ZONGO Beteo, PhD
Candidate

Farmers' practices and acceptability of supplemental irrigation in Burkina Faso

18th ICABR conference 17th-20th june 2014

Supervisors : Prof Thomas DOGOT (ULg)
Prof Hamma YACOUBA (2iE)

Mentors: Dr Abdoulaye DIARRA (2iE)
Dr Bruno BARBIER (2iE/CIRAD)

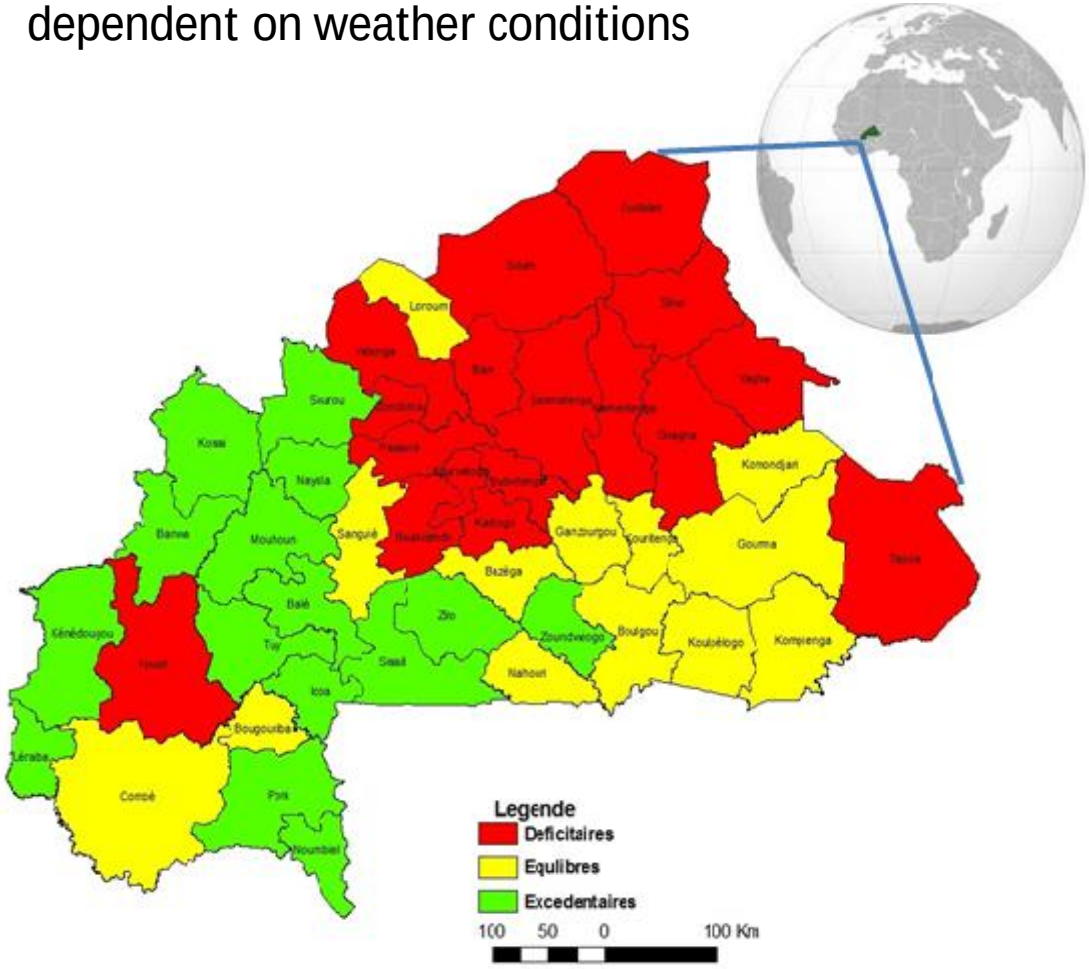
Presentation outline

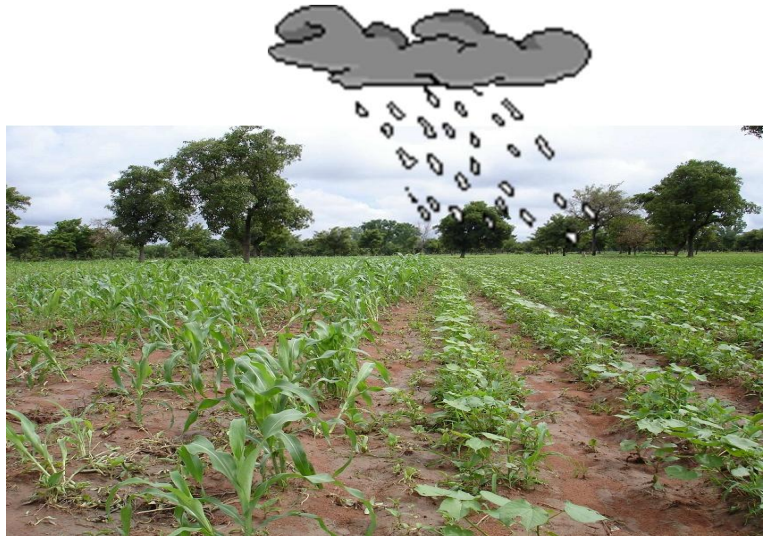
- **Introduction**
- **Study approch**
- **Results and discussion**
- **Conclusion and policy implications**

Introduction

1. Introduction (1/5)

Burkina Faso : Agriculture is mainly rain-fed and dependent on weather conditions





Consequences: reduction of 25-30 % of rainfed yields (less than 1t/ha) , High incidence of poverty among the farmers

1. Introduction (2/5)

Current agricultural techniques adopted by farmers are not effective in stabilizing agricultural production during a 2 to 3 weeks dry spells (short varieties, Zaï, Half moon, Mulching, Rotation, Manure)

Zaï

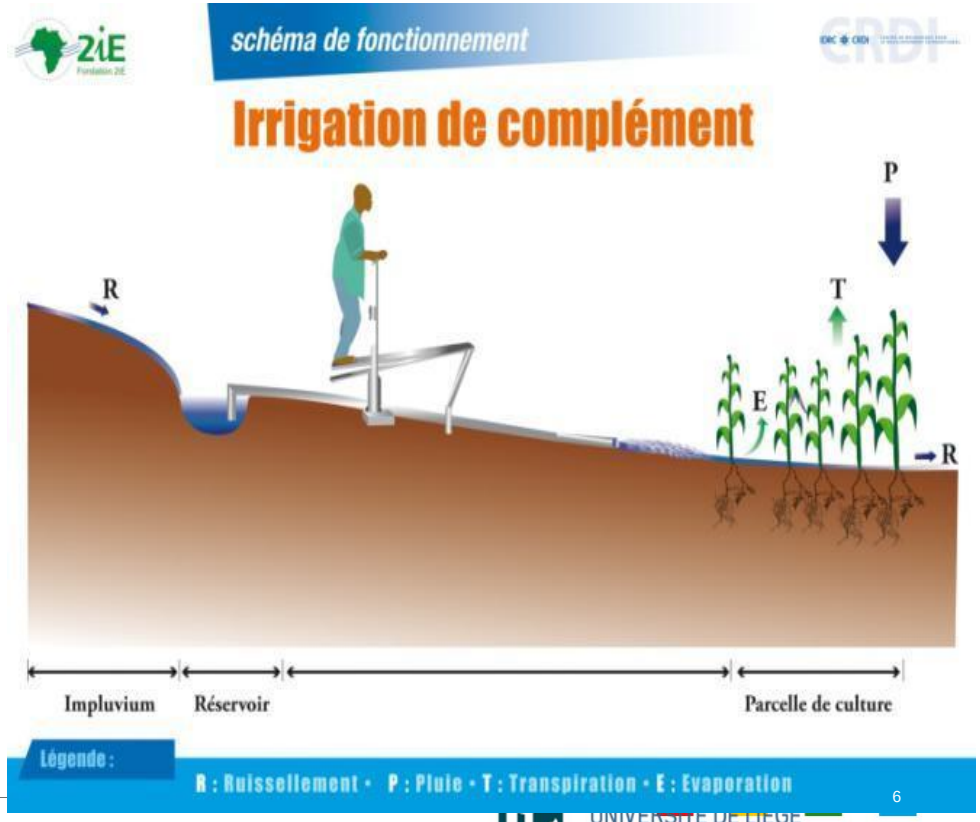
Half moon

Bunds

1. Introduction (3/5)

In this context, Supplemental irrigation is an alternative to overcome the water deficit of rain-fed crops in semi-arid areas

- Supplemental irrigation



1. Introduction (4/5)

Device of supplemental irrigation

Small basin to collect run-off water

Irrigated maize

1. Introduction (5/5)

At this point, if we can consider that Supplemental irrigation is popularized since the 2012-2013 rainy season campaign in Burkina Faso, the question of its acceptability by farmer's remains.

Study objectives

The objective of this research is to determine the susceptibility of farmers to adopt the Supplement irrigation while examining its position related to agricultural innovations practiced in family farms

This research is specifically designed to examine the practices of farmers on the one hand, and to identify the determining factors of the acceptability of Supplement irrigation on the other.

Study approach

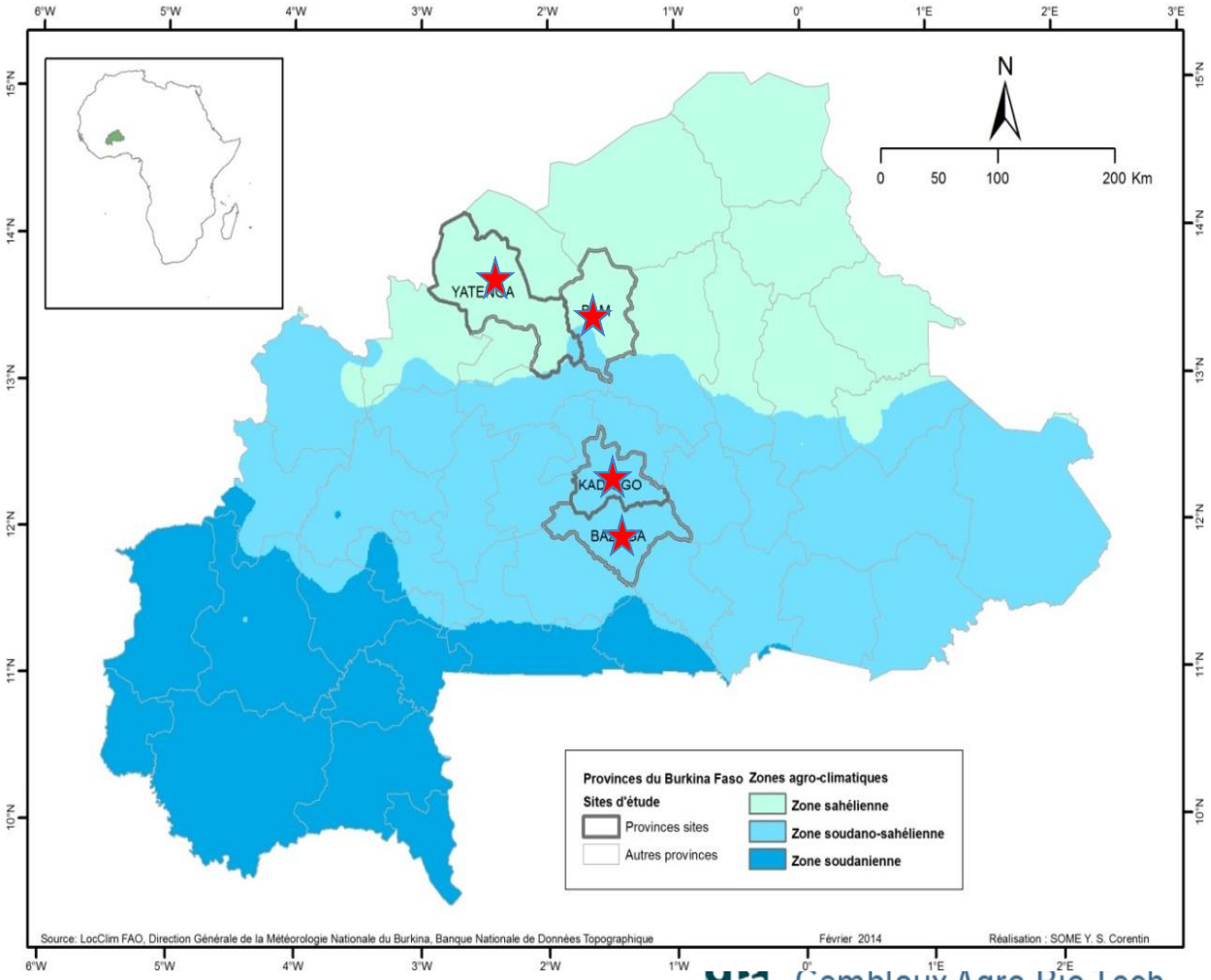
2. Study approach (1/4)

2.1 Presentation of the study area

The study was conducted in the Sahelian and Sudano-sahelian areas of Burkina Faso (figure 1)

The Sudano-sahelian zone is characterized by rainfall between 900 and 600 mm and a rainy season lasting from 4 to 5 months.

In the Sahelian zone annual rainfall ranges between 600 and 300 mm and are characterized by a very irregular spatial and temporal distribution. The rainy season lasts less than three months.



2iE

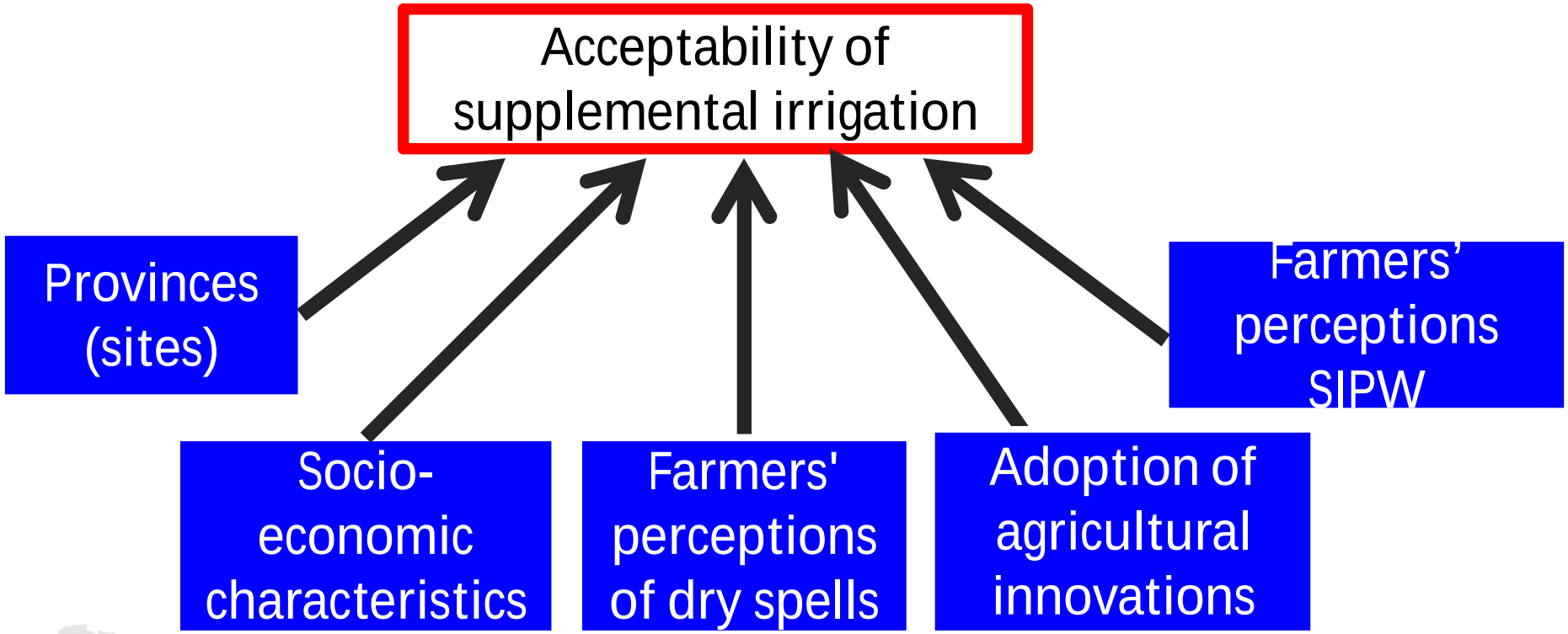
Gembloux Agro-Bio Tech

2. Study approach (2/4)

2.2 Theoretical frameworks

Explanatory variables are related socio-economic characteristics of farmers, their perceptions of drought and interest to the practice of Supplement irrigation

Assumptions have been made on the influence of each of them on the acceptability of supplement irrigation



2. Study approach (3/4)

2.3 Model specification

Logistic regression model representing farmer i decision to adopt or reject Supplemental irrigation is given by the following expression (Gourieroux, 1989) :

$$P_i = \Phi(\beta X_i) = \frac{exp(\beta X_i)}{1+exp(\beta X_i)}$$

$\boldsymbol{P}$ is the dependent variable taking 1 if adopted and 0 otherwise,

$\boldsymbol{\beta}$ is the vector of parameters to be estimated,

$\boldsymbol{X_i}$ is the explanatory variables of farmers

and $\boldsymbol{\Phi(\beta X_i)}$ is the probability that the farmer accepts Supplemental irrigation

2. Study approach (4/4)

2.4 Data collection

Agro-climatic zones	Provinces	Sample
Sahelian zone	Yatenga	200
	Bam	210
Soudano-sahelian zone	Kadiogo	117
	Bazega	102
Total	04	629

Results and discussion

3. Results and discussion (1/7)

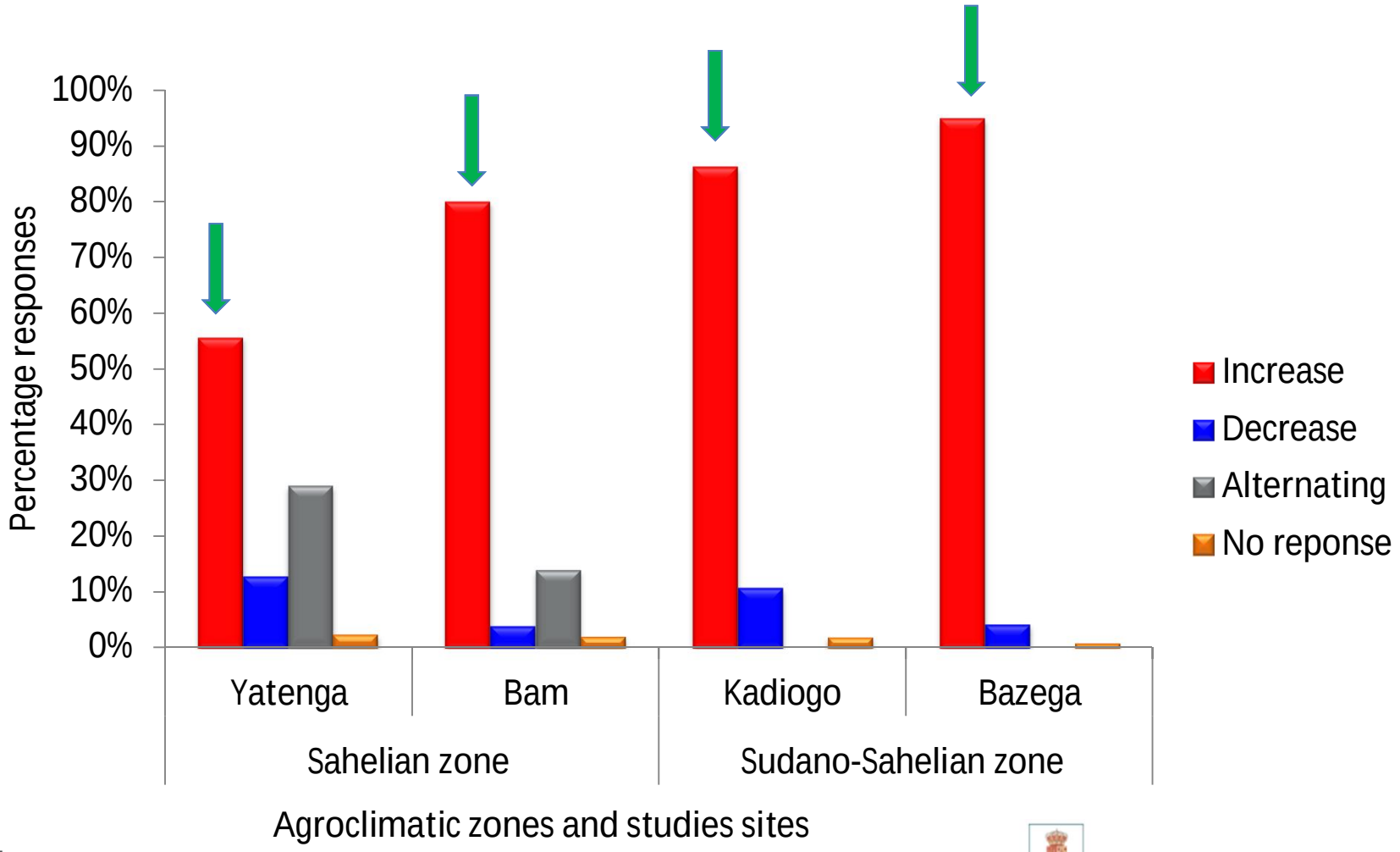
3.1 Current practices of farmers within and between climatic zones

- Adoption of agricultural innovations against dry spells

Agro-climatic zones	Sahelian		Sudano-sahelian		p-value
Provinces	Yatenga	Bam	Kadiogo	Bazega	
Zaï (%)	53.3	94.5	6.9	0.9	0.000
Bunds (%)	72.9	88.5	80.4	17.1	0.000
Moons (%)	1.4	1.0	0.0	0.0	0.402
Dikes (%)	1.0	1.0	0.0	30.8	0.000
Diversification (%)	51.4	11.0	96.1	96.6	0.000
Mulching (%)	7.1	2.5	20.6	1.7	0.000
Rotation (%)	33.3	6.0	97.1	93.2	0.000
Seeds (%)	42.9	28.5	71.6	22.2	0.000
Manure (%)	96.7	94.5	68.6	97.4	0.000

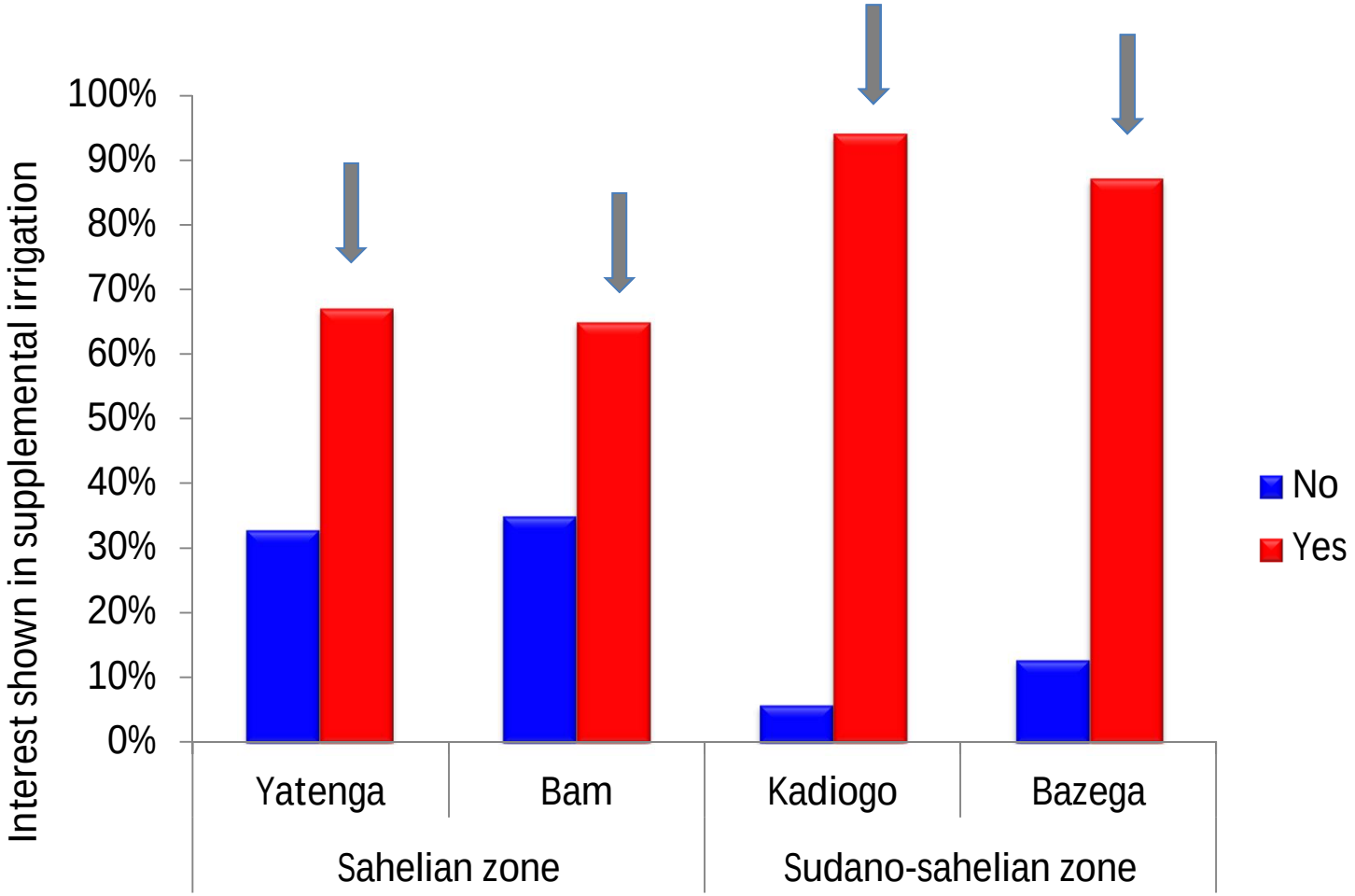
2.3 Results and discussion (2/7)

- Farmers' evaluation of dry spells in the past two decades



3. Results and discussion (3/7)

- Distribution of farms according to their degree of motivation to use supplemental irrigation



3. Results and discussion (4/7)

3. 2 Acceptability factors of supplemental irrigation based on runoff basins

- The results of the econometric regression are statistically valid

Prediction percentage (80.89%) and the log-likelihood (-431.550) are satisfactory

Chi-square model (Prob > chi2 = 0.000) is significant at 1% and a correlation exists between variables (Pseudo R^2 = 0.295)

Depending on the values of p-value, the parameters of model show that among 35 variables uncorrelated 16 variables determine significantly the occurrence of acceptance of supplemental irrigation

3. Results and discussion (5/7)

3. 2 Acceptability factors of supplemental irrigation based on runoff basins

Variables	Coef	SE	z	P>|z|
Provinces				
Bam**	-1,070	0,367	-2,920	0,004
Kadiogo**	1,425	0,532	2,680	0,007
Bazega**	1,660	0,527	3,150	0,002
Socio-economic characteristics				
Marital*	0,582	0,342	1,701	0,088
Education	0,095	0,185	0,516	0,609
Age**	-0,561	0,194	-2,903	0,004
Size***	0,089	0,023	3,854	0,000
Farm laborer***	-0,109	0,030	-3,611	0,000
Organization	0,288	0,208	1,386	0,166
Land	0,557	0,426	1,319	0,191
Transport*	0,348	0,191	1,820	0,069
Access	0,627	0,559	1,127	0,262
Income**	0,000	0,000	2,761	0,006
Off-Income	0,063	0,044	1,433	0,154

3. Results and discussion (6/7)

Farmers' perceptions of dry spells				
Stable	-0,181	0,319	-0,731	0,374
Decrease	-0,277	0,324	-0,868	0,392
Alternative	0,277	0,254	1,095	0,277
No answer*	-1,216	0,590	-2,062	0,039
Adoption of agricultural innovations				
Bunds***	0,929	0,253	3,679	0,000
Mulching**	1,145	0,572	2,001	0,045
Moons***	-1,598	0,931	-1,725	0,086
Dikes	0,410	0,456	0,906	0,368
Diversification**	-0,776	0,284	-2,730	0,006
Manure	-0,276	0,416	-0,664	0,508
Rotation	-0,270	0,283	-0,956	0,341
Seeds***	1,305	0,247	5,298	0,000
Zaï *	-0,573	0,313	-1,832	0,067

3. Results and discussion (7/7)

Farmers' perceptions of Supplement irrigation				
Intend ***	1,108	0,221	5,021	0,000
Sorghum	0,489	0,315	1,550	0,120
Millet	0,356	0,398	-1,454	0,371
Rice	-	-	-	-
Vegetable	-0,908	0,627	0,899	0,148
Ignore***	-2,017	0,294	-6,867	0,000
Cost	-	-	-	-
Constant	-7,828	4,246	-1,841	0,065

Conclusion and policy implications

Conclusion and policy implications

The study showed that farmers have different rates of adoption of agricultural innovations within and between the Sahelian and Sudano-Sahelian regions of Burkina Faso.

Acceptability of supplemental irrigation

Factors promoting :

- ✓ marital status,
- ✓ farmers' perceptions of reduced rainfall events,
- ✓ practice of crop rotation
- ✓ access to information

Constraints:

- ✓ illiteracy
- ✓ use of improved seeds,
- ✓ farmers' perceptions of the frequency of flooding,
- ✓ expected usefulness of maize, sorghum

Farmers' training and information dissemination are the best ways to increase the adoption of this promising technology

UNIVERSITE DE LIEGE
Gembloux Agro-Bio Tech


Thank you for your attention