

Mechanization experience: Implementation of the PPP Pilot in Lower-Mangoky Irrigation Scheme Atsimo Andrefana Region, Toliara Province, Madagascar



Workshop/Training in Tsukuba, Japan



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GENERAL INFORMATION ON THE RICE SECTOR AND MECHANIZATION STATUS IN MADAGASCAR

- **General information** : Rice area : 1,4 million ha, representing 60% of total cultivated land. **Average annual rice production** : 3.5 million ton (paddy). About 2 million households practice irrigated rice. **Rice consumption**: 118 kg à 138 kg/pers/year
- **Mechanization status of rice farmers in 2000 (UPDR survey)**

Type of Machinery/equipment	%	Type of Machinery/ equipment	%
Tractor with accessories	0,2	Rotary hoe / weeders	14,4
Tiller with accessories	0,1	Sprayer	3,5
Push Cart	26,4	Angady / shovel / hoe	97,3
Cattle Plow	33,0	Sickle / Mchette	92,0
Harrow	28,8		



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Data on the Bas-Mangoky Scheme

- ❑ Production Target for PRBM: Total Production: 60,000t (paddy) in 10,000ha at the end of the project; Yield : 6 t/ha
- ❑ Project Period (2 phases): 2009 - 2021
- ❑ Water Supply = 10m³/s; Number of Users: 8,000 in 23 WUA; Main Canal in self-supporting management structure
- ❑ Implementation of policy of the Ministry of Agriculture, via PPP, 2 objectives :
 - Improved producers' access to inputs
 - Enhanced Mechanization



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PPP Pilot for agricultural mechanization in Bas-Mangoky (2012-2014) – Pilot phase

DESCRIPTION OF GOOD PRACTICE



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Memorandum of Understanding and Demarcation of Responsibilities

→ Government through the PRBM Project :

- ✓ Rehabilitation of the irrigation infrastructure and the access road within Bas-Mangoky scheme
- ✓ Organization of WUAs into a federation
- ✓ Facilitation of linkage building among three actors: Micro-Finance Institutions (MFI) - Producers - Private Agricultural Machinery Suppliers
- ✓ Accompanying producers in the negotiation on the tri-party agreement
- ✓ Supervision on the fulfillment of the PPP agreement



Memorandum of Understanding and Demarcation of Responsibilities

- **Volamahasoa Micro-Finance Institution** (Private MFI working in the West South Region):
- ✓ Awareness creation and training on credit,
 - ✓ Provision of campaign credit and on agricultural equipment and materials (interest rate : 3-5%)
 - ✓ Communication and organization of logistics with MATERAUTO
 - ✓ Group purchase of equipment from MATERAUTO : power tillers and small Milling machine



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Memorandum of Understanding and Demarcation of Responsibilities

→ Producers' Association :

- ✓ Users Organization. Tentative organization of the motorized agricultural machinery users among themselves
- ✓ Demand survey for motorized agricultural machinery
- ✓ Negotiation with Materauto and the Volamahasoa MFI on the terms of acquisition and after-sales service



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Memorandum of Understanding and Demarcation of Responsibilities

- ➔ **Private Agricultural Machinery Supplier : MATERAUTO**
- ✓ Sales of a range of products and provision of after-sales services according to producers' choice
 - ✓ Supply and delivery of power tillers in Morombe City (HQ of PRBM), and to producers
 - ✓ Training of local technicians on repair of power tillers
 - ✓ Establishment of a spare parts supply system for the group purchase by association of agricultural machinery users



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Operational Mechanism of PPP pilot (2012-2014)

Operational Mechanism of PPP arrangement during 2 years :

1. → Aggregation of spare parts demand/needs by the office of the Association of Agricultural Machinery Users
2. → Sending purchase orders to Materauto
3. → Reception of the pro-forma invoice by the office
4. → Payment to Materauto (through Western union)
5. → Materauto delivers spare parts through reliable local taxis



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POSITIVE RESULTS OF PPP PILOT (2012-2014)

- ❑ Acquisition of 19 power tillers and huskers by interested individual farmers
- ❑ Creation of a local mechanization service providers for plowing and harrowing on rice fields
- ❑ Improved rice yield from 3.5t/ ha to 5.1t/ ha (with other concurrent actions such as the dissemination of improved technologies such as quality seeds)
- ❑ Increased rice production: increased cultivated area with the additional production of 38,015 tons compared to the production in 2007



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NEGATIVE RESULTS OF PPP PILOT (2012-2014)

:Problem N°1 : Poor Quality of power tillers

- Frequent breakdown and changes of key parts → Increasing needs (in number) of spare parts for repair → Negotiation on “deferred payment” by some members for spare parts (Proceeded by the chairman of the Association of Agricultural Machinery Users)
- Some farmers don't make payment for spare parts supplied in advance → Supplier stopped the supply of spare parts → some power tillers get breakdown → Removal of parts from one machine to operate another: phenomenon of “cannibalization” of machines → Decreased number of operational power tillers and milling machines



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NEGATIVE RESULTS OF PPP PILOT (2012-2014)

:Problem N°1 : Poor Quality of power tillers

- Gradual disruption of the spare parts supply system → Non-payment of spare parts → Destruction of trust between the machinery users association and the supplier MATERAUTO → Discontinuation of the aggregation of needs for group purchase of spare parts
- Decrease in plowing and harrowing → Decrease of rice cultivation area → Reduction of rice production



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NEGATIVE RESULTS OF PPP PILOT (2012-2014) :

Problem N°2 : Decrease of water supply and Difficulty in financing due to Socio Political Crisis

- There is a **decrease of water supply** at the water intake at headwork due to the damaged facility → need financing for rehabilitation
- In the transition of the phases of PRBM, the negotiation was on-going on additional funding for (i) the rehabilitation of the headwork at Bevoay and (ii) the repair of the sediment flush on the main canal.
- Prospect of additional funding was uncertain due to the socio-political crisis that the country was facing.
 - ➔ During the transition/negotiation period: supplementary funding was **uncertain**
 - ➔ No investment by farmers – **This is the farmers' risk management** until approval of the supplementary funding for stable water supply



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Counter measures to enhance mechanization at the PRBM in 2017

Solutions for irrigation problem (low water supply)

- Main water intake in Bevoay and main canal rehabilitated
- Rehabilitation of a main canal dredging system
 - ➔ **Increase of water supply at the headwork**

Changes/ solutions in mechanization

- Acquisition of **better quality machinery**: about 100 power tillers operating in the scheme now, including 7 Kubota and Chinese power tillers: mechanized production + milling + transport of products
- Sufficient quantities of **spare parts available** due to the rapid increase of the numbers of power tillers in the scheme
- Improved capacity in terms of repairing, maintenance of Agric. machines
- ➔ **Application of lesson learned from the pilot phase**



ANALYSIS ON THE CASE

1. Factors for successful mechanization

- **Mechanized rice area: 0.5ha -10 ha → Favorable for mechanization**
- **Strong needs for motorized machinery: producers were interested in the mechanization of rice cropping**
- **Good design of the PPP mechanism, but the project facilitation is necessary at the beginning, to build strong relationship between the machinery supplier and users**
- **Provision of after-sales service with the training of local repairers**



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ANALYSIS ON THE CASE

1. Factors for successful mechanization (continued)

- Producers convinced with the advantages of mechanization, particularly in : (i) increased productivity and (ii) profitability
- Facilitation of PPP by the Project/Government gave confidence to MFI due to its high reputation.
- Responsibility in the management of agricultural machinery was on private individuals
- Efficient spare parts supply system: Aggregation of needs by producers, and low-cost delivery of spare parts by the supplier
- “Mechanization Culture” was introduced and well-anchored in the scheme: Adopted by the producers to a significant degree



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ANALYSIS ON THE CASE

2. Factors preventing mechanization

- **Poor Quality Machinery (quality of steel which break easily, quality of mechanical system, ...)** :
 - ➔ **Parts quickly deteriorated**
 - ➔ **Increased repair cost, low equipment performance**
 - ➔ **High depreciation cost**
 - ➔ **Frequent machinery failures: delayed field work ➔ Discouraging machinery owners due to frequent purchases of spare parts and frequent repairs**



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ANALYSIS ON THE CASE

2. Factors preventing mechanization (continued)

- **Lack of competition in machinery supply at the beginning of the pilot (with Materauto)**
- **Long distance between the Association of Agricultural Machinery Users and Supplier (Materauto)**
 - ➔ **Difficulty in spare parts supply, and Risks related to long distance transport. No antenna offices or representation of the supplier existed in the nearest urban town**



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LESSONS LEARNED AND IMPLICATION FOR SUCCESSFUL MECHANIZATION

- **Intermediation in linking producers to agricultural machinery suppliers is sometimes necessary**
- **Producers stopped investing in mechanization because of the risk of reduced water supply in the scheme**
- **The conditions for a profitable mechanization are necessary: well functional irrigation, decent size of plots for mechanized rice cultivation, profitability with rice**
- **It is effective to train repairers within the schemes where machinery is introduced.**



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LESSONS LEARNED AND IMPLICATION FOR SUCCESSFUL MECHANIZATION

- **Need to introduce quality machinery**
- **Pilot in the introduction of machinery continued for 2 years, and it was sufficient to achieve satisfactory adoption of rice mechanization → Minimum time for the project / adoption process**
- **Presence of representation / antenna shops of the spare parts supplier near the perimeter is necessary**
- **Mechanization resumed as soon as Bevoay's main canal was rehabilitated: producers restrict themselves to make agricultural investment in risky circumstances**



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LESSONS LEARNED AND IMPLICATION FOR SUCCESSFUL MECHANIZATION

Actual situation of PRBM project :

→ **PRBM 1 project is nationally regarded as a success (visit of AfDB president) :** (i) increase in rice cultivation area and rice production; (ii) autonomy of producers and autonomy in milling and transport services of product within the irrigation scheme

→ **Approved a second phase for an expansion of the scheme to 10,000 ha by 2021 with a new main canal at the right bank, to be developed in self-supported concrete structure**



THANKS !



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