



# STOL Meeting 22 & 23 November 2023

## Senegal report



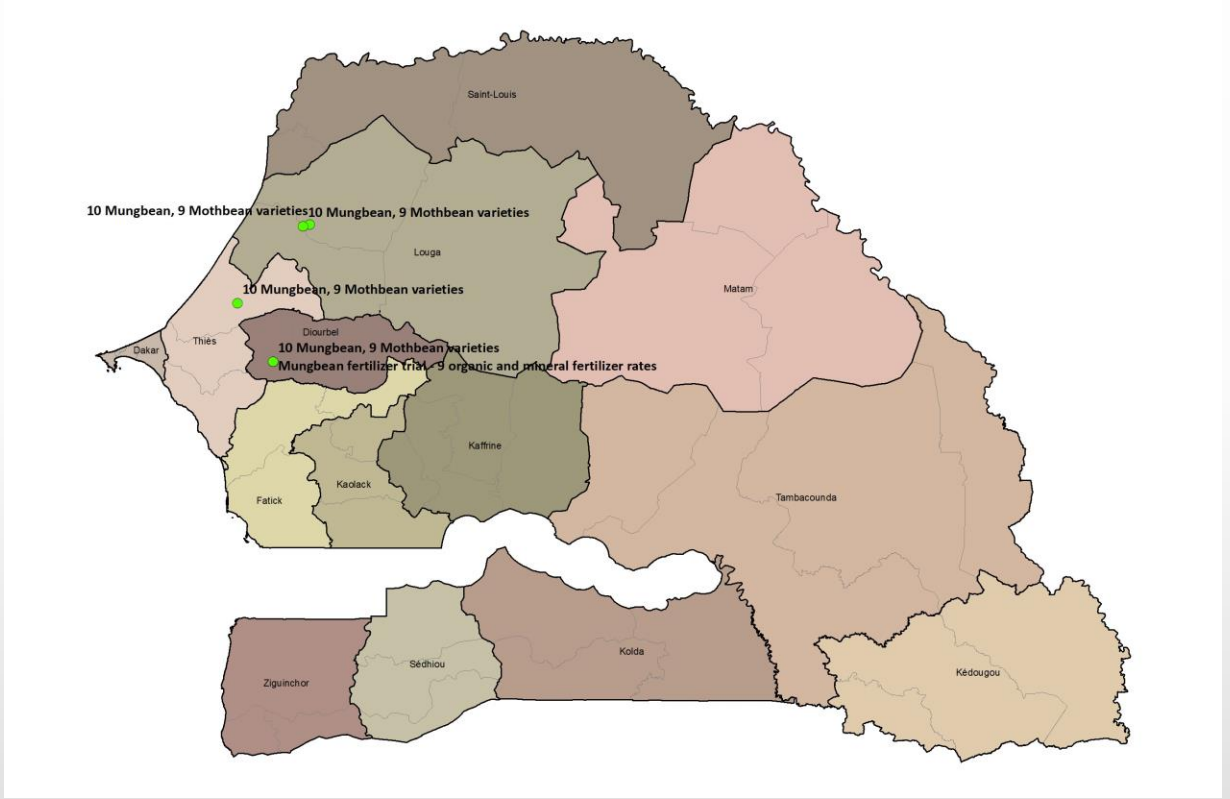
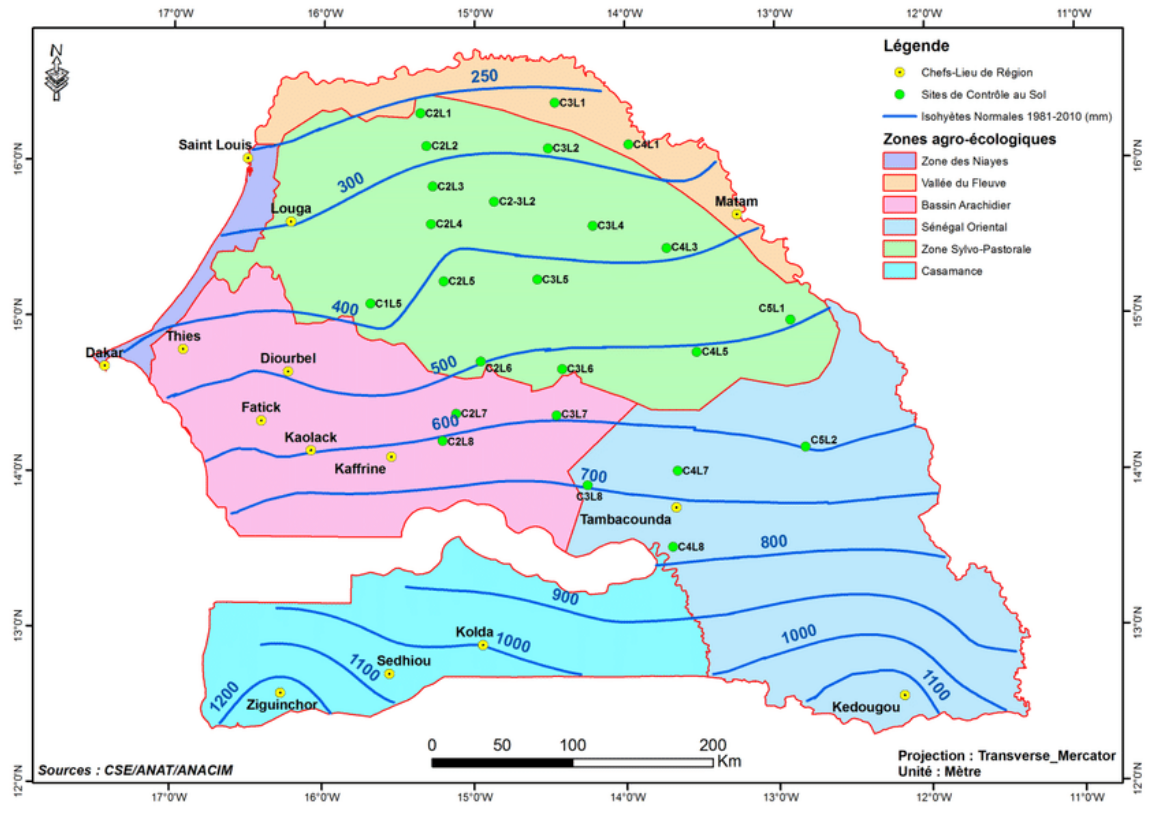
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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

## Project's intervention area: drought prone regions (low and erratic rainfall < 500 mm)



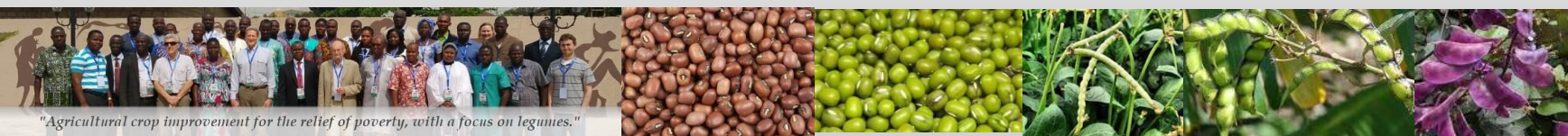
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# Presentation's outline

- **1.** On-station and on-farm evaluation of mungbean and mothbean for release in Senegal
- **2.** Effect of organic and mineral fertilizer rates on growth and yield of mungbean
- **3.** Planned activities over the next coming six months
- **4.** Project sustainability plan







## 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

- **Sites : 3 regions**
  - **On-station** : **Bambey** research station ( Diourbel region)
  - **On-farm trials** :
    - ✓ **Mekhe Village** - in collaboration with a farmer's group - Union des Groupements des Producteurs de Mékhé (Tivaoune - Thies region)
    - ✓ **Darou Diakhour village** - in collaboration with a farmer' group - La coopérative agricole de Kèlle Guèye COPAKEL ( Louga region) - 3 farmers
- **Material : 10 selected varieties**
  - ✓ Berken, Mam: USA
  - ✓ IC-39352, IC-39375, IC-39383: CCSHAU, Hisar
  - ✓ MH2-14, MH-421: ICAR-IIPR, Kanpur
  - ✓ Ganga 8: SKRAU-ARS, Sriganganagar
  - ✓ IPM2614: ICAR-IIPR, Kanpur
  - ✓ GAM -5: AAU, Anand



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## 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

- **Plot size** : 7 to 10 rows 5-m to 7.5-m long
- **Data collected**
  - DUS: 22 traits measured/observed (using the UPOV guidelines)
  - VCU: 24 traits scored (mungbean) and 17 traits scored (mothbean)
  - ☐ Earliness - # days to 50% flowering
  - ☐ Yield components : pod weight per plot, number of cluster per plant, number of pods/cluster, 100 seed weight, plant biomass
- **Statistical analysis**: Single site analysis - ANOVA using Genstat Discovery Edition 4, multiple mean comparison using SNK test



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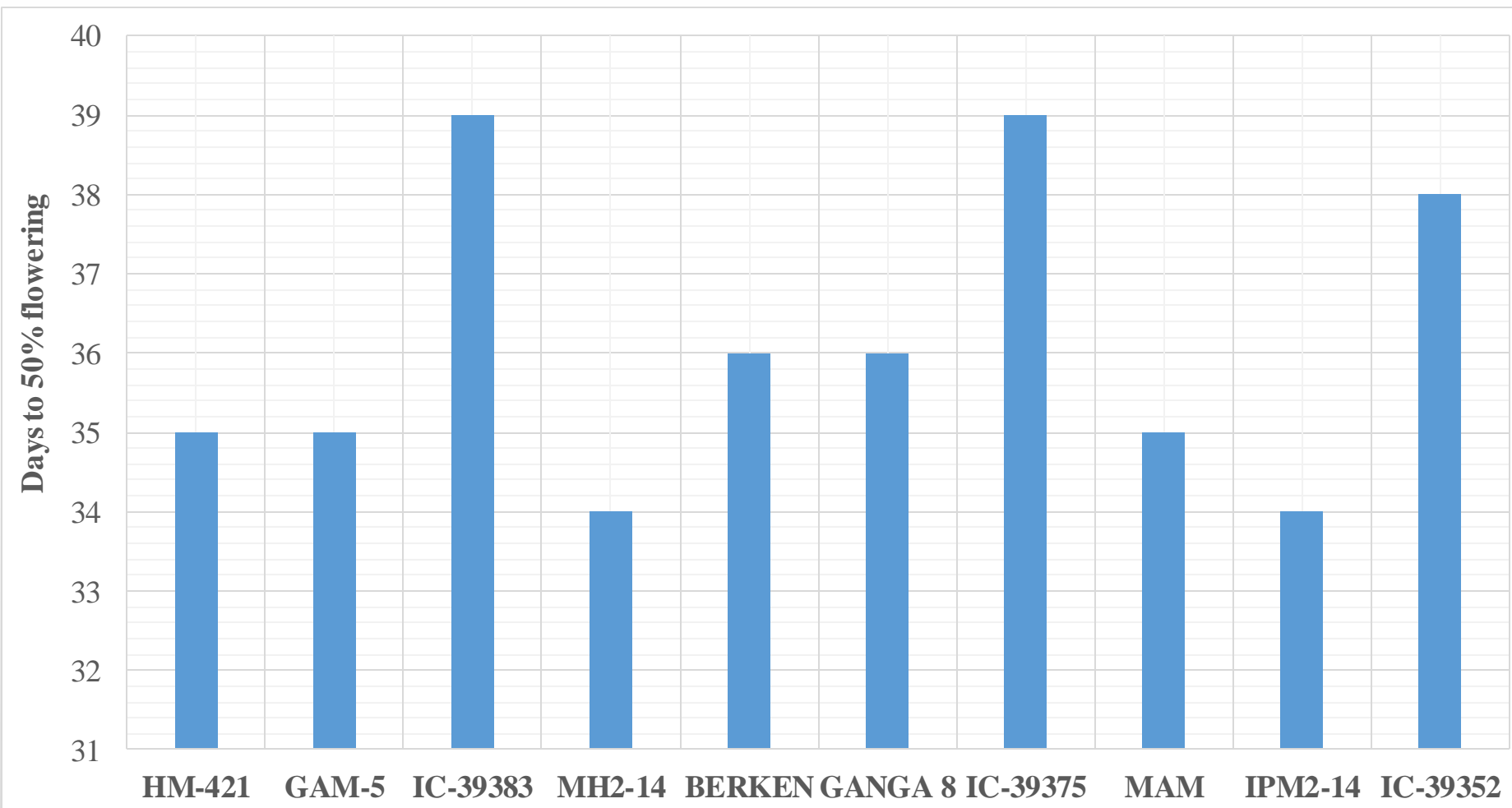
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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

**D50% Flowering < 40 days: All varieties are early maturing at Bambey**



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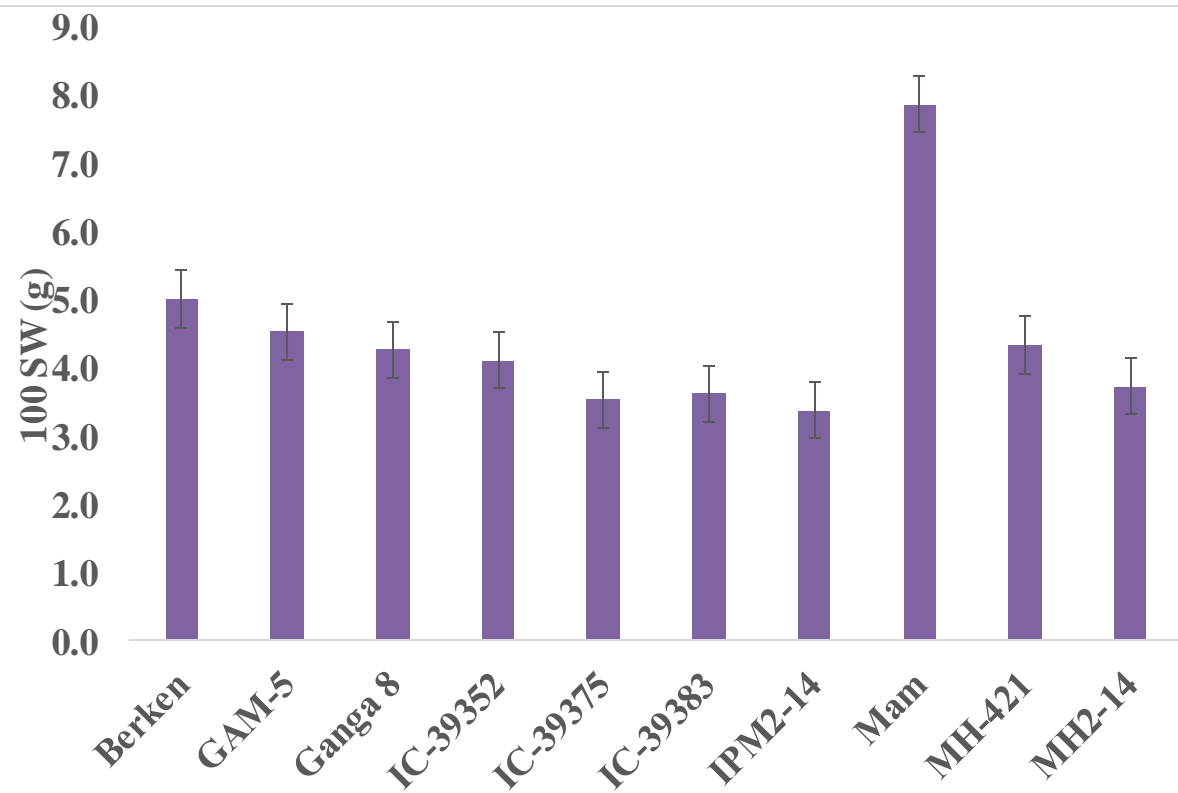
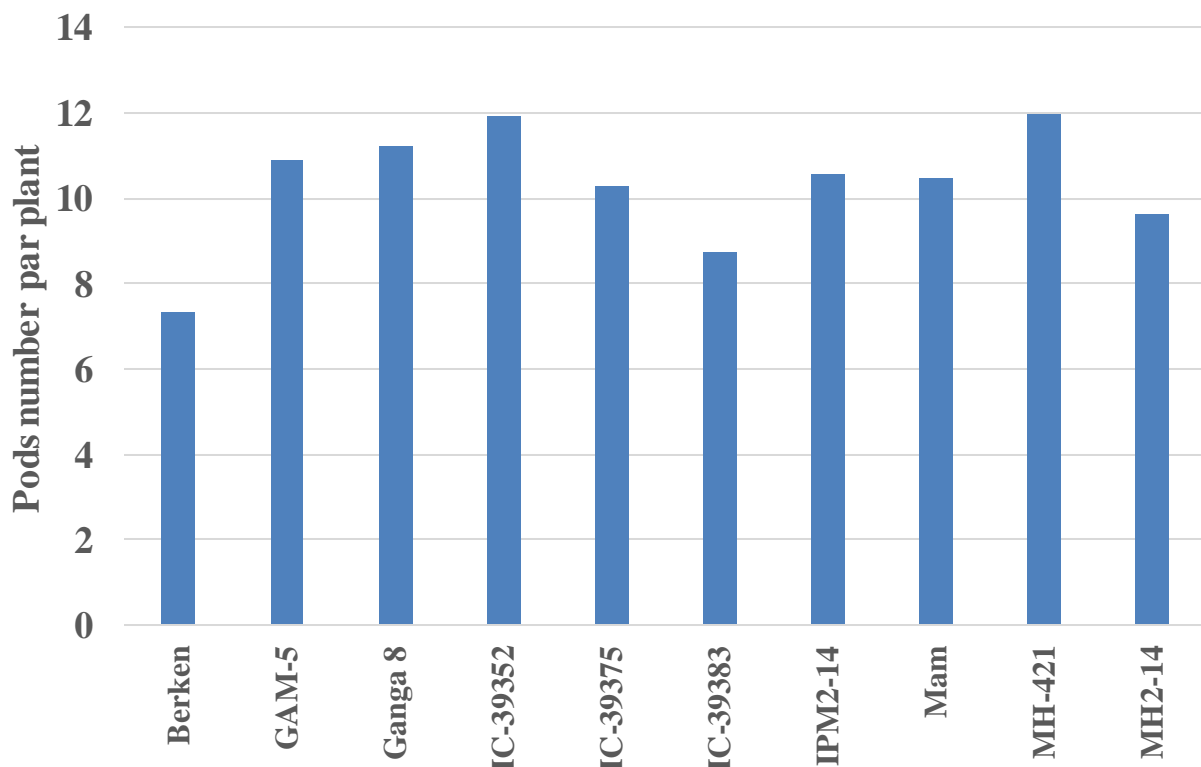


# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

## Mungbean trial at Bambey research station

**GAM-5, Ganga 8, IC-39352, MH-421** have the highest number of pods par plant (11-12)

**Mam and Berken** are large seeded varieties while the others varieties are medium seeded varieties



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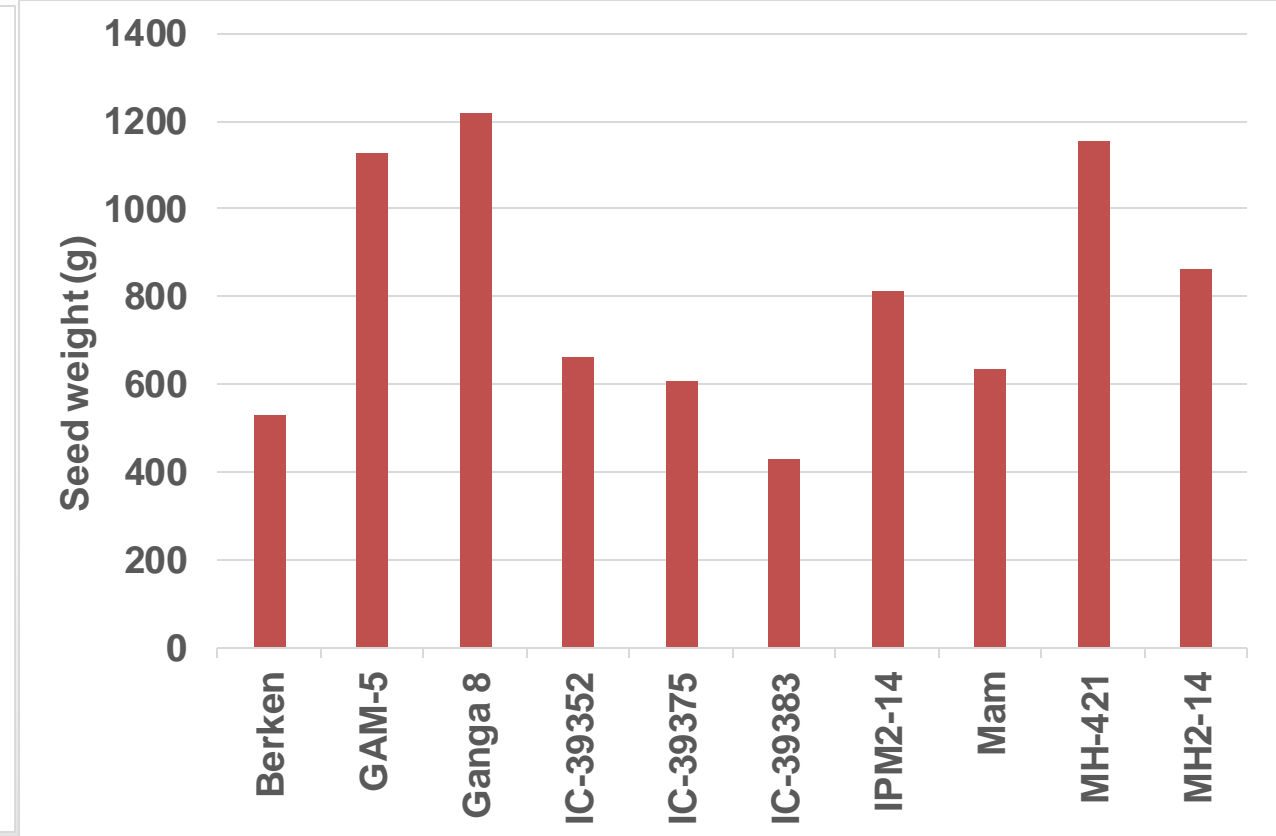
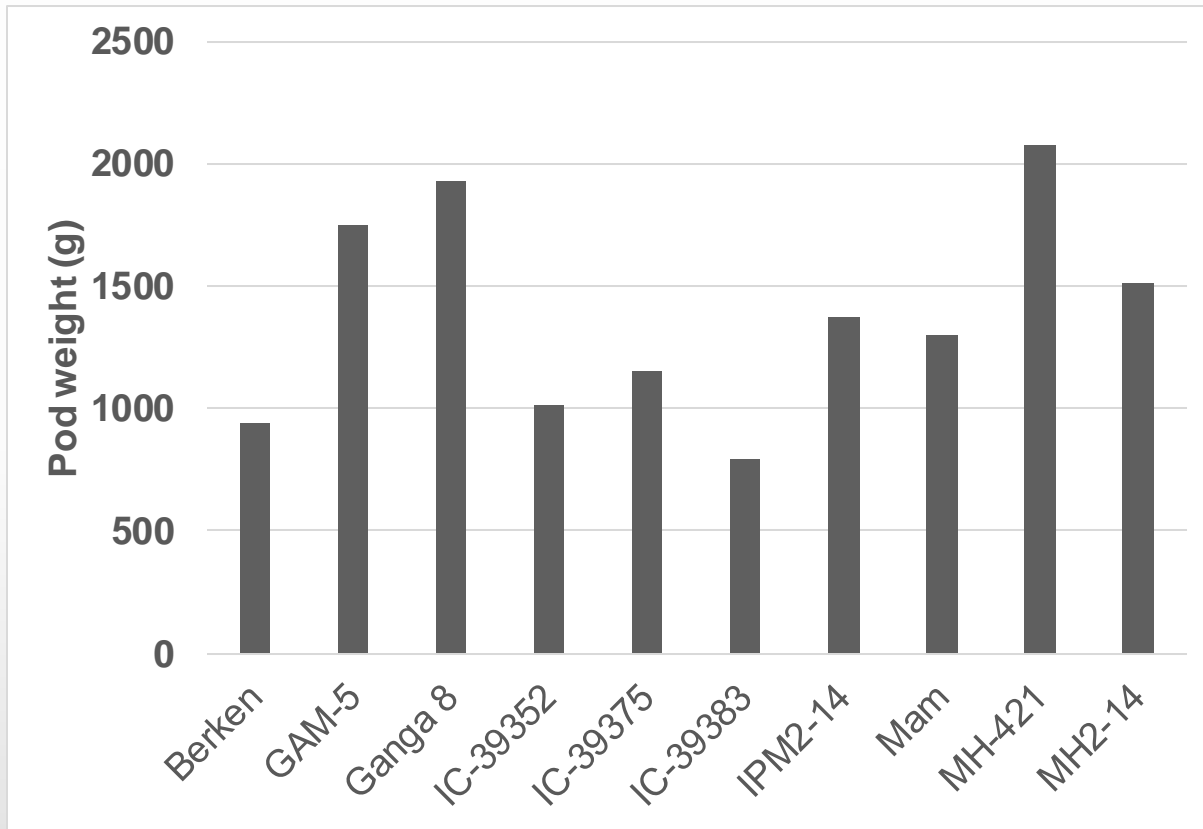
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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Pod and seed weight per plot at Bambey research station



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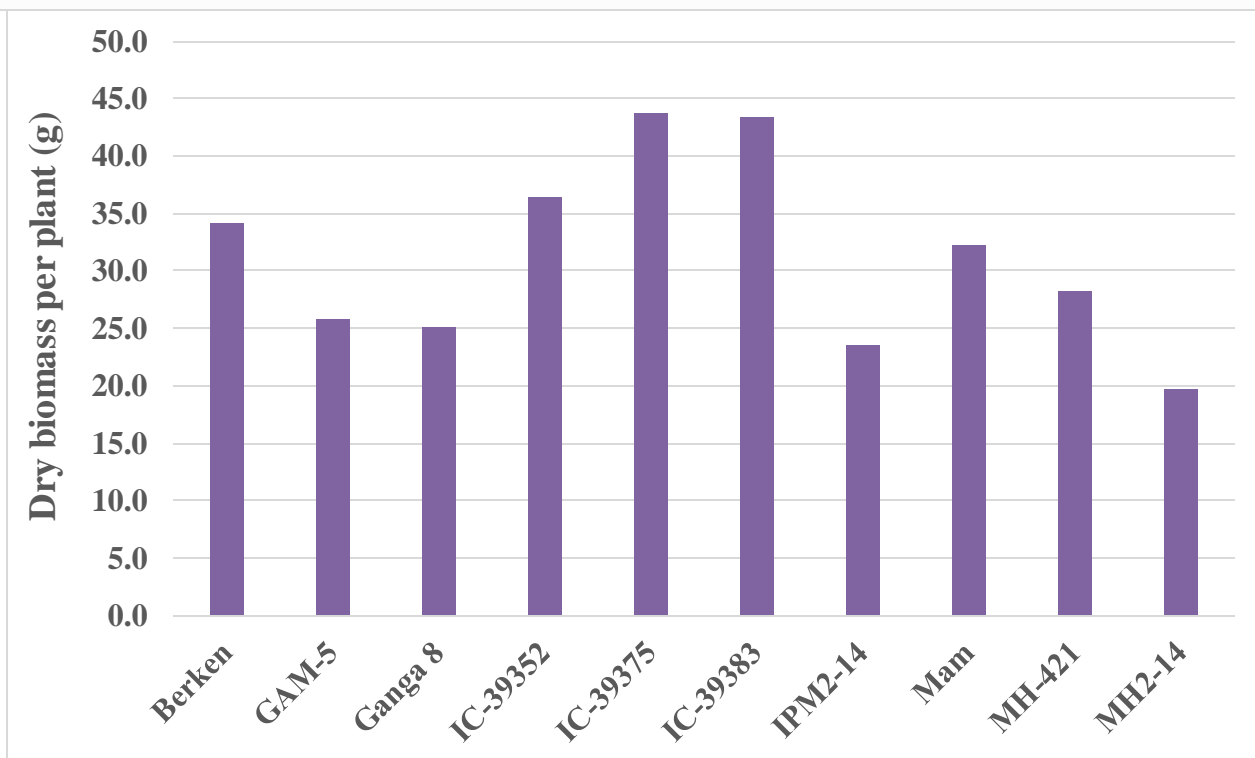
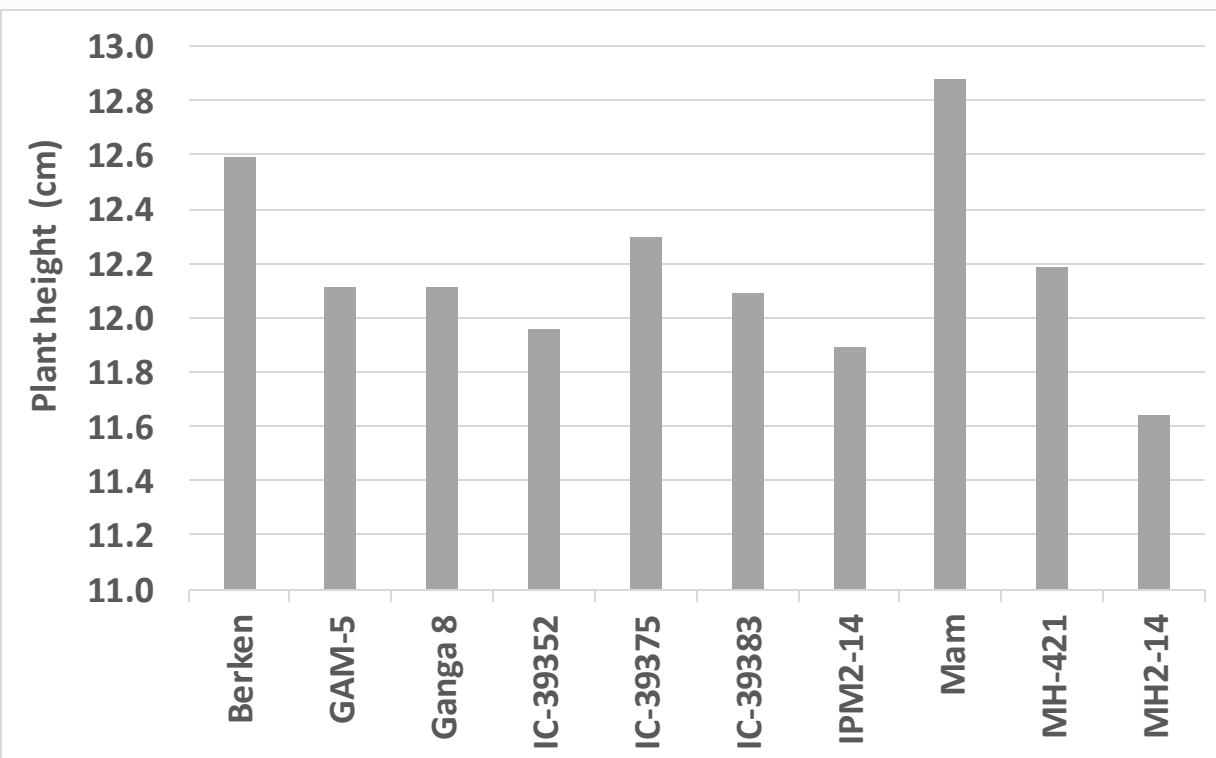


# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

## Mungbean trial at Bambey research station

**Mam, Berken and IC-39375** showed the taller canopy

**IC-39352, IC-39375, IC-39383 and Berken** have the highest dry biomass



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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Variety	Farmer's field (AM)		Farmer's field (CN)	
	PW (g)	SW (g)	PW (g)	SW (g)
Mam	1189	807	386.7 <b>ab</b>	257.3 <b>ab</b>
IC-39383	1241	829	427.3 <b>ab</b>	268.3 <b>ab</b>
MH2-14	1384	937	607.3 <b>abc</b>	401.3 <b>abc</b>
Gam-5	1616	1069	949 <b>bc</b>	626.7 <b>bc</b>
IC-39375	1737	1188	215.2 <b>a</b>	129.6 <b>a</b>
IC-39352	1998	1318	454.7 <b>ab</b>	296.2 <b>ab</b>
Berken	2051	1437	289.3 <b>ab</b>	191.7 <b>ab</b>
IPM2-14	2230	1504	438 <b>ab</b>	280.5 <b>ab</b>
MH-421	2271	1519	794.7 <b>abc</b>	507.3 <b>abc</b>
Ganga 8	2470	1659	1102 <b>c</b>	748 <b>c</b>



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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Variety	Environ. Farmers (UGPM)		Environ. Farmer (BM)	
	PW (g)	SW (g)	PW (g)	SW (g)
Mam	170	111.1	447.4	301.9
IC-39383	86	53.1	238	238.3
MH2-14	89	59.1	346.3	231.8
Gam-5	110	69.3	282	186.3
IC-39375	93	54.9	340.9	225.2
IC-39352	80	48.6	286.3	195.3
Berken	67	26.1	277.3	188.3
IPM2-14	127	80.3	346.3	231.8
MH-421	163	100.1	321.3	193.2
<b>Ganga 8</b>	<b>189</b>	<b>114.8</b>	<b>636.0</b>	<b>407.8</b>



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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Yield performances of the mothbean varieties at Bambey research station

Variety	Date 50%F	100SW	PW	SW
RMO-3-5-70	32 <b>a</b>	2.86	238	148
RMO-4-1-6-9	33 <b>ab</b>	2.93	541	361
GMO-2	33 <b>ab</b>	2.96	382	238
RMO-435	33 <b>ab</b>	3.00	306	188
RMO-257	33 <b>ab</b>	3.03	453	298
RMO-225	33 <b>ab</b>	3.06	415	270
RMO-25	33 <b>ab</b>	3.01	281	173
Maru Moth	34 <b>b</b>	3.20	104	50
RMB-28	34 <b>b</b>	3.33	323	204



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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Yield performances for the mothbean varieties on-farm field

Variety	Farmer's field (Cheikh Ndiaye)		Farmer's field (Abdou Mbengue)	
	PW	SW	PW	SW
RMO-3-5-70	396 <b>abc</b>	282.2 <b>cd</b>	459.3	289.3
RMO-4-1-6-9	499 <b>c</b>	311.0 <b>cd</b>	347.3	222.7
GMO-2	345.3 <b>abc</b>	193.7 <b>bcd</b>	499.0	295.8
RMO-435	273.3 <b>a</b>	152.7 <b>a</b>	325.7	203.7
RMO-257	515.3 <b>c</b>	326.8 <b>d</b>	465.7	290
RMO-225	497.7 <b>c</b>	300.3 <b>cd</b>	265.7	167.3
RMO-25	440.7 <b>bc</b>	264.8 <b>bcd</b>	411.3	282.5
Maru Moth	249 <b>a</b>	140.0 <b>a</b>	223	130.2
RMB-28	292 <b>ab</b>	166.8 <b>ab</b>	470.7	295.5



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# 1. On-station and on-farm evaluation of mungbean and mothbean for release in Senegal

Yield performances for the mothbean varieties on-farm field

Variety	Farmer's field (UGPM)		Farmer's field (Bada Mbengue)	
	PW	SW	PW	SW
RMO-3-5-70	96.3	64.3	505.3	337.2
RMO-4-1-6-9	91.7	60.8	414.7	267.7
GMO-2	180	123	329.3	190.5
RMO-435	112.7	81	652.7	426.7
RMO-257	100.0	68.7	861.7	579.7
RMO-225	94.7	57.3	546.7	330.8
RMO-25	121	81.3	936.0	535.0
Maru Moth	153.7	111.2	*	*
RMB-28	116.3	73.3	489.3	360.5



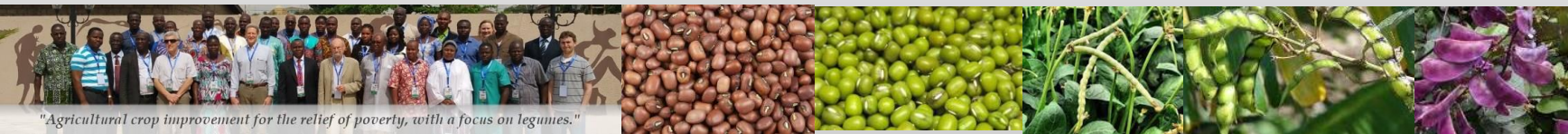
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## 2. Effect of organic and mineral fertilizer rates on growth and yield of mungbean

- **Material:** Mam
- **Treatments:** T0 (control), T1 : 5t/ha OM (manure), T2: 150 kg/ha Fertilizer NPK, T3: 75 kg/ha of NPK, T4: 75 kg/ha NPK + 1.25 t/ha OM, T5: 75 kg/ha NPK + 2.5 t/ha MO, T6: 75 kg/ha NPK + 3.75 t/ha OM, T7: 75 kg/ha + 5 t/ha OM, T8: 150 kg/ha + 5t/ha OM
- **Plot size :** 8 rows 3-m long
- **Data collected**
  - Plant growth parameters
  - SPAD-chlorophyll and NDVI
  - Pod weight
- **Statistical analysis:** ANOVA using Genstat Discovery Edition 4, multiple mean comparison using SNK test

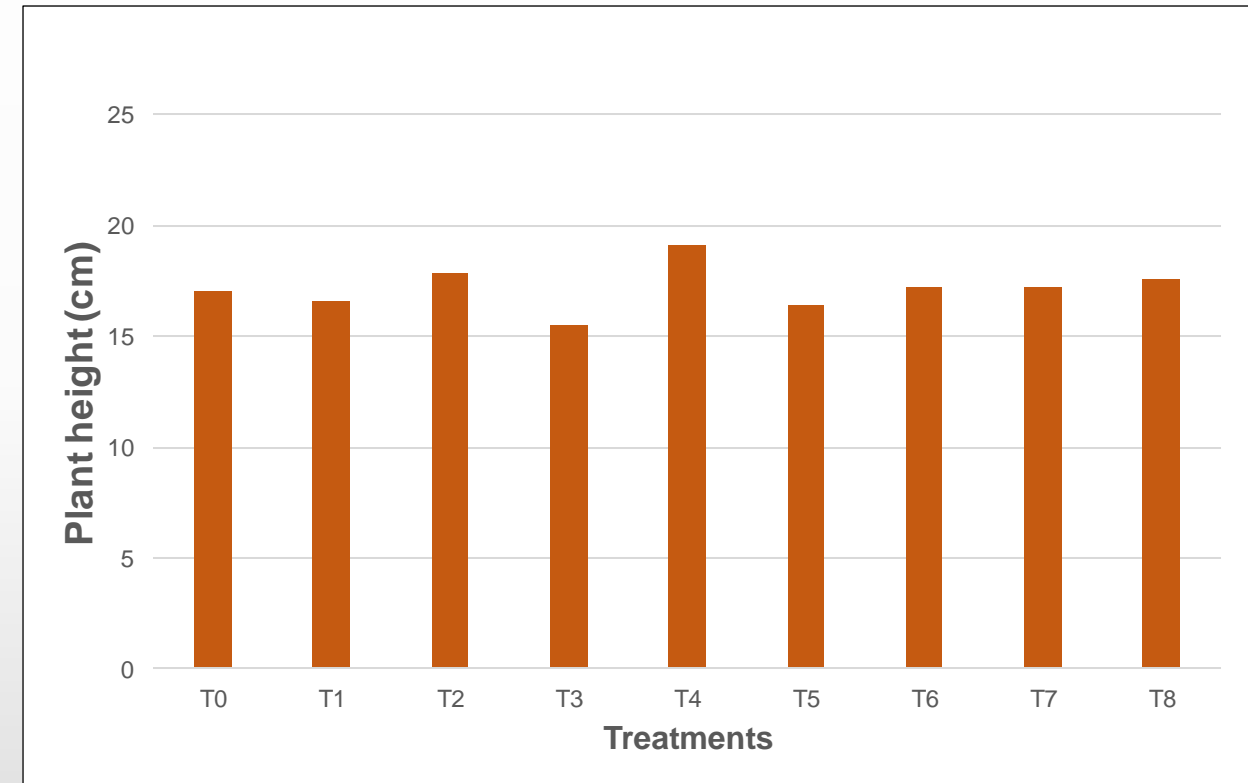
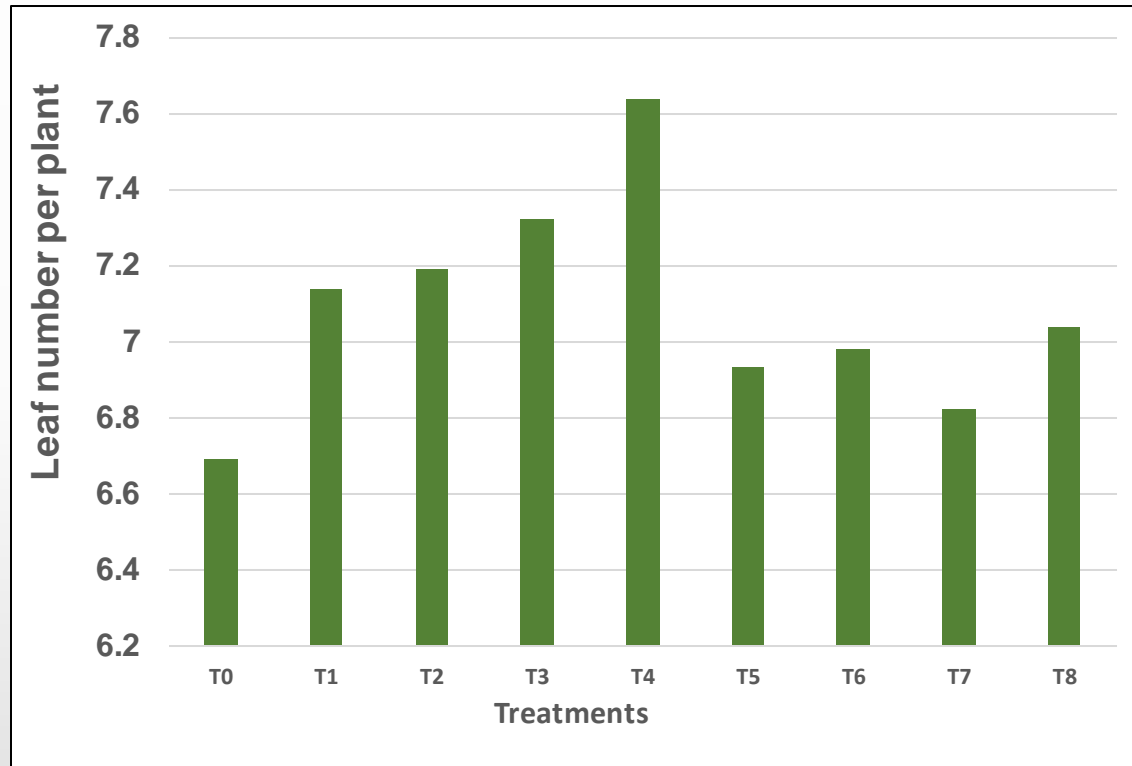


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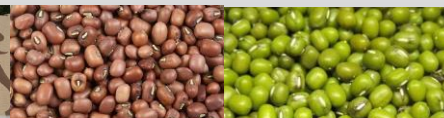


## 2. Effect of organic and mineral fertilizer rates on growth and yield of mungbean

Organic and mineral fertilizer increased mungbean leaf number



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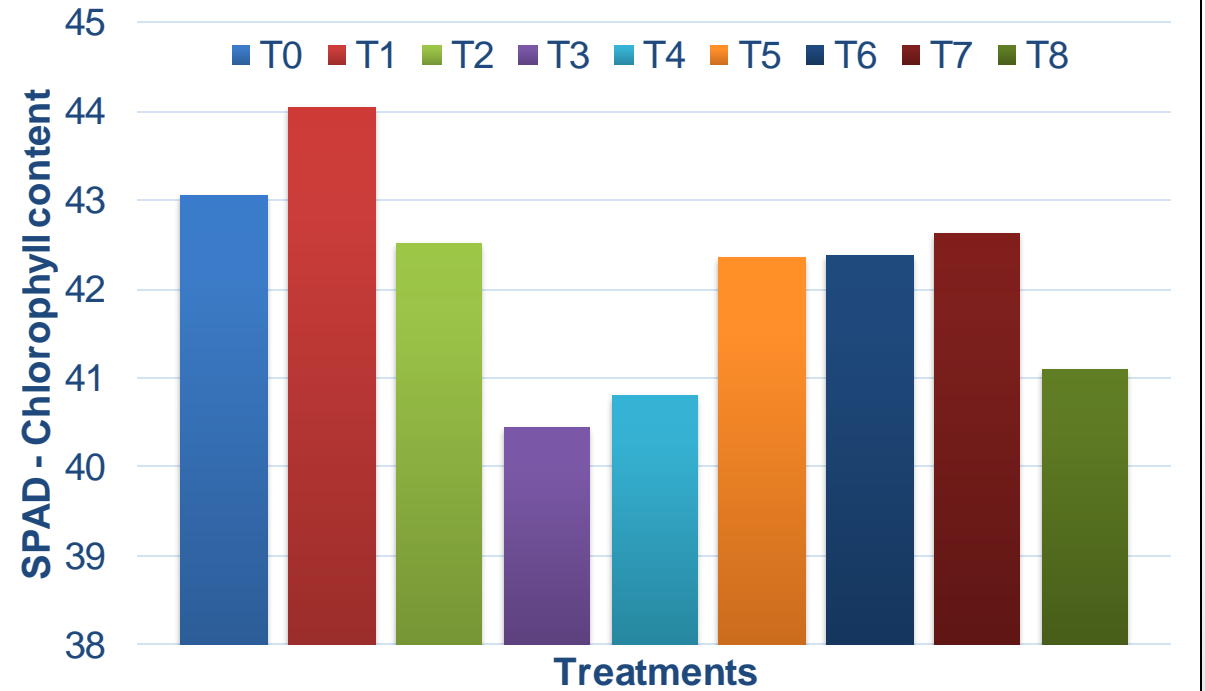
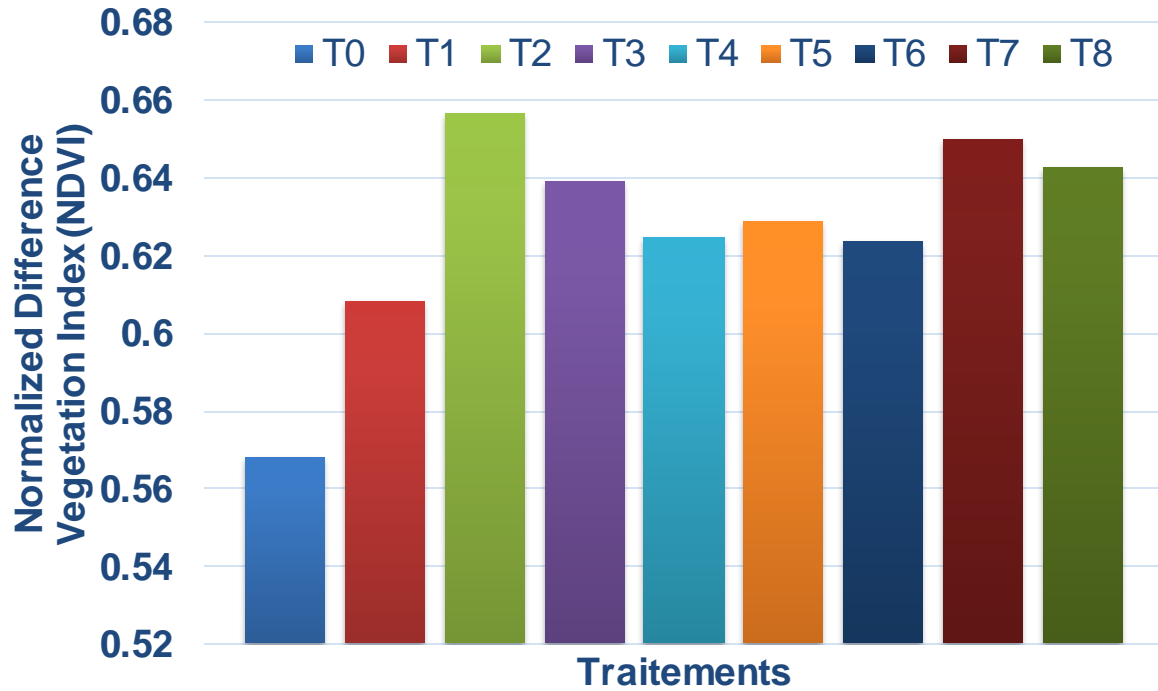






## 2. Effect of organic and mineral fertilizer rates on growth and yield of mungbean

Organic and mineral fertilizer increased plant canopy in mungbean



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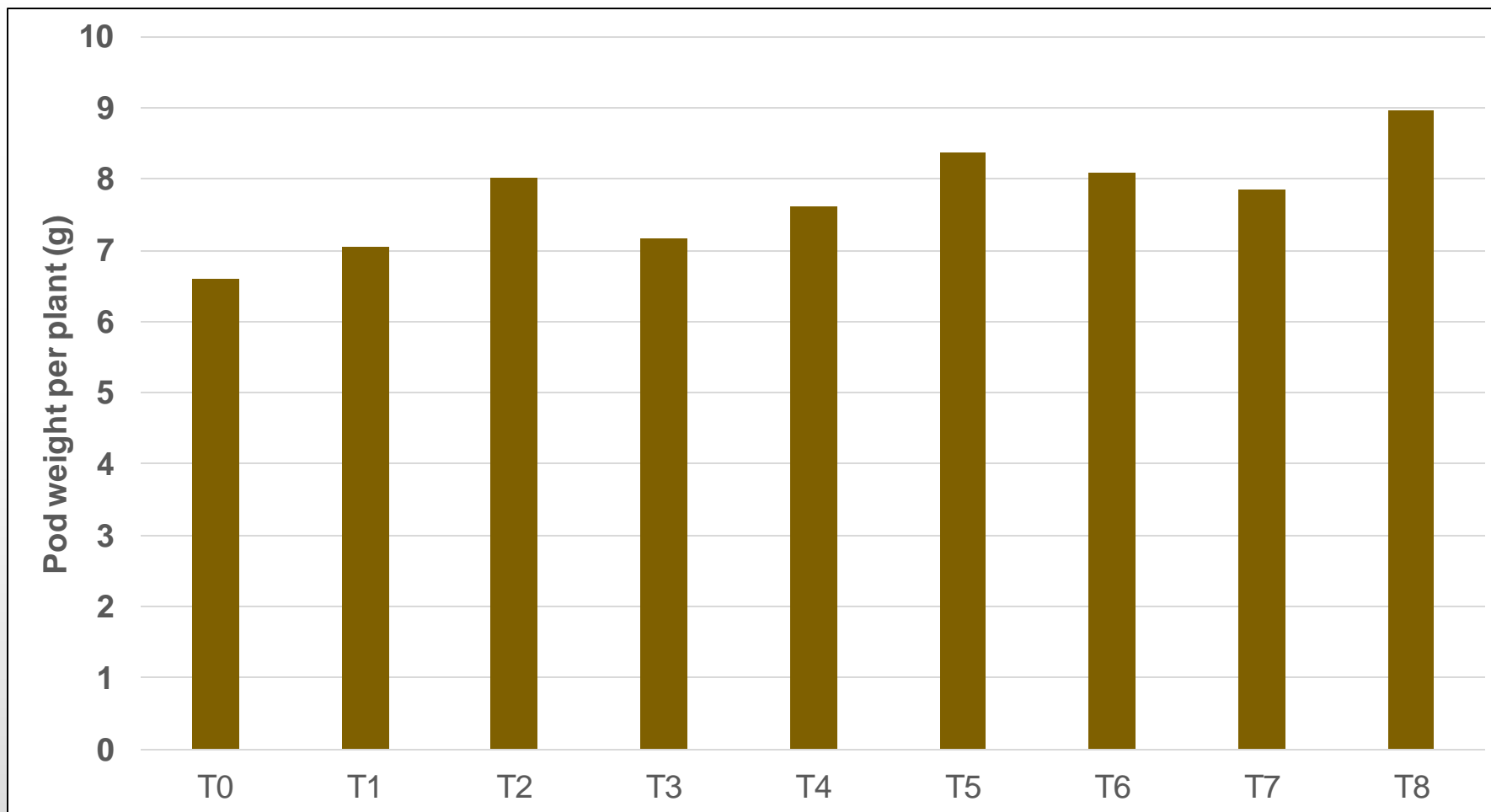
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## 2. Effect of organic and mineral fertilizer rates on growth and yield of mungbean

Organic and mineral fertilizer increased pod weight per plant in mungbean



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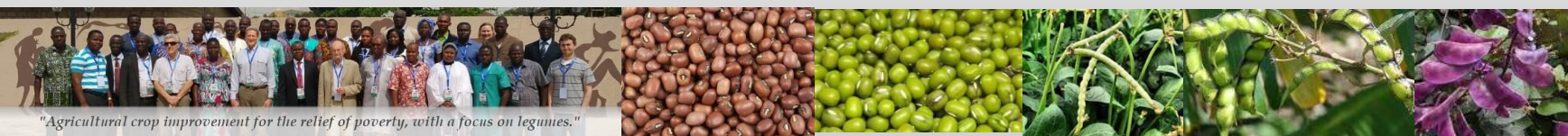
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### 3. Conclusions & planned activities over the next coming six months

1. The top five high yielding mungbean varieties are **Ganga 8, GAM 5, MH-421, MH2-14 and IC-39375**
2. **IC-39375** combined high pod yield with high haulm yield
3. The top five high yielding mothbean varieties are **RMO-257, RMO- 225, RMO-4-1-6-9, RMO- 25 and GMO-2**
4. We conducted a field day in Louga and farmers mentioned they're interested to start planting mungbean & mothbean in their own fields
5. We will conduct **multi-site analysis** to finalize the selection of the best stable and high yielding varieties
6. **Seed composition analysis** will be carried out to complement agronomic with the nutritional data
7. **A seed increase of the entire collections** : mungbean, mothbean and Bambara groundnut) in going to be implemented during the off-season at Bambey research station



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#### 4. Project sustainability plan

1. In 2024 we conduct the second and final year of the DUS and VCU trials
2. Concomittantly, we will produce early generation seeds, in conjunction with seed producers and farmer's cooperatives, in a large scale (1 ha at least of each selected variety) plots the best three mungbean and mothbean varieties selected based on the yield performances and seed composition and quality traits;
3. Registration of the best varieties is expected to be completed by december 2024
4. ISRA's Seed Unit will take over from us the breeder seed production of the released varieties and certified seeds will be produced by key farmer's cooperatives and seed producers
5. Through capacity building of the seed producers and farmer's cooperative, ISRA will help to establish a sustainable seed production for these crops



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# THANK YOU



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