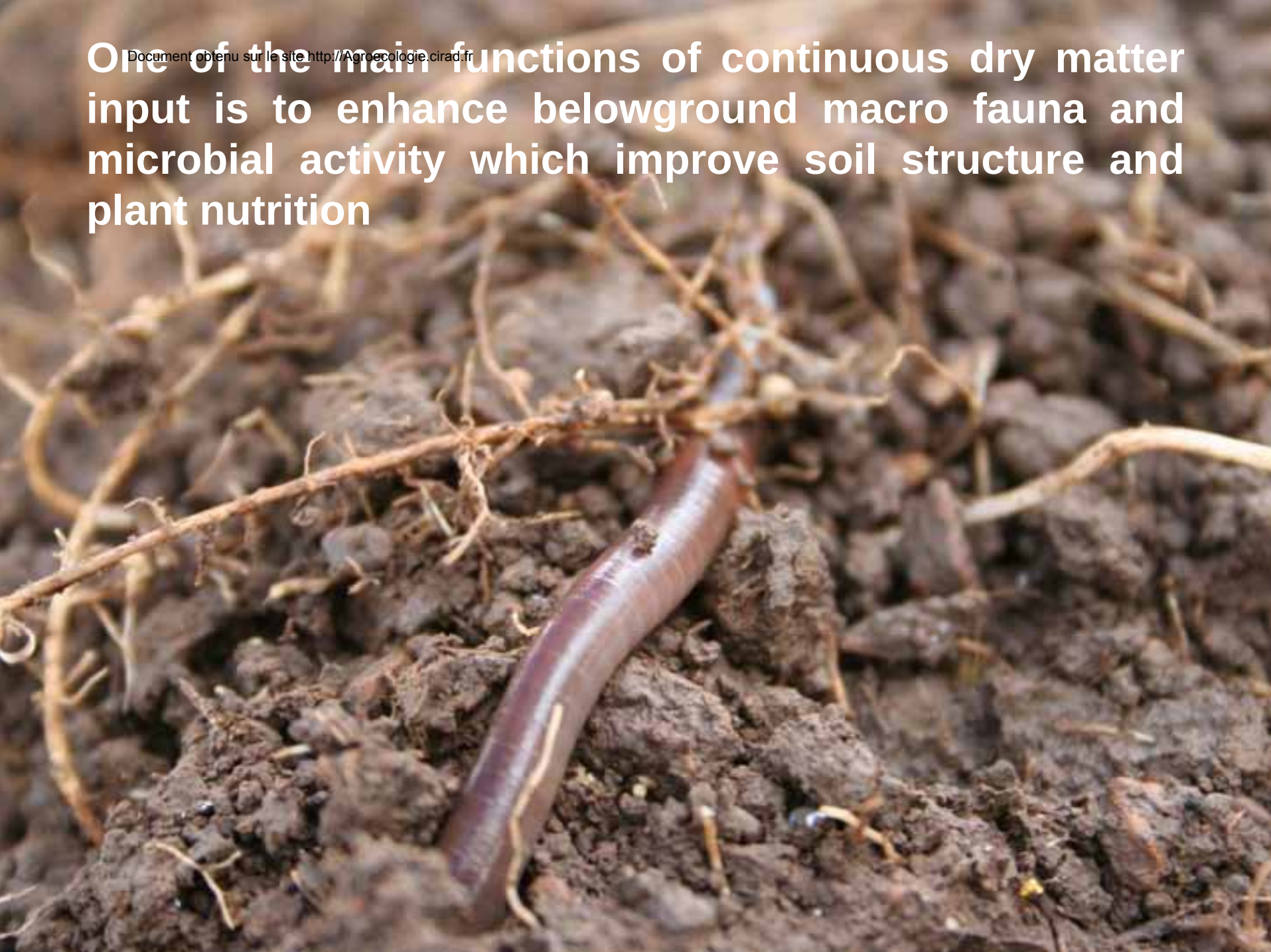
- **Higher % of water infiltration & less runoff allowing for higher moisture storage**
- **Lower water evaporation losses**
- **Increased water use efficiency by increasing the water holding capacity of the soil**

Belowground

Photo L. Séguy

Deep and strong rooting systems of *Eleusine coracana* and *Cajanus cajun*

- **Recycling nutrients leached deep into the soil below soil layers used by cash crops or rice by deep rooting systems of the cover crops**



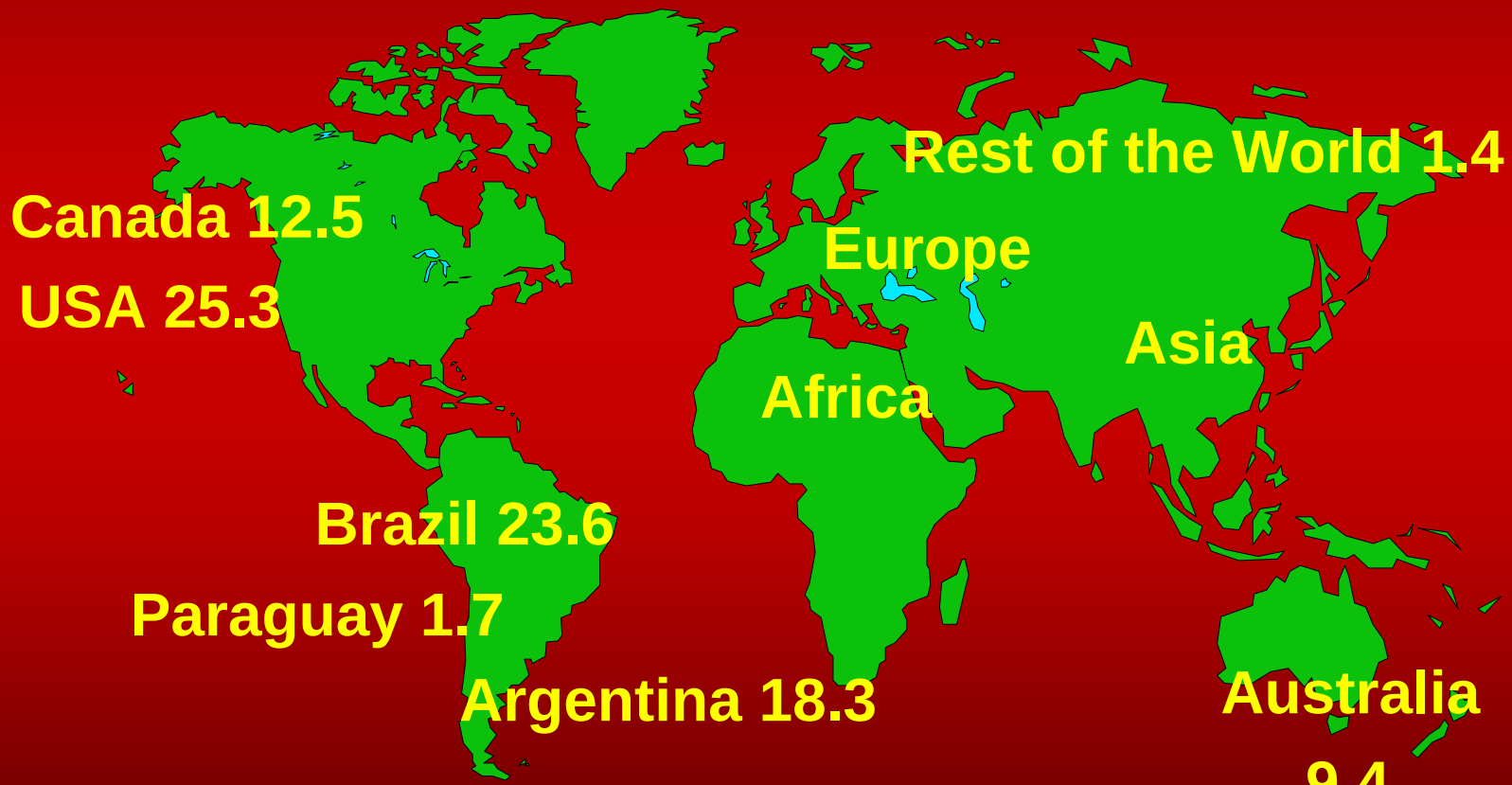
One of the main functions of continuous dry matter input is to enhance belowground macro fauna and microbial activity which improve soil structure and plant nutrition

The soil micro-organisms and soil fauna take over the tillage function and soil nutrient balancing.

World wide adoption of No-tillage 2004-05

(Million ha)

Total 95 Million ha



(Derpsch, 2005)

EXAMPLES OF LARGE SCALE NO-TILL FARMING SYSTEMS

EXAMPLES OF NO-TILLAGE ON SMALL FARMS

Sowing of maize in Kenthao, Lao PDR

Adoption of DMC systems with smallholders

Country	*Area (ha)*	*N° of farmers*	*Area/farm (ha)*
Brazil	173,000	38,000	4.55
India	130,000	26,000	5.00
Pakistan	80,000	5,500	14.55
Ghana	45,000	100,000	0.45
Bangladesh	10,000	30,000	0.33
Paraguay	6,000	2,300	2.61

Source: Wall & Ekboir, 2002

It is estimated today that 500,000 to 600,000 small farms practiced no-tillage in Brazil; 300,000 in Ghana; 200,000 in the Indo-Gangetic plain

No-tillage on small farm in Brazil

No-tillage on small farm in Brazil

Photo F. Jullien, PASS

Sowing of maize in Paklay, Lao PDR

Almost all advantages of the no-till system…

come from the permanent cover of the soil

No-till of rice on *B. ruziziensis* mulch, Plain of Jars, Xieng Khouang

Continuous and full soil cover is the key factor for successful CA/DMC systems and for Sustainable Agriculture

No-till of rice on *S. guianensis* mulch, Plain of Jars, Xieng Khouang