

Agronomic diagnosis on farmers' fields and Effects of Harvest Date on Fonio Millet (*Digitaria exilis* Stapf) in Senegal

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Outline:

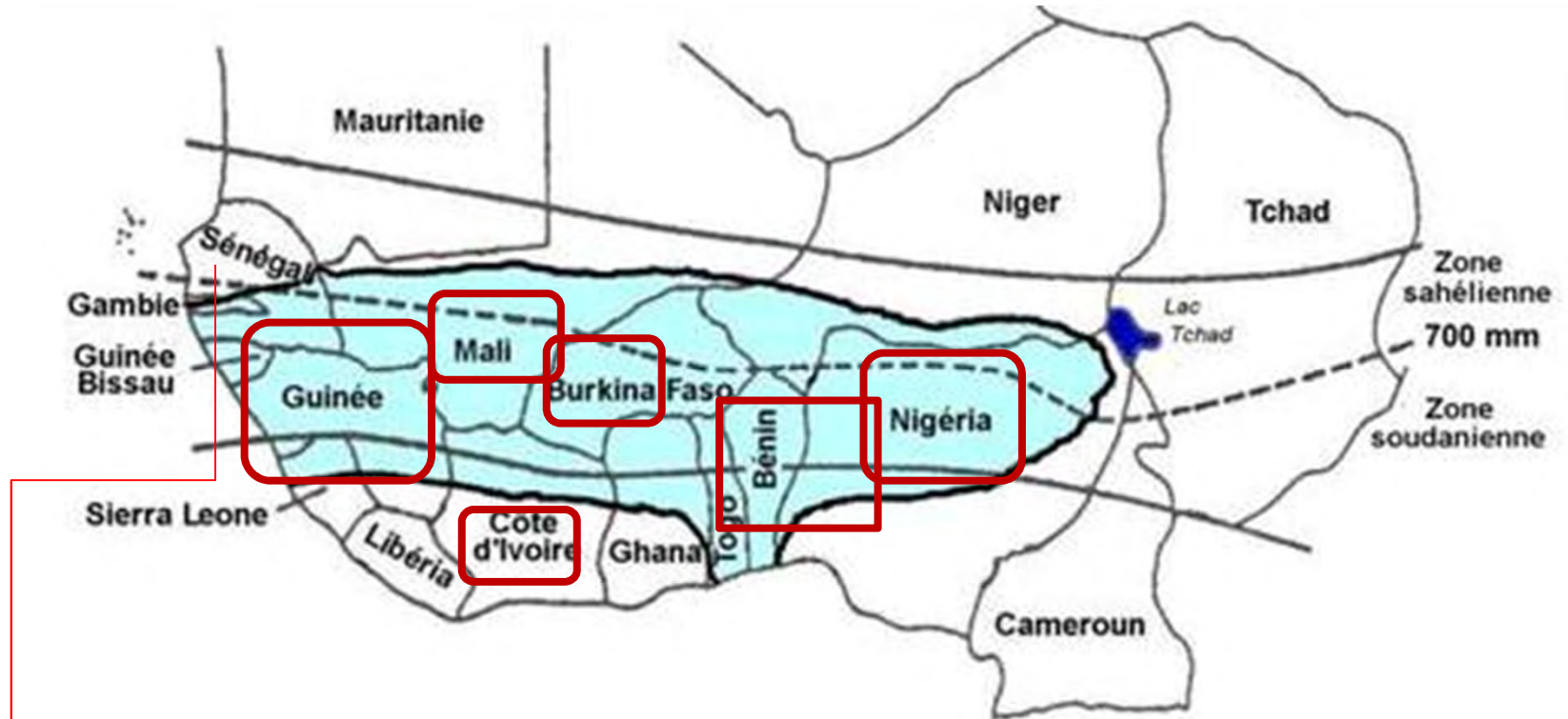
- **INTRODUCTION**
- **MATERIELS AND METHODS**
- **RESULTS AND DISCUSSION**
- **CONCLUSION**



Fonio is very rich in méthionine et cystéine (Fofana et Fall, 2004), two amino acids that are playing a huge role in organism metabolism but few in the principal cereals like rice, maize, Sorghum and millet.

Introduction (1/4)

1. West Africa Production area

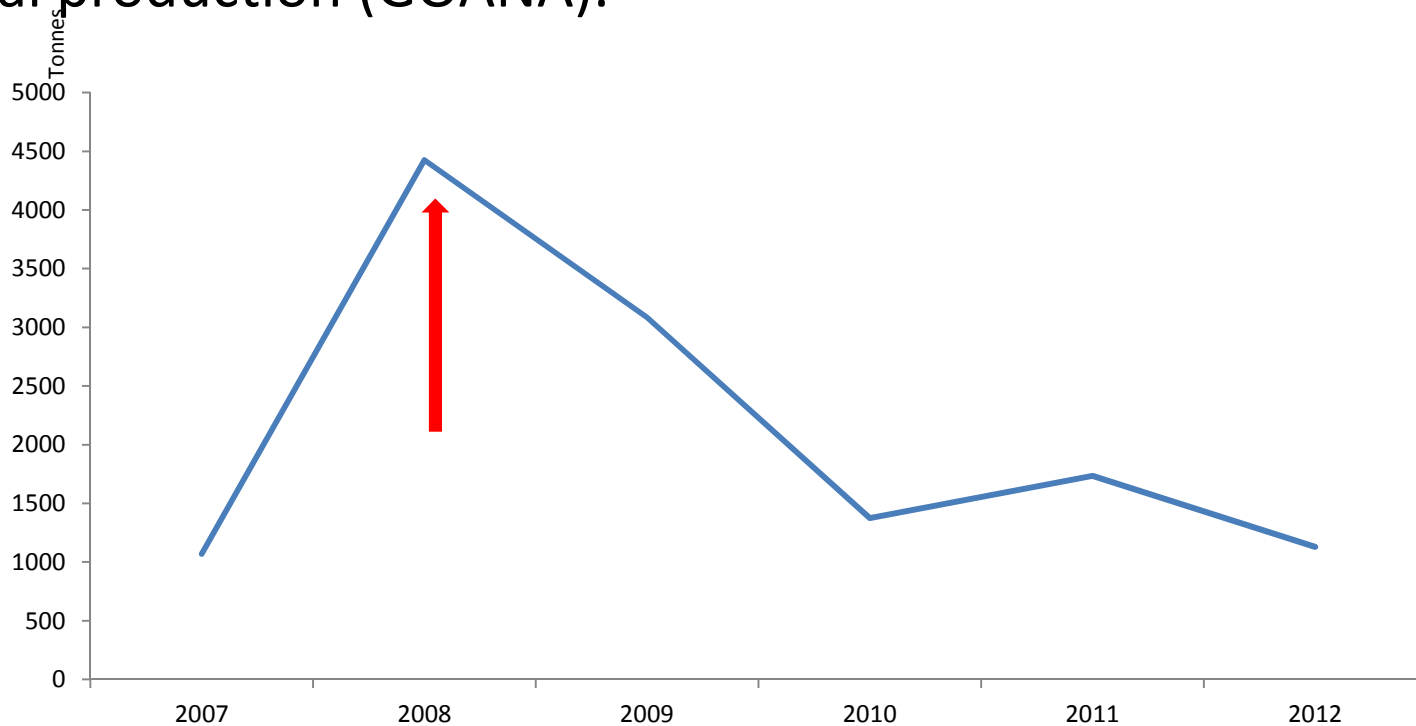


Production area in Senegal:

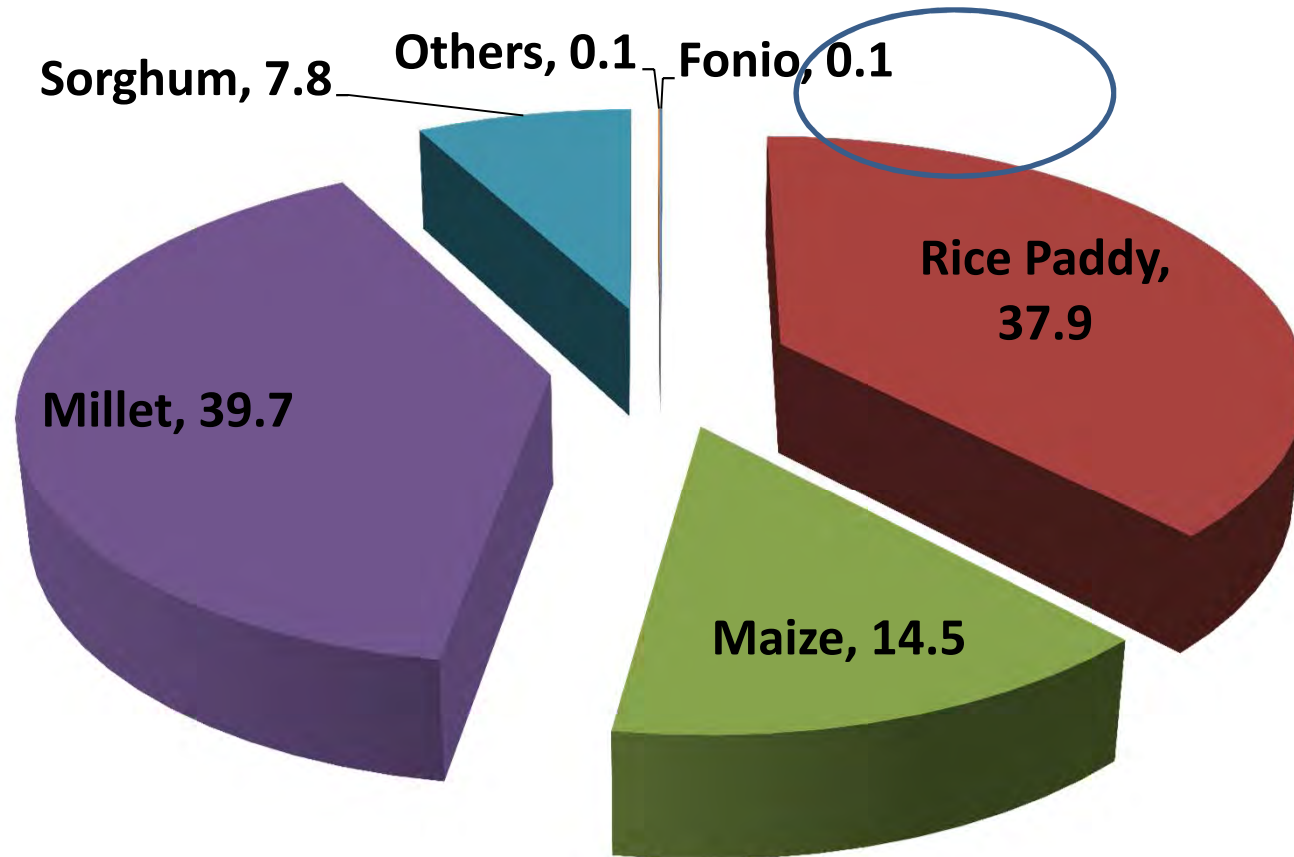
- Senegal Oriental (77%)
- Casamance (22%)
- Sine Saloum (1%)

Introduction (2/4)

- In senegal, production is low and In spite of its regional frame, it is the object of a more and more important demand in the urban areas of the country and in the developed countries
- Grain yield is low, variable and generally less than 700kg/ha.
- Improvment of production in 2008, due to a special program for cereal production (GOANA).



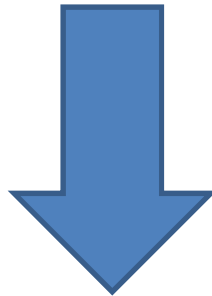
Introduction (3/4)



Lower than 1% of the total annual cropped cereals in Sénégal during 2012 rainy season in comparison with the others cereals

Introduction (4/4)

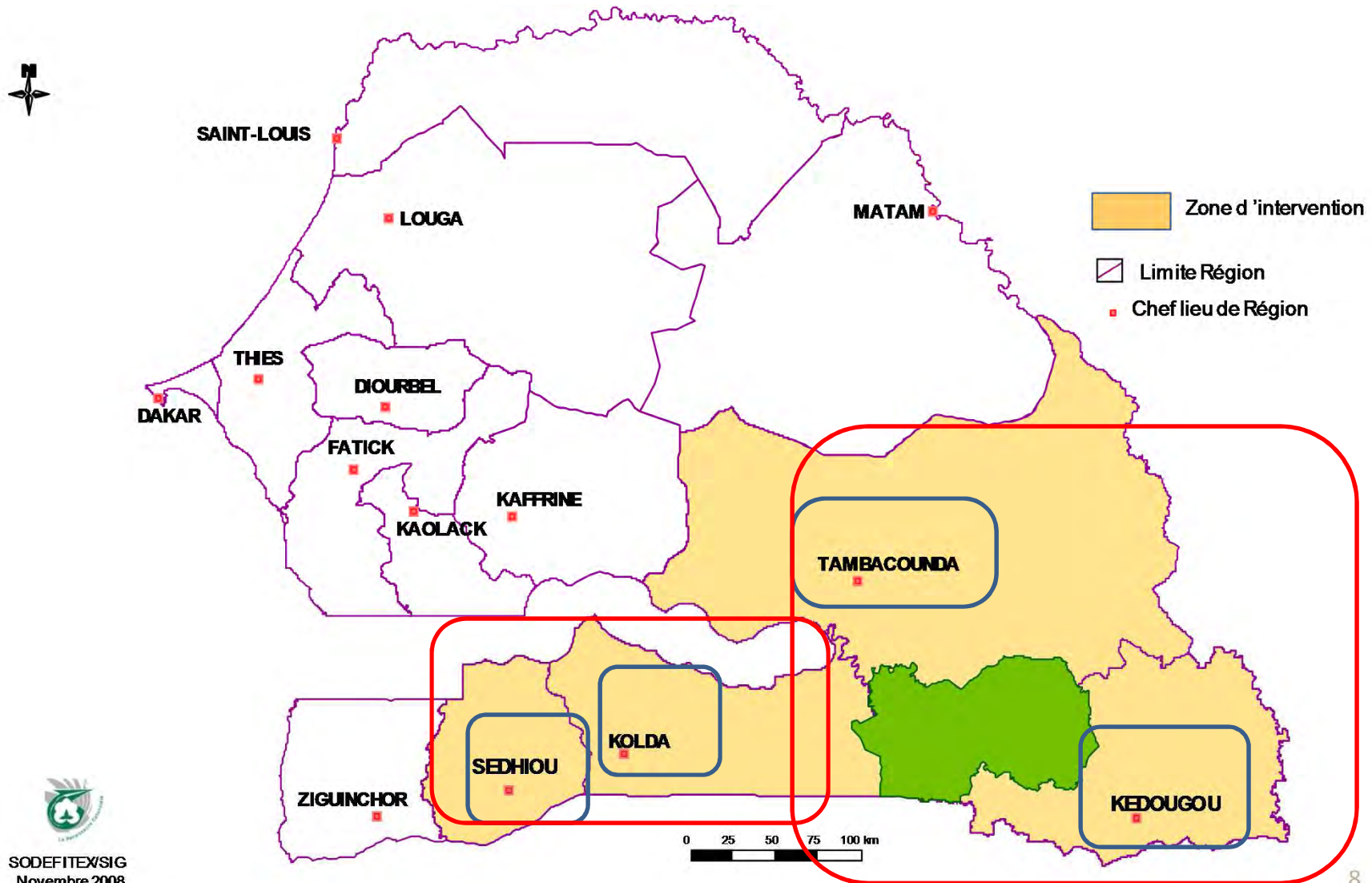
- **Understand the low level of production**
- **Improve cultivation techniques, bridging the gap of knowledge**



- **An agronomic diagnosis was carried out in farmers' fields**
- **Trial on harvest date was conducted at research stations**

Materiels and Methods (1/4)

Agronomic diagnosis



Materiels and Methods (2/4)

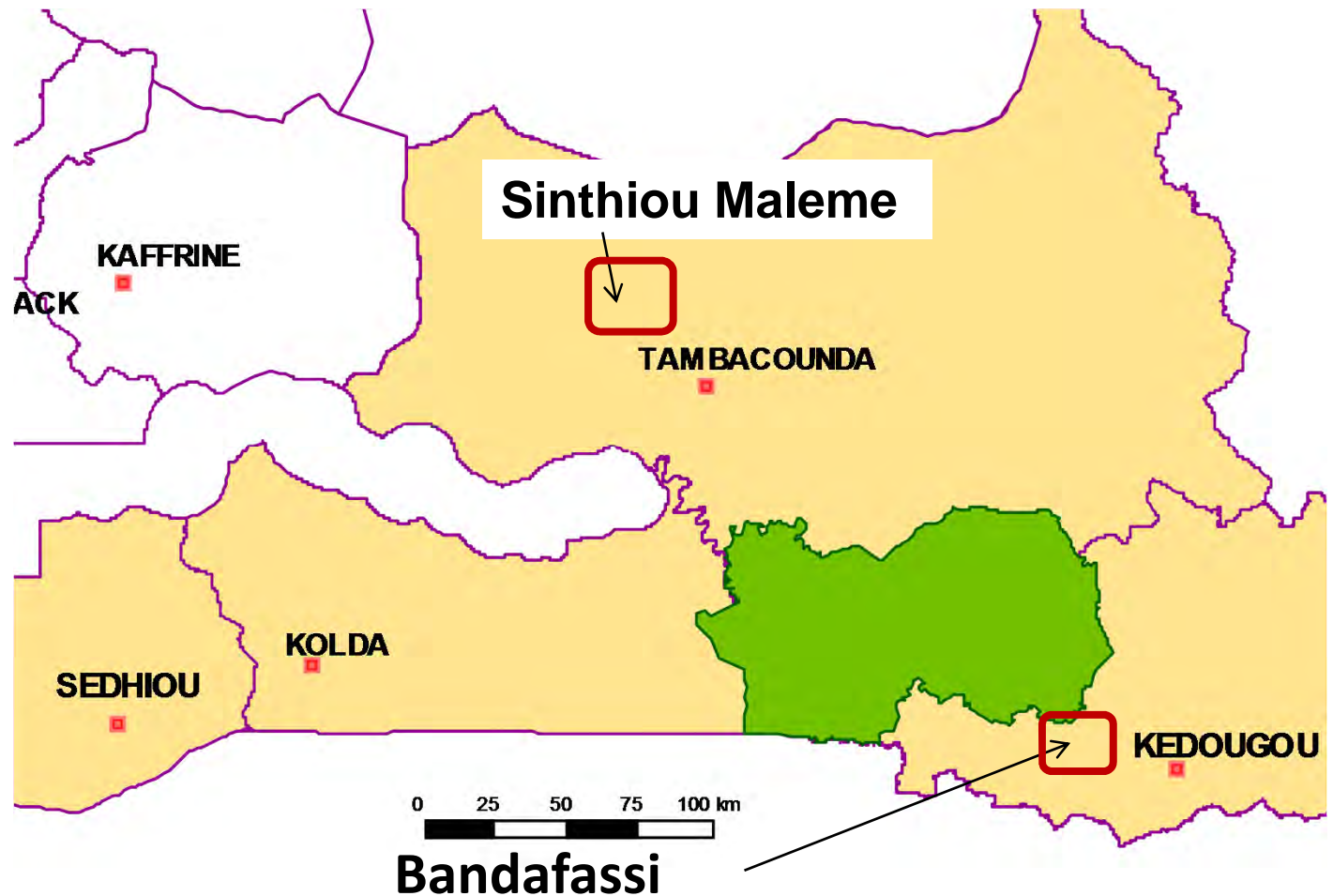
Agronomic diagnosis

Region	Total	
	Villages	Plots
Kolda	11	27
Sedhiou	10	28
Kédougou	5	14
Tambacounda	8	19
TOTAL	34	88

Observations made were on the plot specifications, cultural practices.

Materiels and Methods (3/4)

Harvest date trial



Materiels and Methods (4/4)

Harvest date trial

- Nine harvesting date: 76, 83, 90, 97, 104, 111, 119, 126 et 132 days after sowing (DAS)
- Experimental design was a RCBD with 5 replications (unit plot: 2 m x 2 m)
- Measurements were : aerial dry biomass and grain yield

Results and Discussion (1/7)

Agronomic diagnosis

<i>Location</i>	<i>Cultivated area (%)</i>				<i>Soil Texture / Soil Type</i>				
	Less 0,25 ha	0,25 - 0,5 ha	0,5 -1 ha	More 1 ha	Sandy	Sandy -Clay	Clay	Rocky	Inland
<i>Kolda</i>	55,6	25,9	14,8	3,7	25,9	59,3	7,4	0,0	7,4
<i>Sedhiou</i>	46,4	28,6	21,4	3,6	57,1	39,3	0,0	0,0	3,6
<i>Tamba</i>	63,2	31,5	5,3	0,0	36,8	47,4	0,0	15,8	0,0
<i>Kédougou</i>	28,6	35,7	28,6	7,1	0,0	0,0	7,1	92,9	0,0
<i>Mean</i>	50,0	29,5	17,0	3,4	34,1	40,9	3,4	18,2	3,4

- fonio is cultivated on sandy clay, sandy or rocky Soils
- Around 80% of observed fields are less than 0.5ha

Results and Discussion (2/7)

Agronomic diagnosis

<i>Location</i>	<i>Crop preceding fonio(%)</i>				<i>Variety used (%)</i>		
	<i>Fonio</i>	<i>Groundnut</i>	<i>Main cereals</i>	<i>Other crops</i>	<i>Short duration (75 days)</i>	<i>Medium duration (90 days)</i>	<i>Long duration (120 days)</i>
<i>Kolda</i>	0,0	65,4	7,7	26.9	30,8	65,4	3,8
<i>Sedhiou</i>	3,7	81,5	0,0	14.8	30,8	65,4	3,8
<i>Tamba</i>	0.0	47,4	10,5	42.1	16,7	77,8	5,6
<i>Kédougou</i>	8,3	41,7	8,3	41.7	0,0	81,8	18,2
<i>Mean</i>	2,4	63,1	6,0	28.5	23,5	70,4	6,2

- Groundnut is frequently observed crop as preceding fonio.
- The medium maturing variety (90 days) is the most used with 70% of the observed fields

Results and Discussion (3/7)

Agronomic diagnosis

Location	Source of seed used			
	Personal stock	Local markets	Personal stock+local markets	Extension service
Kolda	50,0	38,5	7,7	3,8
Sedhiou	88,5	11,5	0,0	0,0
Tambacounda	31,6	5,3	0,0	63,2
Kedougou	83,3	16,7	0,0	0,0
Mean	63,4	19,3	2,4	15,7

- **seeds are often self-produced**
- **Extension service in Tambacounda** because it is a big region and we have many projects in this area

Results and Discussion

Agronomic diagnosis

Location	Yield (kg/ha)			
	415±100	760±97	1155±125	1776±336
Kolda	0,0	31,8	50,0	18,2
Sedhiou	28,0	44,0	28,0	0,0
Tambacounda	35,3	29,4	29,4	5,9
Kédougou	8,3	41,7	25,0	25,0

Most of the plots observed had a grain yield that fluctuate between 760kg/ha to 1155kg/ha

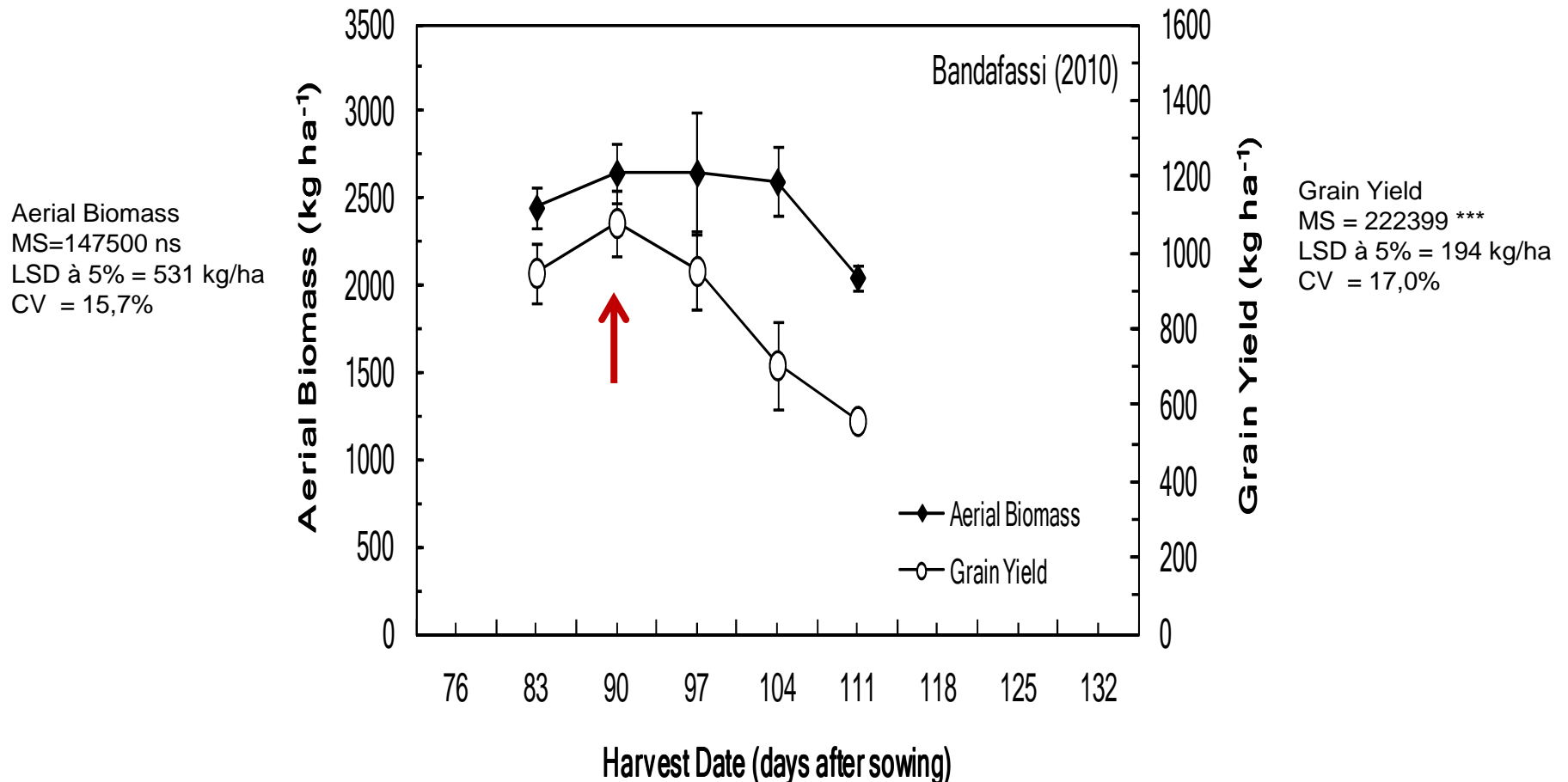
Results and Discussion (4/7)

Agronomic diagnosis

- **Before sowing, farmers plough or scratch the soil to bury the seeds**
- **Sowing is done by broadcasting and the seeds are buried by scraping or hand, with branches**
- **Mineral or organic fertilizer and plant protection are almost absent. Weeding is manual and is done one month after sowing.**

Results and Discussion (6/7)

Effect of harvest date on Grain yield and aerial dry biomass

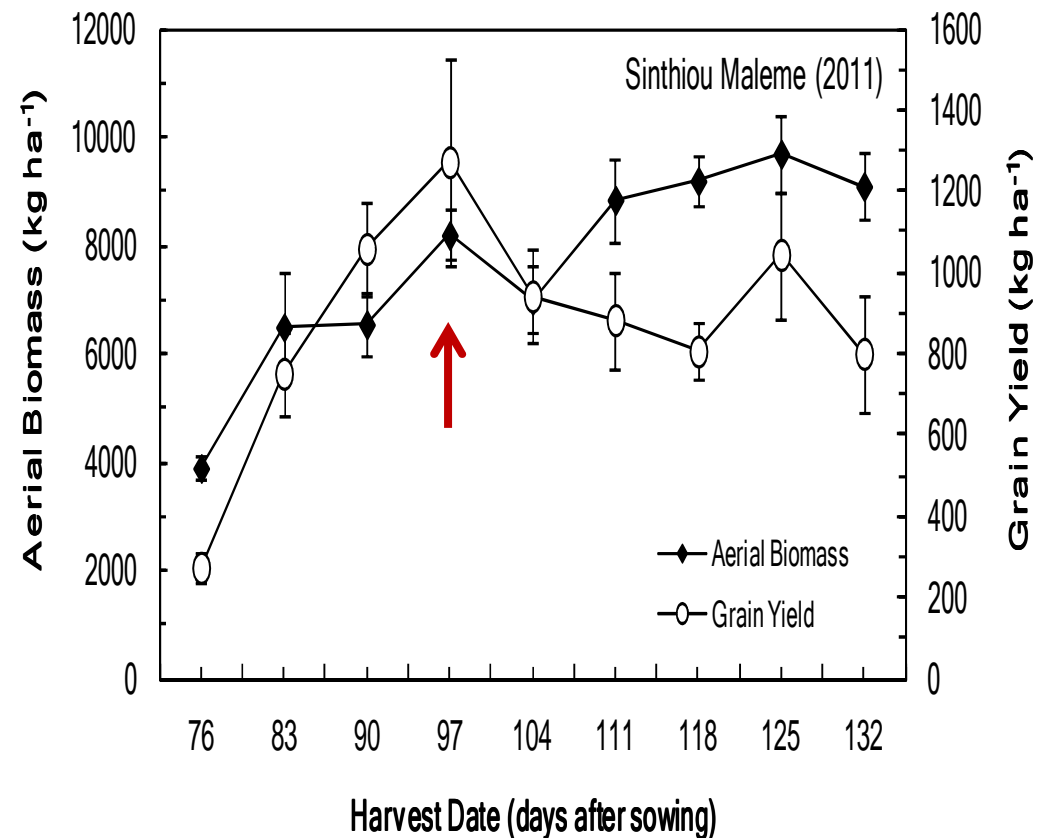


- Dry aerial matter increased with later harvest dates.
- Maximum grain yields (1100kg.ha) were noted when fonio harvesting is done around 90-97 days after sowing

Results and Discussion (7/7)

Effect of harvest date on Grain yield and aerial dry biomass

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Aerial Biomass
MS=17165625 ***
LSD à 5% = 1813 kg/ha
CV = 18,4%

Grain Yield
MS=381812 **
LSD à 5% = 378 kg/ha
CV = 33,7%

Results and Discussion (7/7)

Effect of harvest date on Grain yield and aerial dry biomass

- **Pre-maturity harvesting (76 to 83 days after sowing) significantly reduced grain yield by 74% in comparison to the optimal harvest period**
- **Late harvesting (more than 111 days after sowing) reduced grain yield by 34%, in comparison to the optimal harvest period**

Conclusion

- **Better understanding of low level of production due to extensive cultivation system.**
- **For the optimal harvesting, farmers should harvest at 1-2 weeks after plant maturity for short cycle landraces to reduce grain losses due to high shattering.**
- **Better formulation of research topics with the different actors in value chain to improve production.**

Recommandations

- **Develop Good Agronomics practices**
- **Give more attention on this crop**

Thank you! Merci!

