GROUPEMENT NYETA CONSEILS/AFRIQUE VERTE

BP 19 Niono
BP E404 Bamako
Tel 35 21 27/ 21 97 60

Test for Improving the Quality of Rice Produced in the Office du Niger zone

***Funded by*: CAE/US AID**

November 2000

ACKNOWLEDGEMENTS

The Advisory Consultancy really wishes to express its sincere thanks to all those who, closely or from a distance contributed to correctly achieving the test for improving the quality of rice produced in the Office du Niger zone, particularly

- *Suppliers of paddy rice through the JEKA FEERE EIG*
- *Managers of rice processing sites*
- *Cereal traders from the towns of Niono, Ségou, and Bamako*

The Advisory Consultancy also thanks all Office du Niger executives for their contribution to improving the quality of this work.

Finally, the Advisory Consultancy commends this initiative from Centre Agro Entreprise that has enabled to prove the possibility of improving rice quality from small processing units.
On this occasion, it thanks the Management and the whole staff of CAE.

The Advisory Consultancy particularly thanks Mr. Amadou Sylla, in charge of Agri-business Technology at CAE, without whose determination and high sense of partnership, it would have been difficult to achieve the results obtained.

SUMMARY

"The operation of quality improvement of the rice produced in the Office du Niger zone" conducted for experimental purpose over the year 2000 on four sites by the Centre Agro-Entreprise (CAE), in collaboration with an Advisory Consultancy (Groupement Nyeta Conseils / Afrique Verte) has enabled to note :

⇒ the possibility of improving the quality of rice produced in the Office du Niger zone from small, less expensive processing units ;

⇒ Malian consumers marked interest for high quality rice, particularly from the Kogoni 91 1 variety ;

⇒ the possibility of capturing the Malian market, indeed sub-regional markets with these new produce.

⇒ that improved processing of Malian rice is a business opportunity for banks as well as national and foreign investors.

This operation, however, is worth supporting through refining and validating the technical and economic references obtained and implementing appropriate measures that go with it, aiming to strengthen behavioral changes that were initiated among all sub-sector actors (funding facilities and maintaining the new products on the market).

Table of contents

I- INTRODUCTION

With the devaluation of the CFA franc that occurred in 1994, the Malian state was expecting substantial currency inflows thanks to the export of part of the rice produced in the Office du Niger zone. However it seems difficult to achieve this objective in the present context marked by a production that is yet to meet national consumer needs and the presentation on the market, of rice of a lower processing quality compared with the imported one.

Actually, after rice marketing was liberalized in Mali and Office du Niger restructured, which resulted in making autonomous, then closing big rice fields, the processing of the 200 – 300,000 tons of paddy produced every year is now ensured by the private sector through using small, much less performing husking machines that produce rice of a quality that can be deemed poor with respect to international standards. This is a situation that in fact, restricts the possibilities for appropriately enhancing the value of a paddy produced at largely competitive prices (an average of FCFA 75/kg).

It was due to the perception of this niche as a possible axis of intervention in the framework of support to enhancing the value of agricultural subsectors in Mali that the Centre Agro-Entreprise (funded by USAID) initiated the test for improving the quality of rice produced in the Office du Niger zone. Its implementation was entrusted to an Advisory Consultancy made up of a group of NGOs (Nyeta Conseils and Afrique Verte).

The test focused on processing 160 tons of paddy, collected from producers at Office du Niger on four sites fitted with new technical equipment by CAE.

The use of this technological level enabled to obtain about a hundred tons of processed rice comprising four (4) qualities.

Market response was tested while selling was carried out by 17 grain traders selected in the areas of Niono, Ségou and Bamako.

The present document that records the results of this first great experience deals with the description of operation, technical economic results achieved, market response in the face of new products, actors and perspectives.

II- TEST ORGANIZATION

After a centering meeting that gathered CAE and the Advisory Consultancy, test implementation was carried out according to the following stages :

2.1 Paddy Collection

this operation took place in several stages :

2.1.1. Arranging a bidding procedure :

In close collaboration with the JEKA-FEERE farmer EIG, the Advisory Consultancy launched a local invitation for bids for the supply of 160 tons of paddy, i.e. 120 tons for the Kogoni 91 1 variety (Kogoni 91 1) and 40 tons for the BG 90 2 variety (Ref. technical sheet in Annex 1).

The selection of this professional organization aimed at two basic objectives :

- Ensure correct operation management by taking advantage of this EIG's expertise gathering 19 villages producer organizations, and having capitalized a great experience in grain marketing following many years' collaboration with Afrique verte / Mali. It also gets a close supervision from the "Centre de Prestation de services de Niono" Project.

- Support the dynamics of professionalization of farmer organizations and better raise awareness of rice producers of paddy quality notion.

2.1.2. Identification of Bids :

Following the bidding procedure, 13 suppliers including, 11 farmer organizations and two individual producers submitted their bids. After the withdrawal of 5 suppliers who considered either the proposed price (FCFA 15O/kg) less interesting or the selecting criteria, especially systematic winnowing, too constraining, certification was carried out on 13 batches belonging to 8 suppliers.

2.1.3. Certification of bids :

Each batch submitted was the subject of strict checking of the criteria recommended by the Advisory Consultancy, with the assistance of a representative from the EIG. In addition to visual appreciation, random collections of different samples to check variety purity and paddy cleanliness, non-alteration of grain quality, humidity rates were measured with a portable humidity gauge.

At the end of this operation, only 5 batches (out of 13 batches submitted in total) belonging to 4 suppliers were certified in conformity with the criteria. Thus, only 50% of suppliers presented a paddy in conformity with the quality criteria required for the test.

Table 1 shows the list of suppliers whose product was certified in conformity with the criteria.

Table 1 : List of suppliers selected

Suppliers	Villages	Varieties
Niobougou (VA)	Niobougou (B1)	Kogoni 91 1 + BG 90 2)
Seriwala (Cooperative)	Seriwala (Km 30)	Kogoni 91 1
K20 (VA)	Yangassadjou Coura (K 20)	BG 90 2)
Mamadou KEITA	Siengo	BG 90 2)

Each supplier whose batch was retained received an attestation of certification provided by the specialist responsible for collection.

For the two varieties, the humidity rates recorded varied from 7.7 to 10%, therefore largely below the required optimum (14%). These very poor humidity rates can be accounted for by both climatic factors (high temperatures), and post harvest cultural techniques practised (late harvest, long exposure to sun, etc.).

Table 2 recapitulates the distribution of the 160 tons according to suppliers.

Table 2 : Distribution of the 160 tons of paddy per supplier and per variety

Suppliers	Kogoni 91 1 (tons)	BG 90 2 (tons)	Total paddy (tons)
Niobougou (VA)	80	10	90
Seriwala (Cooperative)	40		40
K20 (VA)		20	20
Mamadou KEITA		10	10
Total	**120**	**40**	**160**

2.1.4. Stocks transport and delivery :

Under the joint supervision of the Advisory Consultancy, JEKAFEERE and site managers only one carrier on contract with JAKAFERE carried the stocks to the processing sites. Each manager signed a delivery slip and a receipt certificate for 30 tons of Kogoni 91 1 and 10 tons of BG 90 2, i.e. 40 tons of paddy.

After on site physical checking of stocks, provision of written evidence, the total amount due for this operation, i.e. the sum of FCFA 25,600,000 was paid by CAE to the JEKAFEERE EIG. Paddy stockpiling on the processing sites took place from March 15 to 30, 2000.

2.2 Paddy Processing

2.2.1. Setting up the sites :

Evaluation of sites and operators

A first field visit enabled the technologist to appreciate the ability of different sites to correctly carry out the paddy processing operations in accordance with CAE's wishes.

This work focused on the conformity of site location, equipment level and the expertise of the operator proposed on the following sites. If need be, improvement advice was suggested.

Site 1 : Nango (N3)

Manager : Mama DIARRA

Suggested place for implantation : an unused plot of land measuring 5.5m/5m.

Alterations : These consist in carrying out excavations and the construction of a reinforced concrete platform measuring 5.5m/5m, 20cm wide for installing machines.

Operator : a nephew of the manager's with a 10-year experience in husking.

Site 2 : Coloni (Km 26)

Manager : Mrs. COULIBALY née Assétou DIARRA known as Mah.

Suggested place for implantation : a building measuring 7m/5m used as a husking workshop.

Alterations : These consist in carrying out the construction of a reinforced concrete platform measuring 7m/5m, 20 cm wide for installing machines.

Operator : the manager's son who has a 6-year experience.

Site 3 : Seriwala (Km 30)

Manager : VA Km 30

Suggested place for implantation : An unused plot of land measuring 7m/5m.

Alterations : These consist in carrying out excavations and the construction of a reinforced concrete platform measuring 7m/5m, 20 cm wide for implanting machines.

Operator : Mr. Bissiry COULIBALY who was proposed by the VA. He has 8-year experience in rice husking.

Site 4 : Siengo

Manager : Mamadou KEITA

Suggested place for implantation : an unused plot of land measuring 7m/5m.

Alterations : These consist in carrying out excavations and the construction of a reinforced concrete platform 20 cm wide.

Operator : Mr. Gorka KEITA, the manager's brother. He has more than 10 years' experience in rice husking, and he repairs husking machines and thermal engines.

Managers of sites (1, 3, and 4) were asked to build a shelter for machines. Individual characterizing sheets were worked out for each site by the advisory consultancy. (Ref. Annex2).

Installing Equipment

After carrying out alterations (platforms), according to the technical specifications retained, different facilities were installed. The necessary training was also provided. The equipment inventory on the processing sites in the test framework is as follows.

1) <u>N3 Site (Nango – Sahel)</u>

Name and Forename of beneficiary : **Mama DIARRA**
Profession : Rice producer/processor.

Number	Designation	Capacity	Type	Trade Mark
1 (one) 1 (one)	Husking bleaching machine + Three-phase 380/220V electric driving engine	800 kg/H 11 KVA/ 15 HP	SB-10D Y 160 M4	China China
1 (one) 1 (one	Sorter + Thermal driving engine (gas)	400 kg 2.5 KVA	CAFON EY 15	Mali Robin
1 (one)	Generator * Three-phase 380/220V alternator * Diesel engine	15 KVA 15 KVA 16.2 KVA	C 13 ZH1115	Italy China

2) KM 26 Site (COLONI – NIONO)

Name and Forename of beneficiary : **Mrs. Assetou DIARRA known as Mah**
Profession : Rice processor.

Number	Designation	Capacity	Type	Trade Mark
1 (one) 1 (one)	Husking Bleaching machine + Three-phase 380/220V electric driving engine	800 kg/H 11 KVA/ 15 HP	SB-10D Y 160 M4	China China
1 (one) 1 (one	Sorter + Thermal driving engine (gas)	400 kg 2.5 KVA	CAFON EY 15	Mali Robin
1 (one)	Generator * Three-phase 380/220V alternator * Diesel engine	16 KVA 16 KVA 22 CV	GS4 2M41	MEIJCO HATZ

3) KM 30 Site (Seriwala)

Name and Forename of beneficiary : **KM 30 VA**
Profession : : Rice producer.

Number	Designation	Capacity	Type	Trade Mark
1 (one) 1 (one)	Husking Bleaching machine + Three-phase 380/220V electric driving engine	800 kg/H 15 HP/11 KVA	SB-10D Y 160 M4	China China
1 (one) 1 (one	Sorter + Thermal driving Engine (gas)	400 kg 2.5 KVA	CAFON EY 15	Mali Robin
1 (one)	Generator * Three-phase 380/220V alternator * Diesel engine	16 KVA 16 KVA 22 CV	GS/4 2M41	MEIJCO HATZ

4) <u>Siengo Site</u>

Names and Forenames of beneficiary : **Mamadou KEITA**
Profession : Rice producer/processor.

Number	Designation	Capacity	Type	Trade Mark
1 (one) 1 (one)	Husking bleaching machine + Three-phase 380/220V electric driving engine	450 kg/H 7.5 km/10 HP	6LN63 Y 132 M4	China China
1 (one) 1 (one	Sorter + Thermal driving engine (gas)	400 kg 2.5 KVA	CAFON EY 15	Mali Robin
1 (one)	Generator * Three-phase 380/220V alternator * Diesel engine	15 KVA 16.2 KVA	SIC - 15 ZH1115	China China

Photo 2 : A traditional husking machine in operation at KM 30

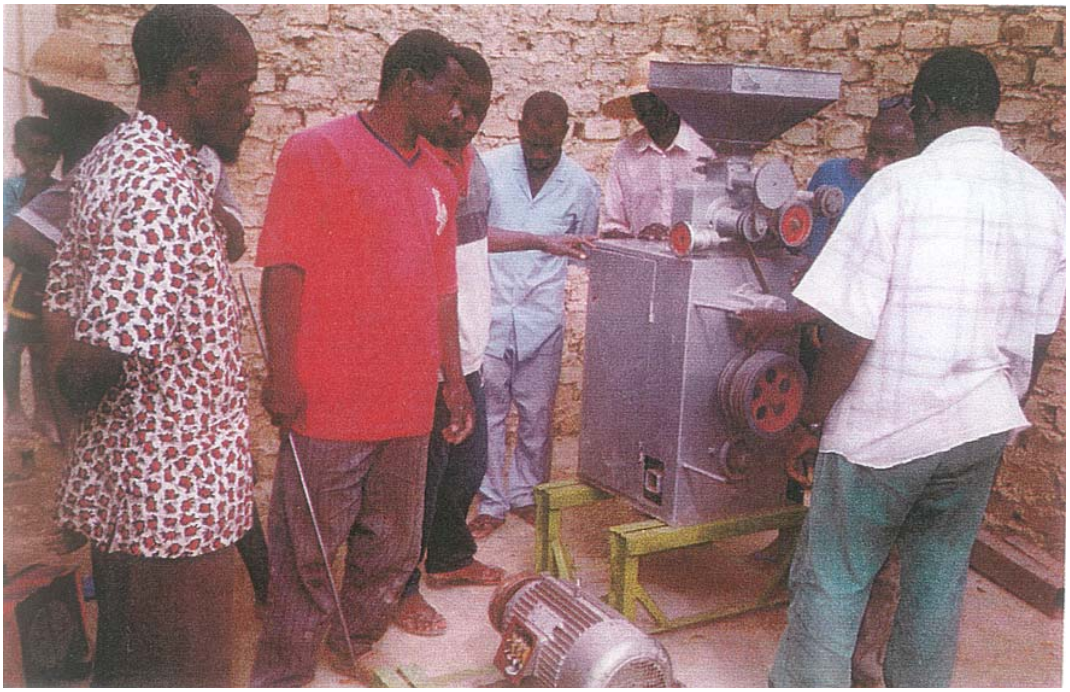


Photo 3 : Installing scene of a 6L N63 husking machine at Siengo

Photo 4 : Installing scene of CAE equipment : Expectation for a population of rice Growers

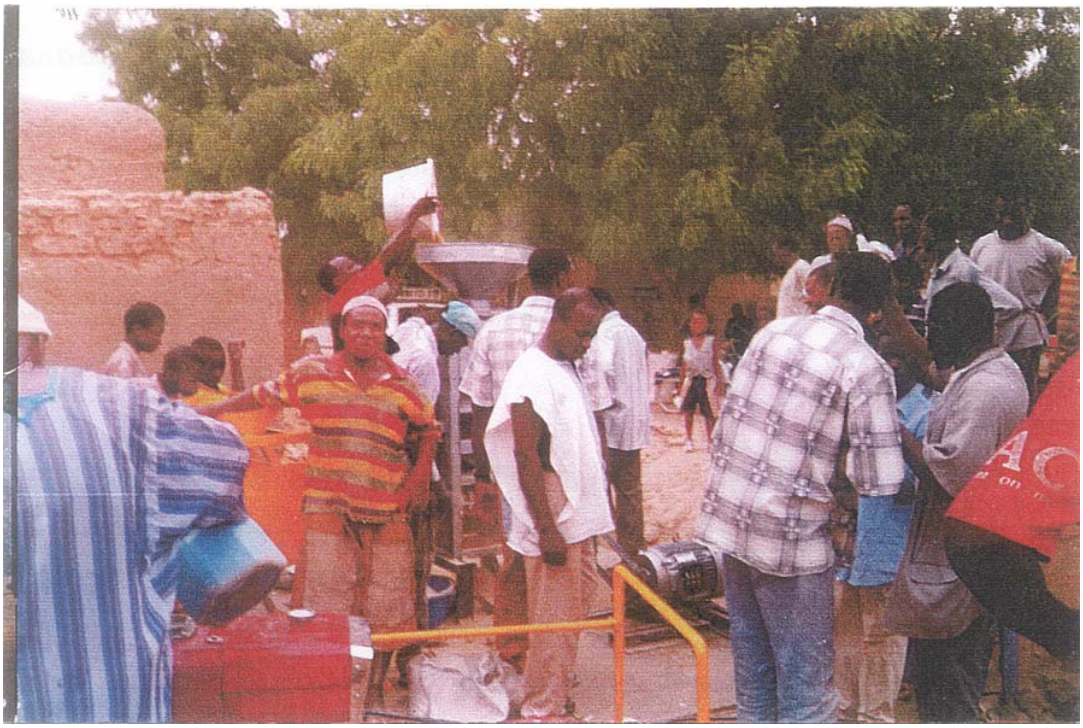


Photo 5 : 16 KVA generator

2.2.2. Training of Operators :

It is a basic training program centred on equipment knowledge and identification of good quality paddy.

Knowledge of production equipment

During this training program, operators are taught the different parts of production tools, how to start-them, their functioning, unit operations of processing and sorting processes, regulating components, wearing parts and components to be greased and lubricated.

The husking – bleaching machine
Description
Upper part : the hopper, the rubber husking rollers
The regulating components are :

- the hopper opening and closing hatch
- the paddy supplying gate
- the screw adjusting the gap between the two rubber rollers.

Lower part : the chaff evacuating fan, the supplying screw (ERS), the bleaching cylinder, the pair of sieves, the fan holding back the bran, the evacuating load fitted with counter-weight.

The regulating components are :

- the fan air inhaling valves separating the chaff and cargo rice.
- the counter – weighting system.

The husking – bleaching machine is driven by an electric motor through a block-belt system.

Processing Process (husking and bleaching)

- Close completely the two rubber rollers. Next open them with two complete turns of the adjustment screw.

- Close the hopper with the hatch.

- Fill the hopper with paddy.

- Start up the engine.

- Open gradually the hatch.

- Open gradually the supplying gate.

- Close the gap between the two rubber rollers up to getting a percentage of about 90% of husked paddy.

- Note the quality of bleached rice at the evacuating load. Act on the counter-balancing system according to the rice quality to be obtained.

N.B. : Paddy or rice grains may be drawn in with the chaff, in this case, you should act on the air valves to reduce the inhaling force of the fan.

The sorter (CAFON)

Description : It comprises :

A mobile sub-frame with three rails to receive three sieves, a fixed sub-frame supporting the apparatus, a cleaning fan, and a grain hopper.

The sorter is driven by a thermal engine thanks to a block-belt system.

Sorting process

- Close the hopper
- Fill the hopper with processed rice grain
- Place the sieve according to the rice quality to be obtained
- Start up the engine
- Place the collecting-tubs at the two exists of the apparatus
- Open the hopper gate

In our case, we have three sieves :
Sieve N°1 (3 mm diameter-hole) for obtaining whole grain rice.
Sieve N°2 (2 mm diameter hole) for obtaining medium-sized rice.
Sieve N°3 (1.5mm diameter hole) for obtaining broken rice, and fine broken rice.

The different rice qualities (whole grain, medium-sized, broken and fine broken rice) are separated in three passages of processed rice.

With the sieve N°1, we get whole grain rice, and the mixture of medium-sized, broken and fine broken rice.

With the sieve N°2, we get the medium-sized rice and the broken and fine broken mixture.

With the sieve N°3, we get broken and fine broken rice.

Paddy Identification

- Varieties : A the Office du Niger, two varieties of paddy are essentially produced, the BG 90 2 and the Kogoni 91 1 ; all operators can identify them from their specific characteristics. The BG 90 2 grains are whitish, short and round ; those of the Kogoni 91 1 are golden, long and thin.

- Homogeneity : It is easy to know if there is an homogeneous mixture of the two varieties.

- Cleanliness : Paddy should be free from any foreign bodies (lump of earth, pebbles etc.) and wastes (straw, immature grains).

- Humidity : Paddy should be neither too dry nor too humid. This paddy quality is not easy to identify without a specific apparatus called humidity gauge. Without this apparatus, a processing trial is carried out, the products obtained enable to know if the paddy is too dry or too humid.

All along paddy processing, a continuous training module of operators was provided. It focuses on :

- the use of production tools
- assess the quality of produce obtained and intervene for corrective adjustments
- change the wearing parts if need be
- identify operating faults, stop the machine, then call on a technician
- carry out maintenance works.

The operator's guide book, worked out for good use is shown in annex 3.

2.2.3. Production follow-up :

This follow-up comprised the following phases :

2.2.3.1 - Production trial

Equipment performance was tested on each site while processing 2.5 tons of paddy. Observations concerned production capacity, power consumption, output (processed rice, bran), the rate of different rice qualities (whole grain, broken) and paddy quality control.

The results obtained have enabled to notice that :

- The average processing capacity of the husking-bleaching machine SB10D is 500 kg/h of paddy and an out put of 66% with consumption of 3L/h of diesel oil by the generator.

- The average sorting capacity of the sorter CAFON is 200 kg/h of processed rice with a gas consumption of 1.25.L/T of processed rice.

- The processing output is higher for the BG 90 2 (70%) against 65% for the Kogoni 91 1.

The BG 90 2 has a rate of broken rice higher than that of Kogoni 91 1 : 70% against 30%.

It should be noted that the state of paddy cleanliness has an effect on the quality of produce obtained : Dirt makes the machine adjustment difficult, spoil rice quality and wears away the parts faster. But it was not possible to appreciate the effect of humidity rate on the paddy. The paddy used was too dry due to its average humidity rate evaluated at 8.5 %.

2.2.3.2 - Working out management tools

The site personnel and the follow-up agents of the Advisory Consultancy were trained in using follow-up sheets of equipment and production, worked out by the technologist.

They are used for recording all information necessary for evaluating production costs :

- the different operations carried out
- the quality and quantity of processed rice and sorted processed rice
- the produce obtained (quality, quantity)
- the time spent in using the machines, breakdowns, the solutions provided, the parts changed and intervention costs
- labor force (number and remuneration)
- maintenance (components changed, prices, intervention costs)
- quantities and prices of fuels consumed
- to complete the production cost, provisions for depreciation are added (conversion, construction, production tools).

Models of different follow-up sheets (equipment and production) are shown in annex 4.

Photo 6.: Training scene of an operator

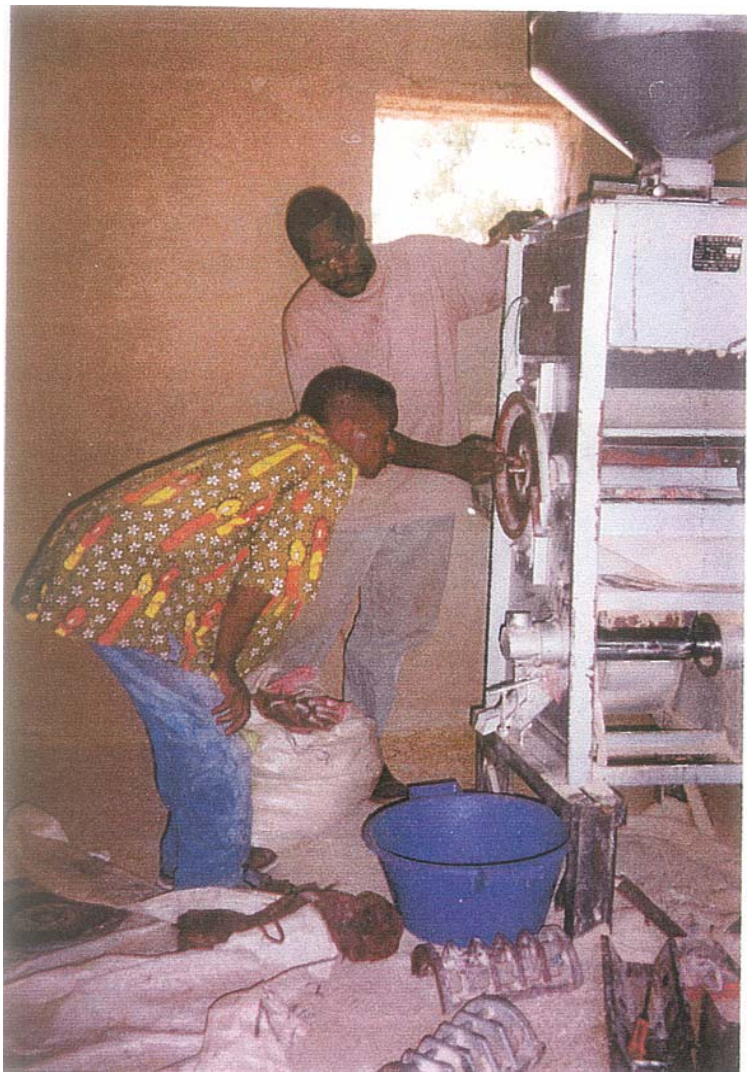
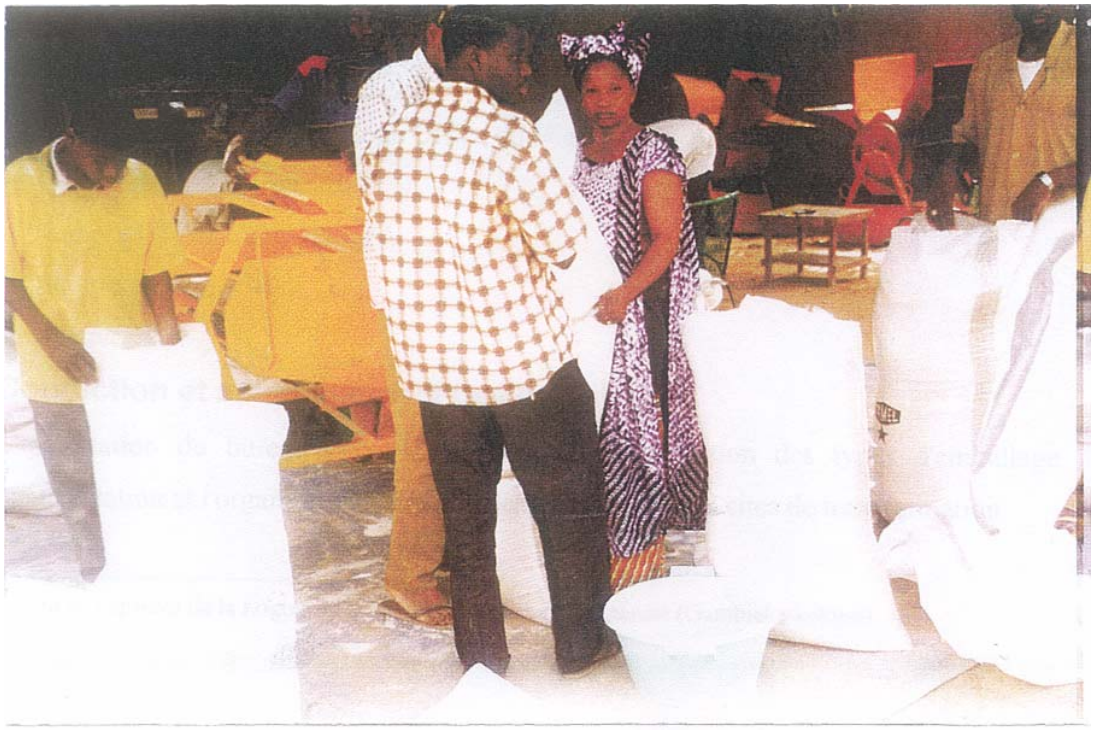


Photo 7 : Sorting CAFON machines : A need for improvement

Photo 8 : Mrs. COULIBALY née Assetou DIARRA known as Mah, a site manager : An exemplary dynamism



2.3 Processed Rice Marketing

It was conducted according to the following stages.

2.3.1 Package preparation :

The different points of this activity were worked out as follows :

Logo definition

In accordance with the terms of the subcontract signed with CAE, the Advisory Consultancy identified a drawer. After many working sessions with the Advisory Consultancy and the sales management of the manufacturing firm of empty bags (Embalmali), he proposed different design prototypes.

While designing them, he took into account the technical constraints related to the fact that the firm cannot copy logos which have more than two different colors and the concern for a better legibility.

In joint consultation, the Advisory Consultancy and CAE retained a logo comprising the following branding elements :

Variable branding elements (3)

- Rice variety (Gambiaka [1], or BG – 90 – 2),
- Quality (whole grain rice or broken rice),
- Weight of bag (25 or 50 kg).

Fixed branding elements (5)

- Area of production : Office du Niger zone
- Year of production : 2000.
- Label : ETOILE DU DELTA (DELTA STAR).
- Country of origin : Mali
- New

Manufacture and Dispatch of Packages

The involvement of the Advisory Consultancy consisted in identifying package types, quantifying them and dispatching them to the processing sites.
Identification was done according to the different rice qualities expected after processing, for each of the two varieties and the desired packaging method.

For quantification, the key elements were : the average potential outputs at paddy processing (70 %), and the firm's minimum production capacity (a bale of 500 bags).

This work enabled CAE to send to the manufacturer Embalmali, an order form for 4,000 bags. In addition to assistance in putting in contact the manufacturer and the carrier retained by

[1] Baptism name of the Kogoni 91 1, in remembrance of one of his relatives Gambiaka kokum

CAE according to its market procedures, the Advisory Consultancy put at its disposal a delivery plan and its own staff.

Thus, 4,000 labelled bags, i.e. 8 bales of 500 empty bags each were entirely delivered on the four processing sites, on 25-5-2000, as shown in table 3.

Table 3 : Distribution of different package types of processed rice

Rice quality	Rice Variety	Package type	Quantity
Whole grain rice	Kogoni 91 1	50 kg bags	1,000
	Kogoni 91 1	25 kg bags	500
	BG-90-2	50 kg bags	500
	BG-90-2	25 kg bags	500
Broken rice	Kogoni 91 1	50 kg bags	1,000
	BG-90-2	50 kg bags	4,500
Total			**4,000**

The delivery slips were signed by the AC ; site managers and the carrier.

Packages production cost FCFA 1,350,000 (including FCFA 1,030,000 for manufacturing and FCFA 320,000 for transport).

2.3.2 Selection of marketing sites :

In accordance with the Advisory Consultancy's technical offer, the district of Bamako (consumption market), and the market of Niono, in the Office du Niger zone (supply market) were selected in the first instance for the marketing test of processed rice. Following a centering meeting on marketing the processed rice, and considering the importance of the central market at Ségou in relation to quality test, the AC suggested CAE to take this market into account, which was accepted.

Marketing sites were identified in each of the three areas.

For the district of Bamako, selections took into account geographical representativeness, preponderance of rice coming from the Office du Niger zone, and the throng of rice consumers. The markets selected were the place de Niono (Niarela), Bagadadji and Médine (Bamako Centre), and outlying areas namely Magnambougou and Badalabougou (right bank) and Djélibougou (left bank).

In the Office du Niger zone, the market of Niono was retained due to its importance and the realness of processing sites.

At Ségou, the Central Market was retained due to the presence of traders recognised for their strong sensitivity to quality notion in the domain of grain marketing.

2.3.3. Selection of traders :

On the basis of information obtained from the managers of processing sites, previous knowledge of the Advisory Consultancy's staff team (especially its marketing component) and results from additional investigations carried out on different markets, a sample of 17 traders, including 11 at Bamako, 1 at Ségou, and 5 at Niono, who met the various selecting criteria, were selected for the test, namely :

- Voluntary participation
- Sensitivity to quality notion
- Regularity on market
- Financial situation
- Appropriate infrastructures available for storage.

It should be noted that traders from Niono are mostly "collectors", thus their turnover takes into account all transactions, including those in favour of their partners from other areas.

Table 4 shows the numbers retained on different markets.

Table 4 : Splitting of traders

Markets	Numbers
Place de Niono (Bamako)	6
Bagadadji (Bamako)	1
Médine (Bamako)	1
Magambougou (Bamako)	1
Badalabougou (Bamako)	1
Djélibougou (Bamako)	1
Marché Central-Ségou (Ségou)	1
Niono (Niono)	5
Total	**17**

The high number at the "place de Niono" market, Bamako, is explained by the fact that it constitutes a kind of buffer zone from where is carried out most redistribution of rice coming from the Office du Niger zone towards the district peripheral markets and some towns in the country (Koulikoro, Dioïla, Nara, Diema, etc.).

As for that of Niono, it is the biggest supply center in the ON zone.

Only one trader was retained at Ségou, because of the particular interest that the latter takes in the move for the present quality test.

After selecting the traders, a defining meeting was held with 8 out of the 10 in Bamako on Monday, June 5, 2000 in the presence of two representatives from CAE.

The different outlines of the test were largely explained by the marketing specialist of the Advisory Consultancy, with the support of the CAE team.

At Niono and Ségou, the operation was conducted during individual meetings between the Advisory Consultancy and the traders selected.

Despite their big craze for this test, traders asked some questions focusing essentially on making the supply of the new product sustainable, modes of setting the selling prices, management of receipts, and making the label secure.

Additional surveys carried out among these traders enabled to better specify elements of characterisation. Table 5 shows the list and the main characteristic features of the sample who were retained for this test.

Table 5 : Characterisation of 17 traders retained for the marketing test

Name and Forename	Site	Contacts	Category	Age	Exp. (years)	Capacity (tons)	Turnover
1.Drapante SAMAKE	Boulkassoubougou Bamako	24 15 90	Retailer	30	2	130	26, 000, 000
2. Moussa KOUMA	Médine, Bamako	21 50 82 77 33 79	Semi-wholesaler Retailer	38	10	364	72, 000, 000
3. Mahamoud Mountaga-ANNE	Bagadadji, Bamako	21 22 16	Semi-wholesaler	31	7	480	96, 000, 000
4. Amadou TRAORE	Badalabougou, Bamako	22 19 82	Semi-wholesaler Retailer	33	18	156	31, 200, 000
5. Salif COULIBALY	Maganmbougou, Bamako	20 05 78	Retailer	36	8	144	28, 800, 000
6. Koni DIARRA	Place Niono, Bamako	21 51 56	Semi-wholesaler	40	18	520	104, 000, 000
7. Siné SANGARE	Place Niono Bamako	21 51 56	Wholesaler	31	13	2,080	416, 000, 000
8. Mrs.COULIBALY Ramata BAGAYOKO	Place Niono Bamako	21 67 04	Semi-wholesaler	38	10	416	83, 200, 000
9. Bakary SIDIBE	Place Niono Bamako	77 33 79	Wholesaler	30	19	1,482	296, 400, 000
10. Boubacar DIARRA	Place Niono Bamako	21 06 99	Wholesaler	40	18	1,100	220, 000, 000
11. Mrs.TRAORE Kalifa SINENTA	Place Niono Bamako	21 67 04	Semi-wholesaler	32	9	600	120, 000, 000
12. Cheick Oumar COULIBALY	Niono autogare Niono	35 20 26	Semi-wholesaler	45	10	1,075	215, 000, 000
13. Mamourou DIARRA	Niono Coloni, Niono	---------	Semi-wholesaler	40	10	2,717	543,250, 000
14. Boubacar KEITA	Niono Place Bamako, Niono	35 20 66	Semi-wholesaler	62	20	1,792	358, 000, 000
15. Birama CAMARA	Place Koutiala Niono	---------	Semi-wholesaler	43	20	1,728	345, 000, 000
16. Bakary SOGORE	Niono Place SAN, Niono	35 20 18	Semi-wholesaler	42	14	360	72, 000,000
17. Amadou Sékou DRAME	Marché Central, Ségou	320 386	Wholesaler	48	10	900	180, 000, 000

Analysis of this table enables to note :

⇒ The presence of two ladies (operating at Bamako) in the sample. It should be noted that despite their great number, women traders in Bamako who stock up on the markets of Niono and Siengo take little interest in rice trade. They tend to specialize in marketing market garden produce (tomato, shallots, etc.).

⇒ A concentration of ages between 30 and 62 years of age, with an average of 38 years of age. This "youthfulness" might account for, partly, their will to test new innovations on the market. It should be noted that only one trader in the sample is 62 years old, and in his case, most of his works is carried out by his children. The other 16 traders in the sample are an age ranging from 30 to 48 years.

⇒ A great variability of professional experience : from 2 to 20 years, with an average = 13 years.

⇒ The presence of four categories of traders.

- Wholesalers : 4 (including 3 at Bamako and 1 at Ségou)
- Retailers-semi-wholesalers : 9 (including 4 at Bamako, 5 at Niono)
- Semi-retailers wholesalers : 2 (both at Bamako)
- Retailers : 2 (both at Bamako)

This categorization essentially related to the volume of yearly transactions (varying from 130 to 2,717 tons), seems to be determining in the selection of the intervention market.

Thus, we find :

- in the district of Bamako, all wholesalers on the redistribution market at the "place de Niono" and retailers on peripheral markets.

- the 5 traders from Niono, all semi-wholesalers on the market of Niono in various places.

- at Ségou, a wholesaler at the central market.

⇒ Easy contact : all traders in the sample (Bamako, Ségou and Niono) except for 2 (Niono) have a telephone or can benefit from the telephone handset of an immediate neighbour.

⇒ Predominance of individual intervention : in only one case the firm is a family one.

Additional analyses have enabled to note :

a) A satisfactory (primary) equipment level

They all have working means essential for practising grain marketing (Storehouses, weighing machines, pairs of scales) ;

b) Acknowledged sensitiveness to quality

They all put forward quality notions. This seem to be a consumer requirement, who in some cases reject the product if it does not meet the desired quality standards. Besides, some traders proceed to reprocess (sorting with a sieve) part of the DP rice coming from the Office du Niger zone.

c) A beginning of Professionalization

60% of traders are affiliated to a financial institution (Bank or Savings and Credit Bank), and 20% have delivery equipment (cart or vehicle).

d) Organization of supply

Retailers are supplied either by wholesalers at the place de Niono (Niarela) or stall holders from Niono delivering at store-door, Bamako.

Semi-wholesalers and wholesalers directly stock up from Niono where they have faithful suppliers (Producers, Farmer Organizations, Commercial Intermediaries, Private Processors).

e) Development of customers loyalty

- For retailers and retail semi-wholesalers, they are made up of direct consumers (households, firm trade unions and special services).

- For semi-wholesalers and wholesalers, they are only stockists who can buy more important quantities intended for supplying peripheral markets and some towns in Mali (Koulikoro, Dioïla, Nara, Banamba, Niono, Diema etc.).

In the specific case of traders from Niono, they are generally "gatherers" supplying either loyally or punctually, several traders in some towns in Mali. They constitute a kind of relays between producers (individuals or organizations) and these traders. Moreover, material elements (equipment), their selection has been mainly dictated by the sensitiveness to quality notion and diversity (geographic extension) of their partners.

In order to better make rice marketing secure, according to the technical offer, the Advisory Consultancy, following CAE's agreement, has signed with each trader a collaboration protocol that they had all approved.

Both ladies in the Bamako sample, after choosing to carry put a joint sale, signed only one protocol.

Eleven (11) traders including 6 from Bamako, and 5 from Niono participated in the test launching day, organized on June 29, at Niono.

This was an occasion for them to better understand the different outlines of the test and find answers to some of their questions.

2.3.4. Stocks delivery :

Processing the 160 tons of paddy enabled to get 102.650 tons of machined rice (all qualities together).

This quantity was distributed as follows :

- 91.675 tons (89.30%) for the 17 sample traders.
- 10.700 tons (10.42%) for the personnel of technical services.
- 275 kg as a stock used as samples.

2.3.5. Proposal of selling prices of processed rice :

The proposals of selling prices for different qualities of "Etoile du Delta" rice were essentially reasoned according to :

1) the current price (at the time of delivery) for the DP rice on the Niono market,
2) the practice of a variable quality premium of FCFA 10.25/kg on the DP rice by certain traders strongly interested in good quality rice,
3) the selling area.

Thus, the Advisory Consultancy and CAE, of a common accord proposed the selling prices indicated in table 6, with possible revision, if need be.

Table 6 : Proposal of selling price (FCFA/kg) of processed rice (per quality and per locality.

Localities	E1	E2	BM	BF
Niono	250	240	230	
Ségou	275	250	240	
Bamako	300	275	265	150

On the basis of these selling prices, a first delivery of about 70% of the processed stock was made to the traders in Bamako and Ségou on 13 and 14-8-2000.

A favorable reaction from the market was recorded, globally for the Kogoni 91 1 variety, particularly for the E1, E2 and BF qualities.

However, for the medium-sized broken Kogoni 91 1 and all BG 90 2 qualities, selling difficulties related to prices considered too high, were recorded.

Additional surveys carried out by the Advisory Consultancy during the days following the second delivery confirmed the need for an adjustment.

Thus a joint visit by USAID (A.CAMARA), CAE (G. LIVINSTON and A. SYLLA) and AC (M. HAIDARA) took place on the market at the "place de Niono" on August 21,2000.

It enabled to note a clear demarcation between the Kogoni 91 1 and BG 90 2 varieties, and the presence, on the market of imported broken rice, of the same quality as the one produced in the context of the test, and sold at a lower price through the channel of semi-wholesalers.

The price indications provided by traders were examined by the mission, and the AC, with CAE's approval reviewed prices as indicated in table 7.

Table 7 : Revised selling price of processed rice per quality and per locality

Localities	E1		E2	BM		BF
	Kogoni 91 1	BG-90-2		Kogoni 91 1	BG-90-2	
Niono	250	230	240	225	220	
Ségou	275	230	250	225	220	
Bamako	300	240	275	230	225	150

2.3.6. Follow-up of traders and collection of receipts :

Marketing follow-up sheets (ref. annex 5) were worked out by the Advisory Consultancy in order to monitor the evolution of rice selling prices by traders, and identify the channels of distribution. The managers of all marketing sites were trained for a better use of these sheets. Two follow-up agents were also based on the sites in Bamako and Niono, to better collect business information.

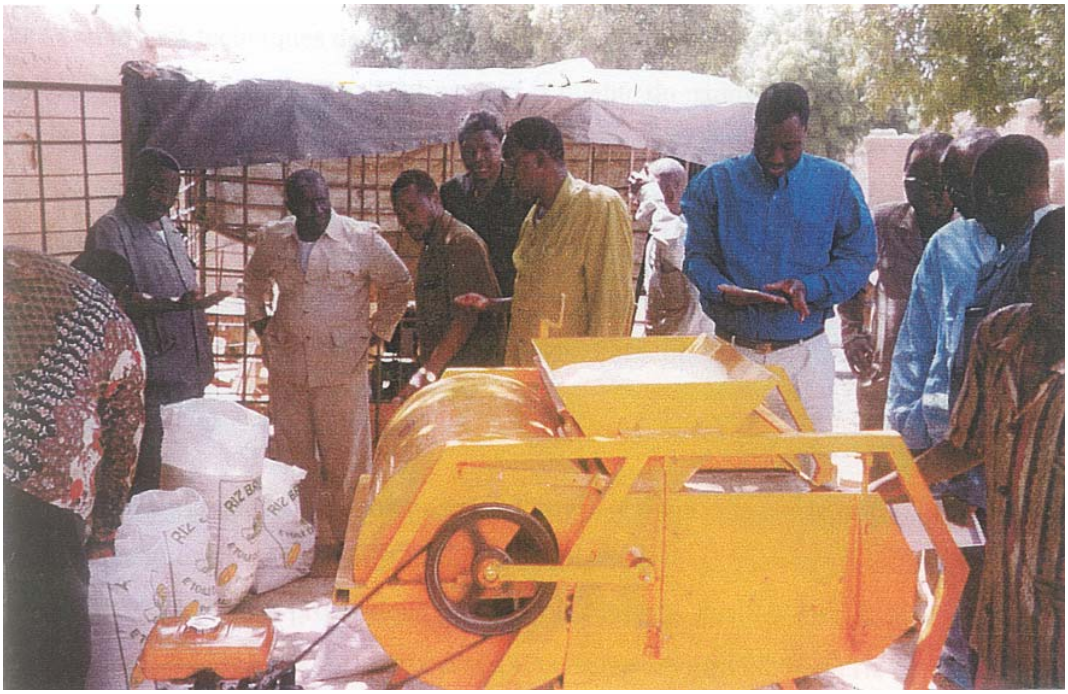
The Advisory Consultancy, besides, worked out a questionnaire intended to collect different opinions of a score of consumers, on the quality and selling prices of processed rice. The plan for collecting the receipts coming from rice sales (two passages per week) was set up by the Advisory Consultancy. Practical arrangements made by CAE enabled the AC to recover the whole amount due (Ref. slip and receipts of payment in annex 6).

2.3.7. Opinion polls among consumers :

Opinion polls were conducted among site managers, traders, and consumers.

Photo 9 : Launching day

On executives strongly interested in the new technology



III- RESULTS

3.1. Processing Part

3.1.1. Processing results :

At the close of this operation, the processing of 159.734 tons of paddy enabled to obtain 105.367 tons of rice, i.e. an average output of 66%.

All varieties merged and on all sites, outputs fluctuated between 64% and 73%

The best outputs were obtained with the BG 90 2 variety. This is in keeping with the technical characteristics of this variety. Besides the latter criterion, the variability of outputs from a site to another is explained by paddy quality and the technicality of operators. It should be noted that the gradual mastery of equipment by operators enabled a notorious increase in processing and sorting outputs in the last processing stages.

At the end of sorting, 104 tons of rice (all qualities merged) were obtained.

The use of the CAFON sorter enabled to get 3 rice qualities for the BG 90 2 variety and 4 qualities for the Kogoni 91 1 variety.

The presence of the E2 quality (not originally anticipated) is explained by the need for conformity with the sorting technical equipment used (CAFON sorter).

Table 8 indicates the proportion (in %) of different rice qualities in the rice stock.

Reading it permits to note that the whole grain rice represents 60% of the Kogoni 91 1 produced.

Tableau 8 : Share of different rice qualities (in % of total processed stock)

Varieties	E1	E2	BM	BF
BG 90 2	30.7		68.2	0.9
Kogoni 91 1	32.7	28.1	33.3	4.3
Average	**32.2**	**28.1**	**42.5**	**3.4**

E1 = whole grain first quality ; E2 = whole grain second quality ;
BM = medium-sized broken rice ; BF = fine broken rice.

Photo 10 : "Riz Etoile du Delta" (Delta Star Rice) : towards a better enhanced value of Malian rice.

Table 9 recapitulates the main technical results obtained.

Table 9 : Processing technical results

Sites	Rice varieties	Processed Paddy Kg	Rice kg	OPT in %	E1 kg	OPT E1%	E2 Kg	OPT E2%	BM Kg	OPT BM %	BF Kg	OPT BF %	Total processed
	BG 90 2	9, 963	6, 619	66	1, 812	27	0	0	4, 740	72	0	0	6, 552
Mama DIARRA	Kogoni 91 1	4,4 690	28, 653	64	9,9,000	37	7, 386	26	9, 400	33	1,500	5	28, 186
	Total 1	54, 653	35, 272	65	11, 712	33	7, 386	21	14,140	40	1,500	4	34, 738
Mah DIARRA	BG 90 2	10, 044	7, 350	7	2, 350	32	0	0	5, 000	68	0	0	7, 350
	Kogoni 91 1	29, 864	19, 364	65	6, 950	36	5, 575	29	5, 862	30	600	3	18, 987
	Total 2	39, 908	26, 714	67	9, 300	35	5, 575	21	10,862	41	600	2	26, 337
Km 30	BG 90 2	10, 135	7, 091	70	2, 380	34	0	0	4, 729	67	0	0	7, 109
	Kogoni 91 1	29, 666	19, 921	67	4, 930	25	6, 033	30	7, 734	39	800	4	19, 497
	Total 3	39, 801	27, 012	68	7, 310	27	6, 033	22	12,463	46	800	3	26, 606
Siengo	BG 90 2	10, 070	6, 563	65	1, 948	30	0	0	4, 373	67	250	4	6, 571
	Kogoni 91 1	15, 302	9, 806	64	3, 607	37	2, 889	29	2, 893	30	425	4	9, 814
	Total 4	25, 372	16, 369	65	5 555	34	2, 889		7, 266	44	675	4	16, 385
TOTAL	BG 90 2	40, 212	27, 623	68.7	8, 490		0		18,842		250		27, 582
	Kogoni 91 1	119,522	77, 744	65.0	25, 387		21,883		25,889		3,325		76, 484
	Total	**159,734**		**66.0**	**33, 877**		**21,883**		**44,731**		**3,575**		**104,066**

Although acceptable, these technical results can be improved by acting on the paddy quality and equipment performance. Optima to be expected can be obtained by increasing the processing output by 70% and 68%, respectively for the BG 90 2 and Kogoni 91 1 varieties. For quality, the rate of whole grain rice of very good quality can reach 50%, or even 60%.

3.1.2. Estimate of production costs :

Production costs were appraised on the basis of actual expenses made on each site and that were recorded in the follow-up registers of operators and follow-up agents of the Advisory Consultancy.

The various cost items were : fuel, consumables, labor and depreciation allocations.
The latter were calculated on the basis of total investment (equipment + site conversion) and a period of yearly average use of 10 months for a length of time estimated at 5 years.

The processing time of 40 tons of paddy was estimated at one month.

For this operation, the accrued expenses amount to FCFA 1,524,265. Variations from a site to another are very invariable.

Tables 10 and 11 indicate, respectively the breakdown of count items for depreciation allocations.

Table 10 : Break-down of count posts for depreciation allocations

Sites	Husking machine	Group	Sorter	Total	Site conversions	Total investment	Monthly depreciation
Mama Diarra	2, 900, 000	2, 050, 000	1, 450, 000	6, 400,000	805, 000	7, 205, 000	28, 820
Mah Diarra	2, 900, 000	2, 050, 000	1, 450, 000	6, 400, 000	805, 000	7, 205 ,000	28, 820
Km 30	2, 900, 000	2, 050 ,000	1, 450, 000	6, 400, 000	805, 000	7, 205, 000	28, 820
Siengo	1, 600, 000	2, 050, 000	1, 450, 000	5, 100, 000	805, 000	5, 905, 000	23, 620
Total	**10,300,000**	**8, 200, 000**	**5, 800, 000**	**24, 300,000**	**3, 220, 000**	**27,520,000**	**137, 600**

Table 11 : Summary of Production expenses

Sites	Fuel	Consumables	Maintenance	Labor	Depreciation	Total Expenses
Mama DIARRA	124, 357	86, 000	41, 000	152, 835	28, 820	432, 812
Mah DIARRA	85, 377	117, 000	35, 500	109, 650	28, 820	376, 147
Km 30	130, 594	42, 000	41, 750	167, 500	28, 820	410, 664
Siengo	65, 520	84, 750	36, 250	94, 500	23, 620	410, 664
Total	**405, 848**	**329, 750**	**154, 500**	**524, 485**	**110, 080**	**1, 524, 263**

By adding these expenses to the quantity of processed rice (160 tons), we obtain an average cost of FCA 10/kg, i.e. FCFA 10,000 to process a ton of paddy.

3.1.3. Estimate of processed rice production costs :

The appraisal of production costs on the sites and the cost prices indicate respective averages of FCFA 261/ kg and FCFA 276/kg of processed rice. (Ref. tables 12 and 13).

The highest production cost was noted on the site of Siengo, where following technical and organizational constraints, only 25 tons of paddy were processed.

Tableau 12 : Production cost of processed rice

Sites	Paddy quantity (t)	Paddy value (FCFA)	Processing charges (FCFA)	Quantity of processed rice (t)	Package (FCFA)	Total cost (FCFA)	Production cost (FCFA/kg)
Mama DIARRA	54. 65	8, 744, 480	432, 812	35. 272	141, 088	9, 318, 380	264
Mah DIARRA	39. 91	6, 385, 280	376, 147	26. 714	106, 856	6, 868, 283	257
Km 30	39. 80	6, 368, 160	410, 664	27. 012	108, 048	6, 886, 872	255
Siengo	25..37	4, 059, 520	304, 640	16. 369	65, 476	4, 429, 636	271
Total	159.73	25, 557, 440	1, 524, 263	105. 37	421, 468	27,503, 171	262

Table 13 : Cost price of rice at traders

Sites	Production cost FCFA/kg	Approach charges FCFA	Cost price of trader (FCFA/kg)
Mama DIARRA	264	15	279
Mah DIARRA	257	15	272
Km 30	255	15	270
Siengo	271	15	286
Moyenne	**262**	**15**	**277**

The cost price does not integrate the difference in approach charges according to areas. A weighted average (FCFA 15/kg) in relation to the quantity of the rice carried was used.

3.1.4. Average operating account per ton of paddy :

Table 14 shows the average operating account for processing a ton of paddy under the test conditions. The negative result (- FCFA 32,538) that alternates the craze of all actors for the new product should be taken with reservations, for it is related to the acquisition cost of paddy that was fixed in a situational context.

Table 14 : Average operating account for processing a ton of paddy (test conditions)

Wordings	Quantity	Units
Paddy	160 000	FCFA
(Average) processing costs	10 000	FCFA
Package	2 600	FCFA
Total productions costs	172 600	FCFA
Quantity of processed rice	0.65	ton
On site production cost	265 538	FCFA/t
Transport of processed rice	15 000	FCFA/t
Cost price	280 538	FCFA/t
Average selling price	248 000	FCFA/t
Receipts	248 000	FCFA/t
Results	**-32,538**	**FCFA/t**
In %	-12%	%

3.2 Marketing Part

3.2.1. Quantities marketed and receipts :

In total 102.75 tons of rice were sold during this operation.

Table 15 indicates the distribution per rice quality and per consignee.

Table 15 : Distribution per rice quality and per consignee

Destinations	E1	E2	BM	BF	Total	%
Bamako traders	20.375	11.850	25.300	2.150	59.675	58%
Niono traders	6.600	7.850	12.450	100	27.000	26%
Ségou traders	1.000	1.000	3.000	-	5.000	5%
Technical structures	4.600	1.150	3.650	1.300	10.700	10%
Total	**32.573**	**21.850**	**44.400**	**3.550**	**102.375**	**100%**
%	32%	21%	23%	3%		

Thus 90% of the stock were sold by 17 traders involved in this test. Receipts stemming from the processed rice sale were FCFA 25,391,750, i.e. a recovery rate of 100% in relation to forecast (Ref. table 16). This denotes the efficiency of the mechanism that was set, the relevant selection of traders and also the interest that the latter took in this operation.

Table 16 : Dispersion of receipts according to their sources

Destinations	Receipts in FCFA	%
Bamako traders	15,176,500	59.8%
Niono traders	6,331,000	24.9%
Ségou traders	1,197,500	4.7%
Technical structures	2,686,750	10.6%
Total	**25,391,750**	**100%**

3.2.2. Analysis of rice marketing :

Marketing the quantity of processed rice (91.675 tons) made available to traders was the subject of close follow-up by the Advisory Consultancy. Results stemming from this follow-up in the areas of Niono, Ségou, and Bamako were as follows :

- All traders sold the rice through their usual channel of distribution.

- The strategy of wholesalers and semi-wholesalers consisted in seeing to it that the main part of their customers composed mostly of stockists are made partners in marketing the new product. Thus, thanks to this policy, the processed rice could penetrate within a week several peripheral markets that were not initially selected as points of sale, such as Banankabougou, Sabalibougou, Sokorodji, Daoudabougou, Kalaban ; and some areas like Dioïla, Ouelessebougou, and Fana through stockists.

- A trader at place de Niono retained his stock for a short while in order to better profit from the effects of advertising on TV and radio on the one hand, and on the other, observe market reaction in order to better enhance the value of his product. However, he respected all the same his usual rice distribution channel following the example of his colleagues.,

- Traders on the peripheral markets (Djélibougou, Badalabougou, Magnambougou) and Médine market gave priority to their faithful consumer customers.

- The stock at Niono was essentially repurchased by traders in Bamako to be resold on different markets of the capital city. *A ton of Kogoni 91 1 E1 was sold to a Mauritanian trader who noted a very favorable reaction from his country's market. Failure to meet his further orders did not permit to confirm this result, His insistence on getting more E1 rice may, however, be considered as an indicator of a possible penetration of the Mauritanian market by the Etoile du Delta Rice).*

- Some semi-wholesalers (Niono and Ségou) preferred to sell their rice directly to consumers in order to increase the number of his customers and also better appreciate the market reaction in relation to this new product.

Table 17 gives the list of destinations and types of clients who bought the Etoile du delta rice through the channel of traders.

Table 17 : Destinations of processed rice sales by traders

Marketing Site	Markets	Destination of rice purchased	Clients
Bamako	Place Niono and Marché Central at Bagadadji	**Peripheral quarters of Bamako** : Lafiabougou, Banankabougou, Sabalibougou, Sokorodji, Daoudabougou, and Kalaban **Other areas in Mali :** Fana, Oulessebougou, Dioïla	Stockists and some consumers
	Peripheral Markets and Médine	**Bamako quarters :** Badalabougou, Médine, Magnambougou, Sabalibougou, Sokorodji, Kalaban, Djélibougou, Boulkassoumbougou, Moribabougou	Essentially consumers
Niono	Niono market	Niono. Bamako. Fana Ouelessebougou. Koutiala. Sikasso. Douentza. Mauritanie. Burkina	- Stockists - Consumers
Ségou	Marché Central	Main quarters in the town of Ségou	Consumers

Price monitoring during the marketing period also enabled to note an average difference of FCFA 25/kg between the Etoile du Delta rice and the other local rice qualities (Ref. table 18).

Table 18 : Difference in price between the Etoile du delta rice and RDP rice (in Bamako)

Market	Quality	Selling price FCFA	Differential FCFA
Place de Niono (Bamako) Wholesale and semi-wholesale	Kogoni 91 1 E1	325	25
	Kogoni 91 1 Cleaned DP	300	
	Kogoni 91 1 E2	275	25
	Kogoni 91 1 DP Standard	250	
Peripheral markets	Kogoni 91 1 E1	350	20
	Kogoni 91 1 Cleaned DP	330	
Retail sale in Bamako	Kogoni 91 1 E2	300	25
	Kogoni 91 1 DP Standard	275	

3.3. Opinions of Actors

Site managers, despite constraints for which they hope solutions will be found for this new campaign, declared themselves satisfied with equipment performance and specially impressed by the quality of products.

Sample traders appreciated in general the different qualities of the Etoile du Delta rice, notably the Kogoni 91 1 variety. Many of them besides, expressed doubts about the veracity of the fact that this was a domestic product (prior to advertising).

In majority, they find this rice better than many imported rice qualities.

The package and packaging method were much appreciated by traders. For them, grading the BG-90-2 is not justified, for it interests a range of medium-sized income consumers, less interested in graded rice. Simple bleaching would enable to increase added value for this variety.

They also wished an improvement of the quality of the Etoile du Delta rice (notably by removing impurities that were observed in some cases and if possible, fine remains of bran).

A survey conducted with a restricted sample of consumers (23), selected on the sites and representing different social professional categories (civil servants, project agents, housewives, workmen) enabled to note as major positive elements :

- A craze of consumers resulting from the packaging method (25 kg and 50 kg bags), the logo and sustained advertising. One or the other of these elements motivated the decision that these consumers made to buy the Etoile du Delta rice.

- A marked preference for the Etoile du Delta rice (and particularly the Kogoni 91 1 variety) in comparison with the usual DP rice for the following reasons :

- cleanliness of produce that enables housewives to save much time
- taste very much appreciated
- swelling volume at cooking.

- However, they find the suggested prices beyond the capability of the average consumer, and propose as bottom prices those indicated in table 19.

Table 19 : Average price objectives for consumers in Bamako

Quality	Bottom Prices (FCFA/kg)	
	Kogoni 91 1	BG-90-2
E1	300	230
E2	275	
BM	230	220
BF	200	150

Deductively, considering a profit margin of FCFA 25/kg these consumer prices suppose the following selling prices (ref. table 20).

Table 20 : Supposition of selling prices to traders in Bamako

Quality	Bottom Prices (FCFA/kg)	
	Kogoni 91 1	BG-90-2
E1	275	205
E2	250	
BM	205	195
BF	175	175

3.4 Test Impacts on Actors

Taken as a whole, the test has had a positive impact on all actors of rice subsector :

Producers : It was translated into awareness of the possibility of better enhanced value of their paddy through improving its quality. The price practised for purchasing the rice used in the context of the test was a strong incentive. Site managers, often under the pressure of traders processed about 80 tons of paddy, after processing the 160 tons provided by CAE, and this just at the start of the new rice marketing campaign.

Table 20 indicates the services provided (in paddy bags) per site. Only a low proportion of the rice processed (26 bags at Km 26) was sorted according to specific demands.

Table 20 : Service supplies carried out by site managers

Sites	Bags of processed paddy
Mama DIARRA	384
Mah DIARRA	689
Km 30	174
Siengo	10
Total	**1,100**

They all expressed the wish to be able to keep their equipment, or even acquire more of higher performance ones. A great majority of processors using traditional husking machines showed a particular interest in the new equipment.

Traders : After the stock of the Etoile du Delta rice ran out and strong demand came from consumers, some traders made contact with site managers in order to produce good quality rice. Others, followed the example of Mr. Koni DIARRA, a cereal dealer at place de Niono (Bamako), who, at his clients'request, wishes to specialize in marketing quality rice, for even without sorting, his customers buy this rice at a price he finds reasonable. However, he admits that the lack of package and the Etoile du Delta logo constitutes a handicap to achieving his price objectives.
Several traders questioned the Advisory Consultancy about the very limited number of participants in the test.

Consumers : The will to change attitude is also well-known among consumers as is attested the will of 77% of those in the sample who no longer wish to buy poor quality rice.
When the stock ran out, the Advisory Consultancy recorded several demands from traders and consumers who want to acquire the Etoile du Delta rice (the rice that is advertised on radio and television).

Promoters : Among promoters, a strong demand about equipment acquiring modalities was also recorded by the Advisory Consultancy. Some of them stated they had the funds, but wish to be better informed and followed up.

The Office du Niger is contemplating right now providing the necessary advice that enables producers to improve their paddy quality on the one hand, and on the other hand, a broad distribution of the results of a joint study by office du Niger, URDOC, IER, and producers on consensual paddy production costs, estimated on average at FCFA 75/kg.

3.5 Expectations of Actors

For all actors of the rice subsector, expectations from the test continuation are important.

Site managers wish the operation to continue on a large scale and with equipment of higher performance. They wonder about the possibility of using the equipment during this new campaign, acquiring packages for some of them, getting a financial support in order to achieve a production/marketing operation of the Etoile du Delta rice.

They expect a promotional support to a quantity more important to develop consumer loyalty and test product regularity on the market in view of seasonal price fluctuations that remain an uncontrolled factor at this stage.

To them, too, this will enable them better appreciate the effects of competition with usual husking machines, and better judge the prices to be practised for services of the type of Etoile du Delta rice production.

Traders wish the production of Etoile du Delta rice to become durable so as to reduce their dependence on imported rice. In the face of uncertain continuity, some wish to be put in contact directly with processors, get a support from CAE for acquiring and obtaining permission to use Etoile du Delta rice packages.

They also wish the Etoile du Delta label to be protected. These supports should be sustained with access facilities to bank credit.

As to consumers, besides a downward price review to make the product accessible to a wider range of consumers, they wish the points of sale to be increased by involving more traders in products sale.

For **promoters**, expectations are structured around three major points :

- **Providing reliable information** on the operation profitability and also ensuring the possibility of getting the necessary technical advice. This concerns operators who want to invest their own funds.

- **Getting advisory support for** preparing bankable documents that enable them to have access to institutional credit, up to investment needs and the purchase of the first paddy stock. These operators seem to have a sound knowledge of relationships with banks.

- **Getting just financial support** This concerns producer organizations or other operators with poor experience in institutional credit management, but who are very much interested in this new opportunity.

The Office du Niger sees in this test, the beginning of a solution to one of its major concerns, that is a better enhanced value of its developments through that of its main production (rice).

3.6 Constraints Encountered

3.6.1. Technical constraints :

- Poor equipment capacity (husking – bleaching – grading), characterised by unstable power supply probably related to inadequate nominal power of generators ;

- The high cost of spare parts available only at one supplier's ;

- Poor resistance of materials as regards these wearing parts (rubber rollers and sieves) ;

- Difficulty in assimilating training on preventive maintenance (perhaps due to lack of rigor) by operators who need assistance to gain confidence in handling (adjusting) machines.

- Power variations making difficult adjustment of the husking machine ;

- Very poor outputs of proposed grading and multiple handling due to sieve characteristics (frequent plugging and difficult demoting) ;

- High wearing rates of spare parts. possible stock ruptures, upward price evolution since test start-up ;

- Great variability between paddy batches considering very various origins.

3.6.2 Organisational constraints :

At organisational level, general problems were related to fuel supply, intervention time to replace spare parts (lack of funds for purchases, and covering repairing costs). In general forecasts for taking care of sites technical operation were quite inadequate, which included any form of quick interventions within reasonable time with heavy consequences such as too much extended stopping times and disruptions in production planning.

Difficult negotiations are also reported with the equipment supplier concerning the purchase and mode of payment of spare parts.

Individual delivery of stocks on marketing sites was very constraining (very strong staff mobilization and additional costs).

Lack of equipment adapted for unit weighing (high working times, packaging losses, etc.)

Risks related to recovery of receipts made under unsecured conditions.

Continuous advertising after getting out of stock.

With respect to these constraints, a possible test extension will require taking into account the following recommendations :

- Making arrangements to ensure supply of spare parts (the most crucial ones being rollers and sieves as far as high prices and availability are concerned) ;

- Replacing the present generators (15 KVA with at least 25 KVA) ;

- Supporting package and good quality paddy acquisition with a view to processing “Etoile du Delta” product (either though providing services to traders, or autonomously for objectives of marketing directly by sites) ;

- Maintaining technical advisory assistance on issues of rice quality management and management advice for the mastery of costs of production, marketing and selling price setting ;

- Changing generators to achieve the required powers ;

- Strengthening operators’ training on more advanced notions in preventive maintenance and production quality management ;

- Acquiring an initial adequate stock as far as spare parts are concerned ;

- Producing micro-programs on paddy (information/communication program on the route of paddy quality) ;
- Spare parts stockpiling ;
- Marketing products on processing sites ;
- Standardising advertising and product marketing.

3.7 Test Balance Sheet

The balance sheet shown in table 21 was drawn up only in relation to paddy purchase.

Table 21 : Test balance sheet

Wordings	Quantity	Unit
Purchase of 160 tons of paddy	25,600,00	FCFA
Processed rice production	105,367	Kg
Husking output	66	%
Sorted rice quantity	104,066	Kg
Marketed quantity	102,375	Kg
Remainder (sample)	275	Kg
Available rotting stock	600	Kg
Miscellaneous losses *	2,217	Kg
Fixed costs	109,680	FCFA
Variable costs	1,414,583	FCFA
Total costs	1,524,263	FCFA
Total production expenses	27,124,263	FCFA
Total receipts	25,391,750	FCFA
Operating result (paddy)	-208,250	FCFA

- Sorting losses, unit weighing and handling

Despite a slightly negative result (FCFA-208.250), this operation can be overall qualified as positive for a test, as is attested on the one hand by :

The correct execution of processing processes :

- Inexistence of big mechanic problems
- Good tackling of organisational problems
- Excellent (100%) rate of receipts recovery
- First steps towards a behavioural change of actors.

and on the other hand, by the following results from the simulation of a yearly operation case, carried out by the advisory consultancy, in collaboration with the CAE specialist of Agri-business processing[2].

[2] A. SYLLA

3.8 Simulation of a Yearly Operation Case

It was done on the basis of the technical results of the test according to the following hypotheses :

Calculation hypotheses

Investments

Rubrics	Unit price	Depreciation	
		Length of time (years)	Yearly amount (FCFA)
Husking machine	3,500,000	5	700,000
Generator	4,000,000	5	800,000
Screening machine	1,500,000	5	300,000
Weighing machine	500,000	10	50,000
Infrastructures	1,000,000	10	100,000
TOTAL (Investments)	10,500,000		1,950,000

Investment funding

Rubrics	Quantities	Units
Borrowing period	5	Year
Interest rate	14	%
Personal funds (20%)	2,100,000	FCFA
Loans to be requested (80 %)	8,400,000	FCFA
Average financial cost	650,000	FCFA

Husking characteristics

Rubrics	Quantities
Capacity per hour (per kg of paddy)	750
Coefficient (using practice)	0.8
Production capacity (kg of paddy per hour)	600
Yearly production (tons of paddy)	768
Average unit buying price (FCFA/ton of paddy	125,000
Working time	
Averages estimated on the basis of peak and low periods	
Month/Year	8
Days/Month	20
Hours/Day	8
Total (Hours/year)	1,280

Husking results

Processing costs	Quantity	Unit
Fuel	2,600	FCFA/t of paddy
Maintenance/Repairing	3,000	FCFA/t of paddy
Labor	4,000	FCFA/t of paddy
Husking output	65	%
Total rice	499	Tons
Bran (10%)	77	Tons
Package	9,984	50 kg bags
Unit price	200	FCFA
Processed rice transport (Niono-Bamako)	15,000	CFA per ton of processed rice
Various management costs	1,000	CFA per ton of processed rice

Paddy purchase and marketing receipts

Rubrics	Quantity (t)	Average UP/ton	Amount (FCFA)
Paddy	768	125,000	96,000,000
SFD interests (1% per month)			8,640,000
Total paddy			**104,640,000**
Receipts			
Processed rice (all qualities)	488.2	275,000	137,280,000
Sub--product	76.8	10, 000	768,000
Total receipts			**138,048,000**

Operating results

Rubrics	Amount (FCFA)
Yearly purchases of paddy	96,000,000
Labor	3,072,000
Power (fuel)	1,996,800
Maintenance / Repairing	2,304,000
Packages (Bag manufacturing)	1,996,800
Product transport	7,488,000
S/Total (variable)	**112,857,600**
Various management cost	499,200
Financial costs (investments)	650,000
Financial costs (paddy purchase)	6,480,000
Depreciation (yearly total)	1,950,000
S/ total (Fixed)	**9,579,200**
Total expenses	**122,436,800**
Sales (Any rice)	137,280,000
Sales (Sub-products)	768,000
Total receipts	**138,048,000**
Operating results	**15,611,200**

Ratios

Rubrics	Quantities	Units
Variable costs per ton of blanched rice	226,077	FCFA
Gross profit per ton of rice	18,923	FCFA
Gross profit margin / turnovers	17.79	%
Cost price per ton of rice	245,266	FCFA
Break-even point	38. 0	%
Net profit margin / Turnover	11.31	%

***N.B** : This simulated operating result cannot be a standard at all. In the prospect of funding this activity, a detailed business plan focusing on several years, should be worked out on a case basis.*

In any case, these acquisitions, on the credit of all actors, augur better perspectives for improving the quality of rice produced in the Office du Niger zone through small processing units.

IV- PERSPECTIVES

The test has led to the beginning of behavioural change among the different actors of rice subsector in the face of rice quality notion. Let us note also the general craze of consumers and traders for the products. These elements constitute relevant indicators of the possibility of better enhanced value of the office du Niger rice, in particular and overall the whole domestic paddy production in a system of small processing facilities.

However, the negative operating result obtained in the particular conditions of the test indicate the need to strive more for improving the first technical and economic references.

To that effect. the main levers of intervention seem to be :

The technological level : through installing high performance equipment and training operators in mastering them. This technical training program should be completed with the one in economic management (condition for profitability) of the firm.

The Paddy buying price : that should be fixed realistically according to production costs, for it is the control of this factor that will essentially determine the competitiveness of Malian rice on the sub-regional market, as illustrated by the simulated results presented in table 22, that indicates an optimum between FCFA 115,000 and FCFA 125,000 per ton.

Management of technical and business information

Appropriate educational aids should be worked out and made available for actors through different media niches (radio, television, newspapers, internet), for many economic operators seem to be unaware of these new investment opportunities.

Strengthening capacities at the level of technical supervising structures (Office du Niger, and others), in the advisory and marketing domains.

When undertaking future actions, it will be important to aim at :

- Increasing the overall processing output.
- Improving the quality of processed rice (increasing the rate of whole grain rice).
- Substituting local rice for good quality imported rice.
- Conquering the sub-regional market by Malian rice.

Implementation of measures that go with them, enabling to make durable the presence of the Etoile du delta rice, might be done according to the work plan roughed out in table 23 by the Centre Agro Entreprise and its partners.

Table 22 : Variation in operating result according to paddy price

Paddy purchase	160, 000	150, 000	140, 000	130, 000	125, 000	120, 000	115, 000	110, 000	100, 000	F CFA/t
Processing costs	10, 000	10, 000	10, 000	10, 000	10, 000	10, 000	10, 000	10, 000	10, 000	F CFA/t
Package	2, 600	2, 600	2, 600	2, 600	2, 600	2, 600	2, 600	2, 600	2, 600	F CFA/t
Total production costs	172, 600	162, 600	152, 600	142, 600	137, 600	132, 600	127, 600	122, 600	112, 600	F CFA/t
Quantity of processed rice	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	tons
On site production cost	265, 538	250 ,154	234, 769	219, 385	211, 692	204, 000	196, 308	188, 615	173 ,231	F CFA/t
Transport of processed rice	15, 000	15, 000	15, 000	15, 000	15, 000	15, 000	15, 000	15, 000	15, 000	F CFA/t
Cost price	280, 538	265, 154	249, 769	234, 385	226, 692	219, 000	211,308	203, 615	188, 231	CFA/t
Average selling price	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	F CFA/t
Receipts	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	248, 000	F CFA/t
Results	-32, 538	-17, 154	-1,769	13, 615	21, 308	29, 000	36, 692	44, 385	59, 769	F CFA/t
In %	**-12%**	**-6%**	**- 1%**	**6%**	**9%**	**13%**	**17%**	**22%**	**32%**	**%**

Table 23 : Operational work plan for promoting the Etoile du Delta rice

Actions contemplated	Modes of execution	Actors	Years 2000/2001 - 2001/2002 - 2002/2003		
Increase and validate (technical and economic) results of processing on a small scale	Extending the test to other ON zones Introducing a higher technological level (performance and capacity) Supporting implementation of a pilot project of small rice mills Extending marketing test sites	CAE ON CAE CAE CAE			
Formalizing conditions for acquiring good quality paddy	Information on sensitisation to paddy quality (harvest, storage). Negotiating and fixing buying prices according to production costs between producers and processors.	Office du Niger Producers Processors Traders			
Promote Malian rice export	Reasoned purchase of paddy marketing test on the sub-regional market	CAE			
Promote private investment	Supporting the elaboration of bankable documents (processors/traders) Bank security training/information Advisory support	CAE			
Following-up rice markets	Market surveys Demand appraisal distributing business information	CAE			
Follow-up/ Evaluation	Establishing a framework of dialogue Impact evaluation	SEG, CAE ON CAE			
Finance new professionals	Supporting the settlement of young graduates	CAE Banks			

NB : Actual promotion of this product will go through financing the settlement of new types of (young) economic operators in this sub-sector.

V- CONCLUSIONS

Results from this first year of the test for improving the quality of rice produced in the Office du Niger have enabled to note :

- The possibility of producing high quality market rice in Mali through small processing units (yearly capacity varying between 750 kg and 1.000 kg) ;
- Competitiveness limits of this rice in comparison with imported rice ; linked to the paddy buying price ;
- Strong demand for quality rice ;
- Possibility of increasing the added value of Malian rice thanks to the consent of an important fringe of consumers to pay a quality premium ;
- The will of a behavioral change towards quality notion among all actors ;
- A marked interest of economic operators in exploring this new investment sector ;

These different revelations indicate the need to validate and strengthen the first technical and economic results and setting up an operational strategic plan for promoting rice quality ;

This is a requirement dictated by the need to improve the current processing conditions of Malian rice, to conquer, even partially the sub-regional market.