

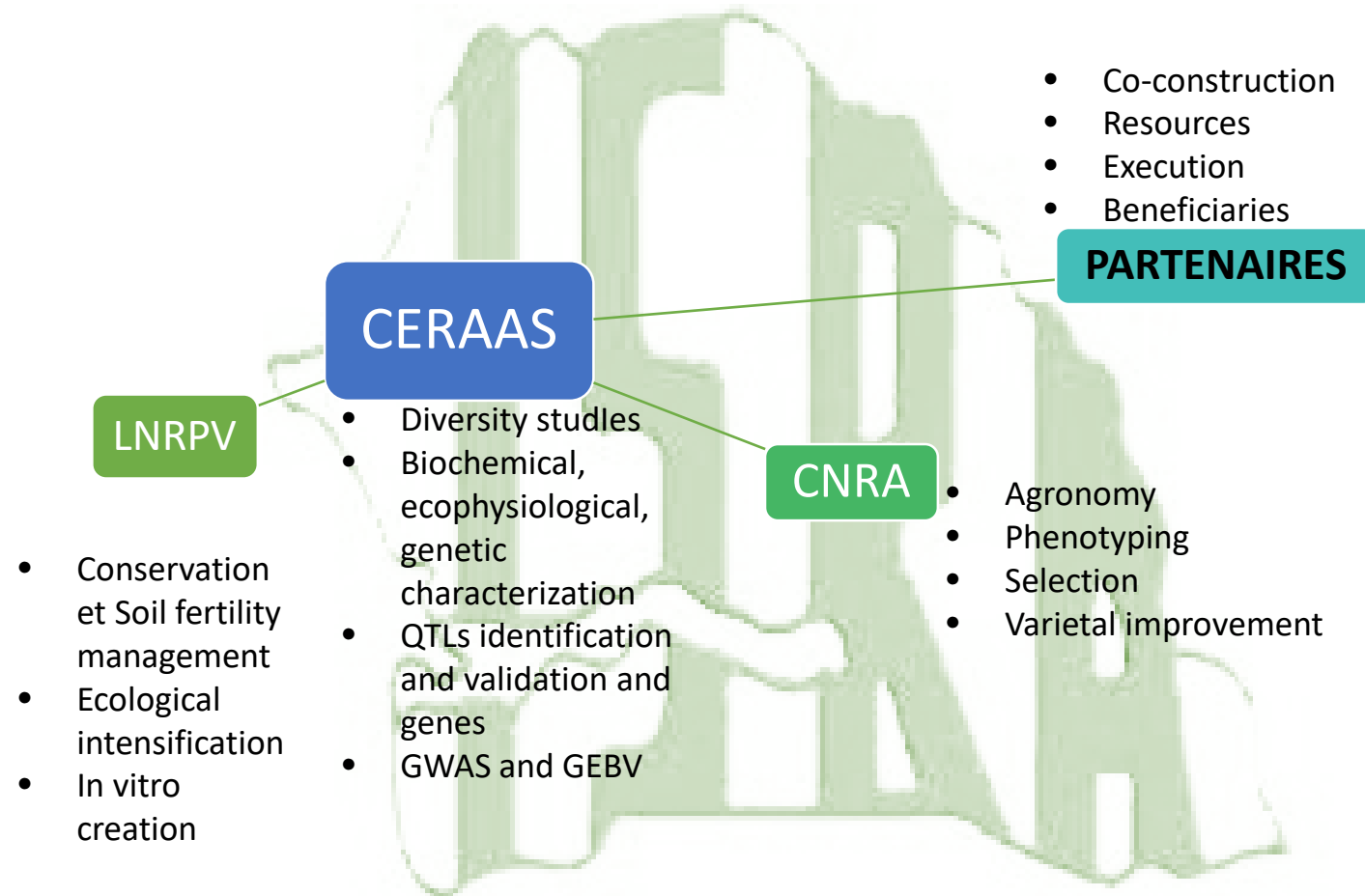
# Pearl Millet Research Activities At ISRA

Speaker: **Dr Ndjido A. KANE**

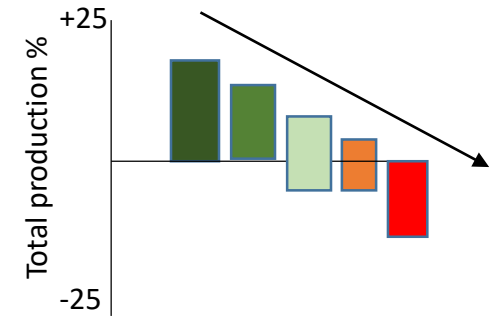
Contributors: Drs Amadou O. DIALLO, Ghislain KANFANY, Ibrahima SARR, Bassirou SINE, Ousmane SY, Alfred K. TINE, Ndèye Yacine Badiane, Moussa Ndiénor, Aliou Faye, Arouna Sonko et al.



# Introduction



➔ Staple and subsistence food , 1<sup>st</sup>  
Crop/cultivated areas, by 90% of the rural population, tolerant to drought



➔ How to increase productivity and better promote the value chain ?

- Molecular tools for selection / varietal improvement
- its high nutritional value
- its potential to access new markets

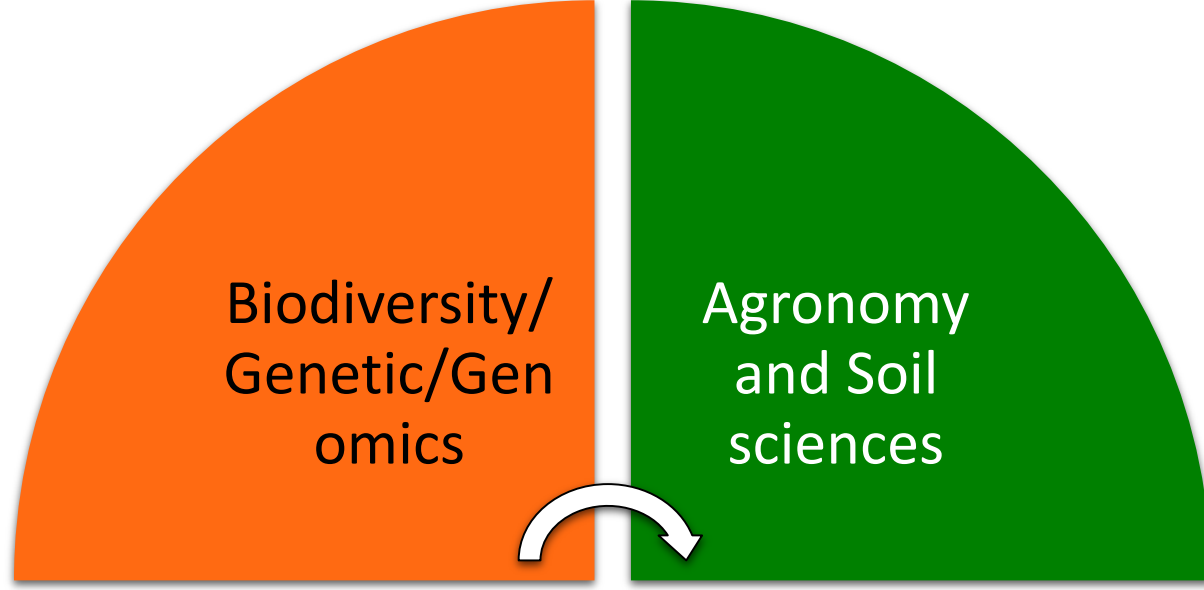
# Goals

Generate innovative knowledge and technologies (varieties, hybrids, practices) that contribute to the improvement of production in the face of global changes (anthropogenic and climatic)

- ➔ Accurate selection and accelerated improvement of better adapted and more productive millet varieties in West African rural agrosystems
- ➔ Promotion of environmentally sustainable and resilient intensive practices

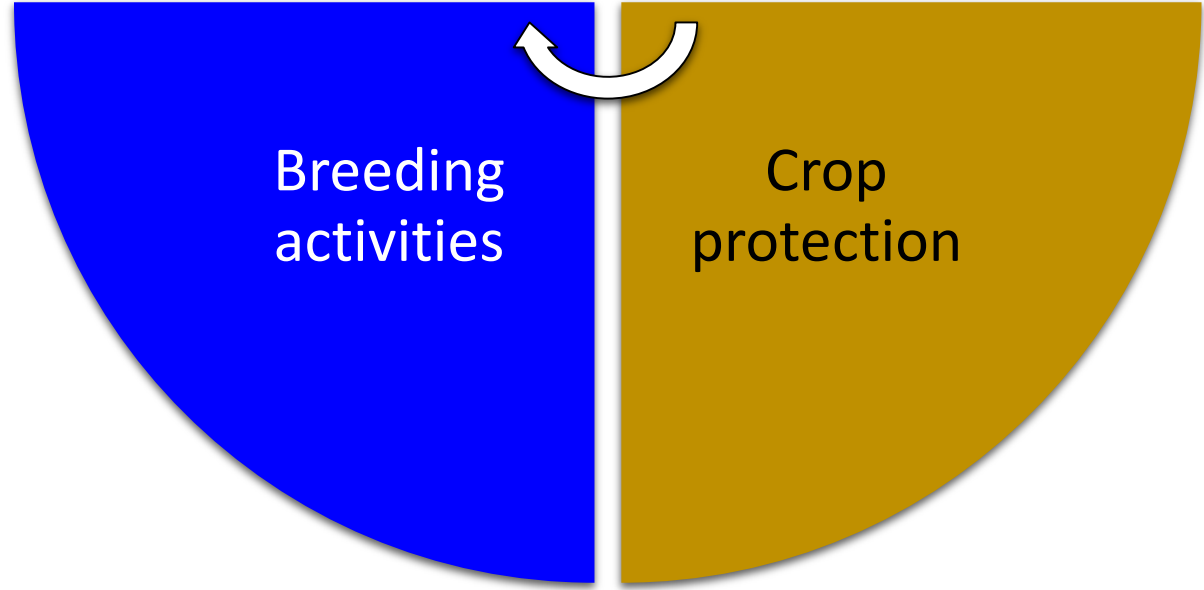
# Current Activities

- Germplasm Characterization
- Wild/Cultivated Introgressions
- Population Genomic
- GWAS and GEBV



- Yield gap reduction by optimizing plant density according to rainfall and soil fertility gradient
- Improvement of soil fertility using compost
- Ecological intensification through inter-cropping

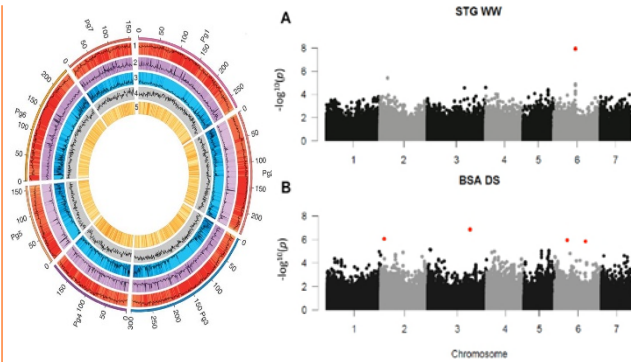
- Development of inbred lines, top cross hybrids and population varieties adapted to different agro-ecological zones
- Evaluation of different varieties and lines for high yielding and high micronutrient contents
- Breeding for dual purpose millet



- Integrated agroecological management of head miner
- Screening of lines for head miner and downy mildew resistance
- Production of diets for high level female of *Bracon hebetor*
- Offspring production for release program with farmers

# Key Achievements/Outputs

## Biodiversity and Genomic



- Core collection
- Reference genome
- SNPs in wild and cultivated lines
- QTLs/genes linked to drought stress, downy mildew, roots exudation, biomass, oxydative stress, micronutrients,
- Modeling of pearl millet diversity evolution and adaptation to rainfall forecasts by 2050

## Breeding



Inbred lines with long panicle head and short cycle

- Top cross hybrids developed using local population
- Extra-early inbred lines with long panicles head developed
- Combining ability of downy mildew resistant lines determined
- Establishment of a core collection

## Agronomy and Soil



Inter-cropping millet/ leguminous

- Optimization of mineral and organic fertilizer for pearl millet
- Improvement of plant density for Souna 3 and Thialack 2
- Agronomic diagnosis reveals that millet responds well to mineral fertilization, there are optimum thresholds beyond which fertilizer is no longer profitable

## Crop Protection



Head miner Female *laying eggs*

- Varieties resistant to head miner, stem borer and downy mildew identified
- Impact of farmers' practices on the incidence and behavior of the head miner
- Egg parasitoid for the head miner identified (*Trichogrammatoidea armigera*), to be mass reared for release at farmer fields
- Optimal release timing for *Bracon hebetor* for the biocontrol of head miner

# Future Goals



Accurate selection and accelerated improvement of varieties / hybrids that are more tolerant and perform better under erratic conditions of rainfall and soil poverty



Increased production and productivity of the millet sector in Africa and elsewhere



Access to new markets, increased income and improved well-being of rural populations

# Constraints/Needs to move forward

- Lack of coordination
- Chase Projects Opportunities

**ONE BREEDING PROGRAM, TWO STRATEGIES**

NEXT GENERATION/RELEASE OF PM



Hybrids



OPVs

# Partnership/Acknowledgements

*Special tribute to Amadou FOFANA*

