

Co-designing low-pesticide input cropping systems with the STEPHY guide



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Joint technology Network for 'innovative cropping system'

- ▶ ~100 agronomists
- ▶ **Objectives**
- ▶ Design and develop innovative cropping systems
- ▶ Create and develop a network of skills
in polyculture, mixed farming & vegetables systems
- ▶ Innovative cropping system :
 - **Deal with societal issues** (water management, energy and gas emissions, biodiversity, ...) **and economic performances**
 - **Results as much from the combinations** of existing crops and techniques, than from **the introduction of new** crops and techniques

The STEPHY co-design approach

- ▶ **What is it for ?**
- ▶ Co-design cropping systems** less reliant on pesticides
- ▶ Evaluate the alternative cropping systems
- ▶ Train the co-designing for cropping systems

- ▶ **For whom ?**
- ▶ Advisers, farmers, R&D engineers, searchers, trainers, students, ...

**cs : cropping system

The STEPHY co-design approach

- ▶ **Not just** a new technical guide !
- ▶ It is a **system approach** ...
- ▶ Aimed for **significant reduction in pesticide use, for solving problem**
- ▶ to **broaden the options available for change** in cropping systems
- ▶ Taking into account **economical and environmental goals**
- ▶ **Best** if used in a **group discussion** (more brains broaden the horizon)

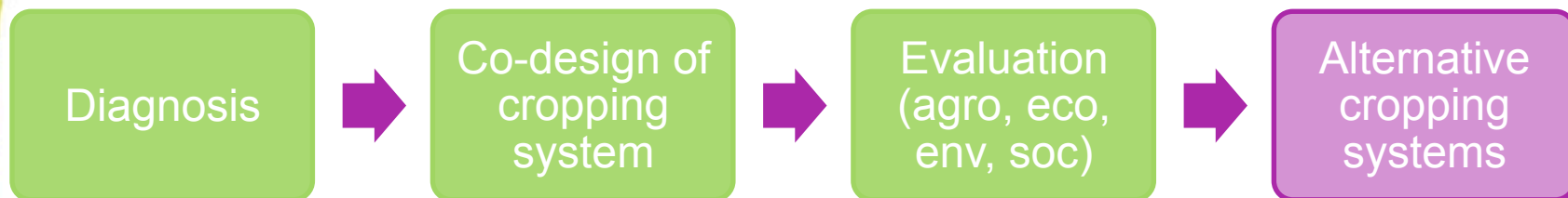
The STEPHY co-design approach

- ▶ **How to use it ? with ...**
- ▶ groups of farmers
- ▶ mixed groups composed of farmers, advisers, searchers, ...
- ▶ groups of students
- ▶ binomial farmer and his adviser...



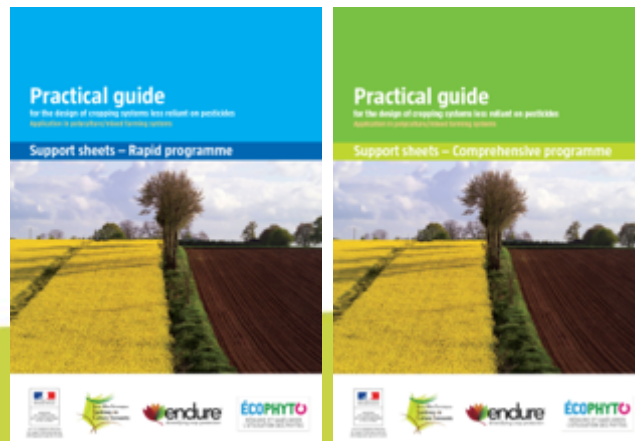
The STEPHY co-design approach

▶ 4 steps



▶ ... which can be down with **two options**

- Comprehensive programme
- Rapid programme



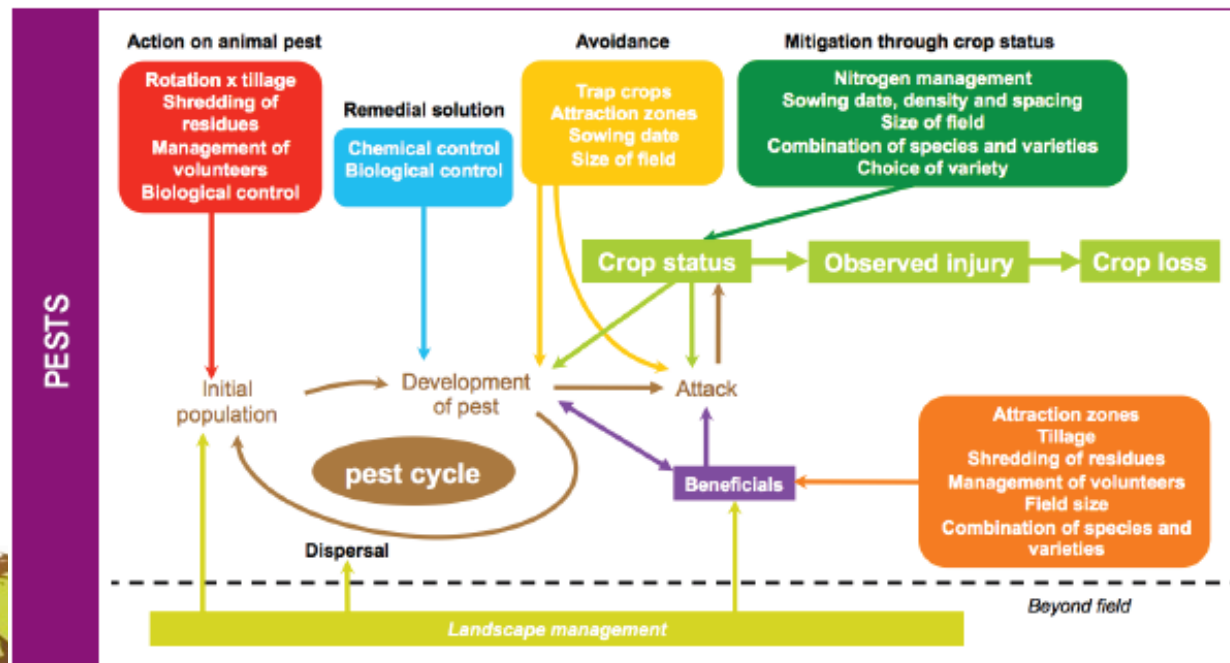
Step 1 : Diagnosis of the initial situation

- Understand the overall objectives of the farmer, assets and constraints
- Identify the cs** of the farm and the problematics

<p>Priority tasks</p> <p>Sowing, harvesting autumn crops Fertilisation, weeding</p>	<p>Farmer's priorities</p> <p>Fewer interventions in the fields because he does not live close Reduce the use of pesticides because of health concerns and desire to reduce energy costs</p>	<p>Milieu (soil/climate)</p> <p>Good potential: medium loam on plateau => No particular constraints in the milieu</p>									
<p>Workforce</p> <p>1 MWU for 73ha Mutual aid for harvesting and other operations => Frees some time</p>	<p>Rotations</p> <table border="1"> <tr> <th data-bbox="703 779 942 811">Rotation 1</th> <th data-bbox="962 779 1193 811">Rotation 2</th> </tr> <tr> <td data-bbox="703 818 942 932"> % on F: 70% Crops: rape-wheat-barley Most common planting method: ploughing/SCT/direct sowing </td> <td data-bbox="962 818 1193 932"> % on F: 30% Crops: pea-wheat-rape-wheat-wheat Most common planting method: ploughing/SCT/direct sowing </td> </tr> <tr> <th data-bbox="703 996 942 1028">Rotation 3</th> <th data-bbox="962 996 1193 1028">Succession 4</th> </tr> <tr> <td data-bbox="703 1035 942 1200"> % on F: Crops: Most common planting method: ploughing/SCT/direct sowing </td> <td data-bbox="962 1035 1193 1200"> % on F: Crops: Most common planting method: ploughing/SCT/direct sowing </td> </tr> </table>		Rotation 1	Rotation 2	% on F: 70% Crops: rape-wheat-barley Most common planting method: ploughing/SCT/direct sowing	% on F: 30% Crops: pea-wheat-rape-wheat-wheat Most common planting method: ploughing/SCT/direct sowing	Rotation 3	Succession 4	% on F: Crops: Most common planting method: ploughing/SCT/direct sowing	% on F: Crops: Most common planting method: ploughing/SCT/direct sowing	<p>Local issues</p> <p>Situation where some fields border water source with N and pesticide issues Contracted for an AEM 'conversion to integrated agriculture'</p>
Rotation 1	Rotation 2										
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<p>Equipment/material</p> <p>Equipment available for mechanical weeding Shared equipment with several farmers => problems of availability</p>	<p>Crop enemies</p> <p>Principal problems: foxtail and grain yield in Cereals, animal pests in rape (aphids, shiny weevils) Average pressure: septoria in wheat, sclerotinia in rape, bistort and bindweed in pea</p>										
<p>Location of fields</p> <p>Lives some distance from fields Fields located in 2 sites 15km apart =>desire to save time spent on travelling and observations</p>	<p>Production system</p> <p>UAL=73 ha: small area => mechanical weeding can be envisaged</p>	<p>Technical-economic environment</p> <p>Neighbouring livestock farms=> possible market Possibilities for selling flax privately Possible markets for peas</p>									

Step 2 : Co-design of alternative cs

- ➔ Define the objectives of design ('rupture' level)
- ➔ Identify the available crop & techniques ... to broaden the horizons for changes
- ➔ Combine the rotation and cropping management plan per crop in an alternative cs



Step 3 : Evaluating alternative cropping systems

→ Evaluate cs

- qualitative evaluation of results and performances
- multicriteria and quantitative evaluation in the results and performances → STEPHY calculator



Légende (type d'information) :

- Information requise
- Information facultative
- Information complétée

Nom du système de culture : CBO

Contexte de prix d'achat des fertilisants : Moyen

Contexte de prix de vente de la récolte : Moyen

Année 1 : Colza d'hiver

Année 2 : Blé tendre d'hiver

Année 3 : Orge d'hiver

MODE DE GESTION DE L'INTERCULTURE PRÉCÉDENTE :

Post-moisson :

Broyage ou rebroyage des pailles chaumes : Oui Non Non

Implantation éventuelle d'une culture intermédiaire (ou repousses) :

Culture intermédiaire semée (ou repousses) : Sol nu Sol nu Sol nu

Matériel utilisé : sans objet sans objet sans objet

Mode de destruction de la culture intermédiaire :

Préparation du semis de la culture :

Désherbage chimique en interculture :

IFT : 1.0 0.0 0.0

Nombre de passages : 1.0 0.0 0.0

Charges : (€/ha) 10.0 0.0 0.0

Travaux du sol entre récolte du précédent et semis de la culture :

Labour : Oui Oui Oui

Travaux superficiels (-15cm de profondeur) : bre pass. : 0 2 2

Décompactage : Non Non Non

Roulage (mettre non si semis en combiné) : Non Non Non

SEMIS DE LA CULTURE PRINCIPALE :

- ▶ Agronomic and technical results
- ▶ Input pressure (TFI, N balance, ...)
- ▶ Environmental, economical and social performances (DM, energy efficiency, consumption, ...)

Résultats de l'évaluation :

Comparaisons des systèmes de culture CBO(Moyen/Moyen)

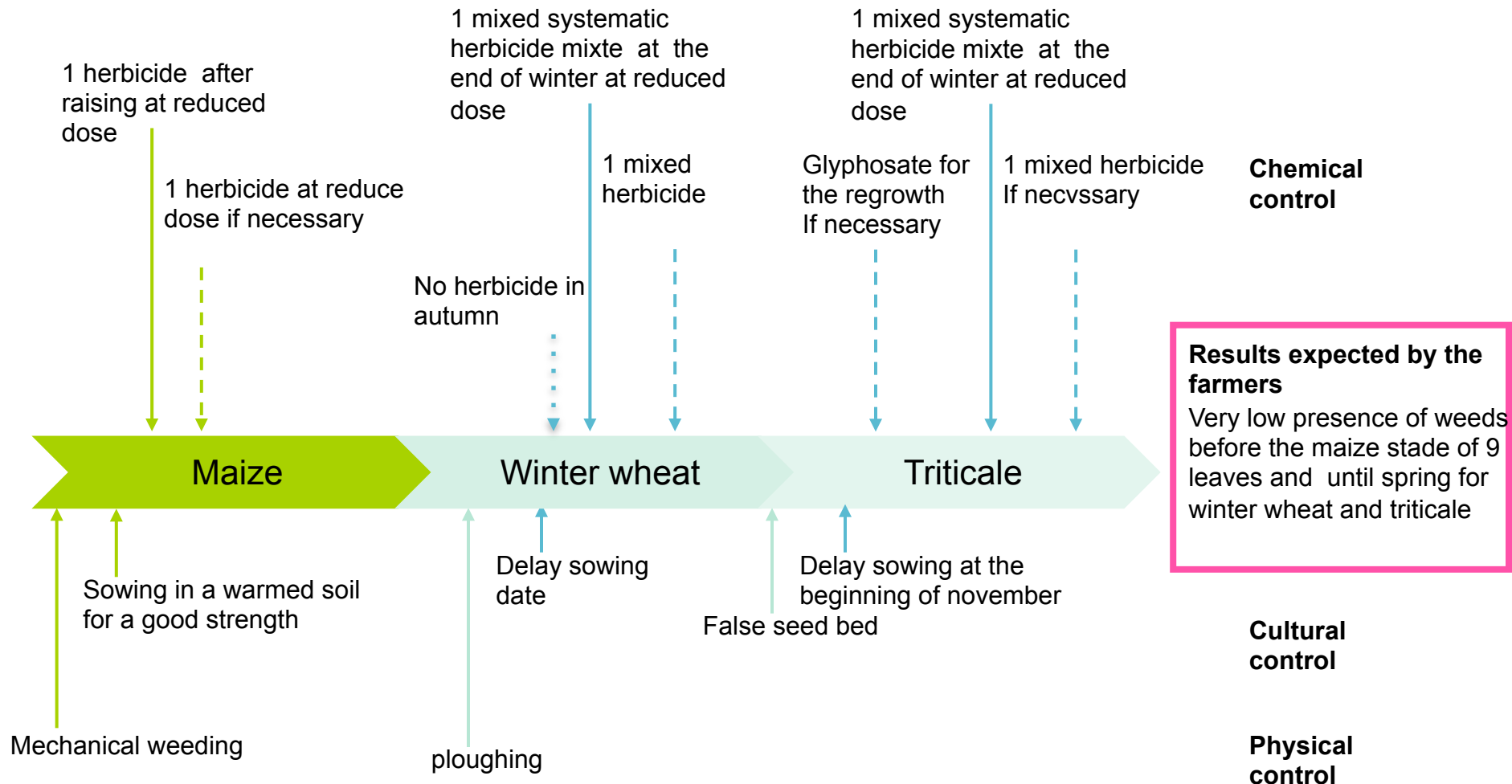
Indicateurs	unité	CBO (réf.)
Traitement des semences	%	100
IFT total		5.8
IFT herbicides		2.2
IFT insecticides		1.5
IFT fongicides		1.4
IFT autres		0.8
Coût énergétique	GJ/ha	13
Efficience énergétique		8
Bilan Bascule	kg d'N /ha	36
Produit brut	€/ha	877
Charges opérationnelles	€/ha	422
Charges phytosanitaires herbicides	€/ha	85
Charges phytosanitaires insecticides	€/ha	18
Charges phytosanitaires fongicides	€/ha	55
Charges phytosanitaires autres	€/ha	14
Charges engrais	€/ha	190
Charges semences	€/ha	60

Pour les indicateurs surlignés : Des paramètres rentrés par l'utilisateur. Le résultat obtenu n'est pas garanti.

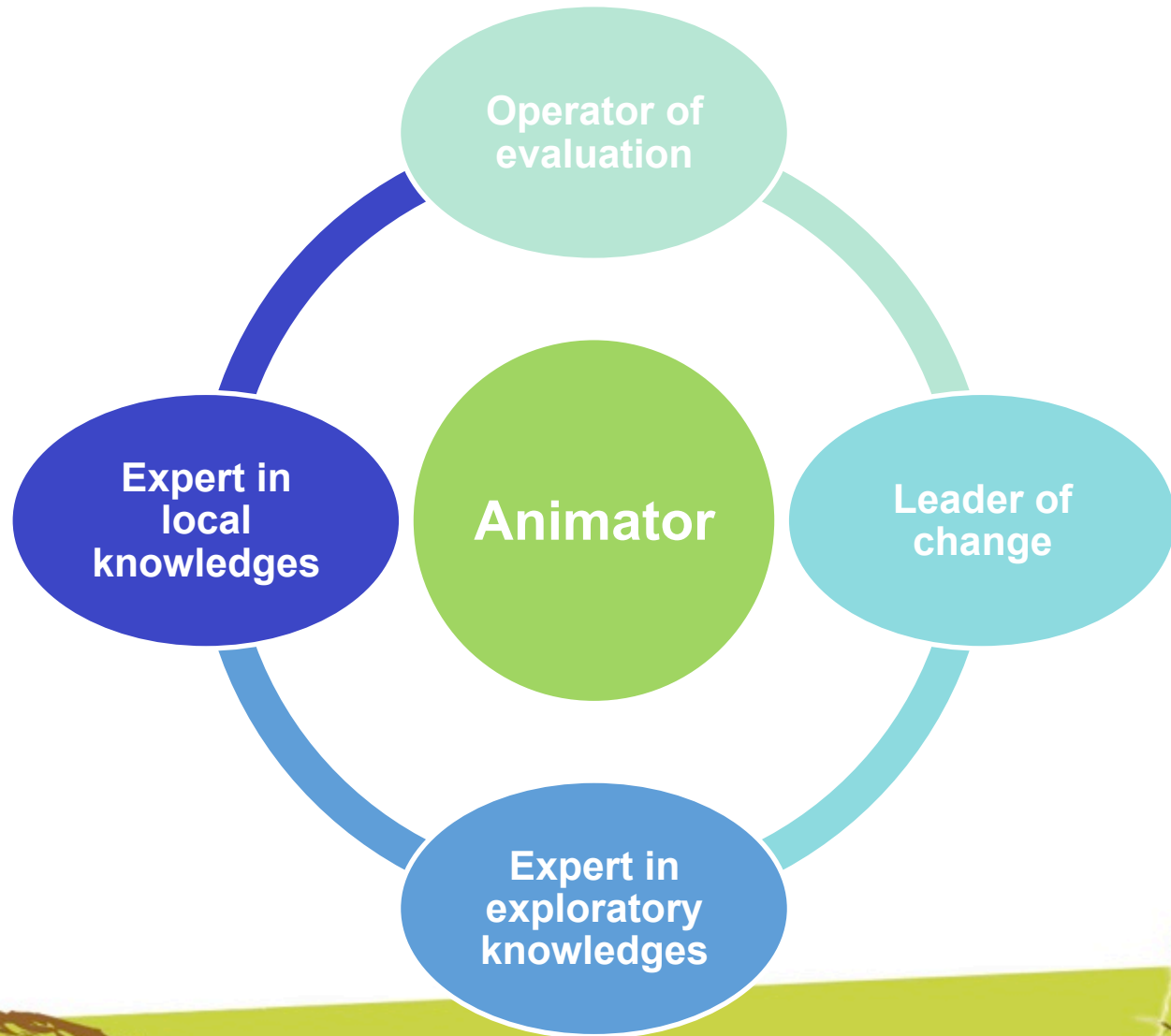
Step 4 : Discussion of results

→ Introduce and discuss the alternative cs suggested

Example of co-design with farmers in mixed farming system
On hydromorphic soil in Loire Atlantique (herbicide TFI = 1,2)



5 key roles in this co-design



Trainings with the STEPHY approach

- ▶ **1 200 advisers** in France
- ▶ **300 farmers**
- ▶ **300 students**
- ▶ **80 trainers**

- ▶ Next step after training :
 - ➔ **DARE a co-design activity or workshop !!**

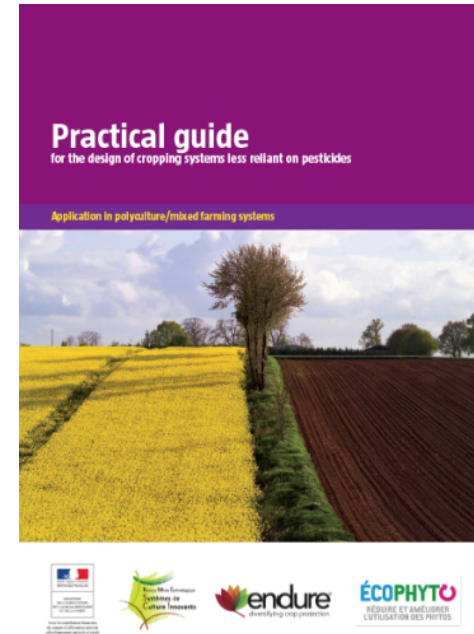
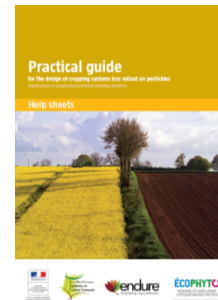
The STEPHY co-design approach

- ▶ a **universal approach** (tested and approved in polyculture, mixed farming systems but also in vegetables, tropical and perennial systems)
- ▶ The **collective, a ressource** ...
- ▶ a way for **learning about techniques** thanks to exchanges between people involved in the process
- ▶ No just a guide but ... mainly a **posture** that put the people in a '**de novo**' approach (≠ 'step by step') and allow them radical changes for radical innovation

Resources

▶ STEPHY practical guide

- www.endure-network.eu
- www.systemesdecultureinnovants.org



- ▶ Agro-PEPS <http://agropeps.clermont.cemagref.fr/>
collaborative website about technical
informations and exchanges

Thank you for your attention !