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REPUBLIC of SENEGAL
One People- One Goal- One Faith

MINISTRY OF AGRICULTURE
AND RURAL EQUIPMENT

CARD

Progress of agricultural mechanization in Senegal

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PRESENTATION OUTLINE

I/ Current situation/ Challenges to good mechanization
- 1/ Access to equipment
- 2/ Challenges and hurdles

II/ Progress of the mechanization process
- 1/ In practical terms:
  - a/ Appropriate technical equipment (the result of an exercise allying farm machinery, the size of holdings and the soil conditions)
  - b/ Tests and certification
  - c/ Scenario – machinery that can be made or assembled locally
- 2/ Policy thrusts: Policy instruments with regard to changes linked to promoting mechanisation

III/ Outlook
- 1/ On the technical side
- 2/ On the policy side

I. EXISTING SITUATION / CHALLENGES TO STRONG MECHANIZATION

1/ Availability – access to powered machinery

	Tractor types	
	2WD	4WD
Number of importers	11	11
Sale price (in $US)	## (varies by Make / Importers/ Origin/ Power)	(varies by Make / Importers/ Origin/ Power)
Size of market (in $US)	Idm (Customs) ##	Idm (Customs) ##

Acces to powered machinery:

- Deficit – antiquated existing machinery – purchase price is beyond the capacity of individuals and a heavy burden on group budgets

I. EXISTING SITUATION / CHALLENGES TO STRONG MECHANIZATION

1/ Availability – access to powered machinery

Annual imports	
2WD Tractors	4WD Tractors
quantity/year ##, import duties (or tax): **28%**	quantity/year ##, annual sales total in US$: ##

Mechanization costs (Rentals)	
Offset discing	25 000 FCFA
Soil working	50 000 FCFA
Combine harvesting	20% Harvest
Stationary threshing	10% of produce
Interest rates	7.5% + transaction costs, over 5 years

Challenges and hurdles to encouraging mechanisation

TECHNICAL ISSUES	POLICY ISSUES
Poor choice of suitable farm machinery	Lack of a coherent mechanization policy
Problems with the suitability of machines for the size and shape of plots	Unsuitable credit for machinery and weak financial strength of producers
Weak producer capability to use and manage agricultural machinery	Low level of producer organisation for managing the equipment
Low level of producer organization for managing the equipment	High taxes on machinery, spare parts and raw materials
	Inadequate extension services
	Lack of training for specialists (Eng., ST, formal courses)
	Absence of quality control for imported machinery

II. PROGRESS WITH THE MECHANIZATION PROCESS

1. On the technical side:

a) Machinery suitability for rice production

Based on analysis, appropriate machinery is proposed: :

For soil working and crop operations:

1) Working:

- a) 4WD tractors, 100 to 130 hp with 61 cm disc plows, because of: Heavy soils; very little used; high cost but a very useful operation
- b) *Complete* power harrow systems (soil working tools, trailer, mower, cage-wheels) : because: suitable for irrigated rice growing, which is characterised by small plot and holding sizes, and the soil conditions (puddled plots), socio cultural

2) Secondary tillage: offset discing, crop cultivations

- a) 4WD tractors, 100 to 130 hp with disc harrows, 61 cm diameter, because: heavy soils, powerful action, double-cropping
- b) *Complete* power harrow systems: because: idem

II. PROGRESS WITH THE MECHANIZATION PROCESS

a) Machinery suitability for rice production

For harvesting and threshing:

1) Combine harvesting/threshing:

a) Combine harvesters with a 4-m cutting width, 120-140 hp, 2 to 2.5 T hopper; **because:** good performance, suitable for producer-groups

b) Small combine-harvesters with a 2 m cutting width, 60-100 hp, 1 T hopper; **because:** suitable for growers with smallholdings and lacking financial means,

c) Powered mowers with 1.5 to 2 m cutting width, 12 - 24 hp: **because:** suitable for individual growers with smallholdings and lacking financial means

II. PROGRESS WITH THE MECHANIZATION PROCESS

a) Machinery suitability for rice production

For harvesting and threshing:

1) Stationary threshing:

a) threshers with 300 to 2000 kg per hr throughput: **because:** good performance, suitable for individual growers with smallholdings and lacking financial means, and harvesting manually

For processing:

a) Fully automated industrial plant (4 t/hr, equipped for cleaning, grading and drying): **because:** To meet quality requirements, suitable for the major production areas,

b) Semi-industrial plant (1-2 t/hr, equipped with a cleaning system): **because:** To meet quality requirements, suitable for medium-size production areas,

d) village husking plants (300 – 500 kg/hr, engelberg type): **because:** for on-farm consumption, to meet Bana Bana (small traders) demand

II. PROGRESS WITH THE MECHANIZATION PROCESS
b) Certification testing

CURRENT SITUATION /PROBLEMS	ROUTE PLAN
Organizational structure: DMER set up, High-level approval pending for a mechanization policy.	**Underway**: a CNM, a CNC,
Quality control testing and certification regulatory framework: Nil	**Infrastructure building**: CEEFMA pending, Warehousing, Roads
Human resources: Very weak for DMER (policy), ISRA (research) and ANCAR (advice), Universities/Schools (training)	**Professional staff**: DMER Director recruited, personnel recruitment underway
	Cooperation with international institutions: Good (AfricaRice, JICA, CIRAD, FAO, WFP, AFD, ACDI, EMBRAPA, WADB, IDB); about to be strengthened with Asia, Latin America

II. PROGRESS WITH THE MECHANIZATION PROCESS
c) List of machinery that could be produced locally

Due date	Assembly	Fabrication
In 3 years	Threshers, Transplanters, Mowers, Seed drills, Huskers, Trailers	Threshers, Transplanters, Mowers, Trailers, Seed drills, Huskers
In 10 years	Tractors, Power harrows, Offset discs, Plows, etc.	Threshers, Transplanters, Mowers, Trailers, Seed drills, Huskers
More than 10 years	Combine harvesters Industrial units	+Tractors, Power harrows, Offset discs, Plows, Industrial plant, etc.

II. PROGRESS WITH THE MECHANIZATION PROCESS
d) Capacity building requirements

Institutional support for private sector stakeholders: i) Main dealers: duty relief on imported machinery, spare parts and raw materials, ii) agrobusinesses : access to land, contract agreements with growers, duty relief on equipment, setting-up of agrobusiness hiring centres for mechanized services;
Capacity building metal fabrication workshops: i) Organizational (central buying etc.), ii) Technical (standardization, welding etc.) and iii) financial (subsidized credit)
Capacity building mechanized growers: i) organizational (GUMA, CUMA, SUMA), ii) Technical (training in machinery use), iii) managerial (administration and financial management)
Capacity building research, advice and training: (agricultural machinery operators, TS machinery, advisors etc.)

II. PROGRESS WITH THE MECHANIZATION PROCESS
2. Policy thrusts

- **i)** Proposed policy measures: Fiscal and customs reform for agricutural equipment, spare parts and raw materials
- **ii)** What change is proposed to this end?: Bring taxes and duties down to a strict minimum to reduce the purchase price of agricultural equipment and spare parts.
- **iii)** To benefit whom?: All stakeholders (growers, importers, metal fabricators etc)
- **iv)** Instruments: New customs and duties code
- **v)** Measures: Support producer organizations (GUMA, CUMA, SUMA) and metal fabricators (central purchasing, network etc.), private sector involvement (set up agrobusiness centres for hiring mechanized services)

II. PROGRESS WITH THE MECHANIZATION PROCESS

2. Policy thrusts

i) Proposed policy measures: Establishment of an institutional framework for agricultural mechanization policy

ii) What change is proposed to achieve this? Coordinate mechanization activities and supervise imports and the quality of local manufacturing,

iii) For whom? All stakeholders in the sector

iv) Instruments: As well as the DMER, set up a CNM, a CEEFM, a CNC

v) Measures: Introduce an equipment certification system to guarantee quality; subsidized credit for equipment

III. Outlook

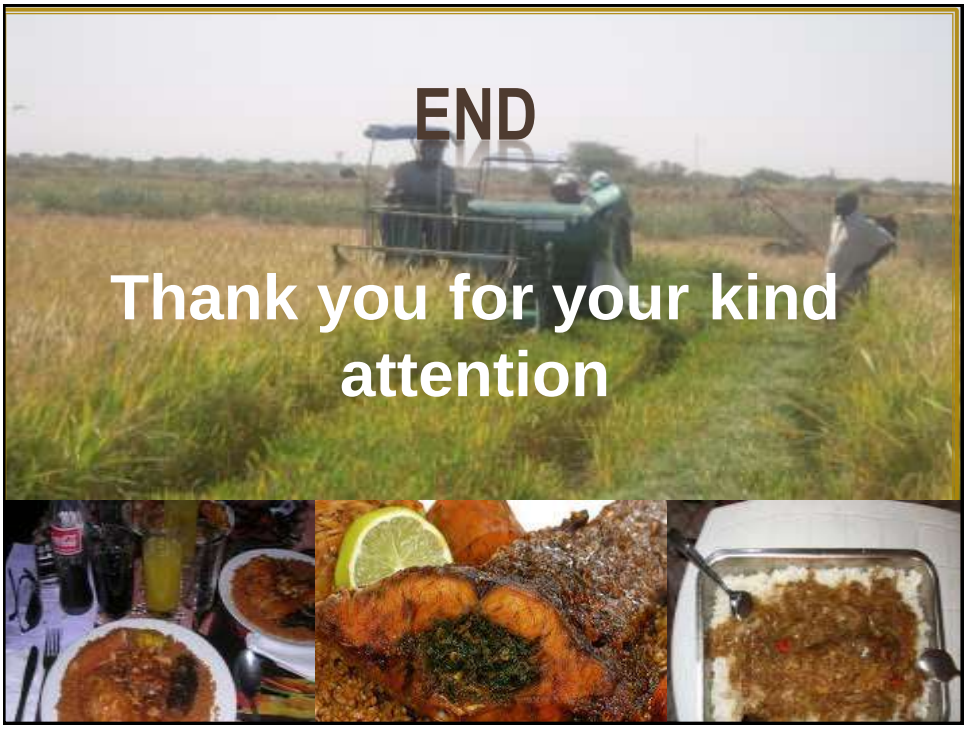
1. On the technical side

- ✓ **Machinery park inventory and an appraisal of reliability**
- ✓ **Identification of technically-appropriate equipment for EAF and Agrobusiness**
- ✓ **Encourage Partnership between DMER/UNIVERSITIES/SCHOOLS and others**
- ✓ **Draw up training modules for stakeholders**
- ✓ **Capacity build on testing and certification (both on the institutional side and in human resources)**
- ✓ **PPP**
- ✓ **Improve/speed up the action plan for encouraging local production of agricultural equipment and plant**
- ✓ **Strengthen rural capacity in running/repairs and maintenance**

III. OUTLOOK

2. On policy proposals

- Take policy lobbying to the highest level (PR, PM, MEF, TFP)
- Seek funding for studies on CNM, CEEFM, CNC
- Top-level meetings with the private sector
- Top-level contact and partnership with relevant technical ministries (commerce, craft, finance, industry)
- Top-level meetings with the TFP
- Funding requests to TFP to supply producers (primary equipment): Brazil, India etc.
- Policy changes and measures that improve the business environment: access to land, taxation
- Adequate funding to encourage mechanization



APPENDICES

5. Matching equipment and farm machinery to holding size
   1) Tractors
   2) Huskers
   3) Combine harvesters
6. Progress of the mechanization process
   1) Events/meetings timetable
   2) List of participants
7. Summary/ Points for the processing questionnaire
   1) Existing position of processing capacity
   2) Existing market situation
   3) Standardization and categorization system

1. (4-C) MECHANIZATION: MATCHING EQUIPMENT AND FARM MACHINERY TO HOLDING SIZE AGRICULTURAL - TRACTORS [1/3]

10 out of 34 factors	Tractor 4 WD		Tractor 2 WD
	120 hp	90 hp	130 hp
Minimum annual sown area (ha)	600	500	**500**
Dimensions of available machinery (m)	4	3	**4**
Drawbar power (kN/m)			
Tractor purchase price ($)	61 144	29 585	**74 950**
Offset disc plow purchase price ($)	15 779	15 779	**15 779**
Total operational costs ($/h)	110	97	**113**
Total fixed costs ($/hr)	50	46	**89**
Total cost/hr ($/hr)	160	143	**203**
Cost/ha ($/ha)	114	111	**169**
Basic contract rate ($/ha)	137	133	**203**

Tractors with 4WD make up 85% of those used in the VFS. Two-wheel-drive tractors are mainly confined to the Podor and Matam departments where the soils are less heavy. In practice, the 2WD tractors quickly reach their limits of adherence.

1. (4-C) MECHANIZATION: MATCHING EQUIPMENT AND FARM MACHINERY TO HOLDING SIZE - COMBINE HARVESTERS [2/3]

9 out of 34 factors	Medium	Large
Annual sown area (ha)	240	500
Dimensions of available machinery (m)	2.5	4.2
Drawbar power (kN/m)		
Purchase price ($)	118 343	112 426
Total operational costs ($/hr)	200.65	153.22
Total fixed costs ($/hr)	106.45	90.71
Total cost/hr ($/hr)	222.56	243.93
Cost/ha ($/ha)	500.76	439.08
Basic contract rate ($/ha)	601	527

1. (4-C) MECHANIZATION: MATCHING EQUIPMENT AND FARM MACHINERY TO HOLDING SIZE - HUSKERS [3/3]

8 out of 34 factors	Large	Medium
Throughput (t/yr)	6300	2500
Dimensions of available machinery (m)		
Purchase price ($)	197 237	78 895
Total operational costs ($/hr)	72,07	70.19
Total fixed costs ($/hr)	147.33	60.74
Total cost/hr ($/hr)	219.49	130.92
Cost/ha ($/ha)	106.57	94.26
Basic contract rate ($/ha)	127.88	113.12

1. (4-C) MECHANIZATION: MATCHING EQUIPMENT AND FARM MACHINERY TO HOLDING SIZE – OTHER POWERED EQUIPMENT

Activities	Farm machinery	Irrigated enterprises		Rainfed enterprises	
		PIV	PIP	Schemes	Traditional farms
Production	drawn machinery	✕		✕	✕
	tractors		✕	✕	
	harvesters		✕	✕	
	threshers	✕	✕		✕
Processing	rice mills	✕	✕	✕	
	husker	✕	✕	✕	✕
Services	gearing, internal combustion engine, engine belts	✕	✕	✕	✕

2. (1) PROCESSING: CURRENT SITUATION FOR RICE HUSKING [1/3]

	Large rice mills (above 3 t/hr)	Medium-size rice mills (1 to 2 t/hr or 2 to 3 Kt/yr)	Huskers
Number of rice mills or huskers	4	21	400
Main paddy source	Cooperatives	Traders Cooperatives Outside suppliers	Individual growers Traders
How is the husked rice mainly sold?	Urban markets (in 2008, 30 000 t in Dakar)	Retailers/ Wholesalers (Louga, Touba, Tamba markets)	Rural markets and on-farm consumption
Major problems?	Color (milled) and differentiation of rice quality (broken, whole etc.)	In some cases, rice that is sorted but not milled (7/17 rice mills sell leavings)	Rice mixtures with a high % of impurities and broken grains

2. (2) PROCESSING: CURRENT MARKET SITUATION [2/3]

	Urban markets	Rural markets
Total volume (t)	40,000	160,000
% of local rice	20%	80%
Most commonly sold rice type	broken	broken
Rice price (most commonly sold type) ($/kg)	0.75	0.5
Import duty (%)	260%	400%
Price difference between local and imported rice of the same type and quality (%)	40%	40%
Consumer preference (Give reasons, if possible)	Broken rice. Reason= normally eaten	
Consumer choice	Broken rice, subject to social category	

2. (3) PROCESSING: STANDARDISATION AND CLASSIFICATION SYSTEM [3/3]

Is there an existing regulation or policy covering classification of rice sold in the markets?

Yes, there are set standards for paddy rice and milled rice: Senegal Standards Institute (ISN)

If yes, **What are the categories and how are they set?**

Category 1 Whole: 0% to 15% broken grains
Category 2 Intermediate: 15% to 55% broken grains
Category 3 Broken: 55% to 100% broken grains

Rice quality

Moisture content: should not be more than 14% (m/m).	Contamination: impurities of animal origin (dead insects) = 0.1% maximum.	Other extraneous organic matter: (other plant seeds, straw…) Maximum tolerance level: - husked rice: 1.5% - parboiled husked rice: 1.5% - milled rice: 0.5% - parboiled milled rice: 0.5%

Institutional capacity: Which institution(s) is/ are responsible for managing standardisation and classification of husked rice for market sale?: ISN

Non existent at present

What limits/constraints exist to implementation of such classification and standardization?
These standards are not widely known and there is no control structure

CHALLENGES FOR BOTH MECHANIZATION TASK FORCES

Reprise: Setting-up of two Task Forces: a Policy Task Force and a Technical Task Force.
Their challenges → concerted action for the speedy implementation of the four main expected policy tools:

- Fiscal reform,
- Establishing the institutional framework for an agricultural mechanization policy,
- Defining Testing procedures for evaluation and certification of machine quality and Standardization of locally produced machinery
- Promote producer access to equipment

NEXT STEPS OR A NEW ROUTE MAP

Until the end of 2013, five (5) main steps emphasized:

(i) Official validation/adoption of the Mechanization Policy
(ii) Development of the project document on mechanization of rice growing
(iii) Obtaining funding, and
(iv) Supply of producers with the initial machinery
(iv) Definition of the DMER's duties, CNM, CEEFM, CNC set up

After these key steps:

(i) Formulation of an action plan for the policy instruments mentioned earlier (ii) Development of the main arms of the strategy for local assembly and manufacture of machinery within a 3 to 10 years' time horizon.

7. (2) CURRENT MARKET SITUATION [2/3]

	Urban	Rural
Total volume (t)	XX,000	XX,000
% local rice	%	%
Most frequently sold rice category	% broken grains	No. categories
Rice price (most frequently sold category) ($/kg)	xxx	xxx
Import tariff (%)	%	%
Price difference between imported and local rice of the same type and quality (%)	%	%
Consumer preferences		
Consumer choice		

Variety;
Long/ Medium/ small grain;
Sticky or non sticky
scented;
Old or new, etc

Rice quality (scented or not);
Cooking characteristics (time, easiness, sticky);
Appearance (size, color);
Breakages (percentage);
Texture (sticky or not)
Packaging (Large/ medium/ small bag);
Price;
Labeling (brand names)