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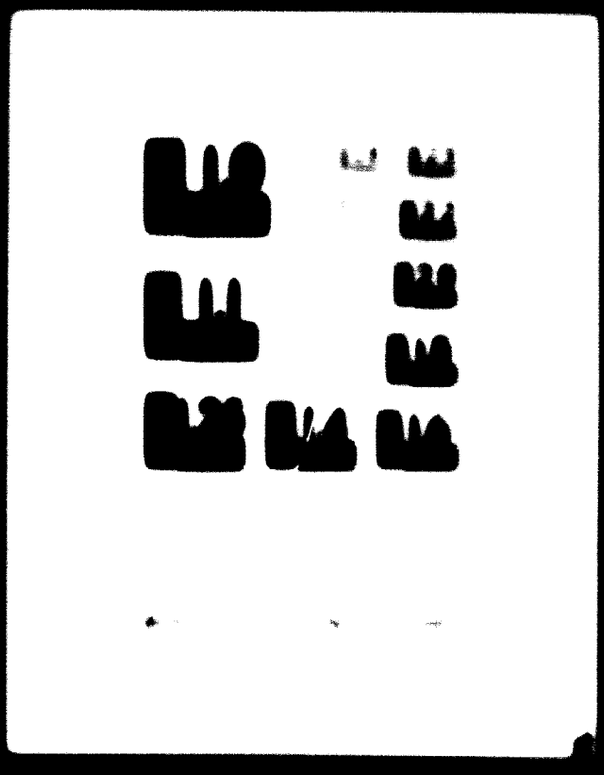

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[redacted]

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[illegible] [illegible]

[illegible]

[illegible]

[illegible]

Le [illegible] :

(1) [illegible]

(2) [illegible]

[illegible] [illegible]

[illegible] l'agriculture. [illegible] pour cent [illegible]

[illegible]

[illegible] pour cent [illegible] pour cent [illegible]

.../...

Le projet "Silos" a pour but :

1. la réduction des pertes en maïs ;
2. une meilleure stabilisation du prix du maïs ;
3. la création d'une industrie locale.

Outre la création d'une industrie locale pour la fabrication des silos il y aura d'autres sources d'intérêts :

(a) l'emploi de la main d'oeuvre - 50 hommes sont envisagés ;
(b) la formation du personnel ;
(c) une réduction des sorties de devises ;
(d) une plus grande indépendance vis-a-vis des fournisseurs extérieurs de matériel de stockage ;
(e) l'amélioration des conditions de vie des paysans. (Avec les silos villageois, les paysans amélioreraient leurs rendements) ;
(f) la création de coopératives pour le stockage de graine dans les villages ;
(g) la possibilité d'exporter les silos (après avoir satisfait les besoins nationaux) ;
(h) la possibilité d'exporter du maïs (après avoir satisfait les besoins nationaux) ;
(i) à plus long terme, le volume de production des céréales et particulièrement du maïs pourra augmenter d'au moins 40 % parce que le paysan ayant une coopérative de stockage pourra faire deux semences dans l'année au lieu d'une seule.

4.0 ETUDE DE MARCHE

4.1 Introduction

Une étude de marché sur les besoins en stockage des graines a été faite fin 1974 début 1975.

Il a été décidé de limiter l'enquête aux besoins en stockage du maïs à cause des grandes pertes que subit le maïs que s'élèvent, parfois, à 45 pour cent (45 %) au niveau du village.

Au cours de la visite de l'expert en silos, M. Hawkey en 1975-76, l'étude de marché a été mise au point.

.../...

4.2 [redacted]

Compte tenu des enjeux, les besoins actuels en stockage de grains sont évalués à [redacted] tonnes. Cependant, suite aux recherches on a pu estimer que les nouveaux silos déjà reconstruits ou en construction réduisent les besoins à [redacted].

D'après les discussions avec le Président de la Commission Nationale Céréalière, il est clairement démontré que les besoins les plus urgents se situent au niveau du village.

Il a été décidé, en accord avec le Président de la Commission Nationale Céréalière, d'utiliser comme base pour un projet une production annuelle de 2000 silos de 9 à 10 tonnes de capacité de stockage soit :

un total de [redacted] ou plus par an.

On peut toujours accélérer la fabrication des silos en créant d'autres unités de production dans différentes régions.

Les besoins en stockage sont urgents pour la République Populaire du Bénin. Il est donc inutile de faire une étude de marché approfondie des besoins des pays limitrophes compte tenu du fait que toute la production des silos sera destinée aux besoins du Bénin pour plusieurs années.

Néanmoins, il est intéressant de noter qu'il existe des possibilités d'exportation vers les pays voisins.

ETUDE FINANCIERE PROJET SILOS

1.	**Investissements**		
A.	**Constructions, Equipements**		
1)	**Bâtiments** 800m² à 30.000F/m²	24 000 000	
	majoration 10 %	2 400 000	
2)	**Terrain** 50F/m² location 5 000 m²	250 000	
	Droit d'enregistrement, bail (15 de 250 000F)	17 500	26 667 500
3)	**Equipements**		
	a) Equipements de base		
	- Chariot élévateur à fourche 10,000 $	2 450 000	
	- Atelier de mécanique 4,650 $	1 117 000	
	- Cisaille à main avec poinçonneuse 2,190 $	537 000	
	- Machine à cercler 156 $	38 000	
	- Scie circulaire 2,500 $	612 500	
	- Outils à remplacer 3,000 $	735 000	
	- Trousse d'outillage de soudage et de coupe 1,125 $	276 000	
	- Génératrice de secours 75 kva 9,375 $	2 297 000	
	- Tour (fraiseuse perceuse radiale polisseuse) 31,250 $	7 656 000	
	- Presse à mandriner hydraulique 2,500 $	612,500	
	- Soudeuse p.fils(Production Welding) 3,125 $	766 000	
	- Pièces de rechange 10 % de 317,500 $	7 779 000	
	- Appareil de séchage 8,975 $	2 199 000	
		27 075 000	
	Majoration 10 %	2 707 500	29 782 500
	Solde à reporter		56 470 000

Report			56 470 000
b) Machines spéciales			
• Dévidoir pour rouleaux de tôle	3,125 $	766 000	
• Cisailles	6,250 $	1 531 000	
• Machine à onduler les tôles	93 750 $	22 969 000	
• Poinçonneuse (perceuse à col de cygne)	6 250 $	1 531 000	
• Machine à cintrer	60 000 $	14 700 000	
• Cisailles électriques	10 000 $	2 450 000	
• Machine à plier les feuilles	9 375 $	2 297 000	
• Machine à étirer les panneaux du plancher	50 000 $	12 250 000	
		58 494 000	
Majoration 10 %		5 849 000	64 343 000
c) Equipement de bureau et de Laboratoire		2 000 000	
d) Frais de transport frêt 75T à 28 250F/T		2 119 000	4 119 000
4) Véhicules			
1 voiture		1 500 000	
2 camions		10 000 000	11 500 000
B. Mise en route de l'usine			
1) Frais de personnel			
1 directeur ingénieur		1 560 000	
4 employés de bureau		1 200 000	
8 mécaniciens et cadres moyens		6 720 000	
9 manoeuvres		1 728 000	
		11 208 000	
Charges sociales et patronales 30 %		3 362 000	14 570 000
2) Frais d'expertise et de démarrage		10 120 000	
3) Formation professionnelle 10 % salaires		1 457 000	11 577 000
Total Investissement			162 579 000

2. Frais de production			
1) Matières premières			
1T de tôle de FOB port européen	500 $		
Frais occasionnés	400 $		
Fret	54 $		
Assurances, crédit bancaire	46 $		
1 T de tôle CAF	1000 $		
100T de tôle ondulée à 1000$ =	100 000 $	24 500 000	
Frais de transport port-usine		100 000	24 600 000
2) Energie			5 000 000
3) Matières consommables et entretien			
Outils - Oxygène - soudure - électrode		1 500 000	
Entretien des machines	3125 $	766 000	
Maintenance des véhicules (véhicules lourds : 2x25000 km x 26F - voitures 25 000 km x 10F)		1 550 000	
		3 816 000	
Divers 40 %		1 526 000	5 342 000
4) Frais de personnel			
1 directeur		1 560 000	
4 employés de bureau		1 200 000	
12 mécaniciens et cadres		10 080 000	
Main d'oeuvre			
15 ouvriers spécialisés		5 400 000	
15 manoeuvres		2 880 000	
		21 120 000	
Charges sociales et patronales 30 %		6 336 000	27 456 000
5) Autres frais			
Frais administratifs		1 000 000	
Assurances		320 000	1 320 000
Solde à reporter			63 718 000

Report		63 710 000
6) Amortissements		
Bâtiments 5 % 26 400 000	1 320 000	
Equipement [illegible] 125 500	14 [illegible] 000	
Mobilier et matériel de bureau 20 % 2 000 000	400 000	
Camions 33 % 10 000 000	3 300 000	
Voiture 25 % 1 500 000	375 000	19 514 000
7) Intérêts		
10 % investissement 162 579 000	16 258 000	
12 % fonds de roulement 17 904 500	2 148 500	18 406 500
Total frais de production		101 630 500

8) Fonds de roulement

Eléments		Mois	Montant
Matières premières	24 500 000	3	6 125 000
Energie	5 000 000	3	1 250 000
Mat. Consommable	5 342 000	3	1 335 500
Frais admin.	1 320 000	3	330 000
Salaires	27 456 000	3	6 864 000
Divers		-	2 000 000
Total			17 904 500

9) Investissement total

Investissement 162 579 000
Fonds de roulement 17 904 500
180 483 500

10) Remboursement du capital (7ans)

180 483 500 / 7 = 25 783 500

11) Prix de revient par T/capacité

127 422 000 / 10 000 = 12742 F CFA
soit environ 52 $ EU/T

12) Prix d'importation

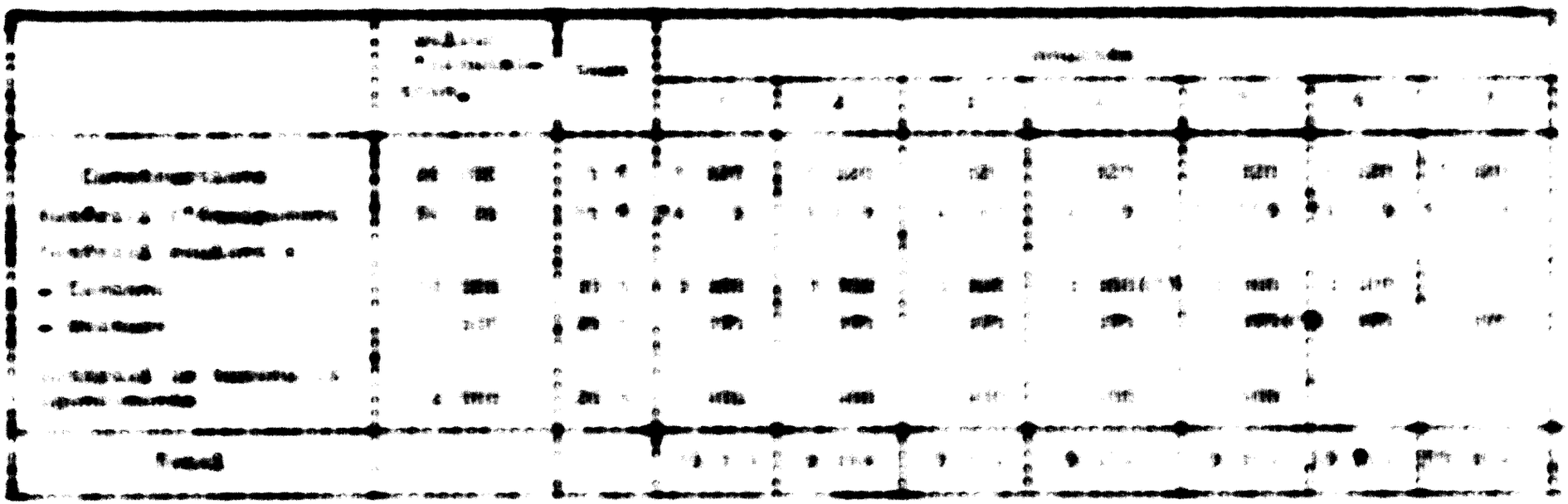
103 $ non monté soit 29 652 F CFA
(Prix de la T/silo complètement monté 150 $ soit 36 750 F CFA)
Base 1 $ EU = 245 F CFA.

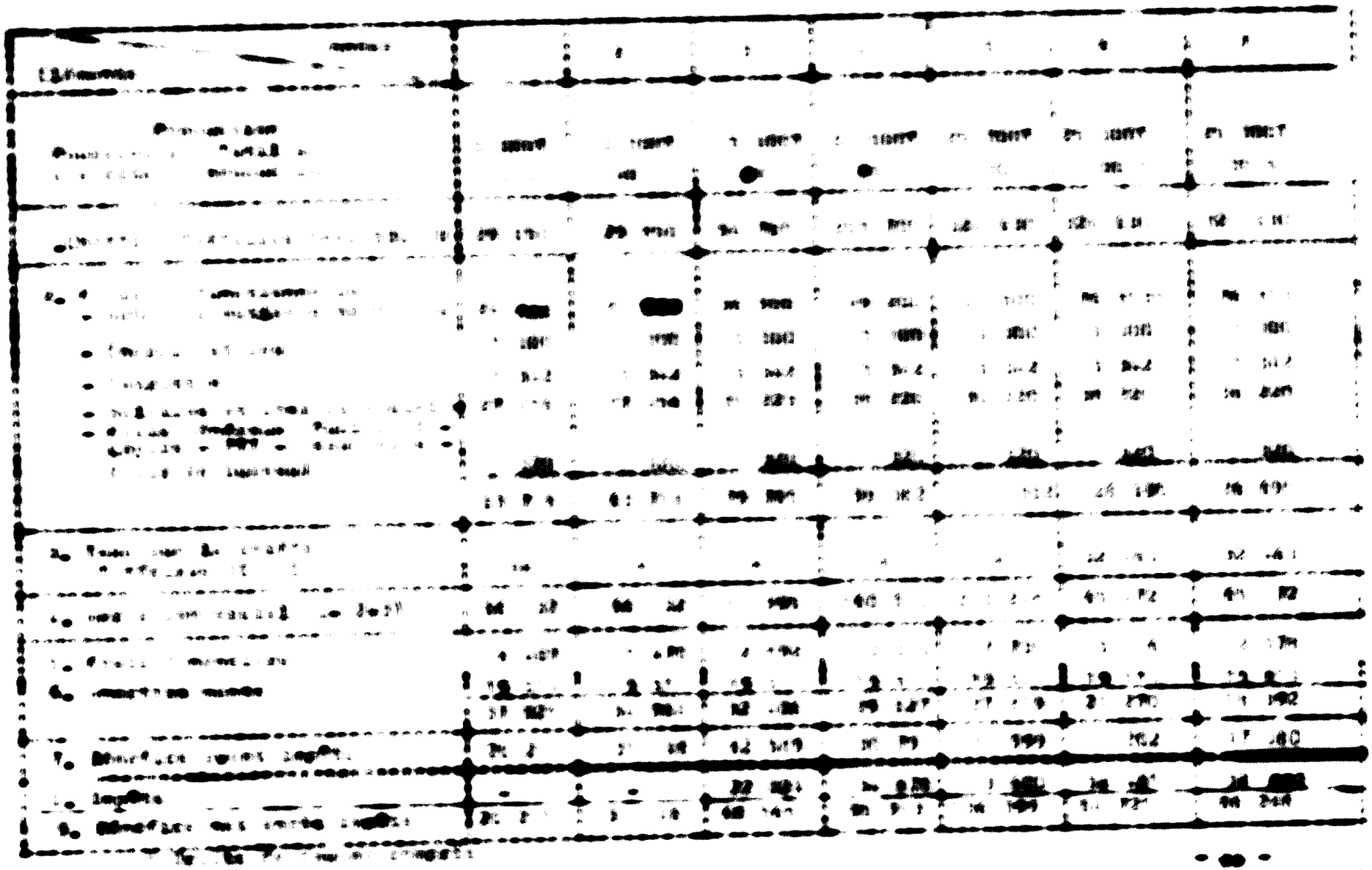
MONTANT DETAILLE DES
INVESTISSEMENTS PREVUS DE
[illegible]

	Coût en devises	Coût en monnaie locale
Terrain	-	[illegible]
Génie civil, constructions	-	[illegible]
Matériel d'équipement	[illegible]	[illegible]
Matériel de bureau et aménagements	[illegible]	[illegible]
Matériel roulant	[illegible]	[illegible]
Stock pièces de rechange	[illegible]	-
Immobilisations corporelles	-	-
Frais d'établissement	-	[illegible]
Provisions pour dépenses imprévues	-	[illegible]
Fonds de roulement	[illegible]	[illegible]
Total partiels	[illegible]	[illegible]
Total général	[illegible]	

Plan de financement

- Capital social	-
- Comptes courants associés	-
- Crédit fournisseurs	-
- Crédit moyen terme sollicité auprès de la BOAD	[illegible]
- Crédit court terme	[illegible]
- Autre concours	-
Total	[illegible]





[illegible]

	0	1	2	3	4	5	6	7
[illegible] Fonds propres	-	-	-	-	-	-	-	-
Report	-	-49 305	-52 [illegible]	[illegible]	-8056	25 353	170 292	254 97[illegible]
Capital [illegible]	-	-						
Cpte Courant Asso.	-	-						
Crédits bancaires [illegible]	-	-						
Marge nette d'autofinancement	-	20 211	31 148	60 565	35 913	136 [illegible]	84 221	[illegible]
TOTAL		[illegible] 094	121 [illegible]	60 560	35 353	17[illegible]	254 973	343 22[illegible]
UTILISATIONS DES FONDS								
REPORT	-							
Dépenses d'investissement	51 100	[illegible] 79						
Autres investissements à réaliser en cours d'exercice	[illegible]							
Remboursement de capital	-	-	-	-	10 000	1 500	-	-
[illegible]								
Crédits fournisseurs								
Comptes courants associés								
Crédits bancaires autres que moyen terme de collecte								
	-49 305	-111 [illegible]	-		10 000	-1 500	-	-
Ecart de liaison au 31 Décembre	-	-152 27[illegible]	121 12[illegible]	60 560	25 35[illegible]	17025[illegible]	254973	343 221

[redacted]

Calcul du net Cash Flow

[redacted]

Equipements de base		20 700 000
Machines spéciales		64 343 000
Equipement de bureau		2 000 000
Véhicules		[redacted]
		107 629 500
Autres investissements :		
Frais de transport		2 119 000
Mise en route de l'usine		[redacted]
		25 306 000
Total		135 091 500

Cash flow

1ère année		
Amortissements	19 914 000	
Bénéfice net	[redacted]	47 726 000
2ème année		
Amortissements	19 914 000	
Bénéfice net	[redacted]	[redacted]
3ème année		
Amortissements	19 914 000	
Bénéfice net	[redacted]	[redacted]
	Total	170 166 000

Les immobilisations fixes (sans bâtiments, terrain et fonds de roulement) seront récupérées pendant la 3ème année.

6.0 [illegible]

Les objectifs à long terme sont :

- à assister le Gouvernement Béninois dans ses efforts multiples pour le fournisseur des moyens nécessaires par rapport à l'accroissement de la population dans les années à venir ;
- à minimiser les pertes en céréales grâce à un système de stockage ;
- à développer la structure industrielle du pays par l'implantation d'industries locales ;

Les objectifs à court terme consistent à établir dans les meilleurs délais possibles le système d'expérimentation prévoyant un bon nombre de séchoirs et de stockage ce qui permettra d'en montrer à la vente un système et les ingénieurs à installer de tels systèmes dans leurs villages.

Vu l'urgence, le Gouvernement Béninois a proposé de passer rapidement à la phase de fabrication en série sans s'attarder à la phase d'essai de prototypes. Les descriptions d'apports du PNUD et du Gouvernement Béninois ne concernent donc que la phase de fabrication en série.

7.0 CADRE INSTITUTIONNEL

Sous le patronnage :

- du Ministère du Plan de la Statistique et de la Coordination des Aides Extérieures (MPSCAE) ;
- du Ministère de l'Industrie et de l'Artisanat (MIA) ;
- du Ministère du Développement Rural et de l'Action Coopérative (MDRAC)
- de la Commission Nationale Céréalière (CNC) ;
- du Bureau Central des Projets (BCP).

Le projet prévoit la construction d'une usine devant être sous la gestion autonome d'un Organisme d'Etat tel que la Société Nationale pour la Production Agricole (SONAGRI)

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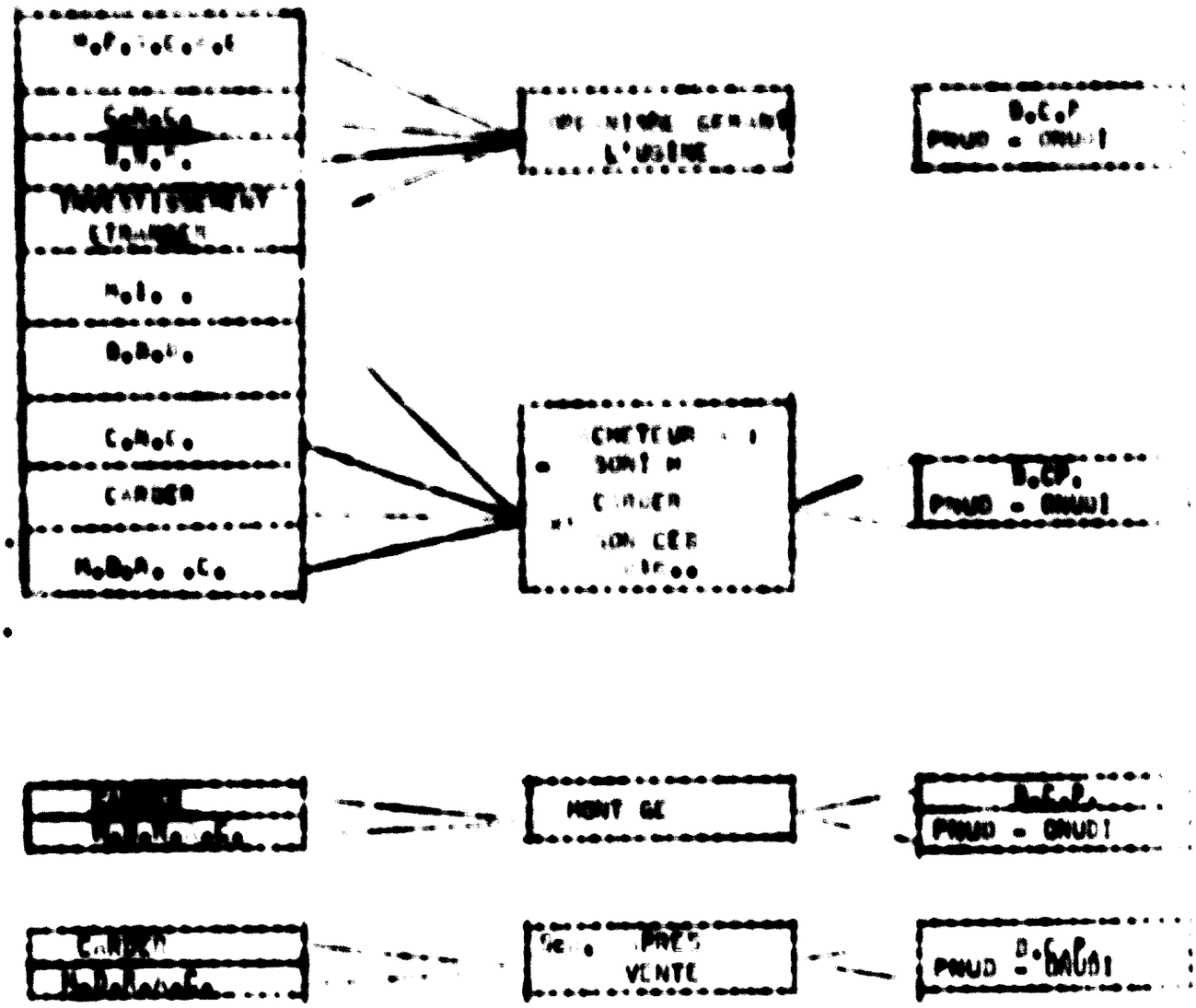


MPSC=E	Ministère du Plan de la Statistique et de la Coordination des Aides Extérieures
CNC	Commission Nationale Céréalière
BBD	Banque Béninoise du Développement
M.I.A.	Ministère de l'Industrie et de l'Artisanat.
CARDER	Centre d'Action Régionale de Développement Rural
MDRAC	Ministère du Développement Rural et de l'Action Coopérative
SONACEB	Société Nationale de Commercialisation et d'Exportation Béninoise.
SONIB	Société Nationale d'Importation Béninoise.

9.0 [illegible]

Le PNUD prendra en charge l'expert et les bourses comme suit :

- [illegible] 5,1,5

	Total	1977
[illegible]		
11-01, Ingénieur, expert en [illegible]	$ 30,000	$ 30,000
[illegible]		
53- Divers	[illegible]	[illegible]
	[illegible]	[illegible]

[illegible] (Programme Régulier Bourses)

Eléments Formation	Total M/H $	1977 M/H $	1978 M/H $
31,00 Bourses			
(Pays Gp 2) 6	10 14,850	10 14,850	
(Pays Gp 3) 1	[illegible]	[illegible]	[illegible]
	27 25,740	10 14,850	9 10,890

9.0 [illegible]

Le Gouvernement du Bénin aura à financer le projet en ce qui concerne la provision des machines d'équipement, de matériel de bureau ainsi que les fournitures nécessaires.

D'autre part, le Gouvernement Béninois mettra à la disposition du projet le personnel et les fonds de fonctionnement prévisés comme suit :

		Total		1977		1978
Personnel du Projet		h/m	F.CFA	h/m	1000F.CFA	h/m 1000F.CFA
10-01	Directeur Général (Ingénieur)	18	2.340.000	6	780	12 1.560
10-02	Mécaniciens et Cadres (12) (8x18h/m,4x9h/m)	180	12.600.000	48	3.360	132 9.240
	Ouvriers spécialisés (15)	135	4.050.000			135 4.050
	Employés de bureau(4)	72	1.800.000	24	600	48 1.200
	Manoeuvres (15) (9x18h/m,6x9h/m)	216	3.456.000	54	864	162 2.592
			24.246.000		5.604	18.642
Equipement						
42-01	Hygromètre		30.000		30	
	Balance avec absorbeur d'humidité		10.000		10	
	4 Thermistances		10.000		10	
	Equipement de bureau		300.000		150	150
			350.000		200	150
Divers						
50-51	Services de transport véhicules, chauffeurs carburants		3.000.000		1.000	2.000
50-53	Fonds contingent		1.000.000		300	700
50-54	Bureau, services de bureau, fournitures de bureau etc...		2.000.000		500	1.500
			6.000.000		1.800	4.200
99.	TOTAUX		30.596.000		7.604	22.992

ANNEXE A.

Cotonou, le 10 Février 1976

V E R S I O N

ASSISTANCE POUR L'ETABLISSEMENT D'UNE USINE LOCALE
DE FABRICATION DE SILOS METALLIQUES
REPUBLIQUE POPULAIRE DU
BENIN

• DP/DAN/71/513/11-05, B/12 ET DAM/72/017/A/01/01 •

LETTRE DE TRANSMISSION PAR RON HAWKEY
(Ingénieur de Constructions Mécaniques)
EXPERT DES NATIONS UNIES POUR LE DEVELOPPEMENT INDUSTRIEL
Agissant comme Agence d'exécution (PNUD).

PROJET DE CONSTRUCTION DE SILOS

Au préalable d'une décision d'étude de marché il est cons& nécessaire de faire ressortir les points majeurs dont le Gouvernement devrait tenir compte.

LA PRODUCTION

La production de 10,000 tonnes par an sur les 7 années représente 2,5 fois la capacité existante déclarée, ainsi que la demande (qui est de 25,000 tonnes) ; cependant qu'il est vrai, que le potentiel de 70,000 tonnes est réellement fondé.

La production peut ralentir initialement. Cela dépend de l'efficacité des structures opérationnelles pour :

- l'approvisionnement
- l'emmagasinage
- le montage
- l'utilisation

Il pourrait s'avérer nécessaire de continuer à bénéficier des apports d'un expert pendant une période plus longue que les six mois envisagés.

LE MARCHE

Dans les normes de l'infrastructure nécessaire, ceci ne pose pas de problème. Le fossé qui existe entre le coût d'une fabrication locale et le prix des silos importés constituent une garantie judicieuse pour la fabrication locale.

L'APPROVISIONNEMENT

L'approvisionnement pourrait être un goulot d'étranglement dans la mesure où il porrait être lié a la production et il semblerait cependant que les paragraphes qui suivent soient des éléments hautement vitaux.

DISTRIBUTION ET MONTAGE

2,000 cellules produites annuellement, représentent 5 cellules par jour pour des localités probablement disséminées, avec les difficultés de transport et un bas niveau technologique.

.../...

UTILISATION

Ceci est le point clé. Plusieurs prévisions schématiques se sont trouvées fondées à cause de l'absence de programmes d'extension.

Le rapport indique la nécessité du renforcement du rôle de la coopérative (de village ou de commune).

En résumé :

1. Est-ce que l'existence d'un niveau de compétence susceptible de maintenir constant ou de garantir la viabilité financière et la capacité de production sans l'aide extérieure est possible ?

2. Peut-on persuader le paysan, le fermier d'utiliser le silo ?

3. Un cadre institutionnel peut-il en priorité être formé ?
   Peut-on en priorité affermir la structure de la Coopérative ?

ANNEXE B.

23.3.76

TRADUCTION DES RECOMMANDATIONS ET CONSTATATIONS
DE M. R. HAWKEY

ASSISTANCE TO THE LOCAL MANUFACTURE OF STEEL SILOS FOR FOOD GRAIN STORAGE

(ASSISTANCE POUR LA CONSTRUCTION D'UNE USINE DE FABRICATION EN SERIE DE SILOS METALLIQUES POUR STOCKAGE DE DENREES ALIMENTAIRES).

THE PEOPLE'S REPUBLIC OF BENIN
(DP/BEN/71/513/11-05/B/12)

REPUBLIQUE POPULAIRE DU BENIN
(DP/BEN/71/513/11-05/B/12)

PROJET FINDINGS AND RECOMMENDATIONS
(CONSTATATIONS ET RECOMMANDATIONS)

TERMINAL REPORT PREPARED FOR THE GOVERNMENT OF BENIN

(RAPPORT FINAL A L'ATTENTION DU GOUVERNEMENT DE LA REPUBLIQUE POPULAIRE DU BENIN)

By

RON HAWKEY (Mechanical Engineer) UNIDO
(Ingénieur Mécanicien) ONUDI

DUREE DE MISSION

L'Expert est resté au Bénin du 18 Décembre 1975 au 18 Janvier 1976.

RECOMMANDATIONS

A.- Un programme-type de fabrication et d'essai de séchoirs et de silos devrait être mis au point par le Ministère de l'Industrie par l'intermédiaire du B.C.P. avec l'assistance active des CARDERS et la commission Nationale Céréalière et l'apport de la machinerie du PNUD/ONUDI.

Ceci sera exécuté dans les ateliers existants.

B.- L'essai réussi et les modifications apportées au programme de production en série seront établis dans le secteur public. Ceci peut être financé par le BDD et l'assistance bi-latérale avec l'appui du PNUD/ONUDI.

On s'attend à la participation de la commission Nationale Céréalière du Ministère de l'Industrie, du BCP et des CARDERS.

C.- Un programme de bourses incluant l'entrainement sur place de nationaux doit être mis au point par le BCP grâce au PNUD/ONUDI.

D.- Le B.C.P. doit continuer ses recherches sur les possibilités d'exportation au Togo, Nigéria et Haute-Volta aussi rapidement que possible.

E.- Le Gouvernement devrait renforcer les activités coopératives dans les régions avec une action d'élimination des intermédiaires et l'établissement d'une meilleure stabilisation des prix.

F.- Le Gouvernement devrait avoir comme cible une réserve stratégique plus grande de maïs pour le même raison.

G.- Toute programmation agricole devrait s'attacher à fragmenter les quantités stockées pour réduire les pertes occasionnées dans les régions par le transport et les communications insuffisantes et inefficaces.

.../...

N.- Le Gouvernement devrait rechercher l'assistance du PNUD pour mettre au point une étude sur le terrain et supprimer les pertes en grain. Où et à quel stade, combien à chaque stade, pourquoi, avec des propositions de solution ?

CONSTATATIONS

Le maïs constitue le principal problème. Il est stocké en épathe, ou despathé et laissé dans le champ. Il est stocké en silos de terre, de palmes, de brique, de ciment, de petits bassins ou des cribs ou bien suspendus en tas sur les arbres.

Les pertes provenant des rats, oiseaux, insectes et de la moisissure sont très importantes en quantité d'où une baisse de qualité qui ne favorise pas un niveau de prix raisonnable.

Dans une certaine mesure, si on ne résout pas les problèmes qui entravent le bon stockage, les avantages qu'on pourrait tirer de l'extension des terres à cultiver pour accroître le rendement par hectare seront perdus.

Si le maïs est le problème alors le village est le centre d'attention. S'il en est ainsi, tout ce qui y est fait doit être bon marché, facile à manier, d'entretien libre, robuste et convenant dans ses effets.

Les unités doivent être petites, portables ou semi-mobiles et en tenant compte de la nécessité d'être bon marché. D'autre part, une seconde proposition peut être d'organiser un centre de stockage régional au port et une réserve stratégique avec facilité de séchage qui sera développé plus tard.

En envisageant une production de maïs de 300,000 tonnes pour 1977, et en établissant que les pertes de 120,000 tonnes sont réduites de moitié, c'est-à-dire 60,000 tonnes et que 75 % des récoltes sont consommées localement on en arrive aux besoins de stockage suivant :

.../...

- niveau villages [illegible] à [illegible] tonnes
- " [illegible] [illegible]
- [illegible] [illegible] [illegible]

[illegible] [illegible] tonnes

On peut faire un [illegible] [illegible] [illegible] et l'[illegible] des [illegible] [illegible] [illegible] [illegible] la [illegible] [illegible] à l'intérieur de la même structure.

Le [illegible] [illegible] [illegible] [illegible] [illegible] et [illegible].

Les [illegible] [illegible] les [illegible], les [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] le [illegible] des [illegible].

Le niveau de technologie des [illegible] [illegible] et le [illegible] [illegible] par les [illegible] de leurs [illegible] [illegible] [illegible] à la conclusion qu'un système de technologie intermédiaire [illegible] la fabrication de [illegible] de [illegible] ou de [illegible] et leur utilisation peut être [illegible] au Congo.

La structure institutionnelle pour [illegible] de l'[illegible], [illegible] des entreprises de fabrication, pour le [illegible] et la distribution et pour la mise au point existe.

Il existe aussi des [illegible] et une [illegible] initiale de 2,000 [illegible] de 1 et 10 tonnes qui constituent les [illegible] [illegible] bien que le Gouvernement [illegible] [illegible] [illegible] [illegible] quant à sa politique à moyen et à long terme.

Il semble que l'assistance du PNUD soit souhaitable au Congo pour chaque phase du programme de fabrication locale. On doit prévoir aussi qu'on peut fabriquer d'autres outils pour l'agriculture dans la même usine.

Le Port de [illegible] serait appelé à avoir une [illegible] influence

.../...

dans le trafic des marchandises allant vers les pays voisins et en provenant, particulièrement du Niger, pays continental.

Les perspectives pour l'exportation de céréales/blé vers les pays limitrophes NIGERIA, TOGO, HAUTE-VOLTA, NIGER semblent de bon aloi et un travail a été déjà effectué au Niger par le B.C.P. Une telle approche devrait être développée.

La contrainte majeure dans les activités villageoises est le manque d'électricité et de moyens à brûler (bois etc...)

Les communications et le transport sont insuffisants. Ce sont là des raisons évidentes pour concentrer les installations agro-industrielles dans le secteur rural.

Le crédit industriel de la BID est disponible et l'étude de faisabilité est bonne. Le crédit agricole du FED/AC est disponible, le taux d'intérêt est de 10 % pendant 7 ans.

La rétention du mil sur pied dans le champ pour une période de 6 mois enlève la possibilité pour les paysans de faire une seconde semence et se préparer à une seconde récolte.

Cependant, l'absence de moyens alternatifs de séchage/stockage lui impose une telle pratique.

ANNEX

ADDENDUM TO FOLLOWING REPORT

26.1.1976

RESTRICTED
17.1.1976

ENGLISH VERSION

ASSISTANCE TO THE LOCAL MANUFACTURE OF STEEL SILOS FOR FOOD GRAIN STORAGE

THE POPULAR REPUBLIC OF BENIN
(DP/DAH/71/513/11-05/B/12)

PROJECT FINDINGS AND RECOMMENDATIONS

TERMINAL REPORT PREPARED FOR THE GOVERNMENT OF BENIN

by

Ron HAWKEY (MECHANICAL ENGINEER) Expert of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION acting as Executing Agency for the UNITED NATIONS DEVELOPMENT PROGRAMME

Note by A. GILLAM, Acting Project Manager, of CEPEB under whose auspices Mr. HAWKEY prepared his report

The matters contained in the addendum arose with Mr. Hawkey's knowledge, before his departure from Benin. Lack of time prevented him from preparing it personally.

The pages of Mr. Hawkey's report were numbered subsequently by hand. Numbering commences at 1 with SUMMARY ending with 75 (Appendix N).

First amendment

Page 49 may be replaced by the new page. The amendment concerns the rate of interest on investment which is now calculated at 10 % instead of 8 %. As a result, the total expenses are slightly higher as is the cost price (Prix de revient par T/capacité).

Second amendment

Pages 54 and 55 may be replaced by the new pages 54 and 55. The changes concern :

1 - Provision for customs duty after 5 years

2 - Provision for taxes after 5 years
(These two items appear in columus headed 6 and 7. Customs duty is incorporated in "Achats de Matières Premières" - tax appears in the line "Impôts").

3 - The interest on investment at 10 % instead of 8 % appears on the line "Frais Financiers".

The above 3 items concern page 54. The sole change on page 55 concerns the gross margin before interest and capital repayment (marge brute d'auto-financement). Changes on this line necessitate resultant changes.

Additional information

The document headed "Analyse Données Projet Silos" is that referred to in the table of contents (page 81) as Appendix C "UNIDO FINANCIAL STATEMENT".

A. GILLAM

Acting Project Manager
CEPEB

7 **INTERETS**

10% sur Investissements	126.611.000	12.661.000	[illegible]
18% sur Fonds Roulement	19.740/000	2.369.000	15.030.000
TOTAL FRAIS DE PRODUCTION			82.001.000

8 **FONDS DE ROULEMENT**

ELEMENTS		MOIS	MONTANT
Mat. Premières	(55.100.000)	3	13.775.000
Energie	(4.000.000)	3	1.000.000
Matières consommables	(4.620.000)	3	1.155.000
Frais administratifs	(1.320.000)	1	110.000
Salaires	(20.000.000)	1	1.700.000
Divers		-	2.000.000
TOTAL			19.740.000

9 **INVESTISSEMENT TOTAL**

- Investissement	126.611.000	
- Fonds de roulement	19.740.000	
	146.351.000	

10 **REMBOURSEMENT DU CAPITAL** (7ème)

$\frac{146.326.000}{7}$ 80.900.000

T O T A L G E N E R A L 108.901.000

11 **PRODUCTION PREVUE**

1 600 Cellules 5 T 8 000 T

200 " 10 T 2 000 T

10 000 T

12 **PRIX DE REVIENT PAR T/CAPACITE**

$\frac{108.901.000}{10.000}$ = 10 290

Soit environ $ 45/T 3/ 4/

13 **PRIX D'IMPORTATION**

103 $ non monté 23 175 CFA 3/

(Prix de la T/mile complètement montée 150 soit 33.750 CFA) 4/

.../...

COMPTE D'EXPLOITATION PREVISIONNEL (en 1 000 CFA)

	1	2	3	4	5	6	7
PRODUCTION (% d'utilisation de la capacité de produit)	40 %	40%	40%	40%	40%	40%	40%
I CHIFFRE D'AFFAIRES BASE 46%/T cap	103.500	103.500	103.500	113.850	113.850	124.200	132.000
II FRAIS DE FONCTIONNEMENT							
- Achats de Matières Premières	22.100	22.100	24.310	25.415	26.741	36.202 x	36.202 x
- Energie et eau	4.000	4.000	4.400	4.400	4.840	4.840	5.000
- Entretien	4.620	4.620	5.090	5.090	5.599	5.599	6.000
- Salaires et charges sociales	20.000	20.000	22.000	22.000	24.200	26.620	29.040
- Frais généraux (Publ. loyers PTT Assurances Frais Bureau)	1.320	1.320	1.450	1.450	1.595	1.595	2.000
	52.040	52.040	57.250	58.355	62.975	75.556	78.942
III TAXES/CHIFFRE	ex	ex	ex	ex	ex	5.545	6.048
IV MARGE COMMERCIALE I -(II + III)	51.460	51.460	46.250	55.495	50.875	43.099	47.010
V FRAIS FINANCIERS	15.030	12.545	10.455	8.365	6.275	4.185	2.095
VI AMORTISSEMENTS	14.950	14.950	14.950	12.950	12.575	12.175	12.175
	29.980	27.495	25.405	21.315	18.850	16.360	14.270
VII Bénéfice avant impôts	21.480	23.965	20.845	34.180	32.025	26.739	32.740
VIII IMPOTS	/	/	/	/	/	10.695	13.100
IX Bénéfice net après impôts	21.480	23.965	20.845	34.180	32.025	16.044	19.640
X MARGE Brute x d'autofinancement	580	3.065	-55	19.230	11.125	- 4.856	-1.260

x APRES AMORTISSEMENT CAPITAL 20.900

x DROITS DOUANE COMPRIS.

PLAN DE FINANCEMENT DE TRESORERIE PREVISIONNEL (en 1.000 F CFA)

	0 (1)	1	2	3	4	5	6	7
A- ORIGINE DES Fonds	-	-	-	-	-	-	-	-
. Report	-	59700	124220	100225	65410	50600	18575	- 6031
. Capital Soc	-	-						
. Opte Courant Asso.	-	-						
. Crédits locaux autres que le moyen terme solli- dés	-	-						
. Marge brute d'autofinancement	-	21480	23965	20045	34180	32025	16044	19650
TOTAL		38220	100255	79410	50600	18575	2531	+ 13619
B- UTILISATIONS DES FONDS								
. REPORT	-							
. Dépenses d' investissement	40 000	86 000						
. Autres investissements a réaliser en cours d' exp. Fds roulement	19 700							
. Renouvellement de matériel	-	-	-	6 000	-	-	3 500	-
REMBOURSEMENT								
. Crédits fournisseurs.								
. Comptes courants Associ								
. Crédits locaux autres que moyen terme solli.								
	59 700	86 000	-	6 000	-	-	3 500	-
A - B = Solde au 31 Décembre (2)	59 700	124220	100225	65410	50600	18575	- 6031	+ 13619

N° 14

ANALYSE DONNEES PROJET SELOS

(UNIDO FINANCIAL STATEMENT)

	DESIGNATION	CALCULS	RESULTATS (en 1000 CFA)	%
I	PRODUCTION ANNUELLE	10.000T/Capacité	-	40% (CAP)
II	INVESTISSEMENTS		146.351	
	Immobilisé	126.611		86,5% (Inv)
	Fonds Roulement	19.740		13,5% (Inv)
III	CHIFFRE D'AFFAIRES		103.500	70% (Inv)
	Base $ 46 T/CAP.	-		
IV	PRIX DE REVIENT		82.020	79% (CA)
	COUT DE PRODUCTION	66.990		81,7% (PR)
	CHARGES FINANCIERES			
	10% 126.611 12.661			
	12% 19.740 2.369	15.030		18,3% (PR)
	CHARGES FIXES	36.800		44,9% (PR)
	CHARGES VARIABLES	45.220		55,1% (PR)
V	MARGE D'AUTOFINANCEMENT	-	21.480	20,7 (CA)
VI	TAUX DE RENTABILITE			
a)	MARGE + INTERETS / Investissements	21.480 + 15.030 / 146.351		25% (Inv)
b)	MARGE / Investissements	21.480 / 146.351		14,68% (Inv)
VII	TAUX DE VALEUR AJOUTEE			
	VALEUR AJOUTEE / Chiffre d'AFFAIRES	28.740 / 103.500	-	27,7% (CA)
VIII	PRIX D'EXPORTATION			224% (CA)
	BASE $ 103 T/CAP	~~23.179~~	231.750	
IX	ECONOMIE EN DEVISES		134.925	58% (Prix import)
	(Prix d'Import- 30%)=(Devises économisées)	168.225-27.300		
X	EMPRUNT (ou Apports)		146.351	
	A certain terme 35%	51.221		35% (Inv)
	A Moyen terme 65%	95.130		65% (Inv)
XI	POSSIBILITE REMBOURSEMENT		20.900	14,3% (Inv)
		146.351 / ?		
XII	EMPLOIS NOUVEAUX	47 (NATIONAUX)		

PROFITABILITY OF PROJECT SILO (1000 CFA)

	1	2	3	4	5	6	7
1 Sales Revenue	103.500	103.500	103.500	113.850	113.850	124.200	132.000
2 Operating costs	52.040	52.040	57.250	58.355	62.975	75.556	78.942
3 DEPRECIATION	14.950	14.950	14.950	12.950	12.575	12.175	12.175
	66.990	66.990	72.200	71.305	75.550	87.731	91.117
4 GROSS PROFIT	36.510	36.510	31.300	42.545	38.300	36.469	40.883
5 INTEREST	15.030	12.545	10.455	8.365	6.275	4.185	2.095
6 PROFIT AFTER INTEREST	21.480	23.965	20.845	34.180	32.025	32.284	38.788
7 TAXES FISCALITY TURNOVER T	-	-	-	-	-	10.695 5.545 16.240	13.100 6.048 19.148
8 NET PROFIT	21.480	23.965	20.845	34.180	32.025	16.044	19.640
9 PROFITABILITY(Percent CAPITAL 146.351)	14,68 %	16,38 %	14,24 %	23,35	21,88	10,96 %	13,42 %
10 REIMBOURSt CAPITAL (OVER 7 YEARS)	20.900	20.900	20.900	20.900	20.900	20.900	20.900
11 [illegible]	+ 580	+ 3.085	-55	+ 13.280	+ 11.125	- 4.856	-1.260

[illegible]

[illegible]

[illegible]

[illegible]
INDUSTRIEL

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

B.P. [illegible] – Tel. [illegible] . [illegible]
Télégramme : [illegible] . [illegible]
[illegible] – [illegible]

RESTRICTED

ENGLISH VERSION

17/1/1976

ASSISTANCE TO THE LOCAL MANUFACTURE OF STEEL SILOS FOR FOOD GRAIN STORAGE

THE POPULAR REPUBLIC OF BENIN

(DP/DAH/71/513/11-05/B/12)

PROJECT FINDINGS AND RECOMMENDATIONS

TERMINAL REPORT PREPARED FOR
THE GOVERNMENT OF BENIN

by

Ron HAWKEY (Mechanical Engineer) Expert of
the United Nations Industrial Development
Organisation acting as Executing Agency for
the United Nations Development Programme

This report has not been cleared with the United Nations Industrial Development Organisation which does not therefore necessarily share the views presented (1)

(1) To be omitted after clearance with UNIDO.

TABLE OF CONTENTS

I - SUMMARY

The Government of Benin is anxious to implement a policy for the local manufacture of steel silos for food grain storage.

Ministries and Departments involved are :

Industry
Rural Development and Cooperative Action
National Cereal Commission
Finance
CEPEB

It is anticipated that local funds or bi-lateral credit will be available.

The institutional framework within which such a plan would operate has been identified.

Who would manufacture, who would buy, how many, where, when, what capacity, what cost has been clarified ?

The export demand is thought to be there though requires further study.

A working plan for the realisation of prototypes and a mass manufacture has been produced.

It is considered that strengthening of the activities of cooperative systems, strategic reserves and studies into causes of grain losses should take a priority through what could best be termed as a "NATIONAL SAVE THE GRAIN CAMPAIGN".

Finally, the overwhelming benefit considered to be present in local manufacture of drying/storage systems are :

i - saving of 30 % of the grain losses
ii - easing balance of payments
iii - uplifting local technology
iv - re-inforcing price stabilisation
v - developing into other agro/industrial activity

- mobile driers
- static driers
- loading/unloading equipment
- threshers
- cleaners
- processing machines
- agricultural buildings
- industrial buildings etc...

.../...

II - INTRODUCTION

This project has its origin in the visit of a staff officer of UNIDO to Benin during 1974 the request of the Government for assistance and the allocation of activities to CEPEB (Centre d'Etudes et de Promotion des Entreprises Béninoises). The project relates quite clearly to the work carried out by that staff officer and the present Expert who were in Indonesia during 1973, UNIDO/TCD 276 13 February 1974 and UNIDO/ITD 251 8 April 1974 particularly refer.

The Government of Benin had long since regarded the problem of lack of adequate drying storage and aeration facilities as a major contribution to excessive loss of grain - quantitative and qualative - the effect this had on price stabilisation socio/economic benefits and agricultural development as a whole.

Benin has adequate arable land and sufficient rainfall. On the other hand very high humidity in the south and central regions (where most grain is grown) acts as a constraint on the safe-keeping quality of its harvests.

The major crops are manioc, yam, maize, sorghum with smaller quantities of millet, paddy, pulses, beans and sweet potatoes.

However the major problem is associated with maize and the Government's desire for improved village drying and storage.

On going schemes of assistance are being carried out by the United States Peace Corps and FAO through SEMIAH (National Society for Agriculture Irrigation and Hydrology). The former is a small though energetic project for making the best of local village resources and the latter operating a project of many years duration appears to be adequately covering expansion of sowing (maize and paddy) and the production of rice from paddy and its storage.

Attention might be drawn to a study on storage carried out some 6 (?) years ago by the U.S.A.I.D. for the Conseil de l'Entente - a regional project covering, it is believed, Nigeria, Benin, Togo, Niger and Upper Volta.

The total crop production is around 1,376,000 tons (1) with a sundament of some 671,000 tons in terms of edible (?) grain. This might well appear to be more than adequate for a country of 3 millions of people allowing for a calorific intake of 2,500 units per day and a carbohydrate factor of 125 kgs per capita/annum.

(1) FAO yearbook

Unfortunately, the losses from birds, insects, rodents and mould are very high, some 40 %, sometimes 75 % and rarely even less (2). Furthermore due to the lack of adequate drying and storage facilities, overuse of cooperative systems, ineffectual price stabilization substantial quantities of products are unofficially exported over neighbouring boundaries with the nett result that the country faces a deficit position.

The case for urgent action related to provision of suitable and adequate numbers of drying/storage units is overwhelming. The case for local manufacture is heightened by the revelation (3) that Benin has procured 10,000 tons capacity Russian silo at a cost of 196 US $ per ton - 1978 price.

This would probably compare to a locally manufactured price of about 80 $ US per ton capacity.

It is much to be regretted that time did not permit of as much travel within the country as might be thought desirable nor was it practicable to tour neighbouring countries except to a short extension of duty, sadly for.

Nevertheless it is felt that this report adequately reflects the needs and wishes of the people of Benin.

No project document has been available so that normal check options are not in this case possible.

Nevertheless the significance to the countries economy in terms of stagnation in losses, deterioration of quality, reduction of imports of food grain in the medium and long term are totally apparent.

Progress in the arrangement of visas, factory visits and appointments with departments, institutions and ostensibly also in getting under way, typing was difficult to achieve. The centre for studies and training a recipient engineer and there were certain other domestic (ECREI) difficulties of which UNDP/UNIDO are aware.

Detailed draughtsmen design drawings of prototype silos and driers are therefore lacking, but it is thought sufficient information has been provided to ensure job description (Appendix A) and Tasks required (Appendix B).

(2) National Economic Commission

(3) National Economic Commission

III - [redacted]

Maize is the principal problem. It is stored in the ear on the cob, without the ear (protective sheath) on the cob, shucked off the cob and left standing on the stalk in the field. It is stored in dust, sticks, brick, cement silos, sacks, chicken wire cribs or hung in bundles on trees.

The losses from rodent, bird, insect and mould are quantitatively high and the weekly destruction damaging to reasonable price levels.

To a large extent unless the problem of sound drying/storage can be achieved the advantages to be gained from opening up more farmland, increasing the yield per hectare can only be wasted.

If maize is the problem then the village is the area of attention. If this be so whatever is done has to be cheap, simple to operate, maintenance free, robust and convincing in its effect.

Units have to be small, portable or containable and with an eye to cash sales in Banda.

On the other hand, a second scale can be stated for regional processing centre, part and strategic stockpile drying/storage to which could be developed later.

Taking a forward view and assuming a maize production of 300 th.tons by 1977, assess losses of 120 th.tons at reduced by half to 60 th.tons and that 75 % of the crop is consumed locally one arrives at the following storage requirements.

Village level	180,000 tons max.	90,000 tons minimum
Urban level	36,000 "	
Strategic reserve	24,000 "	(1985)
say	180,000 "	

A case can be made out for helping at the strengthening and extension of cooperative activities to encourage the retention of grain within the community and perhaps a more effective price stabilization policy within the same framework.

Suitable and adequate drying/storage bins realise to those prospects since traditionally the farmer regards his grain as cash and regards with some suspicion the idealogy of bulk storage of his own crop with that of others.

Field inspections, factory visits revealed an earnest object complementary effort to improve the farmers lot.

.../...

Local workshop levels of technology, understanding by the villager of his problems lends one to a conclusion that intermediate technology in both manufacture of drying/storage systems and their utilization can be applied in Benin.

The institutional framework for raising finance, setting up manufacturing enterprises, marketing, distributing and operating exists. There are buyers and an initial demand of 2,000 5 to 10 tons bins are stated as the immediate needs (4) although the Government appears somewhat uncertain as to its policy in the medium and long term.

It seems likely that UNDP assistance would be desirable in seeing Benin through each phase of a local manufacturing programme and that consideration should be given to the manufacture of other aids to agricultural production at the same factory.

The Port of Cotonou would appear to exercise an enormous influence on the passage of goods to and from neighbouring territories, in particular land-locked Niger.

The prospect of drier/silo exportation to surrounding countries of Nigeria, Togo, Upper Volta and Niger would appear to be sound thinking and some work has been carried by CEPEB in Niger. Such research should be extended.

A major constraint on village activities is lack of electricity and a far from abundant supply of burnable waste (wood, etc...).

Communication and transportation are poor and every evidence points to concentration of agro/mechanical development in the rural sector.

Industrial credit from the Bank for Development of Benin is a reality subject to feasibility and agricultural credit via the Rural Development and Cooperative Action Ministry available, interest rate is 8% over 7 years.

Retention of maize on the stalk, in the field, for periods of over 6 months hampers the farmers ability to grow secondary crops and makes preparing for a second harvest too hurried a procedure. On the other hand, absence of alternate means for drying/storage enforces such a policy on him.

(4) National Cereals Commission

IV - RECOMMENDATIONS

A - A prototype manufacturing and testing program for driers and silos should be promoted by the Ministry for Industry through CEPEB and with the active assistance of CARDER and the National Cereal Commission with UNDP/UNIDO inputs of machinery and Experts as per APPENDIX J, Landm. That this be conducted in the existing workshops.

B - A mass manufacturing program should follow successful testing and/or modification in the PUBLIC SECTOR by virtue of a factory funded by the Development Bank of Benin and or bi-lateral assistance programs with UNDP/UNIDO input of Experts as per APPENDIX K, Landm.

Active participation by the National Cereal Commission, Ministry for Industry CEPEB and Carder is expected.

C - A Fellowship program with ensuing Extension Training through and with UNDP/UNIDO CEPEB should be in-built APPENDIX M.

D - CEPEB should continue its research into export possibilities in Togo, Nigeria and Upper Volta as quickly as possible.

E - The Government should strengthen cooperative activities in the regions with a view to eliminating the middle-man and achieving greater price-stabilisation.

F - The Government should set as its target a larger STRATEGIC RESERVE of maize for a similar reason.

G - All agricultural planning should be geared towards fragmentation of stock-holdings in the regions to reduce the losses occasioned by inefficient and insufficient transportation and communication.

H - The Government should seek UNDP assistance to implement a STUDY on "the area and extent of losses in grain", where, at what stage, how much at each stage, why, together with proposals for remedy ?

V -

APPENDIX A

UNIDO

JOB DESCRIPTION

DP/DAH/71/513/11-05/B

Post Title	:	Mechanical Engineer
Duration	:	One month
Date required	:	End April/beginning May 1976
Duty Station	:	Cotonou with travel within the country, as well as in neighbouring countries
Purpose of the Projet	:	Assistance to the local manufacture of steel silos for food grain storage
Duties	:	The expert will work in close collaboration with the experts attached to CEPEB (Centre d'Etudes et de Promotion des Entreprises Béninoises). Under the supervision of the Project Manager of CEPEB he will in particular :

1. Analyse the local demand and the demand of the neighbouring countries in manufactured steel silos for the storage of food grain, such as rice, maize etc.

2. Design several silos prototypes for local manufacture.

3. Estimate the raw materials and equipment to be provided by UNDP and which would facilitate the start of a steel silo pilot plant in the country.

4. Analyse the existing local mechanical production units able to realize prototypes and a mass production.

5. Elaborate a working plan for the realization of prototypes and of a mass production.

6. Calculate the cost prices of the prototypes and of the mass production.

7. Calculate the financial rentability.

Qualifications	:	Mechanical engineer with a large experience in the design and construction of steel silos, especially in developing countries.
Language	:	French, but also English acceptable.
Background Information	:	Although Benin possesses adequate arable land and receives adequate rainfall, it is currently an importer of food grain. One of the major factor hampering the expansion of local production is lack of storage and marketing facilities. Cotonou is also a major port terminal for the delivery of grain to other regions of West Africa. Grain is currently being piled on the ground. The losses are very high. In order to cut these losses the Government has invited tenders for 8,000 tons of silo capacity. A small silo project (2-5 tons capacity) is being operated in the field at the farm level with locally manufactured silos of steel and wood. These were inherited from earlier Peace Corps and USAID projects. It is believed that the only way to evaluate or promote an efficient programme is to manufacture and test a few bins locally.

V • APPENDIX B

1 • FACTORIES VISITED

OCBN	COTONOU
TOGBE	COTONOU
TRAMEDAH	COTONOU
MECANELEC	COTONOU
DEGUENON	COTONOU

11 • INSTALLATIONS VISITED

SONIAH - PORTO NOVO (METRO)
SONADER - GRAND HINVI
IRAT - NIAULLI
UCRT - TORI CADA
UCRT - ALINO
AGRIC.COLLEGE - SEKOU
SOCAB - COTONOU
OCBN - PORT COTONOU

V. APPENDIX C

4. ORGANISATIONS - OFFICIALS SEEN

FAO - M.R. GALLIEN

BANK DEVELOPMENT BENIN - M. ADAGBE

UNIDO - M. LEVENCHAU

PEACE CORPS - M. S. GRAHAM

FAO - M. H. THORSHAUG

FAO - M. R. NIEUWENHUYSE

FAO - M. S. ALDERICHI

NATIONAL CEREAL COMMISSION - M. NAPOM

MINISTRY OF INDUSTRY - M. DJOLOLO

MINISTRY OF RURAL DEVELOPMENT AND COOPERATIVES

ACTION - M. B. BJERRE

MINISTRY OF FINANCES - M. J. LABITE

BANK DEVELOPMENT BENIN - M. P. DOSSOU

U.S. EMBASSY - M. D. HALL

14 - COUNTERPARTS

A. GBAGUIDI - EXPERT IN INDUSTRY

ASSIGNED TO PROJECT SILOS

ASSISTED BY M. M. DELFORGE AND M. A. GILLAM

ACCOUNTING AND ACTING PROJECT MANAGER

(FORMERLY MARKETING), RESPECTIVELY, UNIDO - CENTRE

APPENDIX D

1 - REPORTS STUDIED

RAPPORT DE MISSION AU BENIN - FAO -E.E. HURST 1972
MISSION DU CEPEB AU NIGER - CEPEB - A.GILLAM 1975
REPORT ON NIGERIA - FAO - AFRICAN RURAL STORAGE 1975
MANUEL DE CONVERSATION DES PRODUITS AGRICOLES
TROPICAUX - SECRETARIAT D'ETAT - REP. FRANCE 1974
HANDLING AND STORAGE OF FOOD GRAINS TROPICS -
FAO - D. 20 - HALL 1970
LE STOCKAGE DES GRAINS DAHOMEY - CORPS DE LA PAIX -
C. LINDBLAD 1974
VILLAGE LEVEL GRAIN STORAGE - FAO - H. THORSMAUG 1974
LE POINT SUR LE SILO - CEPEB - A. GILLAM 1975
REPORT ON BERKY MISSION DAHOMEY - CEPEB -
F. TRETJAK 1974

11 - ASSIGNMENT DATES

1975 - 14 December		LEFT PAKISTAN	
15-16	"	BRIEFING VIENNA	
17	"	TO PARIS FOR VISA	
18	"	VISA AND TO BENIN	
19	"	COTONOU AND START	) 30 DAYS
1976 - 17 January		COMPLETE	)
18	"	DEPART COTONOU	
19-20	"	EXPECTED DEBRIEFING	
22	"	ANTICIPATE IN PAKISTAN	

TOTAL : 40 DAYS

V - APPENDIX E 28/10/76

REPUBLIQUE POPULAIRE DU BENIN COTONOU

UNDP/UNIDO/CEPEB

DP/DAH/71/513/11-08/B/12

TENTATIVE APPROACH AND SUGGESTED PROGRAM

INTRODUCTION

In advance of Meetings, study of statistics available. Raising of further data, field trips and analysis of the research carried out so far it would be proper to assume that a serious drying, storage, transportation, handling and motive power problem exists in R. P. Benin

It would further be wise to ignore any pre-conceived personal methods of overcoming the problems as experience has shown conditions and requirements do differ from country to country.

Whatever is eventually recommended should be positive, action-oriented and fitting the framework of Government Policy UNDP/UNIDO possibilities of future "back-up" and falling within the capability of CEPEB to handle with total involvement of implementing Bodies with CEPEB from the onset .

A - THE APPROACH

1. No pre-conceived ideas
2. Analysis of existing research
3. Discussions with all organisation and persons who have an interest in this project
4. Study of available statistics
5. Raising of furthur data
6. Field trips (urban and rural)
7. Positively what crops are involved
8. Tonnage of each
   a. indigeneous
   b. imports
9. Storage period

10. Where
    a. Farm
    b. Village
    c. Town
    d. Processing centres
    e. Ports
    f. National stockpile

11. How much what where and for how long lies at the responsibility of (a) public sector
    (b) private sector

12. What is Government Policy ?
    (a) Production
    (b) Processing
    (c) Marketing
    (d) Storage
    (e) Electrification
    (f) Communications (roads etc)
    (g) Cooperatives

13. Formulate recommendations for discussion
    (a) CEPEB
    (b) UNDP/UNIDO/FAO
    (c) Cabinet Secretariat
    (d) Ministry of Planning

14. Re-formulate recommendations as necessary and suitable to a solution

15. Set out proposals to take into account (what to do)
    (a) Assistance to existing efforts
    (b) What can be done now
    (c) What can be achieved in the short term
    (d) What can be achieved in the longer term

16. (How to do)
    (a) 100 % local manufacture
    (b) Part local manufacture
        part imported
    (c) 100 % imported

17. (How to do)
    (a) Government
    (b) UNDP/UNIDO
    (c) Private sector or some suitable blend

18. Discuss draft recommendations with
    (a) CEPEB
    (b) UNDP/UNIDO/FAO
    (c) Cabinet secretariat
    (d) Ministry of Planning

19. Agree recommendations
20. Implement so far as can be achieved 15 (a), 15 (b)
21. Raise UNIDO report
22. Raise additional project document (if necessary) covering 15 (c), 15 (d), together with Job Descriptions and input of Fellowship/in service training programs.

B. TIME TABLE

	Consecutive dates	Actual
Approach 1 to 4	19 to 26 Dec.	8 days
5	27 to 30 Dec.	2 "
6	31 to 3 Janv.	2 "
7 to 12	4 to 9 Janv.	1 "
13	6 to 7 Janv.	2 "
14	8 Janv.	1 "
15 to 17	9 Janv.	1 "
18 to 19	10 to 12 Janv.	1 "
20	13 to 14 Janv.	2 "
21 to 22	15 Janv.	1 "
		18 days

C. TRAVEL SCHEDULE

	Days	
Pakistan to Vienna	1	14 Dec.
Briefing Vienna	2	
To Paris (visa)	1	
To Cotonou	1	
In Cotonou	28	19 Dec. - 15 Janv.
To Vienna	1	16 Janv. *
Debriefing Vienna	4	(Sat/sun inbetween)
To & in Pakistan	2	22 Janv.
Total	40	

D. CONTRACT

Allows of 31 days = 13 Dec. to 12 Janv.
Project likely to need 40 days = 14 Dec. to 22 Janv.
Provisionally therefore appears as though an extension of 10 days might be justified.
Visa expire 17 Janv. *

E. INSTITUTIONS, ORGANISATIONS, INDIVIDUALS TO SEE - (A 3)

1. CEPEB
2. UNDP
3. CABINET SECRETARIAT
4. MINISTRY OF PLAN
5. MINISTRY OF AGRICULTURE
6. MINISTRY OF INDUSTRY
7. FAO
8. MINISTRY OF FINANCES

9.	CHAMBER OF COMMERCE	•
10.	PEACE CORPS	•
11.	PORT AUTHORITIES	•
12.	NATIONAL CEREAL COMMISSION	•
13.	MINISTRY OF RURAL DEVELOPMENT AND COOPERATIVE ACTION	•
14.	MINISTRY OF INTERIEUR	
15.	CARDERS	
16.	SOCAD	
17.	SONIAH	
18.	SO.NA.DE.R.	
19.	UNCT	
20.	SODANI	
22.	TRAMEDAH	
23.	MINISTRY OF MANPOWER	•
24.	U.S.A.I.D. (Bank Development) •	•
25.	SGACI AND JOS. HANSEN	•
26.	METAL-WOORKING SHOPS	•
27.	CEMENT WORKS	•
28	FOUNDRIES (OCBN)	•
29.	TIMBER-WORKS	•

E. STATISTICS REQUIRED

A. Annual production of principal crops
2. Annual importation of cereals, etc - by type
3. Present population
4. Growth rate
5. Perdiem consumption per capita - by type
6. Humidity range - days | night, season - by area
7. Temperature range - day, night, season - by area
8. Moisture content at time of harvest - by type

F. FACTS REQUIRES

1. Methods of harvesting
2. Methods of threshing
3. Methods of drying
4. Methods of transportation
5. Methods of storage
6. Methods of processing
7. Methods of marketing
8. Extent of losses 1-7 so far as known (and source)
9. Strenght of cooperative movement
10. National stockpiles
11. Machinery in use for 1-7
12. What is the local demand for silos

(a) Benin
(b) Adjacent countries

M. SPECIFICALLY

Implement factors 2 to 7 of Job Description
Implement factors a to d of telex MISC 1377

L. CONCLUSION ON APPROACH.

In view of the time element, necessity of moving in keeping with National Policy, consequences of a hasty decision & the impact of DRYING on storage, the over whelming advantages of intermediate technology applied to harvesting, threshing, drying, transportation, handling and storage in terms of reduction of losses and corresponding diminution of imports it may well prove necessary to to one of three things.

1. Do what can be done now, however ill prepared and speculative or,
2. Raise a master plan for UNDP/UNIDO early request, sanction and implementation to overcome the problem in the near, medium and long term based on factors determined as a result of this mission.
3. A suitable streamlined plan combining the best possibilities of both.

A. LOSSES

Fall into 2 distinct categories

(a) quantative
(b) qualitive

Quantative loss can be described as that which reduces in some way the original total weight. Birds, rodents, container seepage/spillage, pilferage, reduction in moisture lower than is necessary (overdrying), Trash content, etc...

Qualitive loss is that which is occasioned by mould & insect boring, other grains, mustiness, general unattractive appearances, etc... Thus quantative is a loss of weight and qualitive a loss of value (whichcan of course be total).

K. STORAGE

The availability of good storage is valueless unless drying and aeration features are present.

In economic terms good storage is suspect unless containers can be discarded.

In the medium to large size bulk stores (25 to 250 tons units) pre-cleaners or mechanical (power or foot operated) threshers are a desirable feature.

M. Moisture meters are an important adjunct.

[illegible]

As a rough estimation [illegible] costs run as follows - per ton metric of capacity

	Type of unit	Capacity	Capital Cost (1)	[illegible] Cost CFA	Life Cycle Years	Annual [illegible]	Total	[illegible]
	[illegible]	[illegible] *	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible] *	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible] - 100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 2/	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible] *	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3/	[illegible]	[illegible] - 1 [illegible]	[illegible]	1 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4/	[illegible]	[illegible]	[illegible]	1 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1/ PLYWOOD

2/ METAL ROOF

3/ PORTABLE [illegible]

4/ CONVERTIBLE BAG/BULK

* Below and above these capacities costs are higher

As will be seen interms of "writeoff"

Costs run in this order

N° 1 = 1st
2 = 5th
3 = 2nd
4 = 3rd
5 = 7th
6 = 6th
7 = 4th
8 = 8th

Costs are typical local manufacturing late 1976

Fumigation adds a further [illegible] to [illegible] CFA capital (initial out lay) say 10,[illegible] to 40,[illegible] P.A.

[illegible] :
General Director
Chief of Project
Industrial Section
Marketing Section
Accounting Section
UNDP
UNIDO
R.H.

R. [illegible]
UNIDO
[illegible]

V .

APPENDIX F

9/1/78

e/214 UNDP/UNIDO/CEPEB SILO PROJECT
DP/RAH/77/013/11-08/B/1B

- INTERIM REPORT -

To acting project manager for Director General CEPEB.

The UNIDO Expert left Pakistan 14 December and arrived after briefing in Vienna the 19th.

The tour of duty was 1 month (31 days), this is day 23 and allowing for 3 days travel and debriefing 5 days remain.

It has proved difficult to arrange the necessary field/factory trips as reaction to requests for ministerial meetings has been slow. It would now appear that all these requirements are under way but will extend well into next week. As 6 days is required to write up the reports, type, check and present it will be seen that time is really insufficient.

Special arrangements will be required for typing and duplication as so far no reproduction at all has been possible in the 14 days in Benin including the original work programme.

So far the Expert has had audience with Ministry of Industry, National Core in Commission, has visited - TRANCOAH, TOGBE, SCEN and discussed the subject of storage with SONIAH, CEPEB and UNDP.

A field trip to SONIAH and MEC/MELEC and a discussion with FAO and the B ank has been arranged or has taken place.

However and not with standing the aforementioned, pretty clear ideas are developing and it is expected to

1. Identify potential manufacturers
2. Identify potential buyers
3. Identify means of financing both
4. Identify institutional framework within which 1 to 3 would operate
5. Identify possible UNDP/UNIDO involvement
6. Type of equipment desirable and to produce
7. Plan for implementation
8. Mission report
9. "Back up" Project Document -
10. Job Description
11. Fellowship program

So far the Expert has found no evidence of any study into actual percentage of losses in grain and at what stage this is occasioned. After searching further he will refer to the matter again.

Lastly the Expert refers CEPEB 's attention to the time factor and suggests respectfully that if items 7 to 11 are to be achieved an extension of 7 days should be sought i.e. reporting Vienna monday 19th, departing Cotonou friday 16th January but is now of the opinion that a delay occasioned by circumstances outside of the control of UNDP/UNIDO or its staff might not rate for extension and your advises are therefore in any-case sought visa expires 17th January.

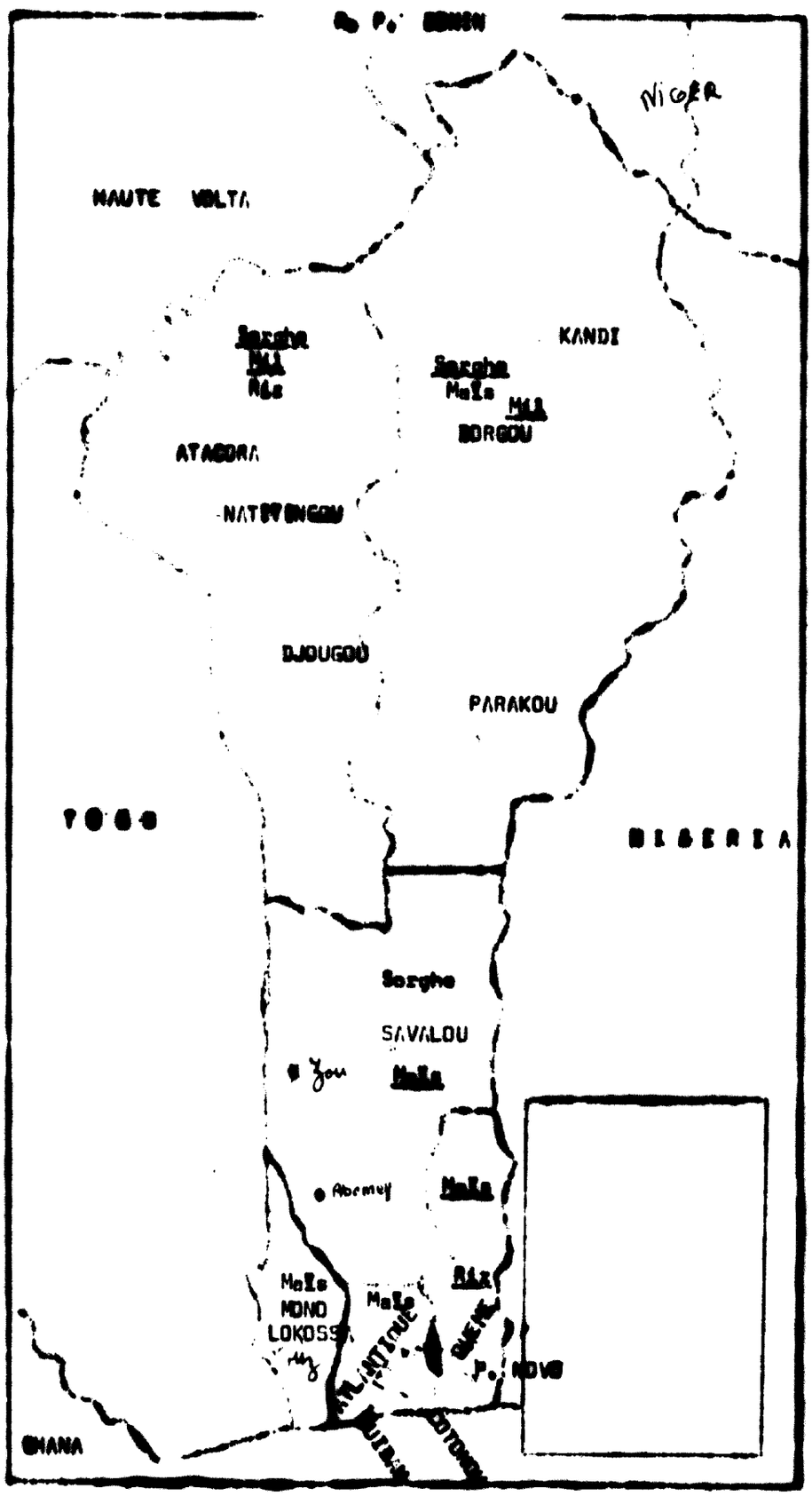
* Assistance to prototype manufacture and testing
  Assistance to mass production
  Assistance to erection
  Assistance to extension servicing

Circulation :

Acting Project Manager CEPEB
Director General CEPEB
File of 314
UNDP
R.R.
UNIDO

V

APPENDIX G


NIGER
HAUTE VOLTA
KANDI
ATACORA
BORGOU
NATITINGOU
DJOUGOU
PARAKOU
TOGO
NIGERIA
Sorgho
SAVALOU
Maïs
Abomey
Maïs
MONO
LOKOSSA
Riz
Maïs
PORTO NOVO
ATLANTIQUE
OUEME
COTONOU
GHANA

V -
i

REPUBLIQUE POPULAIRE DU BENIN

APPENDIX II

TEMPERATURES MOYENNES MENSUELLES

Stations		Janv.	Fev.	Mars	Avril	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Déc.	Période utilisée
COTONOU Aéro		33.8	33.9	33.5	33.9	33.2	31.9	29.6	28.9	30.5	31.8	32.0	32.9	1953 - 1962
PORTO-NOVO	m	17.0	18.8	20.1	20.7	20.4	20.4	18.8	19.8	20.0	19.1	21.1	18.4	1931 - 1962
	M	35.8	36.8	37.4	37.0	37.5	34.8	32.2	33.0	34.2	34.6	36.0	36.0	
	m	15.5	18.8	19.0	19.6	17.0	18.0	19.4	19.0	19.4	19.2	19.0	17.8	
BOHICON	M	37.7	39.3	40.2	38.2	36.3	36.2	33.7	35.2	34.2	34.7	35.6	36.3	1941- 1962
	m	14.9	17.5	19.4	19.8	19.6	19.0	17.7	17.6	19.3	18.9	19.4	15.4	
SAVE	M	40.2	39.0	39.5	39.2	37.4	35.2	32.5	33.2	35.0	34.6	36.2	36.7	1941 - 1962
	m	14.0	16.7	18.6	17.7	19.0	19.0	16.9	17.7	18.6	18.9	17.4	14.7	
PARAKOU	M	38.7	40.2	41.2	40.8	37.8	36.2	33.4	33.2	34.2	35.0	36.5	36.5	1938 - 1962
	m	12.6	13.4	16.0	18.3	17.8	18.0	16.6	17.2	17.7	18.1	13.8	11.6	
NATITINGOU	M	41.3	42.9	44.9	43.0	41.2	40.0	40.0	35.4	36.8	40.2	40.8	40.9	1929 - 1962
	m	13.8	15.0	16.0	17.0	17.0	16.7	16.1	16.0	16.0	15.0	14.0	13.0	
KANDI	M	40.9	42.9	44.3	45.6	42.4	39.0	37.2	35.8	35.3	38.2	39.5	39.0	1938 - 1962
	m	8.5	10.2	15.0	17.5	17.5	18.0	17.5	17.5	18.0	13.7	12.1	9.6	

V - 16

APPENDIX II

HUMIDITE RELATIVE (MAXIMALE ET MINIMALE MOYENNES)

	Stations		Janv.	Fev.	Mars	Avril	Mai	Juin	Juil.	Août	Sept.	Oct.	Nov.	Dec.
SUD - BAIE	COTONOU	M	96	94	92	96	96	96	94	96	96	97	96	97
	Aéro	m	69	69	69	71	72	77	79	77	76	75	73	65
	PORTO-NOVO	M	97	97	96	97	97	96	97	97	97	97	98	98
		m	42	38	47	58	58	62	66	66	64	60	52	44
[illegible]	SAVE	M	92	94	96	97	98	98	98	98	98	98	98	94
[illegible]		m	33	31	43	54	54	59	63	64	62	58	47	36
[illegible] SUD-EST	P.NOVO	M	80	84	92	95	96	97	98	97	98	98	97	88
		m	24	25	37	48	54	60	66	68	64	58	44	30
[illegible]	KANDI	M	44	51	75	87	95	98	99	99	99	97	84	58
		m	18	20	28	40	51	59	65	65	63	62	33	21
[illegible]	NATITINGOU	M	95	91	91	75	88	97	97	98	99	96	84	66
		m	19	17	21	30	45	55	63	65	62	48	26	22

V - APPENDIX I

CEPEB TELEX 29 SEPTEMBER 1975 30/12/75

In reply

(a) Curving corrugated sheets two approaches - there are in fact, 3 ways

i - a jig of the necessary curvature is constructed of stout timber. Allow an additional 5 % at each extremity for springing. Block, tackles and ropes are used and the bending carried out manually.

ii - Build a special forming machine from flat steel plate, solid steel shafts, motor-scooter tyres and angle iron brackets.

The main shaft which is "idle" is turned down on a engine lathe to the exact dimension of the existing currogated sheets available.

The driving shaft is fitted with inflated tyres (pressure 10 kgs per square inch). A bar is fitted to either end of the shaft by weld.

The curvature desired is scribed on to the end plates. 4 guide roller positions are drilled and the sheet worked back and forth by hand to achieve the desired curve.

See Diagram I and Prospectus ITD 251, Page 41, figure I

iii- The third method is of course, the standard commercial forming or curving machine.

(b) Air tight, hermetic three to five tons silos or container.

One of the simplest ways we have found for producing an air tight storage is to have two covers to a small concrete bin. One cover fits the internal circumference, the other acts as a roof.

By its own weight the internal cover sinks on to the bed of grain squeezing out air in so doing.

An eye-hole grouted in to the internal cover allows for lifting by ropes when the main roof has been removed. This one is usually domed and sectional. See Diagram II.

(c) Three to five tons/day mobile drying unit cascading.

Zig zag gravity hand feed type - pilot design.

The cost of manufacture for such small capacities and the heat source produce many serious problems which have so far not been resolved. A flat-bed unit with hand stirring has proved a better proposition.

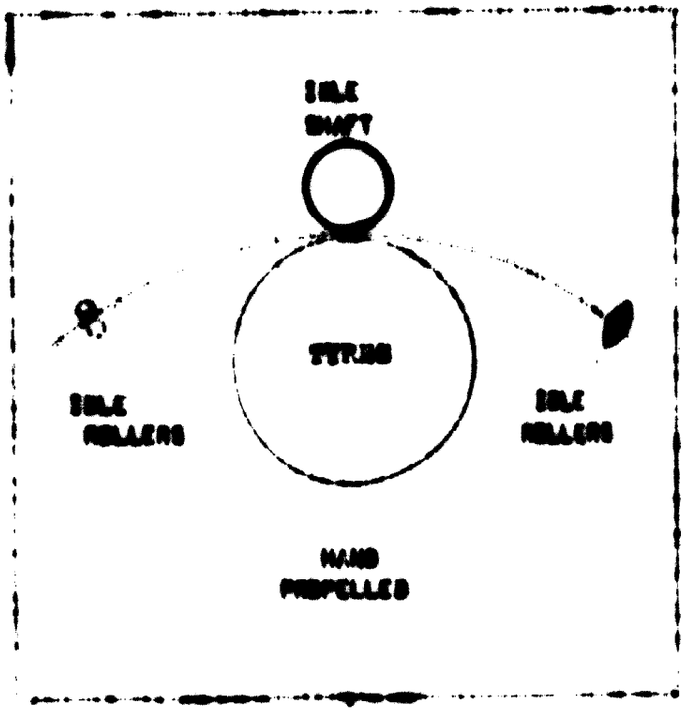
(d) Mobile LISTER ventilating and drying unit which is provided in various sizes and capacities is a well-proven and excellent medium which we have used with complete satisfaction in many countries and under varying conditions.

It will dry cereals unthreshed in stacks, threshed loose in bulk, in bags, godowns or silos - aeration or drying. It can be used static or mobile and requires no mains electricity.

Attached Diagram I and II.

Ron HAWKEY
UNIDO
COTONOU

DIAGRAM 1


IDLE
SHAFT
IDLE
ROLLERS
IDLE
ROLLERS
HAND
PROPELLED

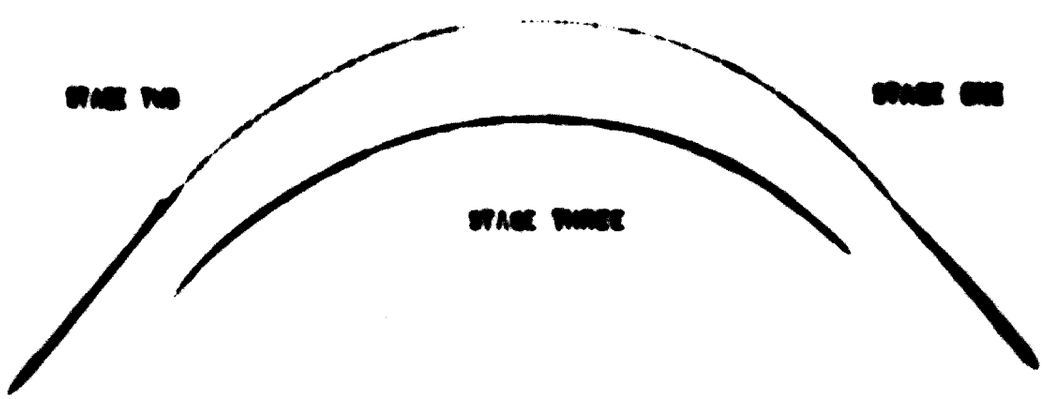
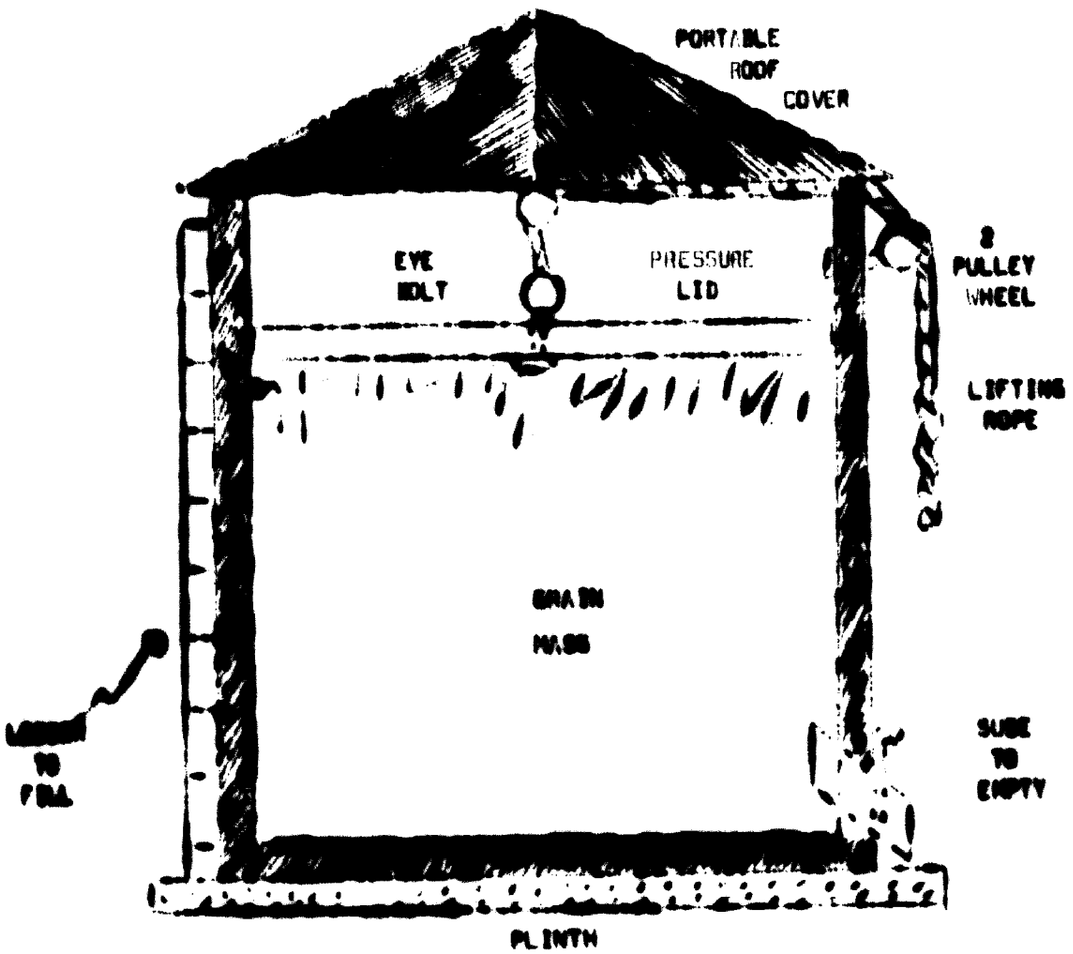

STAGE TWO
STAGE ONE
STAGE THREE

DIAGRAM 8



NOT TO SCALE OUTLINE SKETCH

CAUTION - NOT TO BE USED FOR SEED CORN
(LACK OF OXYGEN DAMAGES GERMINATION)

- MOISTURE CONTENT OF STOCK 18 % OR LESS

30.10.75

UNIDO - VIENNE

Misc 1377 Maneck from Adjouri-CEPED re your tel 28071 29 septembre silos project tighly Linked with drying of maize, rice, cossettes manioc CEPED facing and tackling half-way four problemes.

a. - curving corrugated sheets two approache
b. - air tight, hermetic three to five tons silos or container
c. - three to five tons/day mobile drying unit cascading, zig zag gravity hand feed type - pilot design.
d. - standardized mobil unit diesel driven ventilating and drying unit - range 50 to 250 tons silos. Equipment from lister england to be tested please transmit this info to silo expert Hawkey in Pakistan coming early december and rush to CEPED any relevant documentation.

UNDEVPRO COTONOU 75 OCT - 9 20 17

MANECK
REGISTRY
QUIJANOC

DISTR.
RESTRICTED

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANISATION

UNIDO/TCD
16 JANV. 1976

ENGLISH VERSION

P R O S P E C T U S

FOR THE PROTOTYPE MANUFACTURE OF STEEL GRAINS BINS IN THE POPULAR REPUBLIC OF BENIN (1)

by

Ron HAWKEY Mechanical Engineer Expert of the United Nations Industrial Development Organisation acting as Executing Agency for the United Nations Development Programme

(1) The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

To be omitted after clearance by UNIDO.

TABLE OF CONTENTS

I - INTRODUCTION

The comparison of cost between imported driers and silos and locally manufactured items has time and time again shown that the ratio cost against importation is seldom less than 2 to 1 and often higher.

On the other hand it has proved essential that mass production plans should be preceeded by prototype manufacture and scientific evaluation.

This paper is intended to guide the Government along that path.

A supporting project document has been drawn up reflecting the Governement part and costs and that of UNIDO.

The choice of equipment devised for village use follows determinations of the studies of CEPEB, the views of the Government and the Expert mission to which this prospectus is attached.

Storage without adequate pre-drying or in-bin drying is useless.

Maize should be stored at 12 % moisture content.

II - THE PROPOSAL

UNDP/UNIDO should provide the necessary input of equipment and experts to permit of the construction of

A. - 1 x 5 ton capacity flat sheet hermetic bin
B. - 1 x 5 ton capacity currogated drying bin
C. - 1 x 10 ton capacity currogated drying bin
D. - 1 x 2 ton per day flat bed drier
E. - 1 x 10 ton per day mobile drying fan
F. - 1 x 10 ton per day static drying fan

in the Republic of Benin and to the design of outline sketches APPENDIX V - A to F.

The work would be carried out in existing local workshop (choice to be decided in advance by CEPEB from list attached and recommendations APPENDIX V - G.

The Governement to provide a counter-part agricultural engineer to the UNIDO Expert for the 6 month term.

The Government to provide office space, secretariat services (including translation), local transportation and driver within Benin.

The Government to supply the necessary evaluation equipment.

After construction the equipment will be tested in the field. Modified if necessary and a full report prepared for consideration.

The Government would purchase the approved equipment from the manufacturer at cost plus, say 25 % gross before taxes or whatever was decided as a reasonable margin.

The UNIDO supplied equipment would be taken over by the Government on completion of the prototype manufacture and tests for the new public sector factory next proposed.

The Expert on arrival would develop the outline drawings into factory designs and assist the factory to draw from local sources the necessary materials.

After placement of the curver in the factory flowline he will supervise manufacture, erection and testing together with his counterpart and factory engineer.

He will produce a comprehensive report covering the following points

i - suitability of the unit as a drying/storage unit
ii - structural strength under load
iii - cost of manufacture
iv - cost of erection
v - corrective
vi - any improvements suggested

III - INPUTS

A - MACHINERY REQUIRED FROM UNIDO

1 Curving machine	set	[illegible]

B - EXPERT INPUT REQUIRED FROM UNIDO

1 Grain storage specialist	mo	[illegible]

C - EQUIPMENT TO BE PROVIDED BY GOVERNMENT

1 Moisture meter	set	26,400 CFA
1 Wet/dry bulb hygrometer		8,000
4 Thermisters		6,600
	Sub total	41,000

D - STAFF TO BE PROVIDED BY GOVERNMENT

1 Counterpart		650,000
1 Driver		320,000
	Sub total	970,000

E - [redacted]

Use of gas, fuel	600,000
Office services	100,000
Procurement fee for manufactured	100,000
Sub total	800,000

Grand total	UNDP	GOVERNMENT	
	82,000 $	1,091,000	CFA
		41,000	Foreign Exchange
		1,050,000	Local currency

F - [redacted]

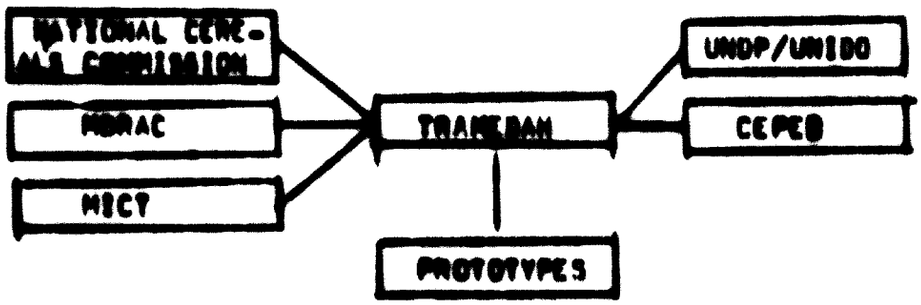
1 Corrugator
1 Sheet coil holer
1 Cut-off shear
1 Drill
1 Leaf bender
1 Roll former
1 Hand shear/punch/iron worker
1 Welding/cutting kit
1 Universal lathe
1 Radial saw
- Metal working tools
- Machine work shop [redacted] nil

IV - [redacted]

i - Refers - DP/DAH/71/813/11-05/E/12
Assistance to the local manufacture of steel silos for food storage - Expert mission report - January 1976

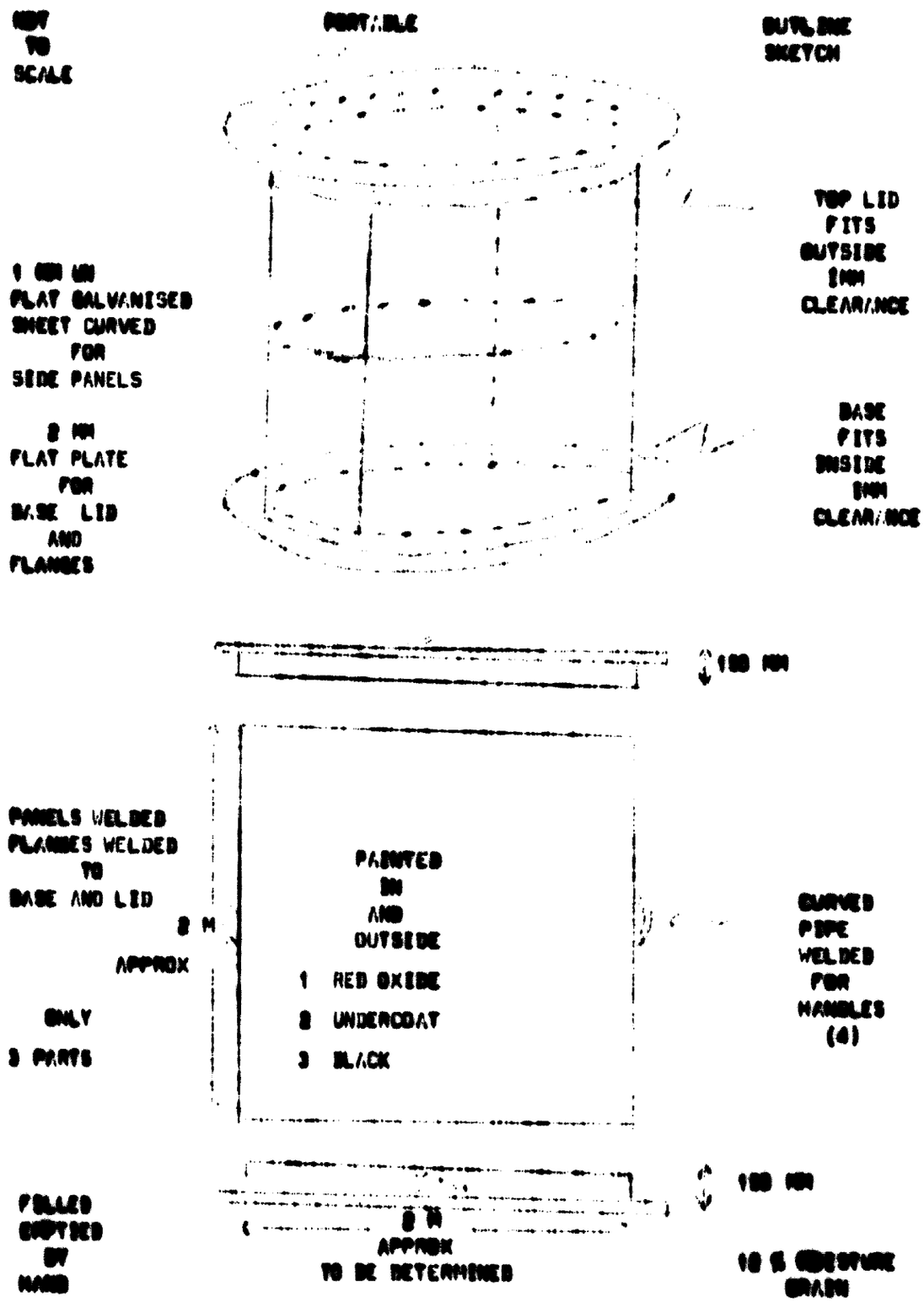
ii - Assistance to local manufacture of driers and silos - project data sheet - January 1976

iii - Institutional framework



APPENDIX

V A A 8 TON CAPACITY FLAT SHEET HERMETIC BIN



APPENDIX

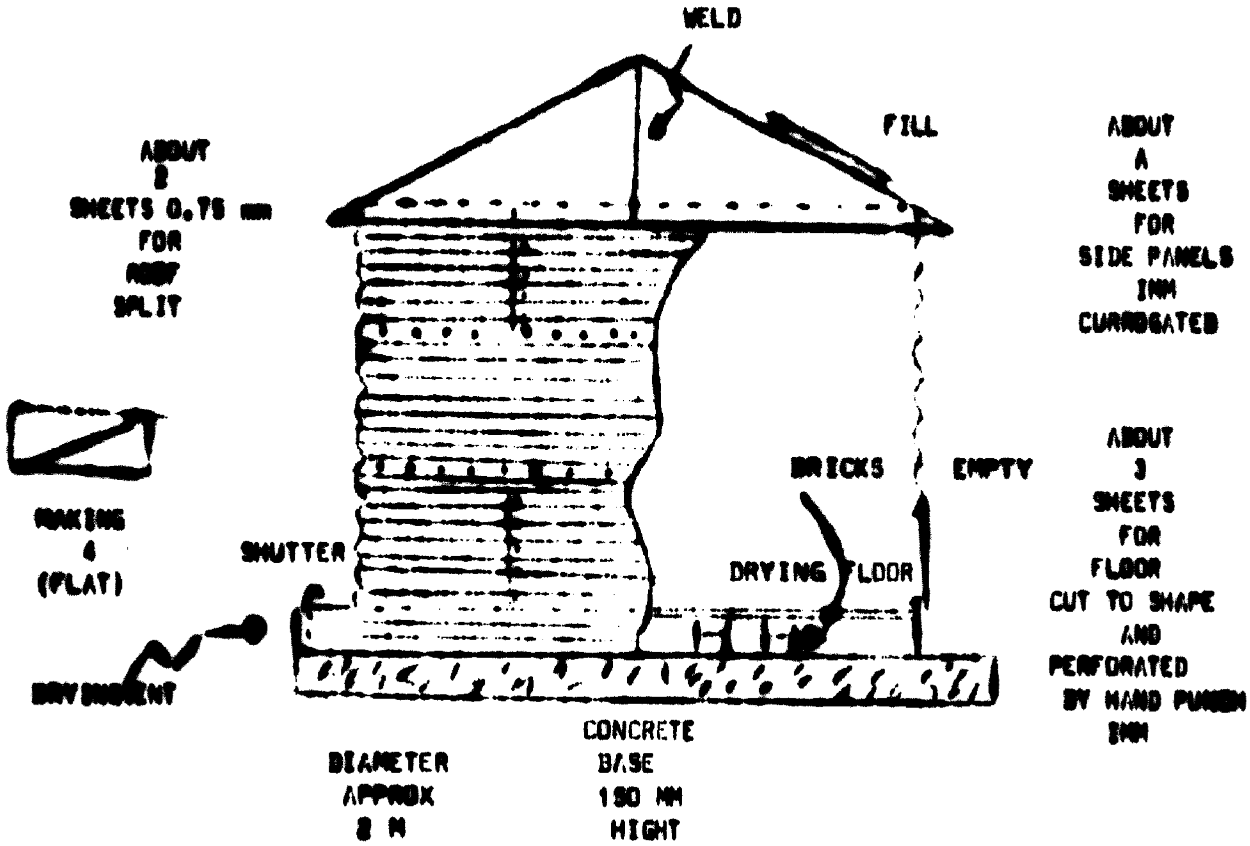
V B A 5 TON CAPACITY CORRUGATED DRYING BIN

STATIC

NOT TO SCALE

EAVE HEIGHT APPROX 3 M

OUTLINE SKETCH



FILLED EMPTIED BY HAND

LID JUST RESTS ON SIDE WALLS

RODENT BIRD PROOF . NOT INSECTS.

N.B. UNIDO ITD 204 [illegible] REFERS

FOR MAIZE ON COB IN HUSK

ON COB

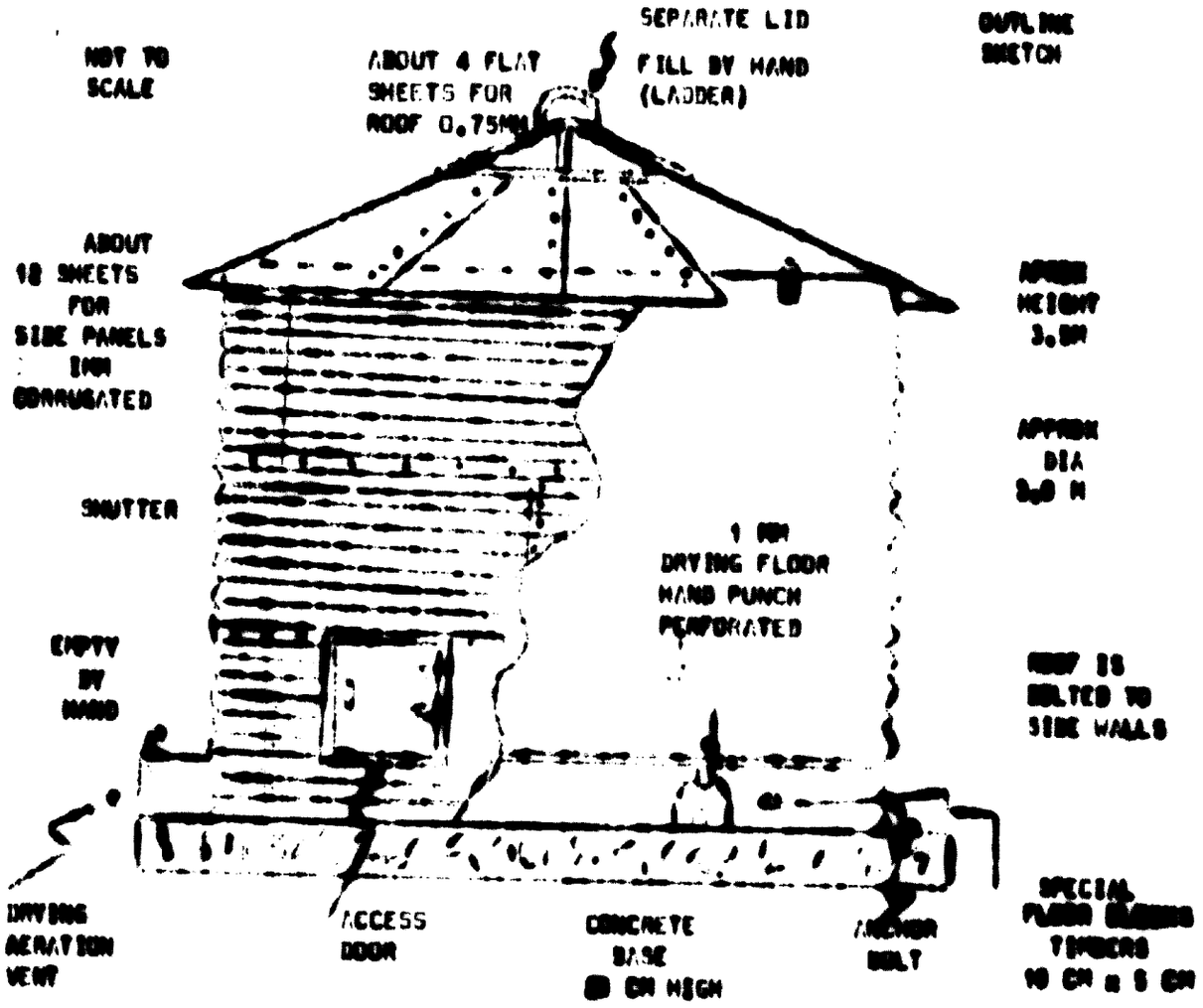
SHELLED

FOR VARIETY OF STORAGE EXACT DIMENSIONS TO BE DETERMINED

17 % MOISTURE GRAIN.

APPENDIX

V C A 10 TON CAPACITY CORRUGATED DRYING BIN AND OR AERATION



AS USED ITD 804 8.4.74 REFERS

RODENT, BIRD PROOF NOT INSECTS

SIDE STIFFENERS OPTIONAL

FOR THIS REASON EXACT DIMENSIONS TO BE EVALUATED

AT 14% MOISTURE GRAIN

FOR MAIZE ON COB IN HUSK ON COB SHELLED OR BAGS

DO NOT AERATE AT AMBIENT HUMIDITY ABOVE 75 %

V B **1 to 2 TON PER DAY FLAT BED DRIER**

MADE OF WOOD, PLYWOOD OR METAL SHEET ANGLE IRON REINFORCEMENT

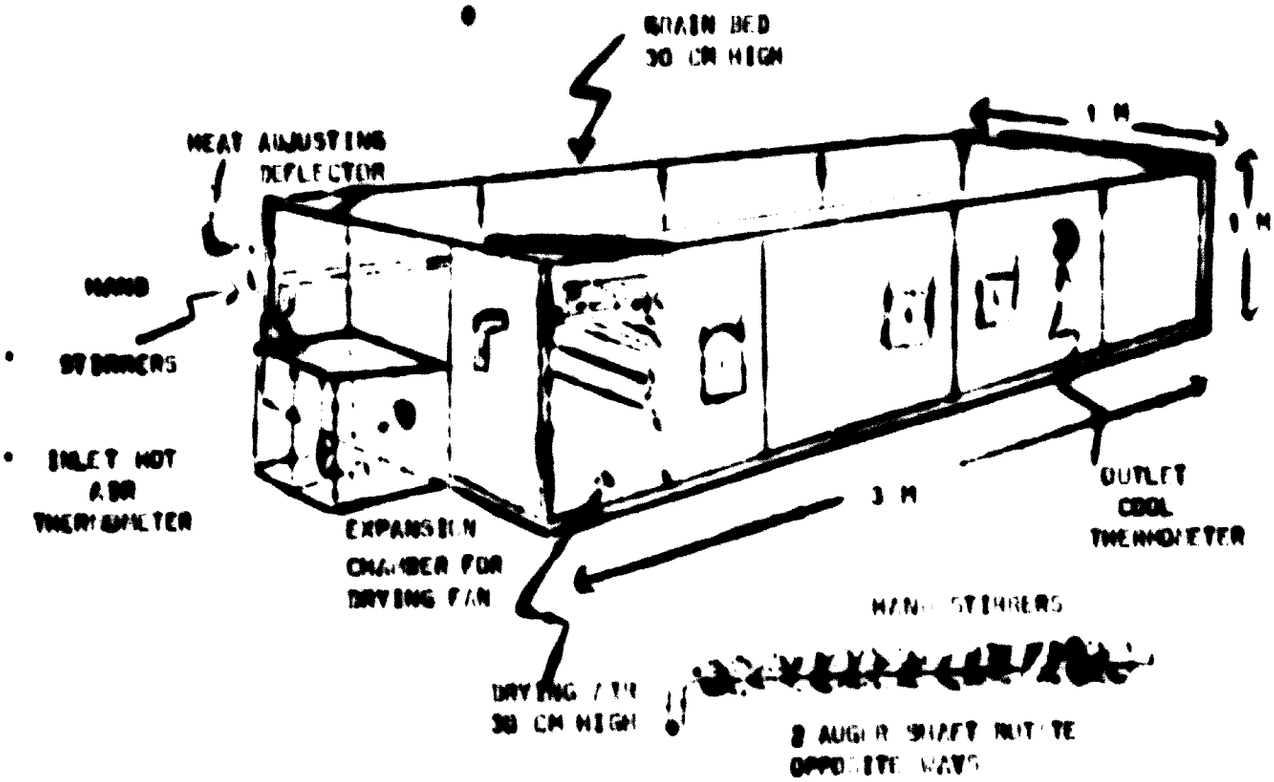
TOP, BOTTOM, SIDES. WOOD REINFORCES METAL DRYING FLOOR

EMPTY FROM SIDES.

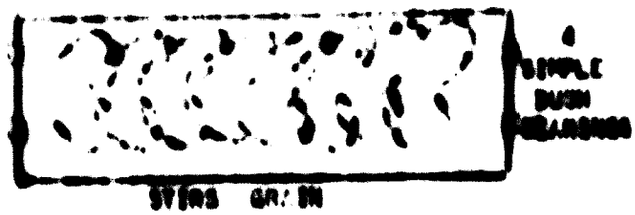
CAPACITY 2 000 KGS. TAKES OUT UP TO 8 % MOISTURE INPUT HEAT

VARIABLE. DRYING MEASURED BY DIFFERANCE BETWEEN INLET/OUTLET

TEMPERATURE.

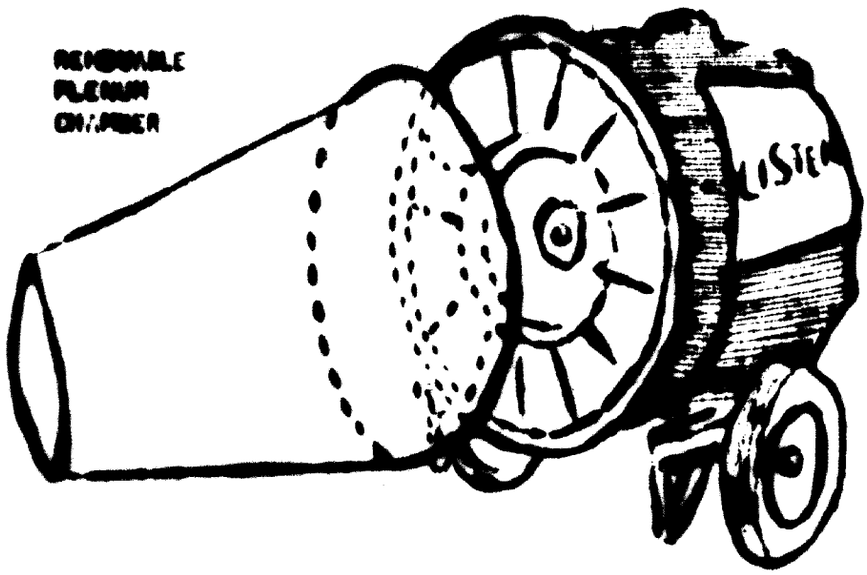


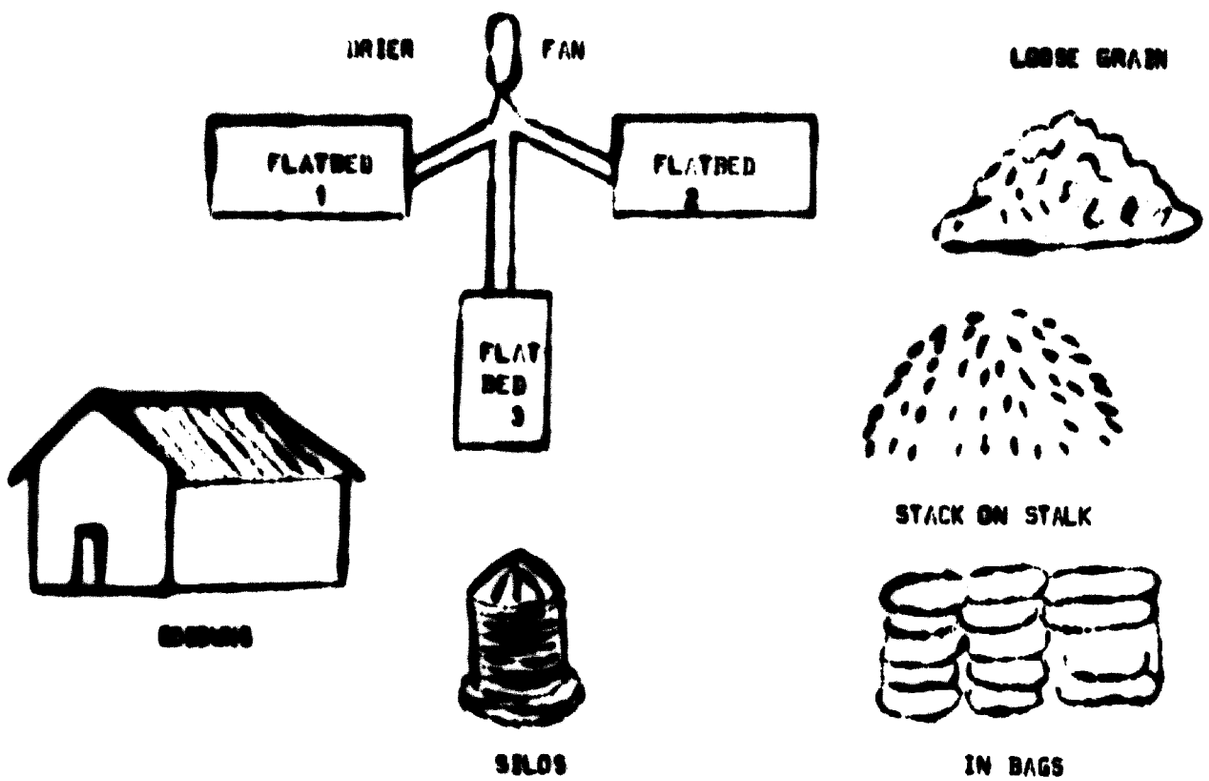
TAKES ANY
DRYING FAN
(DIESEL)
OR CAN BE ADAPTED
FOR HAND BURNER WASTE



V C A 90 TON PER DAY MOBILE DRYING FAN

THE "LISTER" IS A GOOD EXAMPLE OF THIS TYPE OF UNIT. IT IS MOBILE, CAN SERVE GODOWNS SILOS FLAT BEDS GRAIN ON STALL IN STACK LOOSE GRAIN ON GROUND, STACKED BAGS.





A 10 TON PER DAY STATIC DRIER

GRAIN LOADED BY HAND FLOWS FREELY BY GRAVITY CONTROLLED AND STIRRED BY THE ROLLER DAMS. A SIMPLE HAND MOTIVATED FAN DRAWS IN HOT AIR FROM CHOSEN METHOD. HOT AIR PASSES UP THROUGH THE GRAIN EXHAUSTING INTO THE AIR ASIDE OF HEAT SOURCE NO MECHANICAL MEANS OF PROPULSION.

THE "ALVAN BLANCH" IS A TYPICAL MODEL.

MADE LARGELY OF SHEET METAL AND ANGLE IRON

V •

APPENDIX 6

EXISTING LOCAL WORKSHOP WITH MANUFACTURING POTENTIAL

S.C.B.N.	Cotonou
[illegible]	Cotonou
TRADEBAN	Cotonou
MECANELEC	Cotonou

Of these it is considered that TRADEBAN have the best potential in terms of power, space, capacity and capability.

They are the only company presently using a surveying machine.

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANISATION

DISTR.
RESTRICTED
UNIDO/TCD
16 JANV. 1976
ENGLISH VERSION

P R O S P E C T U S

FOR THE MASS MANUFACTURE OF STEEL GRAIN BINS IN THE POPULAR REPUBLIC OF BENIN (1)

by

Ron MAWKEY Mechanical Engineer Expert of the United Nations Industrial Development Organisation acting as Executing Agency for the United Nations Development Programme

(1) The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO

To be omitted after clearance by UNIDO.

TABLE OF CONTENTS

* May be despatched from CEPEB later.

I - INTRODUCTION

The justification for local manufacture of steel silos where a need for extra storage is found to be needed becomes essentially the technical and financial feasibility of the operation.

APPENDIX V D shows the manner in which a factory tonnage of 10,000 tons silo capacity has been reached and APPENDICES A, B and C the financial viability.

Silos can be made in Benin at a cost of 25 $ per ton of capacity with a production flow of 25,000 tons per year or for 45 $ at 10,000.

Imported silos recently negotiated equate 103 $ on the same basis though the ultimate procurement price may be 8-14 % higher ? 114 $.

Choice of design would follow closely upon the prospectus for prototype manufacture devised by the Expert during this same mission.

Closely following each recommended step of which Expert "back-up" is thought to be an essential feature can ensure success.

II - THE PROPOSAL

An Expert, together with his counterpart, designs the equipment, supervises manufacture in the private sector, tests in use, modifies as and if necessary and makes his recommendations to the Government (1).

The Government invites the cooperation of UNDP/UNIDO to set up mass manufacture in the public sector (2).

An organisation is formed, pre-operational staff selected, finance assured.

An Expert, together with his counterpart, assist in all steps from land selection through to mass production including inviting tenders for equipment, supervision of construction.

One year is allowed for development, start up and trial runs.

(1) Assistance to local manufacture - project data sheet.

(2) Assistance to mass manufacture - project document.

A choice of a factory run of 10,000 tons storage capacity per annum has been suggested with an turn-out of 2,000 x 5 tons bins or any variation of 5-10 tons desired. The factory will be capable of meeting other agricultural or industrial needs calling for metal-working facilities. This should offer a "cushion" against any fluctuation or uncertainty in storage demands.

Drier fans, aeration fans, flat bed driers, static driers, mobile driers, smooth sheet silos, loading/unloading equipment, steel sheds, agricultural buildings, industrial buildings, etc, may be with some importation (motors, bearings) but largely anything which on proven and tested design and cost can be made from flat steel, currogated steel, angle iron and piping.

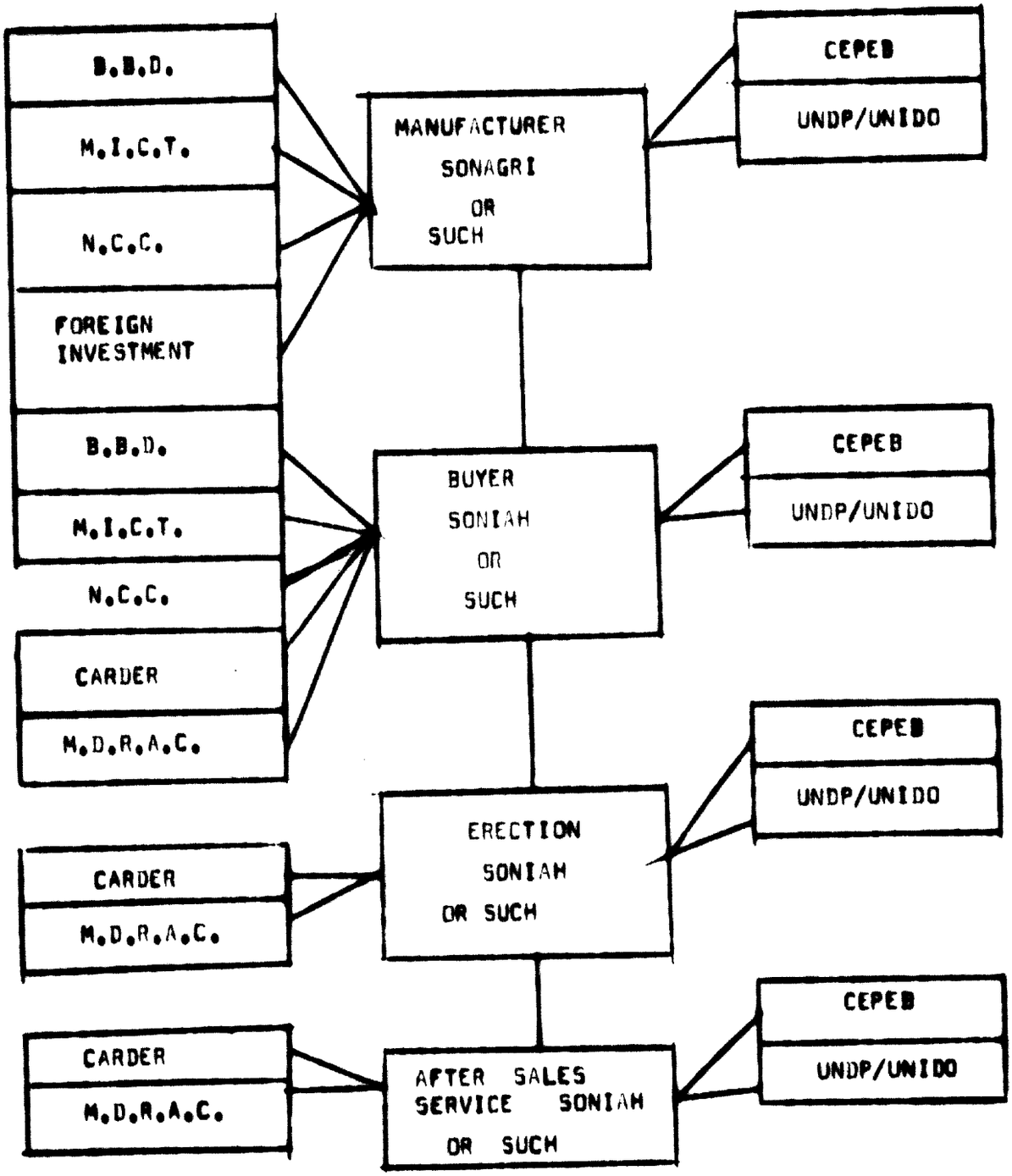
It is assumed to be free of import dues and local taxes for a period of 7 years, to borrow funds over 7 years at an interest rate not in excess of 8 % per annum.

APPENDIX V A shews the materials, manpower requirements, equipment needed, dimensions of land and factory.

A useful further guide is UNIDO/ITD 251 8 April 1974 on which the background work to that financial statement was based.

Joint venture or licensing agreements can be set up later within the framework of an operating factory and Government thinking at the time.

III - INSTITUTIONAL FRAMEWORK



Bank for Development of Benin
Ministry of Industry Commerce and Tourism
National Cereals Commission
Department of Rural Development and Cooperative Action
Action Centre for Regional Development
National Society for Agriculture
National Society for Irrigation, Agriculture and Hydrology
Centre for Studies and Promotion of Beninese Enterprises

IV - [redacted]

The factory is expected to "cash on" at once for the first 7 years when "payback" of loan capital and interest is made.

After that period the price can be substantially reduced as expansion of activities take place as a result of the anticipated profit.

Delivery and erection charges can be taken as 15 $ per ton of installed capacity.

A P P E N D I X 5A

I	[illegible]		186.611.000
	[illegible]	26.585.000	
	1 Bâtiments 800 m² à 30000/m²	24.000.000	
	Majoration 10 %	2.400.000	
	2 Terrains 50 F/m² location 1000 M²	50.000	
	droit d'enregistrement, bail (15 % de 50.000)	75.000	
		26.585.000	
	3 [illegible]	77.270.000	
	a) Equipement de base		
	- Chariot élévateur à fourche 6.000 #	1.760.000	
	- Atelier de mécanique 3.650	730.000	
	- Cisailles à main avec poinçonneuse 1.750	385.000	
	- Machine à cercler 125	20.000	
	- Scie Circulaire 2.000	440.000	
	- Outils à remplacer 2.400	528.000	
	- Trousses d'outillage de sondage et de coupe 900	198.000	
	- Génératrice de secours (75 KVA 7.500	1.650.000	
	- Tour (fraiseuse perceuse radiale polisseuse 25.000	5.500.000	
	- Presse à mandrines hydraulique 2.000	440.000	
	- Soudeuse p. fils (Production Welding) 2.500	550.000	
	- Pièces de rechange 10% de 280.000	6.160.000	
	- Appareil de sondage	1.540.000	
		28.000.000	
	- Majoration 10 %	2.800.000	
		30.800.000	

.../...

b) Machines spéciales			
- Dévidoir pour les rouleaux de tôles	2.500 @	950.000	
- Cisailles	5.000	1.100.000	
- Machine à onduler les tôles	75.000	21.000.000	
- Perceuse à col de cygne profond	5.000	1.100.000	
- Machine à centrer	40.000	10.500.000	
- Cisailles électriques	8.000	1.800.000	
- Machine à plier les feuillants	7.500	1.650.000	
- Machine à étirer les panneaux du plancher	40.000	8.800.000	
		46.500.000	
Majoration 10 %		4.650.000	
		51.150.000	
c) Equipement de bureau et Equipement de Laboratoire		2.000.000	
d) Frais de transport Fret 75 T à 28.250 F/T		2.120.000	
4 VEHICULES			7.500.000
1 voiture		1.500.000	
2 camions	3.000.000	6.000.000	
MISE EN ROUTE DE L'USINE			15.316.000
Salaire annuel personnel National			
1 Directeur Général		1.200.000	
1 Ingénieur		1.000.000	
1 Employé		300.000	
1 Dactylographe		240.000	
1 Standardiste		240.000	
		2.980.000	
Charges sociales et Patronales 30%		894.000	
		3.874.000	
Salaire Semestriel Personnel Mal			
1 Tenour de stock	300.000	150.000	
4 Manoeuvres	720.000	360.000	
2 Gardiens	312.000	156.000	
		666.000	
Charges sociales et Patronales 30%		199.800	
		865.800	
FRAIS D'EXPERTISE ET DE DEDOUANE		10.180.000	
10% S.I. IRES FORMATION PROFESSION.		948.000	

.../...

II	**[illegible]**			
1	**[illegible]**			
	1 T de tôle FOB port Européen	300 $		
	- Frais occasionnés	400 $		
	- Fret	94 $		
	- Assurance, crédit bancaire	46 $		
	1 T de tôle C.F.....	1.000 $		
	100 T de tôles ondulée à 1000 $ = 100.000 $		22.000.000	
	Frais de transport Port à l'usine		100.000	22.100.000
2	**[illegible]**			4.000.000
3	**[illegible]**			
	- Outils - Oxygène-soudure-electrode		1.200.000	
	- Entretien des machines 2.500 $		550.000	
	- Maintenance de 3 voitures (véhicules : 2x 85.000 x 2$ F) voiture 25000 Km x 10 F)		1.550.000	
	TOTAL.....		3.300.000	
	DIVERS 40 %.....		1.320.000	4.620.000
4	**[illegible]**			
	1 Directeur d'Usine		1.200.000	
	1 Chef de production (Ingénieur)		720.000	
	1 Secrétaire Comptable		540.000	
	1 Assistant de Laboratoire		360.000	
	4 Comris		960.000	
	2 Gardiens		312.000	
	[illegible]			
	25 Ouvriers qualifiés		9.000.000	
	12 Ouvriers non qualifiés		2.160.000	
			15.252.000	
	Charges sociales et patronales 30 %		4.575.000	
	Total frais de personnel.....			20.000.000
5	**[illegible]**			
	- Frais administratifs		1.000.000	
	- Assurances 5 % bâtiments, Mobilier Machines		300.000	1.300.000
6	**[illegible]**			
	Bâtiment	5% 24.000.000	1.200.000	
	Equipement	15% 73.163.000	10.975.000	
	Mobilier et Matériel de Bureau	20% 2.000.000	400.000	
	Camions	33% 6.000.000	1.980.000	
	Voiture	25% 1.900.000	475.000	14.931.000
	Total des amortissements			

.../...

7 [illegible]

8 % sur Investissements 125.611.000 10.100.000 10.497.000
12 % sur Fonds Roulement 19.700.000 2.369.000

TOTAL [illegible] 79.000.000

8 [illegible]

ELEMENTS			MONTANT
Matières premières	(55.100.000)	5	13.775.000
Energie	(4.000.000)	5	1.000.000
Matières consommables	(4.620.000)	5	1.155.000
Frais administratifs	(1.320.000)	1	110.000
Salaires	(20.000.000)	1	1.700.000
Divers		-	2.000.000
TOTAL.....			19.700.000

9 [illegible]

- Investissement 125.611.000
- Fonds de roulement [illegible]

10 [illegible] (7 ans) 20.000.000

[illegible]

TOTAL GENERAL [illegible]

11 [illegible]

1 600 Cellules 5 T 8 000 T
200 " 10 T 2 000 T
10 000 T

12 [illegible]

[illegible] = 10.056 F
Soit environ 6 US/T

13 [illegible]

105 $ non monté 25 175 CFA
(Prix de la T/mile complètement montée 150 soit 35.750 F CFA)

.../...

✓ Cotton Councils Commission – 1970 Rates.

Negotiations are proceeding for an "on-cost" of between 0 % and 14 %.

✓ No profit is envisaged on Govt to Govt marketing.

Freedom from Import Duty – Taxes, for 7 Years assumed.

✓ Basic [illegible] = 1 US $

✓ On [illegible] T Production Cost is [illegible]

51

COTONOU, le 15 Janvier 1976

Appendix V B

C.E.P.E.I.

CENTRE D'ETUDES ET DE PROMOTIONS
DES ENTREPRISES BENINOISES

COTONOU

PRESENTATION D'UN DOSSIER
D'INVESTISSEMENT SUR LES
SILOS

Montant détaillé des investissements (en 1.000 F CFA)

	Coût en devises	Coût en monnaie locale
• Terrain		125
• Génie civil, constructions (1) Consultant		26 400
• Matériel d'équipement (1)	60 340	2 120
• Matériel roulant	6 000	1 500
• Matériel de bureau et agencements	1 000	1 000
• Stock pièces de rechange	6 160	
• Immobilisations incorporelles		15 316
• Frais d'établissement		6 650
• Provision pour dépenses imprévues		
• Fonds de roulement (2)	14 000	5 740
TOTAUX PARTIELS	87 500	58 851
TOTAL GENERAL..	146.351.000	

Plan de financement

• Capital Social	-
• Comptes Courants Associés	-
• Crédits fournisseurs	-
• Crédits moyen terme sollicité auprès de la BND	126 611
• Crédit court terme sollicité auprès de la BND	19 740
• Autres concours	-
TOTAL...	146 351.000

.../...

Tableau des Amortissements (en 1.000 F CFA)

	Valeur d'acquisition	Durée ou Taux	ANNUITES 1	2	3	4	5	6	7
Constructions	24 000	5 %	1 200	1 200	1 200	1 200	1 200	1 200	1 200
Matériel d'équipement	73 150	15 %	10 975	10 975	10 975	10 975	10 975	10 975	10 975
Matériel roulant(camions -	6 000	33 %	2 000	2 000	2 000				
(Voitures)	1 500	25 %	375	375	375	375			
Matériel de bureau et Agencement	2 000	20 %	400	400	400	400	400		
Immorporels et frais d'établissement									
TOTAL	106 650		14 950	14 950	14 950	12 950	12 575	12 175	12 175

Besoin de fonctionnement

Matières premières tôles ondulées

- quantités nécessaires 100 tonnes/an
- origines importations
- prix unitaire 220 000F/T

Salaires et organigramme du personnel

Catégories (3)	Béninois	Etranger	Salaires annuels bruts
• Cadres Supérieurs			
• Directeur	1		130 000
• Ingénieur	1		110 000
• Cadres intermédiaires			
• Comptable	1		60 000
• Contremaître	1		50 000
• Employés de bureau			
• Employé	1		30 000
• Sécrétaire	1		25 000
• Standardiste	1		20 000
• Laborantin	1		30 000
• Ouvriers Spécialisés			
• qualifiés	25		36 000
• Manoeuvres			
• Non qualifiés	12		18 000
• gardiens	2		15 000
TOTAL	47		

Compte d'exploitation Prévisionnel (4)(en 1.000F CFA)

	1	2	3	4	5	6	7
Production (% d'utilisation de la capacité de prod.)	40 %	40 %	40 %	40 %	40 %	40 %	40 %
I - Chiffre d'affs. banâ 46[T	101 200	101 800	101 200	111 000	111 000	111 000	132000
II - Frais de fonc-							
- Achats de mat. 1ère et de marchandises	22 100	22 100	24 310	24 310	26 741	26 741	29 415
- Achats d'embal.	-	-	-	-	-	-	-
- Energie et Eau	4 000	4 000	4 400	4 400	4 840	4 840	5 000
- Entretien	4 620	4 620	5 000	5 000	5 500	5 500	6 000
- Salaires & Charges Sociaux	20 000	20 000	22 000	22 000	24 200	24 200	29 040
- Autres charges	-	-	-	-	-		
- Frais Génér.(Pub loyer, PTT Ass. Frais de bur.et divers)	1 320	1 320	1 450	1 450	1 595	1 595	2 000
TOTAL	52 040	52 040	57 250	57 250	62 [illegible]75	62 975	71 455
III - Taxe sur Ch.d'Af	ex	ex	ex	ex	ex	-	-
IV = I-II-III Marge commerciale	49 160	49 160	43 [illegible]950	53 750	48 085	48 025	60 545
V - Frais Financiers	12 497	10 [illegible]06	8 [illegible]364	6 692	5 020	3 348	1 676
VI - Amortissements	14 950	14 950	14 [illegible]950	12 [illegible]950	18 575	12 175	18 175
VII - IV - V VI	27 447	24 [illegible]06	2[illegible]314	19 642	17 595	15 583	13 851
Bénéfice avant impôts	-	-	-	-	-	-	-
VIII - Impôts	/	/	/	/	/	/	/
IX = VII - VIII Bénéfice Net après impôts	21 713	24 174	20 636	34 10[illegible]	30 430	32 508	46 694
X = Marge brute d'autofinancement = IX + VI	[illegible]13	3 274	- 264	13 208	9 530	11 602	25 794

(4) Se conformer impérativement au tableau ci-dessus.

X Après amortissement Capital emprunté 20 000

Plan de Financement et de Trésorerie Prévisionnelle (en 1.000 F CFA)

	0 (1)	1	2	3	4	5	6	7
A - ORIGINE DES FDS	-	-						
. Report	-	59700	23987	99813	85177	80669	8063	8363
. Capital Social	-	-						
. Compte Courant Associés	-	-						
. Crédits Fournis	-	-						
. Crédits locaux autres que le moyen terme sollicité	-	-						
. Marge brute d'autofinancement	-	21713	24174	20636	24108	30430	3850	46694
TOTAL		37907	99813	79177	51069	80639	11863	55057
B - UTILISATIONS DES FONDS								
. Report	-							
. Dépenses d'investissement	40000	86000						
. Autres investissements à réaliser en cours d'exploitation	19700							
. Remboursement de matériel	-	-	-	6000	-	-	3500	-
REMBOURSEMENT								
. Crédits fournis								
. Comptes Courants Associés								
. Crédits locaux autre que moyen terme sollicité								
TOTAL	59700	86000	-	6000	-	-	3500	-
A - B = Solde au 31 Décembre (2)	59700	123907	99813	85177	51069	80639	8363	55057

12.1.1976

APPENDIX K

[redacted]

Discussion between Mr. GILLAM and M. [redacted] after meetings with Mr. [redacted], President, National Cereal Commission and Mr. [redacted], Director of Studies and Plans, Ministry of Rural Development and Cooperative Action.

1. Q. Do we now understand Zambia needs ?
   A. Yes, but only the first requirement 2000 silos of 5-10 ton capacity.

2. Q. How many of each ?
   A. Uncertain

3. Q. The Zambia Development Bank demand a 7 year amortisation period. This would mean 7000 tons of production per annum !
   A. Technically and economically this is just not feasible.

4. Q. In the absence of further advice where do we go from there ?
   A. [redacted]. Mr. GILLAM and Mr. [redacted] consider Zambia present and near future requirements to be 50-90.000 tons at village level 5, 10, 60 tons.

5. Q. Can we take an annual production of 10.000 tons on that assumption ?

   A. In the absence of further Government advices unlikely to be forthcoming in the immediate term we have to offer the Government a minimum tonnage production line.

   We offer accordingly 70.000 tons as the potential need at an annual out put of 10.000 tons and capacities.

   - 2000 silos at 5 tons = 10.000

   No consideration is given here for 10 ? units but these can of course, be provided.

Signed :

[redacted] M. [redacted]

APPENDIX L

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

UNITED NATIONS DEVELOPMENT PROGRAM

SPECIAL INDUSTRIAL SERVICES

PROJECT DATASHEET

RESEARCH DATA

COUNTRY : BENIN

PROJECT TITLE : ASSISTANCE TO LOCAL MANUFACTURE OF DRIERS AND SILOS

PROJECT NUMBER : [redacted] Ref.
: UNIDO Ref.

ORIGIN AND DATE OF REQUEST :

GOVERNMENT COOPERATING AGENCY : CENTRE For studies and Business Promotion (C E P E B)

PURPOSE OF THE PROJECT : AID LOCAL WORKSHOPS TO BUILD SEVERAL TYPES OF DRIERS AND SILOS THEREAFTER EVALUATE

BACKGROUND INFORMATION : AN EXPERT CARRIED OUT CERTAIN WORK DURING DEC. 1975 JAN. 1976 THIS NOW REQUIRES TO BE TAKEN A STAGE FURTHER

DESCRIPTION OF THE PROJECT : AID TO THE AGRO/MECHANICS INDUSTRY IN BENIN HOPEFULLY LEADING TO MASS MANUFACTURE

PROJECT BUDGET : UNDP 68,500$ GOVT. 1.000.000 CFA (3,600$)

REQUEST APPROVED :

FOR UNIDO

DATE :

FOR UNDP

DATE :

I BACKGROUND AND SUPPORTING INFORMATION

A- JUSTIFICATION FOR THE PROJECT

The Government of BENIN acknowledging grains losses and inadequate drying/Storage facilities are anxious to manufacture these equipments locally in the public sector but before so doing require construction of prototypes & testing of same.

Grain losses run as high as 40 % and imported silos are estimated to be over 2 ½ times dearer than locally fabricated ones.

B- INSTITUTIONAL FRAMEWORK

The Ministry of Industry Commerce & Tourism (MICT) had a subsidiary called CEPED (Centre for Studies & Enterprises Beninois). Activity has now been transferred to BCP (Central Bureau of Projects).

OTHER BODIES ARE :

- N C C - National Cereals Commission who control prices and stocks.
- M D R A C- Ministry of Rural Development and Cooperatives who control Regional distribution and Storage.
- B B D - Development Bank of Benin
- C N C A - National Fund for Agricultural Credit.

C- PROPOSAL FOR GOVERNMENT POLICY

It is the Government intention to set up mass manufacture of Driers/Silos in the public sector - subject to successful evaluation of prototypes and financial feasibility.

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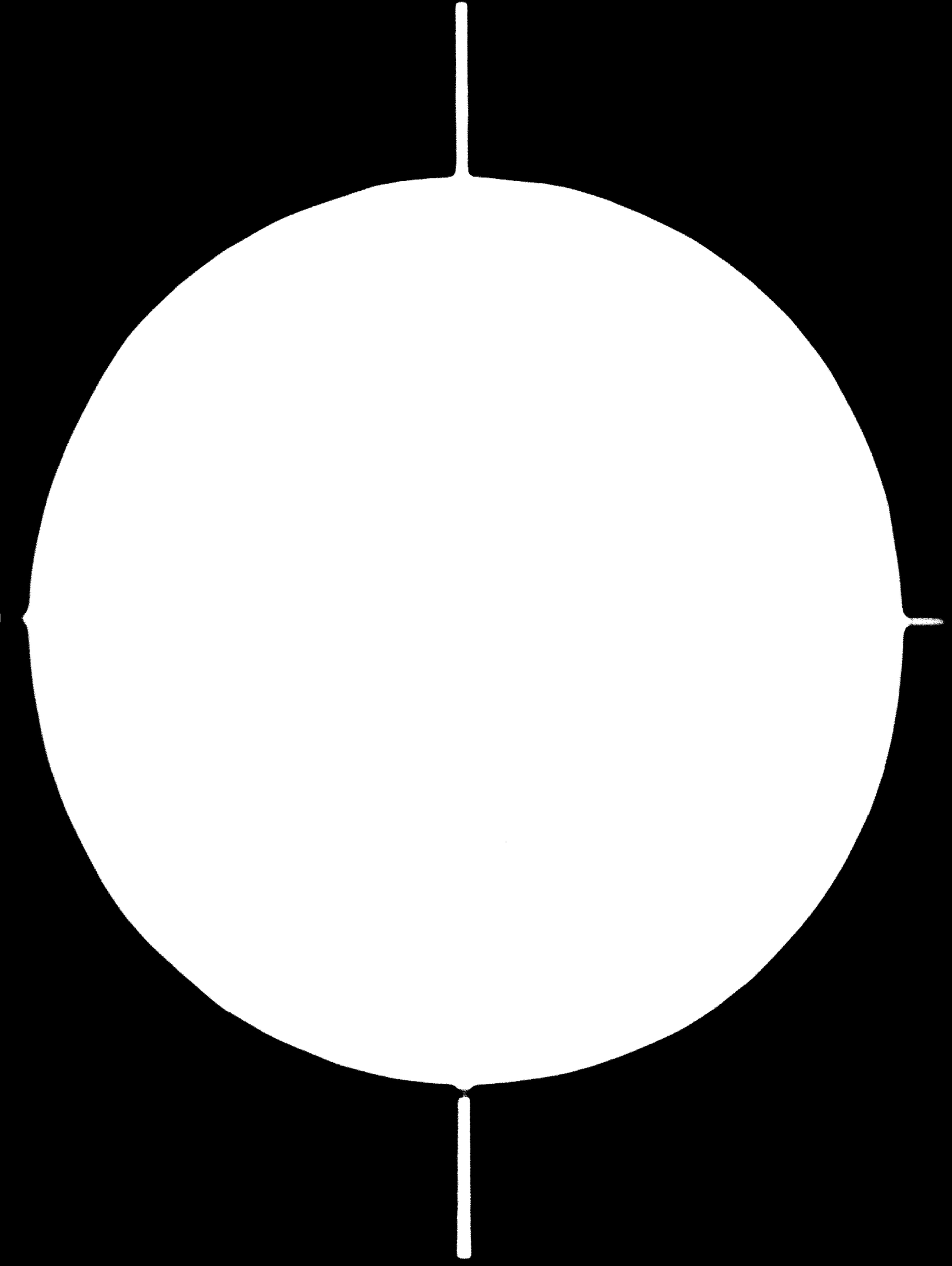

D- OTHER RELATED ACTIVITIES

1.- Peace Corps have a small ongoing programme for local manufacture of driers and silos using locally available materials and craft . This would continue.

2.- SONIAH (National Society for Irrigation Agriculture and Hydrology) has a long standing/sperating project for assistance to Paddy and Maise farming and a much smaller scheme for storage in the Oueme Valley.

It is considered that these projects are complimentary to this provision.

E- FURTHER UNDP ASSISTANCE

Support to the manufacturing phase mentioned in C is foreseen.

II OBJECTIVES OF THE PROJECT

A - LONG-RANGE OBJECTIVES

To assist the Government of Benin to manufacture its own Driers and silos.

B - IMMEDIATE OBJECTIVES

To provide designs for 3 types of Drier and 3 types of Silos with the limited machinery suggested as provided by UNDP/UNIDO to so construct these in existing Factories.Evaluate, test, modify as necessary and there after offer designs and prototypes to the Government as a pattern for further development.

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III WORK PLAN

A - DESCRIPTION OF PROJECT ACTIVITIES	STARTING DATE AND DURATION
(a) Design Driers and Silos at the works of TRAMEDAH - COTONOU, or other	1 July 1976
(b) Fit up imported machinery	6 months
(c) Manufacture / Erect	
(d) Evaluate / Test	
(e) Modify and / or approve	31 Dec. 1976

B - DESCRIPTION OF UNDP INPUTS

.1. ASSIGNMENT OF INTERNATIONAL STAFF

The expert will be a grain storage specialist particularly strong in design erection and evaluation with wide knowledge of workshop pratice and grain technology.

.2. PROVISION OF SUB-CONTRACTUAL SERVICES

None

.3. TRAINING PROVISIONS

None at this stage

.4. UNDP PROVIDED SUPPLIES AND EQUIPMENT

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C - DESCRIPTION OF GOVERNMENT INPUTS

1. PRE-REQUISITE ACTIVITIES

Finalize agreement with prototype manufacturer, agree to freedom from import duty on B 4. Agree to buy prototype outputs at cost plus 25 % gross.

2. ASSIGNMENT OF NATIONAL STAFF

The Government will provide an experienced local agricultural Engineer as Counterpart for the duration of term.

3. GOVERNMENT PROVIDED SUPPLIES AND EQUIPMENT

The Government will provide the expert and counterpart with office space, secretarial services (including translation), local transportation and driver within Benin.

The Government will procure, on advice of the expert, one set of the necessary testing equipment for grain evaluation.

IV_A PROJECT BUDGET COVERING UNDP CONTRIBUTION
(in US DOLLARS)

		Total	1976
10	PROJECT PERSONNEL		
	11 EXPERTS	m/m $	m/m $
	11.01 Grain storage specialist	6 22500	6 22500
	19 Component Total	6 22500	6 22500
49	EQUIPMENT		
	Curver	60.000	60.000
50	MISCELLANEOUS	-	-
59	COMPONENT TOTAL	60.000	60.000
99	UNDP TOTAL CONTRIBUTION	82.500	82.500

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IV_B PROJECT BUDGET COVERING COUTERPART CONTRIBUTION IN KIND (in C F A)

COUNTRY : BENIN

PROJECT NO :

TITLE : Assistance to local manufacture of Driers and Silos.

		TOTAL m/m CFA	1976 m/m CFA
10	**PROJECT PERSONNEL**		
	Counterpart	6.650.000	6.650.000
40	**EQUIPMENT**		
	1 Moisture Meter	26.400	26.400
	1 Wet and Dry bulb Hygrometer	8.800	8.800
	4 Thermisters	6.600	6.600
50	**MISCELLANEOUS**		
	25 % "on cost" to manufacturers price Est.	100.000	100.000
	Office accomodation, staff, services NOM.	100.000	100.000
51	**TRANSPORT COSTS**		
	Car, driver, fuel NOM.	1.000.000	1.000.000
	GRAND TOTAL.....	1.891.800	1.891.800

N.B. - The UNDP/UNIDO supplied Equipment remains the property of the Government and would he taken ever by them on completion of Prototype tests.

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J O B D E S C R I P T I O N

POST TITLE : Grain Storage Engineer

DURATION : 6 months

DATE REQUIRED : July 1976

DUTY STATION : Cotonou, with travel within the country as required

DUTIES : The Engineer will work in close cooperation with BCP, NCC, DRAC, MICT, BBD. 1/ and the manufacturer.
He will be responsible for designing 3 type of Drier and 3 type of Silo following closely upon the prospectus for Prototype manufacture January 1976.
He will supervise manufacture.
He will assemble / erect.
He will assist in evalua tion / test.
He will modify, accept as necessary.
He will up-date the Prospectus for mass production January 1976 and advise / help the Government with it's ensuing conclusions.

QUALIFICATIONS: Grain storage engineer with wide experience of design, manufacture, erection, test, workshop practice and grain technology

At least 15 years experience in this field and 10 years of tropical conditions.

LANGUAGE : French - English acceptable.

1/ Central Bureau of Products, National Cereals Commission, Ministry Rural Development and Cooperatives, Ministry of Industry, Development Bank of Benin.

.../...

B.CKGROUND INFORM.TION

The Government of Benin acknowledging heavy loss of Grain as a result of inadequate and inefficient drying / storage facilities are anxious to manufacture locally such equipment after duly assessing prototype results.

This is a follow up to a visit by a UNIDO staff officer in 1974 and preparatory work carried out by a UNIDO Consultant Dec.1975 - Jan.1976.-

APPENDIX M

UNITED NATIONS DEVELOPMENT PROGRAMME
PROJECT OF THE GOVERNMENT OF BENIN

TITLE	:	Assistance to the mass manufacture of Driers and Silos by the Government of Benin.
NUMBER	:	Duration : 18 months
SECTOR	:	
SUBSECTOR	:	
GOVERNMENT COOPERATING AGENCY	:	Executing Agency
CENTRE FOR STUDIES AND BENINESE PROMOTIONS (CEPEB)	:	United Nations Industrial Development Organisation (UNIDO)
DATE OF SUBMISSION	:	Starting date : 1 Jan. 1977
GOVERNMENT CONTRIBUTION CFA 17.490.000 (79.500 US $)	:	UNDP contribution US $ 133.500

APPROVED : _____ DATE : _____

on behalf of the Government

_____ DATE : _____

on behalf of the Executing Agency

_____ DATE : _____

on behalf of UNDP

.../...

I BACKGROUND AND SUPPORTING INFORMATION

A.- JUSTIFICATION FOR THE PROJECT

The requirements for drying an storage have a very high priority in the Governments future planning. Losses are considerable and the Government is desirous of manufacturing driers and silos :

a) to meet the exact conditions and requirements of Benin.
b) to ease the spending of foreign exchange (it is considered that imported units are 2 ½ times the cost).
c) to uplift local technology in this area.

A UNIDO staff officer visited late 1974 & made suggestions which resulted in mission DP/DAH/71/513/11-05/B/12.

Assistance to the local manufacture of steel silos for grain storage - Dec. 1975 January 1976 5 ½ weeks, when the UNIDO consultant raised 2 Documents one for Prototype and the other for Mass manufacture.

This project adds backing to the latter.

B.- INSTITUTIONAL FRAMEWORK

Under the auspices of the Ministry of Industry, Commerce and Tourism (MICT), Central Bureau of Projects (BCP), the Ministry of Rural Development and Cooperatives (DRAC), the National Cereals Commission (NCC) a Factory would be constructed to be operated by a state concern such as SONAGRI selling the out put to a state concern such as SONEPAL & SONLAH funded by the Development Bank of Benin (BBD) and for Bi-lateral Aid.

.../...

BI-LATERAL AID			ECP - MICT DRAC
		SONAGRI (MALI)	
			N C C UNDP/UNIDO
B B D			
			ECP - MICT DRAC
1/ CARDER		SONEPAL (BUR)	
			N C C UNDP/UNIDO

C.- PROVISION FOR GOVERNMENT FOLLOW-UP

It is the Governments intention to expand the activities of its Drier / Silo. Factory into an ever-increasing area of agricultural equipment and buildings this to steadily diminish importations.

D.- OTHER RELATED ACTIVITIES

NONE

E.- FURTHER UNDP ASSISTANCE

A continuing program of fellowships and in service training in the disciplines of manufacturer, management, marketing, erection and utilisation of Driers and Silos is foreseen.

1/ State society for Development of the Regions.-

.../...

II OBJECTIVES OF THE PROJECT

A - LONG-RANGE OBJECTIVES

To increasingly meet the need of an expanding population increased per capita consumption by a steady modernisation of agricultural engineering.

Alleviate the total loss and price loss occasioned by quantative/qualative deterioration of grain, reduce imports and ease the balance of payments in grain and machinery.

B - IMMEDIATE OBJECTIVES

To make a positive step toward meeting the problem of Grain losses in the cheapest, most effective way and in the area where greatest losses occur - Drying an Storage.

III W O R K P L A N

A/ DESCRIPTION OF PROJECT ACTIVITIES

		STARTING DATE	DURATION
a.	Invite tenders for equipment	1 JAN.1977	3 MONTHS
b.	Receive, evaluate, recommend		
c.	Consolidate finance		
d.	Identify factory site		
e.	Confirm Institutional framework		
f.	Confirm Buyers		
g.	Confirm manufacture requirement		

.../...

h.	Instruct for land Procurement	1 M.R. 1977	3 MONTHS
i.	Instruct for Buildings		
j.	Order equipment		
k.	Stand buy Construction		
l.	Receive & check equipment	1 OCT. 1977	3 MONTHS
m.	Supervise fitting		
n.	Approve designs		
o.	Trial runs		
p.	Mass manufacture	1 JAN. 1978	3 MONTHS
q.	Back - stop erection		
r.	After - sales service	30 JUNE 1978	3 MONTHS

B/ DESCRIPTION OF UNDP INPUTS

-1- ASSIGNMENT OF INTERNATIONAL STAFF

	LOCATION	STARTING DATE	DURATION MONTHS
- Grain storage specialist (Manufacture / Marketing)	COTONOU	1 JAN.1977	18

-2- PROVISION OF SUB-CONTRACTUAL SERVICES

- Grain Storage Engineer (Erection / Maintenance)	COTONOU AND BENIN GENERALLY	1 JAN.1978	6

-3- TRAINING PROVISIONS

- FELLOWSHIPS

(Drying / Storage)

6 fellows Philippines	MANILA	1 M.R. 1977	3
3 fellows U S A (best of above 6)	LOUISIANA	1 SEPT.1977	3

.../...

- IN SERVICE TRAINING	PROVINCES BENIN	1 J.F. 1978	6
3 from USA assisted by 1 each from Philippines train 6 each thus reaching a total of 21 ever 6 months	THEN ONGOING		
- UNDP - PROVIDED SUPPLIES AND EQUIPMENT	NONE		

C/ DESCRIPTION OF GOVERNMENT INPUTS

1 PRE-REQUISITE ACTIVITIES			
Formation of operating Manufacturers, Marketing & Procurement Body Provision of Finance	COTONOU	1 OCT. 1976	3
2 ASSIGNMENT OF NATIONAL STAFF			
1 Counterpart for Expert	COTONOU	1 J.F. 1977	18
6 Fellows (Agricultural Engineers)	- " -	1 J.F. 1977	18
15 Trainees	BENIN	1 J.F. 1978	
3. GOVERNMENT PROVIDED SUPPLIES AND EQUIPMENT Provision of project office, Secretariat services (including translation, transportation & driver.			

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IV_A PROJECT BUDGET COVERING UNDP CONTRIBUTION (IN US $)

		TOTAL m/m $	1977 m/m $	1978 m/m $
10	PROJECT PERSONNEL			
	11 EXPERTS			
	11-01 Storage Specialist	18 59.605	12 41.250	6 18.355
	Storage Engineer	6 22.500	- - -	6 22.500
	19. COMPONENT TOTAL	24 82.105	12 41.250	12 40.855
30	TRAINING			
	31 FELLOWSHIPS	27 41.400	27 41.400	- - -
	COMPONENT TOTAL	41.400	41.400	
40	EQUIPMENT	-	-	-
50	MISCELLANEOUS	10.000	7.000	3.000
	59. COMPONENT TOTAL	10.000	7.000	3.000
99	UNDP TOTAL CONTRIBUTION	133.505	89.650	43.855

IV_B PROJECT BUDGET COVERING GOVERNMENT COUNTERPART CONTRIBUTION IN KIND (CPA)

COUNTRY : BENIN

PROJECT NO :

TITLE : Assistance to the mass manufacture of Driers and Silos by the Government of Benin.

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		TOTAL		1977		1978	
		CFA	m/m	CFA	m/m	CFA	m/m
10	PROJECT PERSONNEL						
	Counterpart	1.950.000	18	1.300.000	12	650.000	6
	6 Fellows	3.240.000	108	2.160.000	72	1.080.000	36
	15 Trainees	5.400.000	90	- - -	-	5.400.000	90
40	EQUIPMENT						
	Project office etc.	300.000	-	200.000	-	100.000	-
50	MISCELLANEOUS						
	30 % on Staff	3.600.000	-	2.400.000	-	1.200.000	-
51	TRANSPORT COSTS						
	Car, Driver, etc	3.000.000	-	2.000.000	-	1.000.000	-
	GRAND TOTAL	17.400.000	-	8.060.000	-	9.430.000	-

J O B D E S C R I P T I O N

POST TITLE : Senior storage specialist (manufacture)

DURATION : 18 Months

DATE REQUIRED : 1 January 1977

DUTY STATION : COTONOU with travel within the country

DUTIES : The specialist will work closely with BCP, NCC, DRAC, MICT, BBD and the Manufacturing Agency, CARDER and the Buyers. 1/

1/ Central Bureau of Projects, National Cereals Commission, Ministry of Rural Development and Cooperatives, Ministry of Industry, Development Bank of Benin, Probably SONAGRI, Regional Development Society, Probably SONEPAL.

.../...

He will be responsible for assisting the development of drier and silos (and other agricultural equipment) from the creation of the state concern through to successful installation vutilization in the field including.

Production, marketing, procurement, financial viability and training.

QUALIFICATIONS : Senior grain storage specialist with wide experience of manufacture and marketing of drier and storage systems.

At least 15 years experience in that field and 10 years of tropical conditions.

LANGUAGE : Preferably French but English acceptable.

BACKGROUND INFORMATION

The Government of Benin acknowledging the heavy loss of grain occasioned by inadequate and inefficient drying / storage facilities are anxious to manufacture locally such equipment after duly assessing prototype trials.

This is a follow up to there trials passing the situation on to mass manufacture.-

J O B D E S C R I P T I O N

POST TITLE : Grain Storage Engineer (Installation)
DURATION : 6 Months
DATE REQUIRED : 1 January 1978
DUTY STATION : COTONOU with extensive travel within the country.

DUTIES : The Engineer will work closely with the Senior storage Specialist, his counterpart, Factory manager & Production Engineer.

He will be responsible for successful erection, operation and after sales service and for the in-service (extension) training program of the Government in the area of Drying / Storage and Agricultural Equipment so manufactured within Benin.

QUALIFICATION : Grain storage Engineer with wide experience of installation operation and maintenance of Driers and silos.

At least 10 years experience in that field and 5 years of tropical conditions.

LANGUAGE : French, English acceptable.

BACKGROUND INFORMATION

The Government of Benin acknowledging the heavy loss of grain occasioned by inadequate and inefficient drying/storage facilities are anxious to manufacture locally and are setting up a factory in the public sector for that purpose after duly assessing prototype trials and evaluation.

This is a follow up to those tests passing the situation on to mass manufacture.-

APPENDIX N

CONCLUSION

The mission role was greatly assisted by the preparatory work carried out by CEPEB prior to the experts arrival and to the efforts of the following staff members during the project.

MM. B. BIDOUZO	Director General
A. GILLAM	Acting Project Manager
M. DELFORGE	Accounting Expert
O. ADJOURI	Engineering Expert *
A. GBAGUIDI	Counterpart Industry
L. WOROU	Counterpart Industry
C. DOSSOU	Counterpart Marketing
Melle L. MARQUES	Stenographer

* Although indisposed and unable to attend the office arranged several meetings with the expert and counterparts and thus none-the-less made a valuable contribution.

ANNEXE D.

DESCRIPTION DE POSTE

TITRE	Ingénieur hors classe - spécialiste de stockage des graine (option : production).
DUREE	9 mois
DATE D'ENTREE EN FONCTION	Dès que possible
LIEU D'AFFECTATION	Cotonou avec déplacements à travers le pays.
ATTRIBUTIONS	Le spécialiste travaillera en collaboration étroite avec : - Bureau Central des Projets - Commission Nationale Céréalière - Ministère du Développement Rural et de l'Action Coopérative, - Ministère de l'Industrie et de l'Artisanat, - Banque Béninoise de Développement et une agence de production (ex-SONAGRI) Les CARDERS Les organismes acheteurs -(exemple SOBEPALH) Il sera responsable de l'assistance pour le développement de l'industrie de séchoirs et silos (et de tout autre équipement agricole), eu égard à l'intérêt de l'Etat depuis le montage jusqu'à l'installation et l'utilisation dans la campagne de ces séchoirs et silos. Il aura à s'acquitter des tâches suivantes : (a) Assister le Gouvernement dans l'établissement des centres d'expérimentation possédant un bon système de séchage et de stockage; (b) Assister ses collaborateurs dans leurs efforts pour montrer les avantages de ces systèmes de séchage et de stockage aux paysans ainsi que les coopératives ; (c) Assister ses collaborateurs dans l'installation de tels systèmes dans les villages; (d) Déterminer les machines nécessaires pour l'usine de fabrication des silos ;

.../...

(e) Assister le Gouvernement dans la prépa-
tion des appels d'offre pour les machines
et leur évaluation ;

(f) Assister le Gouvernement dans le montage
et l'installation des machines ;

(g) Préparer avec ses collaborateurs les
manuels d'utilisation et d'entretien des
machines pour la fabrication en série des
silos ;

(h) Assister le Gouvernement dans la fabri-
cation des silos et leur installation
dans la campagne pour le séchage et le
stockage ;

(i) Former ses homologues.

FORMATION ET EXPERIENCE REQUISES

Spécialiste de haut grade avec une vaste expérience dans la production et le marché des systèmes de séchage et de stockage du grain.
Au moins 15 années dans ce domaine et
10 années dans les conditions de
climat tropical.

CONNAISSANCES LINGUISTIQUES

Français indispensable

RENSEIGNEMENTS SUPPLEMENTAIRES.

Le Gouvernement de la République Populaire du Bénin est conscient de ce que la lourde perte des grains est la conséquence du caractère inadéquat et inefficace des moyens de séchage et de stockage dont disposait le pays. Il demande avec insistance, la mise en place, d'une Usine locale de fabrication en série de silos et séchoirs.

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RÉPUBLIQUE DU DAHOMEY

MINISTÈRE DE L'INDUSTRIE
DU COMMERCE ET DU TOURISME

ORGANISATION
DES NATIONS UNIES
POUR LE DÉVELOPPEMENT
INDUSTRIEL

[redacted]

B.P. [redacted] - Tél. 31-60-85 - 31-60-16
Télégramme: CEPED - Telex MICT [redacted]
COTONOU - République du Dahomey

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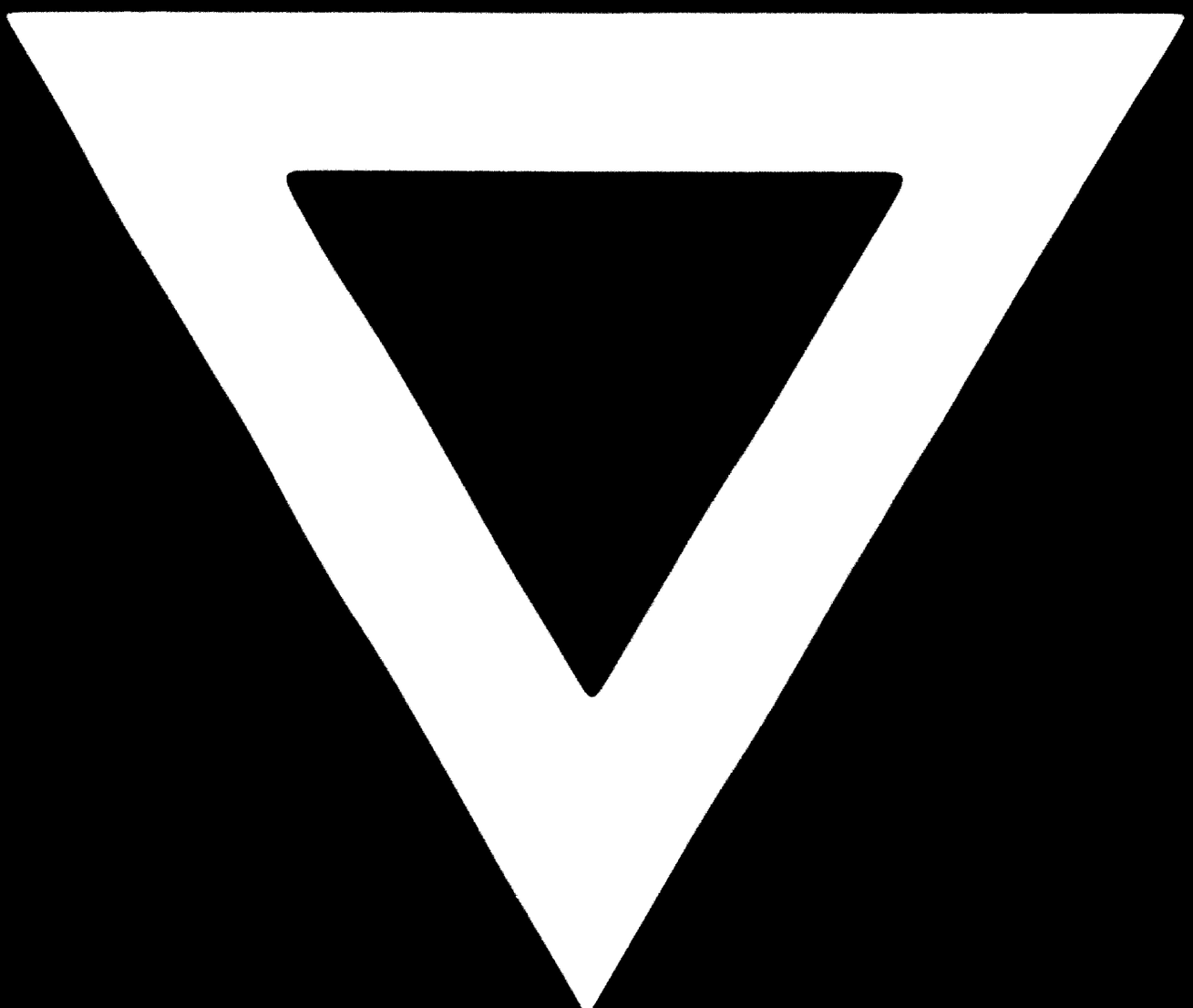

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