



Improving smallholder's income generation by the integration of DMC by-products into pig raising activities

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Objectives:

- Soil and environmental conservation
- Farmer's income diversification
- Improvement of agricultural commercialization

Activities:

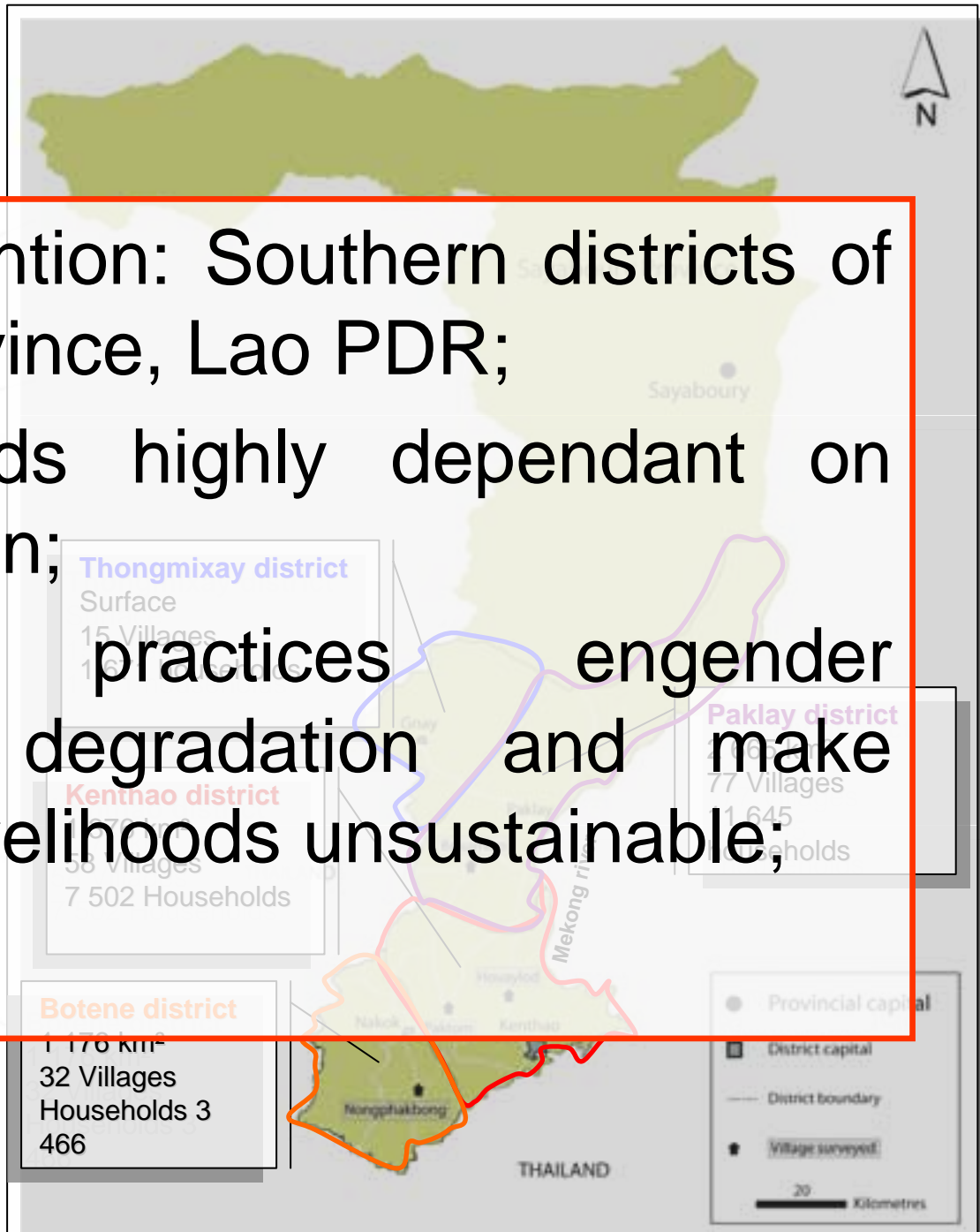
- Extension of DMC systems
- Improvement of livestock farming systems
- Structuring of agricultural production network
- Road rehabilitation



4 southern districts

Xayaburi province

- **A**rea of intervention: Southern districts of Sayaboury Province, Lao PDR;
- **L**ocal livelihoods highly dependant on maize production;
- **C**onventional practices engender environmental degradation and make smallholder's livelihoods unsustainable;



improving smallholder pig raising

- Diversify and increase incomes;
- Support recent intensification of the activity;
- Transform and enhance agricultural production;

Improvement involves all the production factors:
Pig pen, feed, health and genetics with different
levels of intensification depending on farmer's
strategy,

Implementation of short-term pig fattening with smallholders

- During 2006 and 2007, short-term pig fattening has been experimented with 32 families (a total of 155 pigs);
- Best results were obtained with the most intensive system: exotic breeds and use of protein concentrate aliment in feed intake;
- Average net benefice of 30 USD/head;

Improvement of pig pen, feed intake, healthcare, water access
and genetics with different intensification levels

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

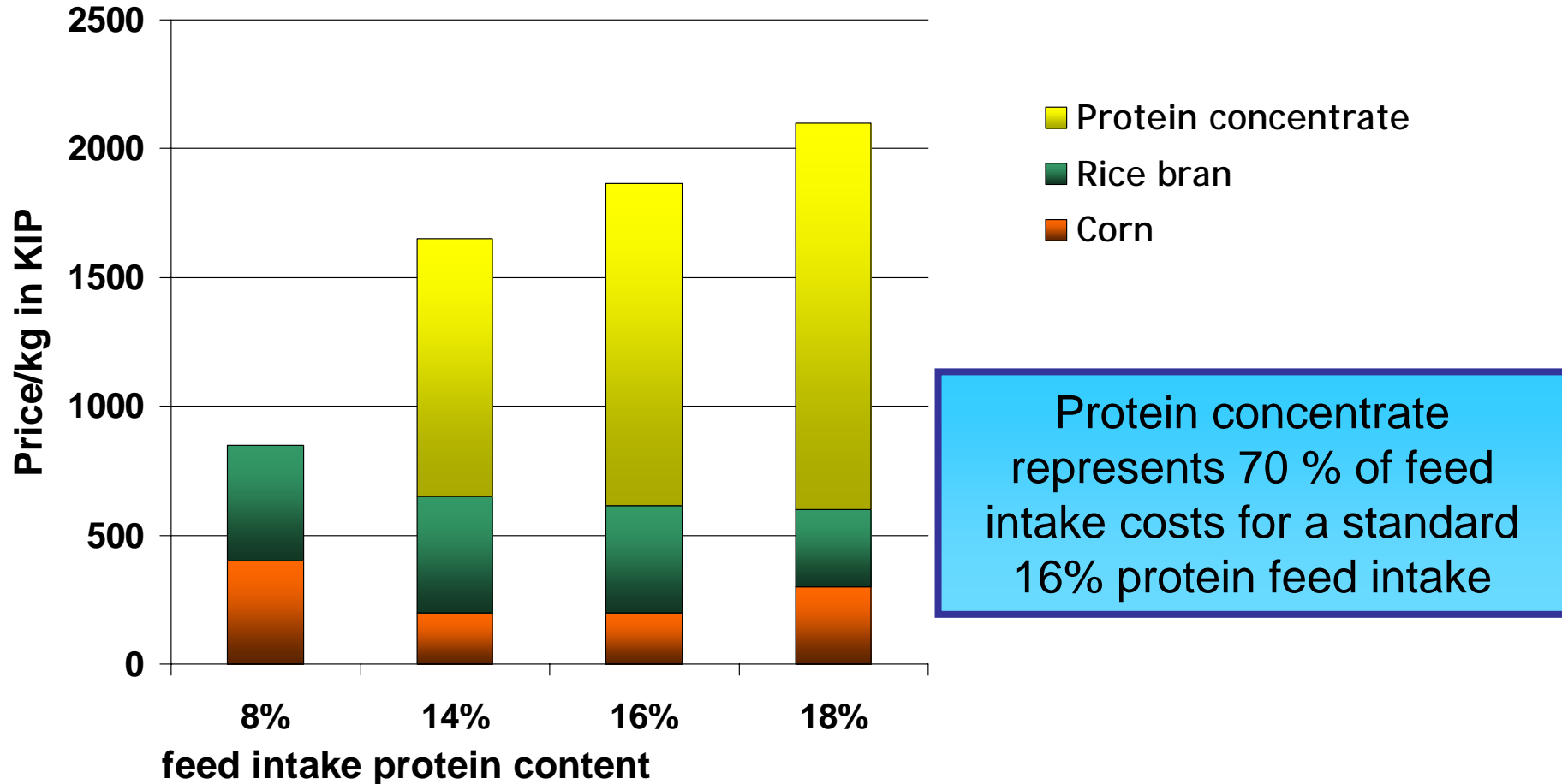
Local breed

Local / exotic cross-breed

**Most of the farmers
switched their strategy to
the more intensive system**

Industrial exotic cross-breed

Feed intake costs



With this intensive system, protein concentrate imported from Thailand is the main factor contributing to the total production costs

Challenge:

Use DMC by-products in order to reduce protein concentrate content in feed intake

Cajanus cajan (pigeon pea)

- Existence of DMC systems associating maize and pigeon pea;
- Seeds of *C.cajan* have a protein content of 22%

DMC system: Maize and *C.cajan* association

May



June



DMC system: Maize and Caj association



After two years of association, average yields of maize increased by 500kg/ha compared to the control maize monocropping system

DMC system: Maize and *C.cajan* association



November



April

Average yields of 1.2 T/ha for *Cajanus* seeds



DMC system: Maize and *C.cajan* association

- Very effective on weeds control for the next cycle;
- Chemical and physical soil properties improvement;
- Total amount of dry biomass from 8 to 12 T/ha;

How can this DMC by-product be integrated in animal raising activities?

Objective of the study:

Assess the technical and economic performances of short-term pig fattening systems using *Cajanus cajan* as a main source of protein to feed intake

C.Cajan is known to have a high nutritional value but previous study had quite contradictory conclusion on the impact of anti-nutritional factor present in seeds meal (Amaefule, D'Mello, Ologhobo,...)

Methodology

- Short-term fattening were conducted with three different feed intakes:
 - G1: control intake
 - G2: 18 % of *C.Cajan*
 - G3: 18% of processed *C.Cajan*
- 18 piglets (industrial cross-breed) coming from 2 different litters;
- Experimental design was completely randomized;

- For each group, feed intake, weight gain, feed conversion ratio (FCR) and daily feed costs were measured

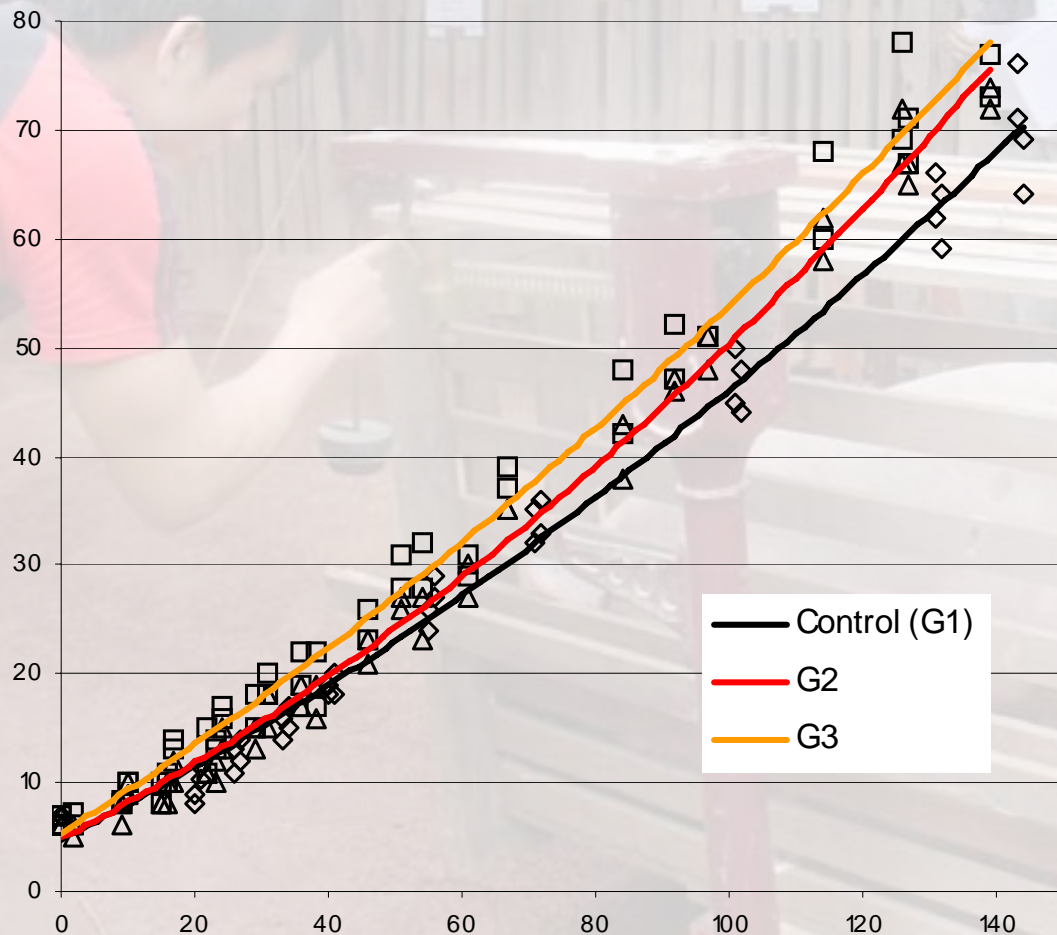
Methodology

Feed rations for each group (in average for a period of 150 days)

Feed intake	G1 (n=4)	G2 (n=6)	G3 (n=6)
Rice bran	42%	35%	35%
Maize	34%	31%	31%
Protein concentrate	24%	16%	16%
Cajanus	-	18%	18%*
Average Protein content	15,6%	15,6%	15,6%

* Seeds of Cajanus for G3 were boiled during 2 min before milling

Technical performances



Average Daily Growth at 150 days:

G1 = 464 g/day

G2 = 523 g/day

G3 = 529 g/day

Control: $y = 0,001x^2 + 0,3158x + 4,7742$
 $R^2 = 0,9871$

G2: $y = 0,0014x^2 + 0,3167x + 4,8894$
 $R^2 = 0,992$

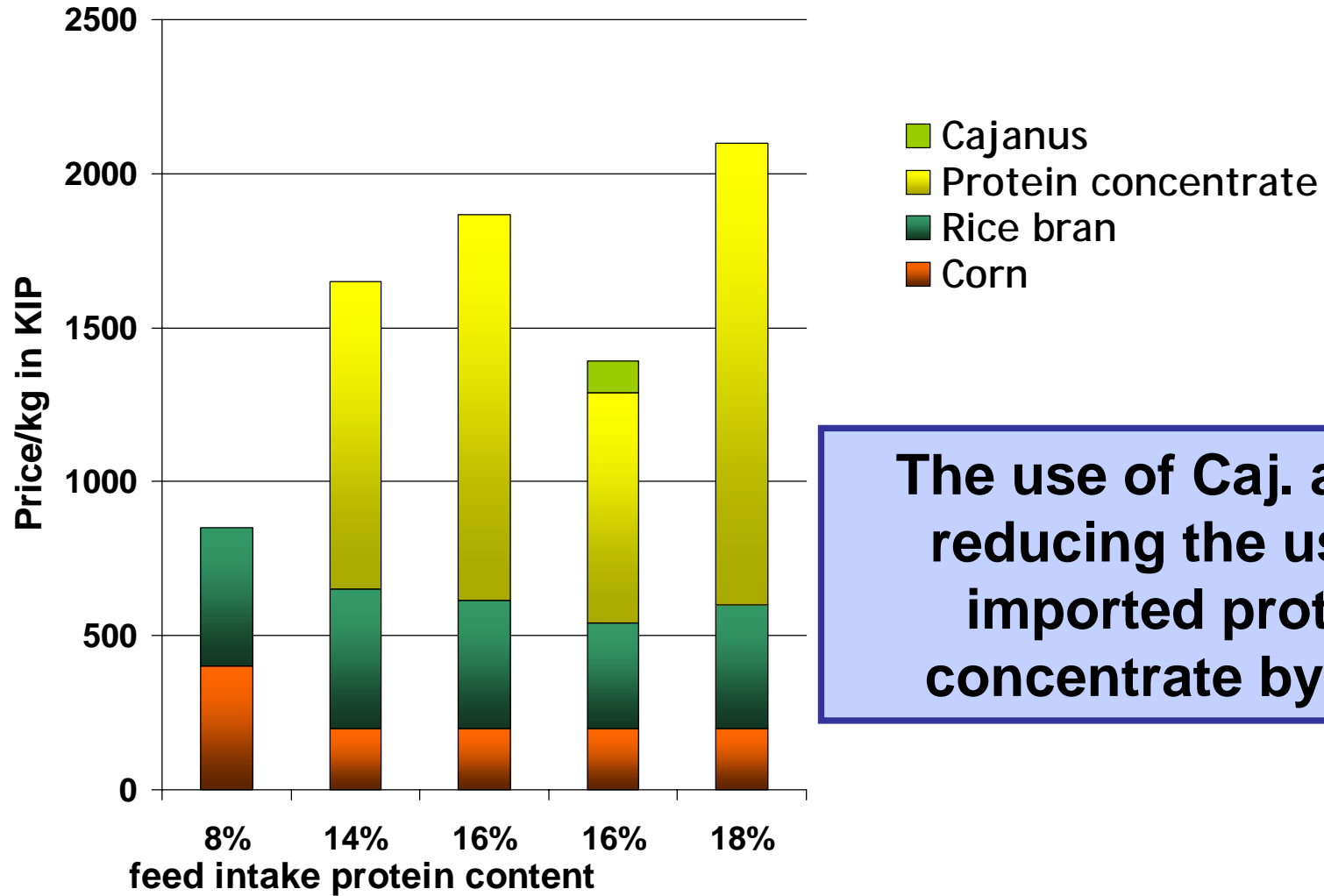
G3: $y = 0,001x^2 + 0,3867x + 5,3522$
 $R^2 = 0,9878$

Technical performances

	G1 (n=4)	G2 (n=6)	G3 (n=6)
Total feed at 150 days (kg/pig)	252	250	259
ADG (gr/day) 7 - 25 kg	330	348	395
ADG (gr/day) 25 - 100 kg	559	628	602
ADG (gr/day) 150 days	464 (\pm 30)	523 (\pm 28)	529 (\pm 50)
FCR (Food Conversion Ratio)	3,6	3,2	3,3
Average weight at 150 days (kg)	76,6	85,5	86,4

- **ADG are significantly higher for G2 et G3 than G1 ($P < 0,05$);**
- **FCR are significantly lower for G2 et G3 than G1 ($P < 0,05$);**
- **ADG between processed and non-processed *C.cajan* feed intake are not significantly different ($P > 0,05$);**

Economic performances



The use of Caj. allows reducing the use of imported protein concentrate by 30%

Economic performances

	G1 (n=4)	G2 (n=6)	G3 (n=6)
Feed production costs/kg (USD)	0,22	0,18	0,18
Mean feed production costs at 150 days (USD)	54,6	44	45,7
Mean net profit (USD/pig)	33,9	57,9	57,8

Average increase of 24 USD per head within 150 days for pigs receiving the *C.cajan* rations;

Discussion

The development of Maize/*C.cajan* association in DMC systems can benefit smallholders in various ways:

- ❑ Improvement of the current mono-cropping systems;
- ❑ Reduced importation of protein concentrate, decreased production costs and increased Average Daily Growth by 60 g/day

Discussion

- ❑ The variety of *Cajanus cajan* used does not contain anti-nutritional factors that can affect pig ADG: no need for processing;
- ❑ Additional experiments should attempt using larger amounts of Ca, cajan (up to 30%) in order to further reduce production costs;
- ❑ The association requires a good technical control;
- ❑ Dissemination would be facilitated with the provision of hand seeders to farmers



Discussion

□ Other research will be done in order to have more choice for protein or carbohydrate stuff for coming from DMC system for pig raising

THANK YOU

