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REPORT TO
USAID/UV, AID/W
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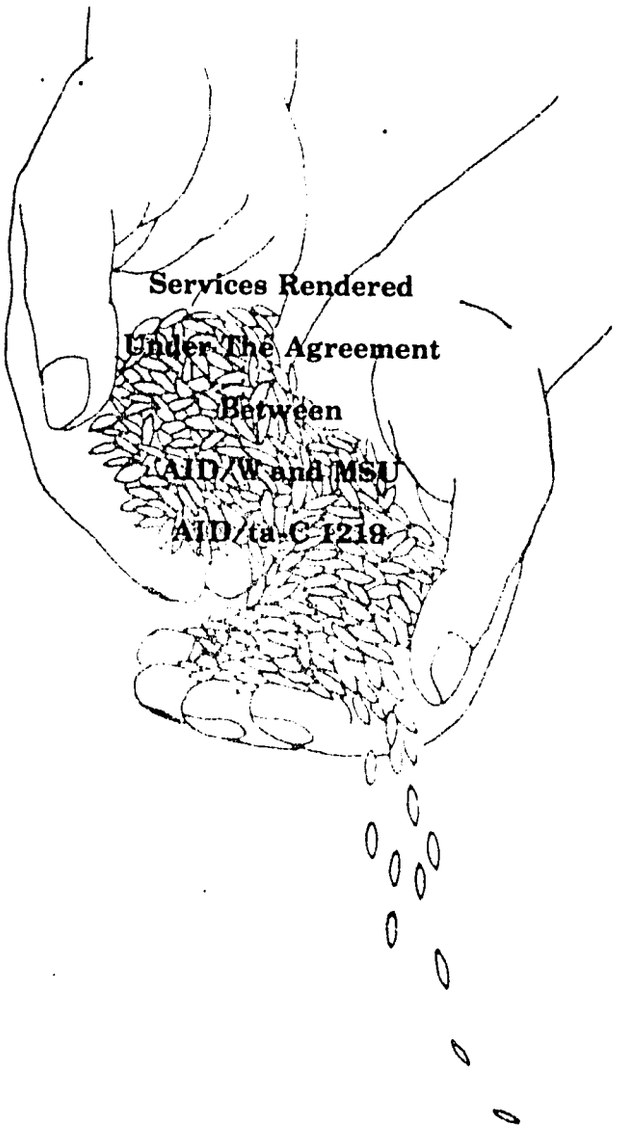
SHORT TERM IMPLEMENTATION OF THE NSS TECHNICAL PROGRAM



Services Rendered

Under The Agreement

Between

AID/W and MSU

AID/ta-C-1218

SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

REPORT TO USAID/UPPER VOLTA, AID/W AND MRD/UPPER VOLTA

ON

Short Term Implementation of NSS Technical Program

Services Rendered
Under the Agreement
between
AID/W and MSU
Contract AID/ta-c-1219

SEED TECHNOLOGY LABORATORY
Mississippi Agricultural and Forestry Experiment Station
Mississippi State University
Mississippi State, MS

July, 1978

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The author is particularly grateful to Mr. Richard Meyer, USAID/UV, for his assistance, hospitality, and counsel during my time in Upper Volta. Your competence and dedication were refreshing.

For his interest and cooperation in working to resolve one of the many serious problems faced by the people of Upper Volta, a special thanks is extended to Mr. Koumassi Yogo, Chief of the National Seed Service. As his former professor I say - You have some knowledge of seed, now become a viable seed of knowledge!

Howard C. Potts
July, 1978
Mississippi State, MS

REPORT SUMMARY

Title:	Short Term Implementation of NSS Technical Program
Contract:	AID/ta-c-1219 with Mississippi State University
Consultant:	Dr. Howard C. Potts, Seed Technology Laboratory MAFES, Mississippi State, MS
Period of Consultation:	April 16 - May 7, 1978

Summary

The AID/W assigned a three man team to assist the USAID/UV in its evaluation of the Seed Multiplication Project (683-202). The final draft of the team report was submitted to USAID/UV prior to the departure of the above consultant. A copy of this Evaluation Report is included as Appendix I.

At the request of the USAID/UV Project Manager and the Chief of the National Seed Service, this consultant utilized the last three days of his service period developing and discussing means of strenthening the technical implementation of the project which could be accomplished within the next two years with the personnel and equipment currently available to the program.

Th specific activities, designed primarily to accumulate factual information concerning current farmer seed usage patterns, level of seed quality, variety identification and seed storage are outlined. A fourth suggested area of effort involves a reduction of personnel, time and money presently utilized for seed production, but placing increased emphasis upon seed marketing i.e. increased usage of the good seed of improved varieties being produced.

REPORT TO
USAID/UV, AID/W and MRD/UV
Short Term Implementation of NSS Technical Program
April 16 - May 7, 1978

1. BACKGROUND

The Ministry of Rural Development (MRD) established the National Seed Service (NSS) in 1974 under its Department of Agricultural Services (DSA) at the recommendation of a USAID Planning Team. The primary role of the NSS was to coordinate the efforts of various research and production agencies involved in seed production and distribution and to provide impartial quality control services to the production-marketing agencies. The USAID agreed to assist the GOUV in the development of a seed program with the capability to meet the basic needs of the Voltaiac farmers for seed of improved, superior varieties.

The author of this report was one of a three member team assigned by AID/W to review the progress of the GOUV/USAID seed multiplication project. A copy of the team report, including recommendations and organizational details is attached as Appendix I.

The purpose of this report is to suggest specific activities and actions for the NSS which can be implemented with the currently available personnel and facilities during the final two years of the current project. Each of the items suggested were discussed with the Chief of the NSS, as part of the consultant's service, at the request of the USAID project manager. A secondary purpose of the report is to record some pertinant information and data concerning Upper Volta which was obtained during, though not directly related to, the project review.

2. SUGGESTED ACTIVITIES FOR THE NSS (1978 - 1980)

A major, possibly the most serious, constraint to the effective implementation of the NSS program is the lack of trained , experienced personnel. Removal of this constraint will be a long term undertaking, however, a start has been made and is programmed to continue. The primary purpose of this section is to outline activities which should be undertaken and which are within the personnel and budgetary limits of the NSS. Each of the suggestions which follow were discussed with the Chief of the NSS.

2.1 Seed Survey:

A major problem encountered by the technicians responsible for implementation of a "young" seed program is the nearly complete lack of factual data concerning the quality of seed and the varieties (local selections) actually being planted by the farmers. This is currently true in Upper Volta. The purpose of the national seed program was stated to be to help the farmers of Upper Volta increase their yields. Thus, the best place to obtain the information needed concerning seed quality and seed use is from the farmers i.e. conduct a seed survey.

The seed survey simply consists of going to a farmer when he is planting his crop, obtaining a small sample of the seed he is planting and asking him a few simple questions about his seed and related farming practices.

The survey form (next page) lists the type information that most farmers will readily give when asked. The form should be altered to meet the specific needs but should not be longer than one page. Most of the questions should be stated so the answers can be completed by simply placing an "x" in the space provided.

Typical Seed Survey Form

Date_____

A. General Information

1. Name_____(not necessary but desirable)
2. Address_____
3. What crops do you normally grow?

a. Sorghum	_____	f. Peanuts	_____
b. Millet	_____	g. Sesame	_____
c. Maize	_____	h. Cowpeas	_____
d. Rice	_____	i. Cotton	_____
e. Soybeans	_____	j. Fonio	_____

4. Will you use any of the following this year?

a. Fertilizer	_____	c. Seed treatment	_____
b. Insecticide	_____	d. Animals to cultivate	_____

B. Seed Sample *

5. Kind_____ 6. Variety name_____
7. Area Planted_____ 8. Planting rate_____kg/ha
9. Source of seed:
   a. Own production_____ d. Market_____
   b. Neighbor or family_____ e. Government_____
   c. Other_____
10. When was the last time you planted seed you did not produce?_____year
    a. Kind of Seed_____
    b. Source: 1. Neighbor_____ 3. Market_____
       2. Government_____ 4. Other_____
    c. If purchased, give price or rate of trade
       _____ or _____ / _____
       CFA/kg. kg grain kg seed
11. Have you ever obtained seed from the government? _____yes _____no
    If yes, a. What crop_____
    b. Name of organization_____

* Place 100 grams of seed and this completed form in the same bag.

countries.

(a) A planning session is held to establish the specific goals of the survey, develop the farmer questionaire, determine the ORD's and Cercels which will be included in the survey, prepare a news release concerning the purpose of the survey, make arrangements for the personnel, supplies and equipment for making the survey and transporting the seed samples and survey forms to the NSS headquarters.

(b) Before starting the survey the person in charge should meet with each surveyor to explain the purpose and importance of the survey, the suggested procedure for gaining farmer co-operation, the numbers of samples to be collected in each village, Cer cel, etc. (Precaution is necessary to assure that the group of farmers in each area which participate are selected at random, not just those which normally participate in government programs.)

Each surveyor will need the following: Survey forms, small bag (paper or plastic) to hold each seed sample and completed form, string or tape to seal the bag, pencil, vehicle, large bag box to hold samples during transport and shipment.

(c) The key to obtaining accurate information is for the surveyor to visit the farmer when he is actually in the field, planting his crop. Since it should take no more than 10 minutes to complete the form, most farmers do not mind the interruption in their work. A small sample 100-200 grams (1 or 2 handfuls) of seed should be collected from the container in which the

farmer has his seed, after the surveyor has briefly explained what he wants. The survey form should be completed after the farmer has provided the sample. When the form is complete it should be placed inside the bag with the sample.

(d) All of the samples within each ORD should be collected within a period of two weeks. Only seed of the two or three major crops of the area should be collected i.e. sorghum, millet, maize, peanuts, not vegetables or other crops which the farmer may grow on small areas. A total of 150-200 randomly collected samples from each cooperating ORD should be sufficient the first year of the survey.

(e) When all the samples from an ORD have been collected they should be transported to the NSS seed testing laboratory as soon as possible.

(f) The NSS seed analysts should conduct a standard purity and germination test on each sample as soon as possible after receiving the samples.

(g) Finally, the data from both the survey forms and the laboratory tests should be summarized, intrepreted, and the results of the survey distributed to DSA, ORD, AVV and selected MRD personnel.

Experience in other countries indicates that the first year survey efforts should be attempted in a small area, not on a country wide basis. Therefore, it is suggested that initally only NSS personnel collect samples from the following Cercels of the Ouagadougau ORD; Bousse', Zorgho, Po. This will permit both field and laboratory personnel to gain experience and the making of needed changes before larger

scale efforts are attempted.

The second year, seed multiplication officers from the four ORD's cooperating in the NSS program could be included, others in subsequent years.

In addition to providing a factual data base concerning the varieties and the quality of seed actually planted a seed survey would provide, (a) . the laboratory personnel with the experience that is badly needed to attain competence, (b) a data base for estimating the real demand for seed of improved varieties (c) information for educational programs (d) provide national norms for purity and germination that could be used when developing certification seed regulatory standards. A seed survey is not complicated but it is not an easy task.

2.2 Varietal Identification:

The NSS is responsible for the field inspection of the varieties produced by the National Seed Program. To be effective in this role, each inspector must be able to identify the plant and/or mature seed characteristics of variety. Varietal identification is the primary reason for field inspections. To date, no attempt has been made to prepare a detailed morphological description of the varieties being multiplied. This must be done before the NSS can state with some degree of certainty that, for example, a production field of the variety "Sorgho 29" is infact "Sorgho 29" and not "Gnofing" or some other variety. This task can readily be completed by NSS pers el in cooperation with the plant breeders at the various research stations.

The basic steps are:

(a) Foundation seed of each variety in the NSS multiplication program should be obtained from the originating research

station.

(b) A single row of 100- 200 plants should be planted on the same day.

(c) As the plants develop a detailed record of the morphological characteristics of each crop - leaf shape and size, overall plant height, days from planting to flowering, characteristic coloring, seed color, size, shape, etc. should be made. Of particular importance will be those genetically controlled characteristics which can be used to distinguish one variety from another. A copy of the form used to describe the morphological characteristics of soybeans appears on the next page. A different form must be prepared for each crop. Plant breeders working with each crop can provide most of the information, however, the NSS inspectors must know the meaning of each descriptive term.

Once prepared, the varietal descriptions should be duplicated and distributed to every inspector and ORD seed multiplication officer as a reference. The plantings could be made at the Kamboinse research station both for convenience to NSS personnel, the availability of irrigation and plant breeders who are familiar with varietal descriptions.

2.3 Seed Storage

Because of the weather patterns in Upper Volta the assumption is made that (1) seed of all crops harvested the previous year are of high viability and (2) seed can be stored in warehouses for several years with no significant loss in viability. Again, experiences in other countries with similar weather patterns have demonstrated that the above assumptions are not always valid.

As an example, this consultant was provided a small sample of

FORM GR-470-2
(6-15-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*GLYCINE MAX*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)

ADDRESS *(Street and No., or R.F.D. No.; City, State, and ZIP Code)*

FOR OFFICIAL USE ONLY

PVPO NUMBER

VARIETY NAME OR TEMPORARY DESIGNATION

Place the appropriate number that describes the varietal character of this variety in the boxes below.

1. SEED SHAPE:
[ ] 1 = SPHERICAL 2 = SPHERICAL FLATTENED 3 = ELONGATE 4 = OTHER *(Specify)*

2. SEED COAT COLOR:
[ ] 1 = YELLOW 2 = GREEN 3 = BROWN 4 = BLACK 5 = OTHER *(Specify)* _____
SHADE: [ ] 1 = LIGHT 2 = MEDIUM 3 = DARK

3. SEED COAT LUSTER:
[ ] 1 = DULL 2 = SHINY

4. SEED SIZE
[ ][ ] GRAMS PER 100 SEEDS

5. HILUM COLOR:
[ ] 1 = BUFF 2 = YELLOW 3 = BROWN 4 = GRAY 5 = IMPERFECT BLACK 6 = BLACK 7 = OTHER *(Specify)* _____
SHADE: [ ] 1 = LIGHT 2 = MEDIUM 3 = DARK

6. COTYLEDON COLOR:
[ ] 1 = YELLOW 2 = GREEN

7. LEAFLET SIZE *(See Reverse)*:
[ ] 1 = SMALL 2 = MEDIUM 3 = LARGE

8. LEAFLET SHAPE:
[ ] 1 = OVATE 2 = OBLONG 3 = LANCEOLATE 4 = ELLIPTICAL 5 = OTHER *(Specify)* _____

9. LEAF COLOR *(See reverse)*:
[ ] 1 = LIGHT GREEN 2 = MEDIUM GREEN 3 = DARK GREEN

10. FLOWER COLOR:
[ ] 1 = WHITE 2 = PURPLE 3 = OTHER *(Specify)* _____

11. POD COLOR:
[ ] 1 = TAN 2 = BROWN 3 = BLACK

12. POD SET:
[ ] 1 = SCATTERED 2 = CONCENTRATED

13. PLANT PUBESCENCE COLOR:
[ ] 1 = GRAY 2 = BROWN 3 = OTHER *(Specify)* _____
SHADE: [ ] 1 = LIGHT 2 = MEDIUM 3 = DARK

14. PLANT TYPES *(See Reverse)*:
[ ] 1 = SLENDER 2 = BUSHY 3 = INTERMEDIATE

15. PLANT HABIT:
[ ] 1 = DETERMINATE 2 = INDETERMINATE 3 = OTHER *(Specify)* _____

16. HYPOCOTYL COLOR:
[ ] 1 = GREEN 2 = PURPLE

17. SEED PROTEIN:
[ ] 1 = A 2 = B

18. NUMBER OF DAYS TO FLOWERING *(Place a zero in first box (e.g. [0][9]) when days are 9 or less.)*
[ ][ ]

19. MATURITY GROUP:
[ ] 1 = 00 2 = 0 3 = I 4 = II 5 = III 6 = IV 7 = V 8 = VI 9 = VII 10 = VIII

20. SIZE OF 10 DAY OLD SEEDLING GROWN UNDER CONSTANT LIGHT *(Growth Chamber)* **AT 25° C.** *(Place a zero in first box (e.g. [0][2]) when size is 9 mm. or less.)*
[ ][ ] MM. LENGTH OF SEEDLING [ ][ ] MM. LENGTH OF COTYLEDON [ ][ ] MM. WIDTH OF COTYLEDON

21. DISEASES: *(Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)*

[ ] BACTERIAL PUSTULE	[ ] SOYBEAN CYST	[ ] DOWNY MILDEW	[ ] PURPLE STAIN	[ ] POD AND STEM BLIGHT	[ ] ROOT KNOT
[ ] FROGEYE	[ ] STEM CANKER	[ ] PHYTO-PHTHORA	[ ] BROWN STEM ROT	[ ] TARGET SPOT	[ ] BROWN SPOT
[ ] BUD BLIGHT	[ ] WILDFIRE	[ ] RHIZOCTONIA ROT	[ ] OTHER *(Specify)* _____		

"Koupela" millet when in Upper Volta. The sample was hand carried to our laboratory where it was tested for germination. Its germination was only 31%! Additionally, the GOUV is reportedly considering the establishment of a strategic seed reserve to resupply farmers who lose all of their planting seed. The idea of a strategic seed reserve has validity, however, no one could give a factual answer to the question, "How long will seed of millet, sorghum, maize and peanuts retain ther viability when stored in a warehouse?"

The validity of the first assumption can be determined from the results of the Seed Survey. However, to determine the validity of the second assumption it is suggested that NSS personnel conduct a simple storage experiment.

The following proceedure is suggested.

1. Obtain three, 50 or 100 kg. bags of both foundation and "certified" seed of each of the following crops; sorghum, millet, maize, rice, peanuts (unshelled) as soon as possible after harvest and cleaning.
2. Test the seed of each lot for purity and germination.
3. Place one bag of each in storage at each of the following locations; NSS warehouse in Ouagadougou; Bobo-Ord warehouse at Bobo-Dioulasso and the seed warehouse at the Kamboinse Research Station.
4. Draw a sample of approximately 500 grams from each bag at each location every three months. Test each sample for germination, examine them for insect damage and general appearance and record the results.
5. Continue the quarterly sampling until the germination decreases to 50% or for a period of three or four years.

This simple storage test will provide the minimum information to test the validity of assumption (2) above. If arrangements can be made, the test would be strengthened considerably using seed of 3 or 4 lots of each crop and adding at least one location nearer the dessert, Dori for example.

2.4 Seed Marketing and Estimating Demands

The most direct way to evaluate the effectiveness of Upper Volta's seed program is to answer the question, "How many tons of the seed produced under the Nss program were actually planted by Voltaiac farmers this year?" The number of tons of seed produced, the hectares of seed production fields inspected and the number of seed samples tested are of very little importance if the inspected, tested seed produced are not planted by the farmers.

Seed marketing is the most difficult and least understood phases of all seed programs, developing and developed. Seed marketing includes: (a) determining who needs seed, what kinds and varieties of seed are needed and how will the seed be paid for i.e. cash, credit, barter. (b) accumulation of the kinds, varieties and quantities of seed that are needed. (c) Communication to the farmer, concerning where the seed can be obtained, when they will be available, how much the seed will cost, what varieties are available and the characteristics of each. Communication from the farmers concerning what they like and don't like about the seed, the variety, the cost, etc. (d) Distribution of the seed to assure they are available when and where they are needed and, finally, collecting the money or barter for the seed. Distribution activities increase the cost of seed but do not increase the value of the seed to the farmer. Thus, costs of distribution can be a major factor limiting farmer utilization of improved varieties because they

often increase seed prices by 30 to 50% or more.

At present, essentially all of the planning effort and funds of the National Seed Program are directed toward producing "x" tons of this variety and "y" tons of another variety. Varietal development and seed production are justified only when seed of these varieties effectively marketed and planted by farmers. The National Seed Program has demonstrated the ability to produce more than adequate quantities of seed to meet the real demand, major emphasis should now be placed upon getting the good seed used, that is, seed marketing.

What valid justification is there for producing 1000 tons of the highest quality seed of the best variety when only 10 tons are utilized? There is none. In Upper Volta, as in many other countries, seed production goals are based upon the volume of seed (a) which can be produced, (b) which planners believe should be used or (c) required to justify construction of processing, storage or testing facilities. These reasons are in striking contrast to the only valid reason for establishing a seed program i.e. to meet the real demand for seed.

Real demand is the exact amount of seed of a variety and quality level which will be bought by farmers using a specific technology in a defined location, within a specified time period and with a given marketing effort. The above definition places restrictions upon the concept of real demand not usually included in demand estimates made by seed program planners. These restrictions are:

(a) Variety and quality level-refers to the specific variety and quality level for which demand is determined. For example, there is a great difference between the real demand for maize seed and the demand for certified seed of the "Jaune Flint" variety. Applying the demand relationship for all

maize seed to demand estimates for "Jaune Flint" leads to serious over-production of "Jaune Flint."

(b) Bought-refers to the ability of the farmer to pay, either cash or trade, for the seed. Most traditional farmers will not use their limited cash funds for purchase of a product (seed) which they can produce and save. On the other hand, they are often willing to trade "2 or 3 pans" of grain for "1 pan" of seed. Until an exceptionally superior variety becomes available, it is estimated that not more than one Voltaiac farmer out of 100 would pay cash for seed of sorghum, millet, maize or cowpeas. Why produce seed that will not be bought and planted?

(c) Technology-implies that the concept of real demand must consider the farming practices used by the farmers who obtain the seed. A change in the demand for seed of one variety may occur, for example, when farmers in an area shift from hand cultivation to animal cultivation or chemical fertilizers become available.

(d) Location-this means that real demand has geographic dimension. Crops and varieties that are adapted in one region of Upper Volta may not be adapted or accepted in another. Thus, the demand is specific to different geographic regions of the country.

(e) Time period-relates to the length of time that the real demand will exist. Rainfall patterns establish the range in days that a crop can be planted and grown to maturity throughout Upper Volta. The dates for planting some improved varieties or new crops may be restricted when compared with tradi-

tional varieties or crops. The seed must be available to the farmer when he is ready to plant, not a weed or even a day later.

(f) Marketing effort-recognizes that real demand can be influenced by demonstrations, promotional campaigns, distribution effort, and price. The current marketing effort in Upper Volta is minimual and should receive far greater emphasis than xpanded production capability.

It is suggested that seed production goals of the NSS program be eliminated and new goals be established using the following guidelines.

(a) Determine as precisely as possible the quantity of seed of each variety that was used for planting purposes (not bought as seed and used as grain).

(b) Produce only twice the amount of "certified" seed of each variety that was sold the previous year.

This procedure will drastically reduce the currently planned and very costly, 730 MT over production of "foundation" and "certified" seed. Mean while the NSS and ORD seed technicians could closely examine and adjust the seed production-marketing relationships without placing the real demand for seed by Voltaiac farmers in jeopardy.

The four specific activities mentioned above are only the first steps toward developing the informational and technical experience base necessary for the development of Upper Volta's seed program, others will be necessary. Should assistance be required to implement these activities it is available through the USAID Mission and the MSU/AID Seed Industry Development Contract as well as other organizations.

3. GENERAL INFORMATION

Upper Volta is economically among the poorest countries of the world having an reported per capita income of US $90 for its population of 6.2 million persons in 1976. 1/ Ninty-two percent of the population is rural, essentially all of whom expend their productive labor to provide themselves the bare necessities of life; food, clothing and shelter, and this is not always successful. Less than 10% of the school age children (5-19yrs) have the opportunity for any formal education and, indeed, nearly 50% of the children born die before they reach schoolage.

Agriculturally, the soils of Upper Volta are not particularly productive, even when the most advanced technologies are applied, ranging from the desert sands in the north to the latteritic clays of the central and southern regions. Rainfall, in reality the poor distribution, presents a serious limitation to agricultural productivity. To date, no major mineral or petroleum activities show real promise of ending the economic doldrums of either the public or private sectors. Wood, the principal source of fuel for cooking, has become so limited that it is illegal to cut a living tree.

In spite of the very stark situation described above, the people of Upper Volta have established a reputation as good workers. Reportedly, the Voltaics which seek employment in adjacent countries are prefered because of their good work ethic. Reportedly, a "major portion on the income of Upper Volta is derived from money sent home by Voltaics" working in Ghana, Ivory Coast, etc. Thus, the human resource is Upper Volta's major asset and, therefore, must be the basis for long term

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[1] Data reported in "Upper Volta Briefing Book - Oct, 1977"

agricultural and national development.

Upper Volta's initial goal for agricultural development is to attain self sufficiency in production and distrbution of the basic food crops; sorghum, millet, maize, cowpeas and oil crops. Rice is a food crop economically available only to the relatively wealthy urban dwellers and the few farm families which produce it. Cotton and peanuts are the major cash crops, but much of the approximately 90,000 MT of peanuts produced annually are consumed by the producing farm families. Cotton acreage is less than 70,000 ha.

According to the 1975-76 agricultural estimates, the average farm size in Upper Volta was 5.26 ha. Data indicating the relative importance of the various crops are given in Table 1. The discrepency in data concerning cotton and peanuts is indicative of the difficulties encountered in obtaining reliable statistical data on which to base projections.

Table 1 Utilization of Crop Land on the Average farm in Upper Volta 1975 - 1976

Crop	Area Planted by Average Farmer 1/	National Acreage 2/	
	(ha)	(%)	(oooha)
Sorghum	1.90	36.1	1,148
Millet (pearl millet)	1.52	28.8	902
Cotton	.37	7.0	69
Peanuts	.35	6.6	164
Maize	.24	4.5	142
Cowpeas	.18	3.4	180
Fonio (seteria millet)	.18	3.4	130
Rice	.17	3.2	41
Sesame	.13	2.5	30
Other crops (incl. vegatables)	.24	4.5	na

[1]Source: Upper Volta Briefing Book USAID/Ouagadougou

[2]Source: Department of Agricultural Services, MRD

The rainy season extends from June through September. Data presented in Figure 1 shows that the southern half of the country recieves sufficient rainfall to support production of all major crops. However, total rainfall is not the major problem, rather it has been poor distribution and high intensity. Detailed evaluation of daily rainfall records revealed that it is not uncommon for rainfalls to exceed 75mm in a few hours. Because of the rolling terrain and slow percolation rate of the soils there is very heavy runoff. Such rainy periods are often followed by dry periods of 10 to 20 days duration, particularly during June and July planting period. As a result, soil moisture sufficient for germination are frequently not sufficient to sustain seedling growth. This results in thin stands or the necessity to replant after the optimum planting date, in either case the result is decreased yields.

The Voltaic farmers have learned to aadjust their crops and cropping patterns to the erratic rainfall. Many select the best heads from their crop to be saved as seed for the next year's production before harvesting their grain crop. When total production permits they save sufficient seed to replant two or three times.

Stability of yield and good cooking quality not total yield, are the two primary criteria for acceptance of a new variety. The only economically acceptable production input for food crops for an estimated 95% of the Voltaiac farm families is seed of superior genetic capability. At present, only cotton, rice, and some peanut producers believe the use of fertilizers and pesticides is economically justifiable.

For reference purposes, the location of the research stations and the ORD'S participating in the NSS program are given in Figure 2.

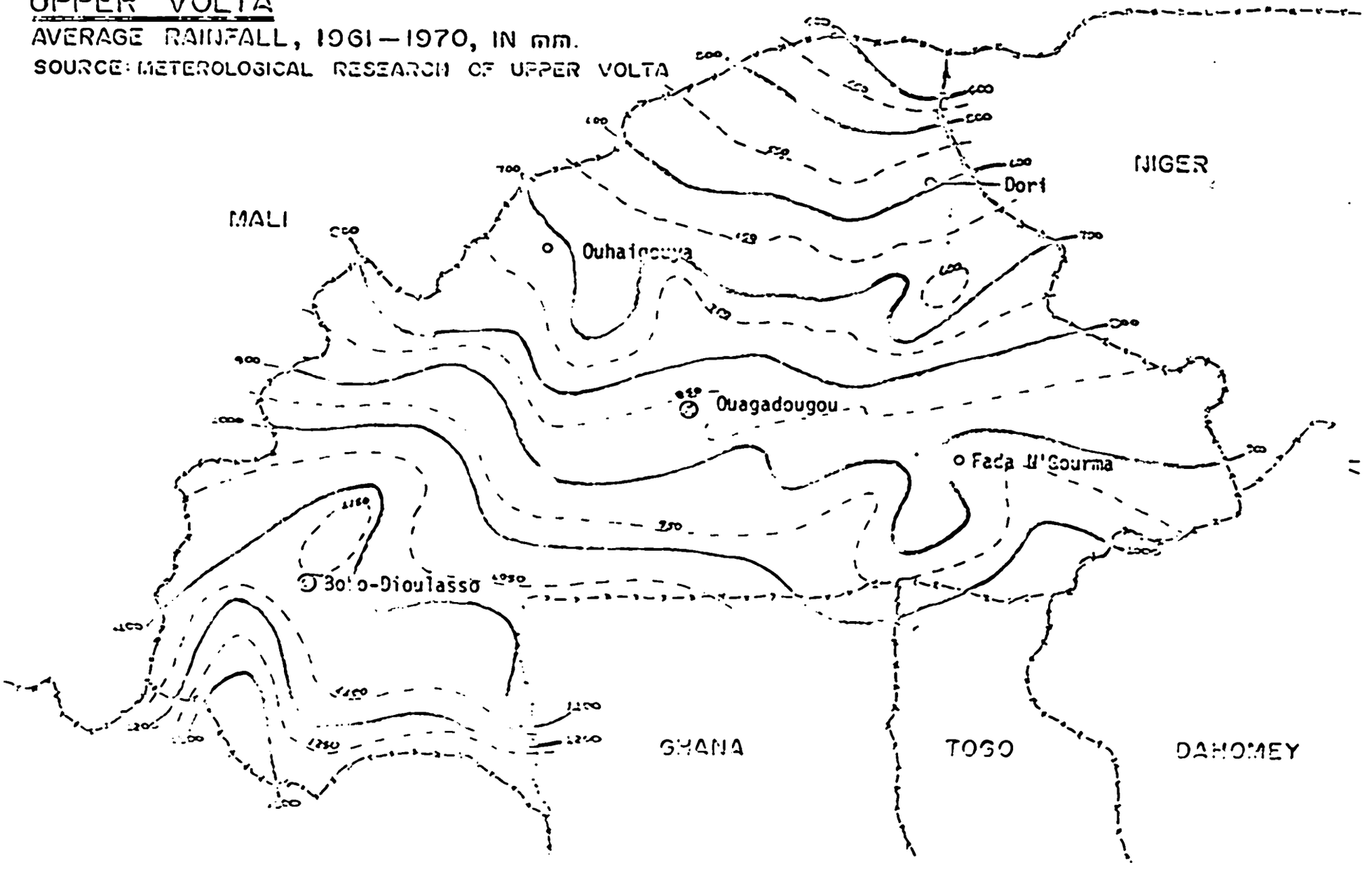

Figure '. Average rainfall in Upper Volta 1961-1970.

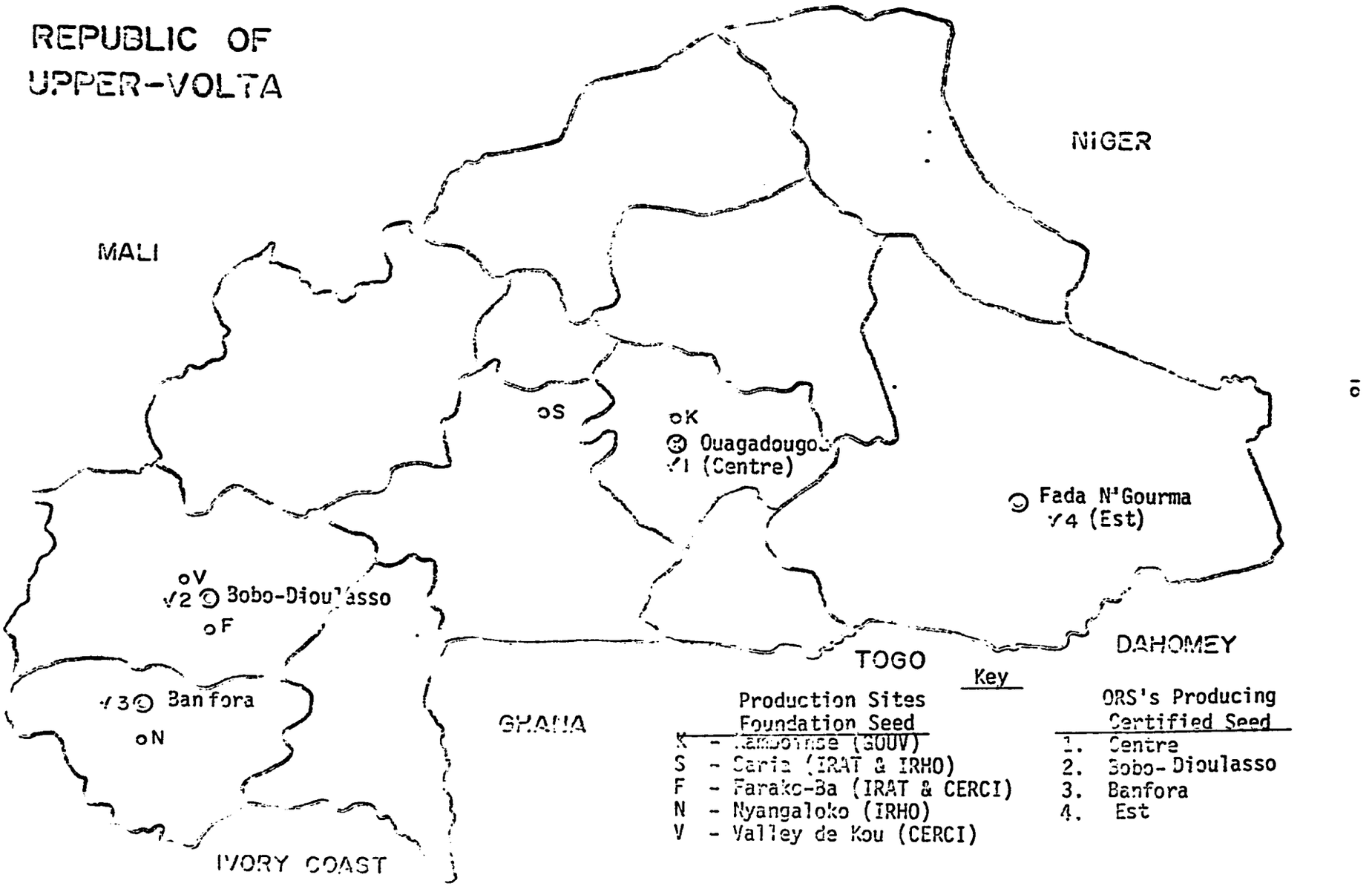

Figure 2 Research station foundation seed production sites and ORD's producing certified seed for the National Seed Program.

APPENDIX I

EVALUATION REPORT

UPPER VOLTA SEED MULTIPLICATION

686-202

I. Purpose and Method of Evaluation. The 1974 PROP for this project called for an evaluation after three years of project operation to ascertain the quality and quantity of improved seed produced as a result of the project, the degree of farmer acceptance of such seed, the quality of leadership developed through the project's training component, and the willingness of the Voltaic government to continue the project without further external assistance.

The optimism inherent in that PROP has not been realized. A project appraisal report, written a year before this evaluation, characterized as critically unsatisfactory the U.S. staffing for the Project:

> "The first technician arrived at post one year after the project manager. The second has not yet arrived, although, the project manager has now been at post two years and the Project Agreement was signed 2½ years ago."

Not all of the commodities contemplated in the project have arrived, three years and four months after the project agreement was signed. The first technician has left, and no replacement is contemplated for him. The second technician, badly needed, is yet to be recruited.

It might be said then that the project has not truly been in operation for three years. Nonetheless, this evaluation seeks to gauge the contribution already made by the project to the attainment of the project's purpose and goal - an effective national system for producing and using improved seed and an increase in domestic food production, specifically sorghum, millet, rice, corn and groundnuts. The evaluation furthermore looks at additional (extra-project) steps that should be taken to achieve that purpose and goal.

The evaluation team had three members - Dr. Howard C. Potts, Professor and Agronomist, Mississippi State University; Donald G. Brown, International Development Service, U.S. Department of Agriculture; and George Rublee, AID.

The team spent two weeks in Upper Volta. Visits were made to the Rural Development Organizations (ORDs) at Ouagadougou and Bobo-Dioulasso, the research stations at Kamboinse and Farako-Ba, the headquarters of the Directorate of Agricultural Services (DSA), the National Seed Service (NSS), the Volta Valley Authority (AVV), and the Institute for Tropical

Agriculture (IRAT). The team is indebted to a number of people for their impressions and information supplied. Among these are Joseph Kabore, Director of Agricultural Services (DSA); Drs. Pattanayak and Lawrence of the Research Institute for Semi-Arid Tropics (ICRISAT); M. Djuigma, DSA Station Director at Kamboinse; Korstian Korteweg and Arlan McSwain of the Semi-Arid Food Grain Research and Development Project (SAFGRAD); Sibiri Ouedraogo, Seed Multiplication Officer, Ouagadougou ORD; M. Sanon of the Volta Valley Authority (AVV); Marcel Tatieta, Director, Louis Sow, Technical Services Chief and Christophe Traore, Seed Multiplication Officer, of the Bobo ORD; Messrs. Poulain and Darendol of IRAT; M. Roussel of the Institute for Research in Oils and Oleaginous Plants (IRHO); M. Taoufik Jomni, Technical Advisor to the National Office of Cereals (ONACER); Donald Atwell, Acting C.D.O., Ouagadougou; Richard Swanson, an anthropologist on contract to USAID; Mark Gilcrest and Bill Jadwin of USAID; and last but not least, Richard Meyer of USAID and Koumassi Yago, Chief of National Seed Service (NSS), both of whom travelled with and gave counsel to the team. M. Kabore met with the team several times at the beginning, in the middle and at the end of the evaluation; we hope that the report will have some utility to recompense him and the others who helped us for their time and interest.

II. Findings and Recommendations. For ease of reference, the team's findings and recommendations are numbered. Findings and recommendations are inter-mingled, being grouped around substantive issues.

A. Findings and Recommendations

1. The National Seed Service (NSS) Project is valid in the sense of serving the national interest of the Republic of Upper Volta and should continue to receive domestic and external support.

2. The contributions to the NSS made with AID project 686-202 have been useful, especially the contributions towards helping the NSS become operational. The remaining funds in the project, not already sub-obligated, should be reprogrammed with an emphasis on facilitating NSS responsibility to assure sufficient quantities of foundation[1/] and multiplied[2/] seed are produced to meet the demand for seed in the 1979-80 crop year.

3. The es ential functions which the NSS exists to serve are: first, the selection of improved seed varieties that should be multiplied to meet Upper Volta's needs; second, arranging to produce foundation seed for such varieties from the research

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1/ Foundation seed are those produced under direct supervision of one of the cooperating research stations.

2/ Multiplied seed are those produced by the ORDs which use foundation seed as planting stock.

organizations in appropriate quantities; third, arranging to have the ORDs 3/ multiply those foundation seed; fourth, coordinating the distribution of quality multiplied seeds within and among all eleven ORDs; fifth, checking on the maintenance of high genetic and biological quality of seed in the multiplication processes; sixth, fostering the transfer of technical knowledge along with improved seed and better agricultural practices through the ORD's extension agents to farmer members of the ORDs.

4. While the NSS is almost fully staffed and has an operational budget, the NSS urgently needs to fill out its senior staff with a qualified Chief of Seed Production and a qualified Chief of Quality Control. Their capabilities should be reinforced with a qualified USAID Agronomist Advisor. They should establish close liaison between the research organizations, the foundation seed production centers, the seed multiplication centers in the ORDs and the extension agents in the ORDs who carry on demonstration field trials, ascertain seed needs of producers, and generally perform extension services for ORD members.

5. The clearest and most direct way for the NSS to obtain appropriate quantities of foundation seed is through purchase contracts with the National Seed Production Centers, i.e. Kamboinse, Saria, Vallee de Kou, Farako-Ba, and Niangoloko. (These centers have been operating under the supervision of international research organizations such as IRAT, IRHO, ICRISAT and CERCI as well as by the Government of Upper Volta.)

6. The clearest and most direct way for the country to obtain appropriate quantities of multiplied seed is to establish a rational seed/grain pricing system which would encourage utilization of the seed of improved varieties for planting purposes rather than as a cheap source of food, thus placing seed in the category of other production inputs from which the ORDs recover their operational costs. As an interium measure, while actual demand is being ascertained, the NSS might advance funds to those ORDs with seed production-processing capability, to establish a revolving fund to support seed multiplication expenses with funds restored through the sale of seed to other ORDs, AVV, and farmers.

3/ There are 11 Organizations for Rural Development (ORDs) covering the entire territory of Upper Volta. They represent the primary effort of the Government to incorporate the nation's farmers, who are maily subsistence farmers, into the national economy. ORDs sell agricultural inputs, provide extension services and purchase some of the farmers' produce.

7. The clearest and most direct way to distribute multiplied seed to farmers is through sales contracts between user and producer ORDs and then sales between the ORDs and their farmer members.

8. The NSS should not have a monopoly on the sale of seed except foundation seed. Only the NSS, however, should be able to certify the genetic and physical purity of seed. NSS quality control ultimately should extend to imported seed but only after qualified, experienced seed analysts are available.

9. The price paid to the NSPC[4/] by the NSS for foundation seed should cover production costs, under tight quality control, and seed storage and distribution costs. Foundation seed should be sold generally at a price of three to five times the price of grain market prices at harvest.

10. The price paid for seed multiplied by the RSPCs[5/] should be 5 to 10% above the pre-planting market price for grain of the same crop.

11. The NSS should purchase only foundation seed of varieties demonstrably better than traditional varieties. The NSS must take account of the fact that the traditional varieties of millet and sorghum are not yet sufficiently improved to provide a significant advantage to the traditional farmer, therefore the NSS should refrain from large scale multiplication of millet and sorghum seed until substantial genetic improvements have been achieved.

The only exception to this might be to maintain an emergency stock of millet and sorghum seed to relieve the impact of drought. One must distinguish between the reserve capacity of food grains (20,000 tons to be maintained by OFNACER) and the corresponding reserve seed capacity that could not rationally exceed 800 tons. Consideration needs to be given to the organization that should hold this seed reserve as well as to the measures to maintain its viability.

The non-emergency role for NSS vis a vis millet and sorghum is to facilitate field trials of new varieties by research institutions until a demonstrably superior strain is developed. Thus, the 1977 recommendation of CILSS that the NSS purchase and distribute selected traditional seed of millet and sorghum from the year 1977 to the year 2000 should be disregarded. Farmers have proven to be competent selectors of traditional millet and sorghum seed.

4/ NSPC-National Seed Production Centers, i.e., Kamboinse, Saria, Farako-Ba, Vallee du Kou, Niangoloko.

5/ RSPC-Regional Seed Production Centers, i.e., ORD's of Ouagadpugou, Bobo-Dioulasso, Camoe, Eastern ORD.

One of the principal factors militating against an involvement of NSS in millet and sorghum seed of traditional varieties is that historically less than 8% of the millet and sorghum grain production has come on the cash market. Thus, 92% of the production and consequently at least 92% of the utilized seed have never reached the cash market. These crops remain essentially outside the control and purview of NSS, the ORDs and OFNACER, all agencies which deal with crops that are bought and sold.

12. The foundation seed programs already started by the NSPCs should not be allowed to founder. The planting season is here! The NSS needs, within the first week of May, to place firm orders with the foundation seed production centers at Kamboinse, Saria, Vallee de Kou, Farako-Ba and Niangoloko for 1979 requirements of seed of maize, peanuts, rice, soybeans and cowpeas. NSS should not now contract for any significant quantities of millet or sorghum seed over and above that required to build up the emergency seed reserve.

13. Similarly the RSPC multiplication programs should also be started the first week of May with the ORDs of Ouagadougou, Bobo-Dioulasso, Banfora and Fada N'Gourma.

14. As indicated in point 9 above, the official price for foundation seed should be fixed at a relatively high level compared with the actual grain market price to cover the costs of closely controlled, high-technology production. The NSPCs producing foundation seed for the NSS should maintain books and records in accordance with generally accepted accounting principles adequate to show the proper allocation of costs of foundation seed production and should make them available at reasonable times to NSS and to donor agencies assisting NSS with financing. The foregoing obligation should be incorporated in the contracts between NSS and the NSPCs. A similar obligation for accurate accounting should be incorporated into the arrangements between the NSS and ORD's for revolving funds to finance seed multiplication.

15. As indicated in point 10 above, the selling price for RSPC-multiplied seed should be above the actual market price of such grain. Both this recommendation and recommendation 14 are necessary if the NSS and the ORDs are to be able to compete on equal terms with the commercial grain dealers. These two recommendations stand independently of any debate over private vs. state marketing. The existing pricing policies put the ORDs, the NSS and OFNACER at a competitive disadvantage with the commercial grain dealers. At a minimum, the state agencies should be able to compete on an equal basis.

16. With proper pricing policies and if devoted only to distributing foundation seed of significantly improved seeds, the NSS foundation seed operation should be self-supporting (recover all variable and some fixed costs) by 1983. The quality control educational and reserve stock functions will not and probably should not be self-supporting in this century. The NSS should maintain books and records adequate to show the costs of its operations and its application of funds. These should be available at reasonable times to agencies assisting the NSS with financing.

17. The emphasis on quality and improved varieties of seed cannot be too strong. It is not just a matter of the reputation of the NSS. It is a question of survival for the farmer who puts his trust in seed purchased from a government which is attempting to improve his well being.

III. Historical Project Goals. The overall project goal was to increase domestic food production in Upper Volta, specifically, production of millet, sorghum, rice, corn and groundnuts. The purpose of the project was to move towards this goal through the establishment of an effective National Seed Service and related organizations to provide a constant source of seed of improved varieties to farmers in the ORDs. The related organizations were the research stations, which were to develop, introduce and evaluate improved varieties and produce foundation seed, and the ORD's, which were to identify the demand for seed, multiply the foundation seed, conduct farm level demonstrations of the new varieties, distribute seed of known quality to farmers and provide extension services to assure appropriate use of the new varieties.

The project paper envisaged the quantities of seed of improved varieties for distribution to farmers by 1979 (assumed to be the fifth year of the project) to be as follows:

CROP	SEED PRODUCED	% OF DEMAND
Sorghum	1240 tons	100%
Millet	720 tons	100%
Corn	625 tons	100%
Peanuts	480 tons	13%
Rice	359 tons	136%

The institutional goals were: to establish a National Seed Service which, with the help of a National Seed Committee, would have the capacity to evaluate the varieties developed by the research organizations in Upper Volta, of ascertaining which varieties should be selected for multiplication and distribution, for overseeing the process as necessary to maintain seed quality; to provide support for four production centers for the production of foundation seed; and to provide support for seed multiplication and distribution centers in four ORDs.

Training contemplated as necessary for attainment of these goals was: one scholastic year in the U.S. for the Chief of the NSS and his two section chiefs; short-term training in African training centers for the NSS Chief and the four ORD seed multiplication officers; short-term, in-country training in seed multiplication and demonstration for 24 extension agents working in the ORDs; and a week at each station producing foundation seed for the Chief of the NSS Quality Control section.

Equipment and commodities to be provided were: office, laboratory, warehousing and transport facilities for the NSS; cultivation, transport, warehousing, seed processing equipment and commodities for the four foundation seed production centers; cultivation, transport, warehousing, seed handling equipment and commodities for the four seed multiplication centers in the ORDs.

Advisory services were to include; for five years a project manager, fluent in French, with experience in grain-seed production and processing, and for two years an extension advisor or general agriculturalist, also fluent in French, who would be primarily concerned with field operations. Short-term contract advisors were contemplated to help with the installation and utilization of seed multiplication facilities.

The project goals were stated to be the minimum that would yield a substantive improvement. The two most important assumptions articulated in the project paper as necessary to project goal attainment were, first, that a high enough priority would be placed by the host government on agricultural production to assure a budget and qualified staff for the project, and second, that favorable pricing and other relevant policies would be adopted in a timely fashion.

IV. Inventory of AID-assisted Project Assets. At the time of this evaluation (April-May 1978 - just prior to the planting season), it is too early to assess the impact on food pruduction of the national seed program. The institutional measures - establishment of the NSS, equipment for the foundation seed production centers and the four ORD multiplication centers - are partially put in place. The NSS has a chief. He has received training in the U.S., although, it was but three months instead of the academic year contemplated. The headquarters building of the NSS has been constructed and equipped. The NSS is staffed except for two key personnel,- the Chiefs of Production and of Quality Control. The advisory services contemplated have not yet fully been utilized. The services of an agronomist advisor, a field man, could be extremely valuable in improving the communication of data on seed needs between the ORDs and the NSS and more significantly in assisting with transferring technology from the research institutions through training and retraining ORDs' extension agents in seed demonstration projects.

Training has been provided to only 10 of the 24 encadreurs contemplated, but to 11 rather than 4 ORD seed multiplication officers. Short-term technical assistance was ably provided in laboratory procedures, equipment selection and economic evaluation. As noted earlier, the technical, long-term advisory services have not yet been fully delivered. At the time of this evaluation USAID had a promising candidate for the agronomist-advisor. Immediate posting of such an advisor could make up for the lack of training to date in field trials and demonstration projects.

Most of the equipment and commodities contemplated have been delivered. The equipment package contemplated has been modified to provide seed cleaning equipment for each of the four ORD multiplication centers and for the foundation seed production centers at Niangoloko, Saria and Kamboinse. (The NSPCs at Vallee de Kou and Farako-Ba have such equipment from extra-project sources.) Two heavy trucks originally contemplated, in addition to the nine pickup trucks supplied, have not been ordered. The heavy trucks were to go the the NSS headquarters and to the Eastern ORD. In the absence of showing of special need (none appeared in the material available to the team), it would seem sensible to reprogram the funds reserved for the heavy trucks into more pressing needs. In this direction the original project agreement quite sensibly provided funds for the operation and maintenance of vehicles. The inclusion of an allowance for the operating costs of activities which will not originally be self-sustaining seems entirely correct, especially for the ORD and NSS where existing budgetary resources are inadequate to support program activities even as modest as those contemplated in the project.

In summary, three and one-third years after the project agreement was signed, the basic project is in place and is starting its operations. Last year the NSS took and placed orders for seed as shown in the following table. Also shown are the seed needs forecasted in the project paper, and an estimate of the short term estimate of the effective demand for seed assuming seed prices are at least 17% above grain price at the time of sale.

Table 1. Estimates of Seed Requirements in Upper Volta.

Crop	1974 predictions of 1979 Demand (MT)	Seed of all classes produced in 1977 (MT)	Seed requested by all ORD's for multiplication and/or resale 1978 (MT)	"Potts" estimate of effective demand 1979 Foundation Seed (MT)	1979 Multiplied Seed (MT)
Sorghum	1,240	33.0	27.8	10.4	57.2
Millet	720	12.5	6.5	5.2	25.5
Corn	625	24.5	21.4	2.7	71.6
Peanuts	480	52.9	43.8	57.2	429.0
Rice	359	273.8	177.8	3.0	91.9

Of the total seed tonnage produced in 1977, 138 tons came from the NSPCs (foundation seed) and 273 tons from the RSPCs. It is not clear from available data to what extent the RSPC production was from multiplication of foundation seed produced in 1976. Further, there was no indication that seed produced by the RSPCs were multiplied further before being sold to farmers.

There are at present no varieties of millet or sorghum markedly superior to traditional, local varieties under tradition farming practices. Dr. Pattanayak of the SAFGRAD Project at the Kamboinse Research Center spoke hopefully of the possibilities of adapting strains of sorghum obtained from Hyderabad to give improved yields without chemical inputs, but it will be at least 1981 before a breakthrough is likely to occur.

On the other hand, improved varieties of corn (composite varieties) rice, peanuts, sesame and soybeans have been released and accepted by the farmers. The development, release and multiplication of peanut varieties resistant to peanut rosette literally saved Voltaic peanut industry of 143,000 ha. The information presented in Table 2 gives a strong indication of the continued release of improved varieties.

Table 2. List of Improved Varieties in Upper Volta.

Crop	Deemed worthy of field trials in 1974	Multiplied in 1977 by NSS Program
Sorghum	Sorgo 29 Tioade Quedezoure Gnofing 137-62 CE 90 Yi-Fui 7706	Sorgo 29 Gnofing 137-62 Quedezoure Belko*
Millet	Dori Zalla Syn 71 Mil du GAM	Mil 9 Mil 12 Syn 71
Maize	Jaune de Fê Massayoumba Western Yellow I Samaru	Jaune de Fê Massayoumba Jaune Flint Synthetic Jaune

(Table 2 continued)

Crop	Deemed Worthy of field trials in 1974	Multiplied in 1977 by NSS Program
Groundnuts	V-90 28206 TE-3 1040 55-437 47-16 Bambei 55-437	KH 241D RMP 12 TE 3 KH 149 TS 321
Cowpea	Bambei 88-63	Bambei 88-63
Sesame	----	S38-1-7
Soybeans	----	G115 G121 G38
Rice	CICA-4 IR-20	Sintane-Diofor Giambiaka C74 Dourado IR10

*Varieties underlined released for multiplication since 1974.

V. Present Situation

A. Inventory of Assets

1. National Seed Committee: This committee was established by Ministerial decree October 4, 1977 . It's membership is broadly representative of the major governmental agencies operating in the agricultural sector except for OFNACER. The stated responsibilities of this committee are to establish policy, set seed prices, establish operational guidelines and coordinate activities of the national seed program and its supporting agencies. Additionally, the committee is to make certain technical decisions, i.e., quantities of seed to be produced, varieties to be multiplied, etc.

The National Seed Committee has not yet been called into session, although as is discussed in Section V.B.2., the NSS and the national seed program in general needs the guidance for which this committee was formed.

The orginial project plan sought two committees, one for policy guidance and a second for technical operations. This approach was abandoned for a very pragmatic reason. There are so few professionally trained agricultural technicians (35 for all of agriculture) in Upper Volta, the same people would be on both committees. The current opinion of the GOUV officials contacted is that the NSC should be eliminated and replaced by a national agricultural committee to serve all agricultural programs. Such a committee could aid coordination of many programs in addition to the project under review.

2. National Seed Service: The NSS is one of six sub-divisions of the DSA and is the primary counterpart organization for the GOUV/AID project. It has responsibility for direction and coordination of seed-related activities at the national level. Specific responsibilities include: (a) liaison between reaearch and seed multiplication organizations, (b) determination of national seed requirements, assignment of production goals and allocation of seed produced to the regional level, (c) establishment and implementation of a national quality control program for seed of all crops, (d) arranging for and implementing training activities related to seed production and marketing at all levels, (e) development and implementation of a system of varietal evaluation trials at the farm level in cooperation with the national research centers and the extension services in each ORD.

The GOUV has thus far been able to allocate one middle-level technician (two different persons) a junior technician (high school), a laboratory technician and supporting staff. None of the Voltaics had any prior training in seed technology. The AID counterpart team has consisted of a project manager (1975 to date), a seed processing/marketing technician (1976-1978) and three short-term consultants. The original project design required the services of three middle-level Voltaic technicians and U.S.

technical advisors. One experienced in seed production and marketing and the other experienced in extension work. The U.S. technician advisor assigned had little impact upon the program's development beyond that of equipment procurement and distribution. The extension advisor has not been recruited yet.

The NSS team has been effective in fulfilling its responsibilities particularly in view of the personnel constraints and several significant differences between the project design and the realities of its implementation.

In performing the role of liaison between research and the ORD seed multiplication organizations, the NSS has been reasonably effective only in terms of arranging for the production and allocation of foundation seed. The apparent project-envisioned role of gathering information concerning the performance of released varieties (ready for multiplication) and indicating the potential of new varieties is not presently a reasonable responsibility for the NSS, which does not have personnel working in the production fields.

The working relationships between the NSS, Research and ORD seed production personnel appear satisfactory, although a breakdown in communications between Voltaic and some expatriate researchers was readily apparent.

The NSS has made sincere, although rather ineffectual, efforts to determine the effective demand for seed, arranging for production at the NSPC and RSPC and allocation of the seed produced. The principal vehicle for meeting this responsibility is an annual conference during which representatives of the nine seed producing organizations report on the quantities of seed available and the seed marketing organizations, 11 ORDs and AVV, indicate the quantity of seed they need. The NSS chief is responsible for allocation of available seed and establishing seed production goals for the next crop year. The information is subsequently transmitted to the affected organizations.

Accurate estimates of the true relations between effective demand for seed of various generations and the volume of seed produced are essentially impossible to make at this stage of development. Nevertheless, efforts are made to have each extension agent determine the amount of seed his clientele will purchase. This information is the primary basis for the ORD's estimates of the varieties and quantities of seed needed during each crop year. Due to the seed/grain pricing structure (see V.B.5 Economic Viability) and the fact that demand for foundation seed must be predicted two years in advance of need for seed sold to farmers, the available historical records are not a valid tool for predicing future seed needs. Simple logic makes it apparent that a portion, sometimes

significant, of the seed moves into the grain market due to the seed price structure.

The first stages of the NSS quality control program were implemented in 1977. All seed produced at NSPCs and at two RSPCs were sampled by NSS inspectors and tested for purity and germination. Unfortunately no provision was made to place the results of the evaluations on the individual bags of seed. Technical supervision of NSPC and RSPC fields and contract growers was provided by the technicians responsible for production (most of whom had received training through the project). The NSS did not make field inspections because it had no qualified inspectors.

Neither the NSS nor the GOUV has the internal capacity to train personnel in the basic skills required to effectively produce and efficiently market seed as a production input. It was apparent that a "grain mentality" existed at all levels with rare exceptions, principally the farmers. Voltaic farmers recognize the importance of selecting and saving the very best of their crop for seed. Most government officials contacted made no distinction between seed and grain. If those individuals who have and will have received formal training through the project gain experience by working with seed they should provide the core of thinking for establishing seed as a production input (seed mentality). The current utilization of personnel in activities for which they received training is at the highest level of any country known to the review team.

The responsibility for establishing a varietal trial or demonstration program at the farmer level has not been assumed since neither a qualified Voltaic nor American technician has been available. A qualified, experienced varietal trials officer with the SAFGRAD program will initiate an off-station varietal testing program at 10 locations this year. The primary purpose of this program is to gather research data on sorghum and millets. The SAFGRAD program does not eliminate the need for a national system of farm level demonstrations of the available improved varieties. This should be an integral part of the marketing effort.

Despite the personnel constraints and the limited technical assistance provided, the Voltaic seed program has made significant progress toward meetings its responsibilities, particularly during the past 18 months. A minimum of five additional years of project input, resolution of the major issues (i.e., seed price structure and fiscal accountability) by the end of the current project, and increased emphasis on training and marketing of the seed produced will be required to develop an ongoing, responsive, acceptably efficient GOUV seed program.

3. National Seed Production Centers: The NSPCs are those associated with the various research stations as follows: Kamboinse (GOUV/ICRISTAT), Saria (IRAT/IRHO), Farako-Ba (CERCI/IRAT), Niangoloko (IRHO) and Vallee du Kou (GOUV/CERCI). These stations are responsible for the production, processing and marketing of the "foundation" seed of the food and grain crops of Upper Volta. The principal market for

these seed is the four ORD and AVV seed production centers, although some seed are sold at official seed prices to farmers living near the stations. In theory, the seed produced by the NSPCs are to be used only as seed stocks for further multiplication. In reality, the major portion of these seed (est. 90%) are sold directly to farmers for crop production or find their way into the grain markets because of the seed price structure.

Technically, the NSPCs are doing an excellent job of seed production as far as it could be determined through discussions and visual observation of seed at Farako-Ba and Kamboinse. At present only the Kamboinse and Farako-Ba centers have seed processing capability, but the project has ordered equipment for the other NSPCs.

Seed production by the NSPCs totaled 138 MT in 1977. This volume exceeds the estimated total national demand for seed of this quality in 1981 of 120 MT (Table 4, Sec. V.B.2.) The influence of the seed price structure and the lack of reliable data on the acreage planted with foundation seed for production of additional seed (multiplied seed) made it impossible to determine the relationship between foundation seed supply and effective demand for this class of seed. As is explained in detail in Sec. V.B.5 the research organization which supports the seed multiplication program is forced to subsidize this production with "research" funds.

The 1978 seed allocation plan from the NSS assigns 122 MT of foundation seed among the 11 ORDs and the AVV. This represents 42% of the known supply of genetically pure seed of improved varieties in Upper Volta. In the two stage multiplication system being used in Upper Volta, seed of the foundation class should represent no more than 5% of the total quantity of seed of known genetic quality. Based upon the total requests for seed of improved varieties by the 11 ORDs and AVV the maximum effective demand for foundation seed in 1978 was 14.65 MT.

In summary, the NSPCs are performing their assigned role in the national seed program in a technically sound, although economically wasteful manner (i.e., producing foundation seed which are used for commercial grain production or food). However, the NSPCs must be provided financial relief if they are to continue to fulfill their responsibilities.

4. Regional Seed Production Centers: The RSPCs are located in the Bobo-Dioulasso, Banfora, Ouagadougou and East (Fada) ORDs. These centers were established for the purpose of multiplying the foundation seed produced by the NSPCs. In theory, the volume of seed produced by these centers should be 25 to 30 times that of the NSPCs. In reality, the volume was only 1½ times that of the NSPCs in 1977. Again because of the seed price structure the RSPCs cannot economically justify producing the desired quantities of seed since they must provide a subsidy for each kilo of seed they produce and they have no way to recover the sub-

sidy. The ORDs are supposed to be self-supporting organizations to supply needed production inputs and purchase farm commodities and are not the recipients of government subsidy funds.

The original project designated money to establish a revolving fund at $15,000 at each RSPC to support seed production activities. In theory, the money received from the sale of seed to other ORDs and farmers within the producing ORD would replace the money spent on seed production. However, the combination of the subsidy indicated above and the failure of the purchasing ORDs to pay for the seed delivered exhausted the fund in one crop season in the only ORD which established a revolving fund. Under the present situation only the seven ORDs which do not produce seed have an opportunity to break even in their seed operations.

To maintain some continuity in the seed program, the AID project manager and NSS chief advanced money to the NSPCs and RSPCs in 1977 to assure seed would be produced, although such funds were not provided in the original project agreement. It is the evaluation team's opinion that this was an intelligent, rational decision under the circumstances.

In spite of the financial losses, the ORDs have made an attempt to maintain the flow of seed of improved varieties from research to the farmers. It was not possible to accurately determine the physical and genetic quality of the 323 MT of seed produced by the RSPCs in 1977. Unfortunately for the seed program, only 155 MT of the seed produced by the RSPCs were requested for distribution in 1978. Presumably, most of the 168 MT apparent over supply will be sold as grain although some may be used for replanting if necessary. It appears as though the RSPCs will perform their role as third stage seed multipliers and wholesale-retail distributors when seed become an economically viable product for them to market.

5. Supportive Programs:

a. Research: Varietal development and evaluation research is conducted by six organizations in Upper Volta.

(1) IRAT: Maize, millet, sorghum, cowpeas, forage crops;
(2) IRHO: Peanuts, sesame, soybeans, oil crops;
(3) CERCI: Rice, vegetables and other irrigated crops;
(4) ICRISAT: Sorghum, millet
(5) IITA: Cowpeas
(6) CFDT: Cotton

At present, most senior plant breeders are expatriates because of the limited number of Voltaics who have had the opportunity to obtain the training and experience required to lead a comprehensive breeding program. Reportedly, three have received training and are working with senior plant breeders.

In Upper Volta, farmer acceptance of the seed input, except cotton, is limited to those varieties which have the genetic capability to produce more stable and/or higher yields in the absence of the chemical inputs and/or advanced cultural practices. Until there is a significant replacement of the traditional farming practices by more advanced practices, plant breeders must recognize this "farmer acceptance" criterion. Failure to recognize this criterion is the principle reason there has been minimal farmer acceptance of the sorghum and millet varieties developed during the past 30 years of breeding activity in Upper Volta. Breeders developing varieties of peanuts, rice, maize, soybeans and sesame have recognized and overcome the "no chemical input constraint" principally through increased disease resistance.

b. Other Seed Projects:

(1) The AVV. The AVV seed multiplication scheme is the only other active seed production and marketing project encountered. This project was initiated in the mid-70s to supply seed to the farmers resettled in the regions where "river blindness" has been recently controlled.

The AVV has two seed multiplication farms where they multiply foundation seed obtained from the research stations. A second multiplication is made with contract seed producers. Total seed production of the food and grain crops in 1977 was 15 MT.

Within the AVV program, farmers who need seed either pay cash or they may return 1½ kg of grain for each 1 kg of seed obtained. The 1978 cash price for sorghum seed is 70 CFA/kg (official seed price - 53 CFA/kg). AVV officials indicated the price for sorghum seed in 1979 would be around 100 CFA/kg to discourage farmers from buying at seed prices and selling the seed as grain for a profit. Although the AVV has always attempted to set seed prices above grain market prices, the demand for their seed has always exceeded the supply. The AVV experience indicates that Voltaic farmers, like others around the world, will pay for seed or other production inputs when they perceive the seed's value to exceed the price requested.

(2) Certified Peanut Seed Production Project. The 1978-79 crop year will be the first year of this three-year CEAO funded project to be implemented through IRHO. This project is designed to support the production of 188,240 and 270 MT of foundation peanut seed during 1978, 1979 and 1980, respectively. Production and processing equipment and support funds will be supplied and revolving funds established at the ORDs to support further seed multiplication activities. (See V.B.1.)

(3) The FAO/SIDP has allocated U.S. $71,000 to fund a six-week training program in seed production, processing and quality control in 1979 at the CERCI/IRAT seed production center at Farako-Ba. Twenty junior technicians and extension monitors will receive training in this program, some of which is to be taught by Voltaic techicians. This project also includes funds for laboratory and seed processing equipment (one air-screen cleaner) and a combine.

V.B. Issues

1 National Seed Policy Formation and Coordination.

The national seed policy has been handled on an ad hoc basis. As has been noted in Section V.A. 1., the National Seed Committee (NSC) has only recently been legally constituted.

Thus, outside of the annual meeting to determine seed supplier and needs, there appears to be no formal mechanism to determine answers to such questions as: which varieties to produce, orientation of research needs, seed prices and development of seed quality standards. Answers to these questions appear to come from the specific institution(s) involved. For example, coordination and direction of varietal development research among the research institutions is limited to verbal agreement between institutions on such questions as crops or the specific geographic region with which each will work.

In principle, the Director of DSA coordinates national seed policy and activities, but since he is not directly responsible for the ORDs' operations, his effectiveness in policy decisions is diminished. The ORDs have shown themselves to be quite independent of decisions of the central government. Their participation in policy decisions is a prerequisite for policy to be effectively carried out.

Up to now this loose, ad hoc method of policy formation has been more or less workable with the glaring exception of seed price policy (see below). It is highly questionable how long this loose arrangement can be effective given the increased complexity of the seed program as it develops.

On the other hand, in terms of coordination of the seed program there has already been considerable confusion and duplication. More can be expected unless a more formal policy and coordination organism is created and begins to function. The following examples are indicative of some of the current problems of coordination within the seed program at the national level:

The ORDs and AVV are quasi-independent organizations under the Permanent Secretary of the Ministry of Rural Development. AVV is designated to handle the resettlement of the Volta River tributaries once the river blindness (Onchocerciasis) vector is under control. It,

along with the ORDs, has considerable independence from the central government. AVV has decided that NSS is not reliable enough to handle its seed needs and has established its own independent seed operation, including multiplication fields, cleaning equipment, seed laboratory, and warehouses. This equipment and personnel are in close proximity to those of the project-supported Ouagadougou ORD and duplicate its work.

Due to the drought problem, there has been increased activity by other institutions in the seed area. There has been a lack of coordination of these activities. For example, FAO/SIDP has proposed and received general approval from the GOUV to prepare a six-week training course for middle-level technicians at the Farako-Ba seed multiplication farm. This farm was financed by AID. Part of the FAO/SIDP program is to purchase a seed combine, a seed harvester, a germination chamber and precision balance for a seed laboratory, and to move a multi-purpose seed cleaner now being used by OFNACER to the Farako-Ba station. There is a great deal of redundancy in this program. Farako-Ba already has two seed laboratories, one for IRAT and another for CERCI, at the same location. In addition, the USAID multiplication farm has a operating multi-purpose seed cleaner. There is no need for two at the same station. The GOUV cannot be completely faulted for this duplication. The FAO/SIDP team who prepared this program did not meet with USAID representatives.

In 1976, a year and a half after signing the USAID seed multiplication project, CEAO (Centre Economique de l'Afrique de l'Ouest), the West African Common Market, signed an agreement with the GOUV to finance production of foundation seed for peanuts by IRHO at its stations in Saria and Niangoloko. These two stations are also where the NSS seed multiplication project is supplying materials, equipment and funds for the multiplication of foundation seed, including peanuts. The CEAO project duplicates much of the USAID equipment given to these two stations, including tractors and attachments, cleaners, shellers and trucks.

Even more of a waste than duplication of equipment, which can often be used for other purposes, will be the overproduction of foundation seed of peanuts. IRHO has already experienced an overproduction problem of foundation peanut seed. Of 200 tons of seed produced in 1974, it was able to sell only 120 tons of these to a single ORD. The rest was sold to OFNACER for consumption. Of the 120 tons sold to the ORD most of that was also sold for consumption. Again in the 1975-76 season IRHO produced 240 tons of peanut seed and 160 tons were sold for consumption. Thus, the vast majority of the foundation peanut seed produced in past years has been eaten as very expensive and high quality food.

It seems apparent this project will encounter financial problems similar to those encountered by the NSS/AID project, except IRHO seed production expenses will be paid from project funds. Additionally, the seed production goals appear to be totally unrealistic and inappropriate

in view of current realities. The NSS program, which includes IRHO, produced 53 MT of peanut seed of all classes in 1977. The total request from all ORDs for peanut seed to be planted in 1978 was only 44 MT. It does not appear probable that the ORD request for foundation seed will quintuple in one year. Further, if this project is successful in achieving its stated seed goals (multiplying the foundation seed two additional times) it would have an out-turn of sufficient seed to plant the total acreage of peanuts in Upper Volta seven times each year.

(3) The CILSS has a project in the planning stage with the "Fiche de Projet" submitted in March 1977. The proposal projects seed production needs in Upper Volta through the year 2000 for sorghum, millet and peanuts. The demand projections are wildly unrealistic in view of the traditional habit of farmers to select and save their own seed of the three crops indicated. The data in the table below is sufficient to emphasize the impracticality of the CILSS proposal.

Table 3

Comparison of 1978 Apparent Demand and CILSS Projections

Crop	Apparent Demand in 1978 (MT)	CILSS Project Projected Demand by 1985 (MT)	Increase in Farmer demand required to utilize projected demand
Sorghum	27.8	3,570	128,400%
Millet	6.5	1,300	200,000%
Peanuts	43.7	6,204	142,000%

Regardless of the intention of this project, the fact that such ridiculous projections were placed on paper was a serious disservice to the Voltaics. Further, such presentations tend to destroy the credibility of other organizations which in the future present at least rational programs for seed or other activities. The Mission and AID/W both have an obligation to prevent similar proposals from being developed and submitted to any government with whom they are cooperating in the future.

One last point concerning the coordination of the national seed policy. The NSS is not in a position either in the hierarchy nor in qualification to handle this coordination. NSS is only a subdivision or department within the DSA. The Director of DSA can and has handled many of these

coordination questions but he too is not in a strong enough position in the COUV to handle all of them. Thus, the urgent need of a national level coordinating agency. Only at a policy level of the government with all concerned parties involved can a national policy and related coordination of seed activities be decided upon and implemented.

2. Demand for Seed

The question of what is the effective demand for seed has been raised throughout this report. Even at this point in the project only an educated guess is possible in answer to this question.

We know that demand for seed is a function of three major variables: the value of the seed to the farmer; the cost of the seed to the farmer, and the replacement rate of the seed. This latter variable refers to the replacement of the seed stock by the farmer due to the deterioration of the seed stock or on the arrival of a new and better variety. Many of the estimates of seed demand we have seen have not taken into account all of these variables. The item most often ignored is the fact that the farmer saves his seed from one year to the next. In other words, that there is not a 100% replacement rate. The technical replacement rate is determined by the type of crop grown and its mode of pollination. Hybrid seeds since they are unique have to be replaced every year. They have a technical replacement rate of 100%. In crops that are cross-pollinated, the seed stock will deteriorate over time due to genetic contamination. They should be replaced about every three years, a technical replacement rate of 33%. Self-pollinated crops have little genetic change over time and can go five years or more before new seed stock would be needed. They have less than a 20% technical replacement rate.

Of the crops handled by the seed multiplication project none are hybrids, only millet and corn are cross-pollinated and the rest (sorghum, cowpeas, rice, peanuts) are self-pollinated.

The interaction of the three variables, value, cost and replacement, generates a typical demand pattern for all non-hybrid seeds. With the introduction of a new improved variety there is a sharp increase in demand. This increase is followed by a sharp drop in demand as the farmer saves his seed rather than purchasing again for the next planting. Then a gradual increase in demand occurs as farmers begin to replace seed that has begun to deteriorate genetically. This increase occurs until a steady farmer replacement rate is reached where demand levels out or until a new variety is introduced and the pattern starts again. This pattern is seen in both traditional and modern farmers.

The main point to note is that demand for seed is not steady and certainly is not a 100% replacement rate, again excepting hybrids. This error seems to be at root of many of the exaggerated estimates of seed demand presented.

Value of seed plays an equally important role in the seed demand function. This appears to be particularly important in the basic food grains of sorghum and millet. To date research has not developed a variety of these two crops that has greater value to the farmer than his own local varieties. Among the farm inputs, seeds are unique in the fact that organizations selling seed have as their prime competitors the farmer himself. The Voltaic farmer, like farmers elsewhere, selects the best heads of the crop and saves it as seed. Any new variety must compete with the variety the farmer himself has selected. Because of this the role of the extension system becomes extremely important in the introduction and acceptance of new varieties. As the farmer learns the value of a new variety he will begin to demand it.

The last variable of the seed demand function is cost. This refers not only to the cash price of the seed of a particular variety but to the other inputs needed for the proper use of that variety. Thus, if a variety requires more labor or other inputs such as fertilizer or irrigation then it has a high cost to the farmer. In such a case, even if the seed were free it may be too expensive. Another important cost, especially to the peasant farmer, is the loss of security. Farmers are generally risk adverse and they often prefer a smaller but more certain crop than high yield under high risk conditions. How the farmer perceives a new variety in these terms affects the demand for seed for that crop.

One final point should be noted concerning the demand for seed - what type of seed is being discussed? Total seed demand includes both multiplied seed and that seed saved by the farmer. This demand can be determined by multiplying the areas to be planted by the accepted seeding rate per area. The demand for multiplied seed is determined by the three variables mentioned. It is a much smaller figure than total planted seed. These are the seed the ORDs are producing.

The demand for foundation seed is a much smaller figure yet. It is derived from the quantity of multiplied seed demanded. In theory, seed are multiplied twice between the foundation and multiplied classification, therefore the amount of foundation seed required is normally the square of the multiplication ratio of the variety concerned. As an example, assume the estimated demand by farmers is 1,250 MT/year. How many tons of foundation seed are needed? The average planting rate is 80 kg/ha and the average yield is 2,000 kg/ha of clean seed. The multiplication ratio is $\frac{80}{2000}$ or $\frac{1}{25}$. If the seed are multiplied two times, the

multiplication rate is squared: $\left(\frac{1}{25}\right)^2 = \frac{1}{625}$ which means that for each 1 ton of foundation seed 625 tons of "certified" can be produced. Therefore, 1250 ÷ 625 = 2 MT of foundation seed required. Of course the basic data should be inflated slightly since some seed will be lost to weather, poor isolation, etc.

When beginning a seed multiplication program it is usually not practical to initiate a three stage multiplication program, i.e. Foundation-Registered-Certified, due to inexperience on the part of those involved. This is the case in Upper Volta where a two stage multiplication system (Foundation-Multiplied) is being used. As those involved in the seed multiplication process gain experience the seed program will gain efficiency in use of foundation seed.

Taking these variables into account an estimate was made on the effective demand for seed in Upper Volta in 1981 by crops and type of seeds. These data are presented in Tables 4 and 5.

3. Quality Control Program: One of the major roles originally ascribed to the NSS was the development and implementation of a quality control program. The need for this aspect of the program increases with every additional kilo of seed produced under the auspices of the national seed program. To date, one man (laboratory technician) has received two months intensive training and he in turn has trained one woman in laboratory evaluations techniques. A Junior Technician (field inspector), has also recieved some training in field production techniques. The basic equipment necessary for implementation of this program have been provided by the project. This activity can not and need not wait until a middle level technician becomes available to act as Chief of the Quality Control section before its activities are initiated.

Two of the cornerstones of a seed program are (a) the availability of varieties with characteristics superior to those commonly available and (b) providing assurance to the consumer (farmer) that the seed he buys has the genetic, biological, and physical quality to produce a crop with the desired attributes. Seed with the highest genetic potential are of no value if they won't grow when planted. Seed with perfect viability are of minimal value if they do not produce a crop having the desired characteristics.

With minimum assistance from the NSS Chief the two technicians should be active in determining the quality of all seed presently being produced under auspices of the NSS as well as sampling seed from the market place, farmers' stocks, etc. to accurately determine the quality of seed presently being planted in Upper Volta. Single row field plots, 2-3 meters long, of every variety being multiplied should be planted at

TABLE 4

Estimated Effective Demand for seed
of Improved Varieties by Voltaic Farmers by 1981

Crop	Total Planted[1] (000 ha)	Average Seedling Rate (kg/ha)	Total Seed Requirement (MT)	Technical Replacement Rate[3] (%)	Farmer Replacement Rate[4] (%)	Effective Demand[5] (MT)
Sorghum	1,100	10	11,400	25	2	57.0
Millet	760	10	7,600	33	1	25.1
Maize	116	25	2,900	33	20	71.4
Rice	42	35	1,470	25	25	91.9
Peanuts	143	100	14,300	20	15	429.0
Sesame	27	4	108	20	50	10.8
Soybeans	6[2]	80	288	25	75	54.0
Cowpeas	NA	50	---	25	1	3.0

[1] Average area planted in 1971 ("bad crop year") and 1975 ("good crop year"). Base data from Ministry of Rural Development.

[2] Estimated by IRHO.

[3] Determined by each crop's natural mode of pollination and genetic stability of the seed used.

[4] Based upon ease with which farmers can save seed, availability of proven superior varieties, use of the crop produced, level of farmer technology.

[5] Effective Demand = (Total Seed Requirement X Tech Replacement Rate) X (Farmer Replacement Rate).
It is assumed that the price of seed will be at least 100% that of grain.

TABLE 5

Quantities of Foundation and "Multiplication" Seed Required to Supply the Recurring National Demand in 1981

Crop	Effective Demand[1] (MT)	Yield of Clean Seed (kg/ha)	Foundation Seed[2] Acreage Required (HA) 1978	Foundation Seed[2] Quantity Required[4] (MT) 1979	Multiplication Seed[3] Acreage Required (HA) 1980	Multiplication Seed[3] Quantity Required (MT) 1981
Sorghum	57.0	550	37.8	20.8	104	57.2
Millet	25.1	500	20.4	10.2	51	25.5
Maize	71.4	675	8.0	5.3	106	71.6
Rice	91.9	1,100	5.4	5.9	83.5	91.9
Peanuts	429.0	1,500	38.1	57.2	286	429.0
Sesame	10.8	150	4.0	0.6	72	10.8
Soybeans	54.0	450	44.0	19.2	120	54.0
Cowpeas	3.0	400	1.0	0.4	8	3.2

[1]Assuming the price of seed will be at least equal to that of grain.

[2]Seed produced under supervision of research stations, i.e., Kamboinse, Saria, Vallee du Kou, Farako-Bu, Niamgolako.

[3]Seed produced by ORDs East (Fada), Ouagadougou, Bobo-Dioulasso and Banfora and the AVV project.

[4]Acreage and volumes shown are twice the amount actually required to provide some national seed reserve of the improved varieties. Initial requirements for the "seed" by farmers losing seed and grain to natural disaster could be met from national grain reserves.

the Kamboinse Station. The two technicians should prepare descriptions of the morphological characteristics of each variety to permit distinction among varieties when subjected to field inspection. These and similar tasks should be completed while the program is still small.

If the applicant currently being considered for employment as the AID project's junior advisor is posted one of his major responsibilities should be assisting in the accumulation of information necessary to the establishment of an effective quality control program. The project may desire the services of a short term quality control specialist to work with the available technicians, both of whom read English very well and speak and understand at reasonable levels.

It is most important that the NSS establish reasonable seed quality standards both for the production field and the clean seed in the near future. It is important that these standards are based upon factual data not someone's idea of good seed quality. Data sufficient to support establishment of reasonable seed quality standards should be available by the end of the current project.

4. Varietal Demonstrations at the Farmer Level: The final justification for funds spent for varietal development research and a seed program, which extends the research output to the farmer, is the number of farmers who obtain and plant seed of the improved varieties. This project has spent nearly $1 million to develop the infrastructure and get a few tons of good seed produced. The supply (411 MT) of good seed of improved varieties exceeded the demand (293 MT) in 1978. The time has come to focus greater effort on increasing farmer demand and use of seed of superior varieties.

The need to demonstrate superior varieties, as proposed in the original project design, has and will continue to increase as the volume of seed and number of superior varieties increases. The junior level technical advisor currently being considered has experience in planning and implementing varietal comparisons. He could be most effective in establishing a country-wide program of variety demonstrations at the farm level, in cooperation with the ORD's extension services.

Because a poorly planned, poorly supervised demonstration is worse than no demonstration it will be incumbent upon the technical advisor to first, train the extension agents in demonstration techniques. Because the village level extension workers have not been trained in demonstrational techniques and their clientele generally do not have the income or credit to purchase inputs other than seed, the initial demonstration

should only include the superior varieties verses the cooperating farmer's variety. Other inputs and cultural practices can be added to the demonstrations after the extension agents demonstrate the capacity to present an effective demonstration of the one input which can be made available to large numbers of farmers at a cost they can afford.

It will be necessary for the technical advisor and his counterpart to make planned visits to every research station at least twice a year. One visit to determine which varieties of each crop should be demonstrated in specific climatic zones, this visit could be made during the dry season. A second visit should be made just prior to harvest to permit the breeders and demonstration officers to exchange information concerning the performance of released varieties in the demonstration plots and potential new varieties in the research plots. The role of liaison between research, extension and the NSS is vital to the establishment and maintenance of a cooperative working relationship.

5. Economic viability of project. The economic viability of the project is in doubt due to the present seed price policy of the government. Until that policy is changed the seed multiplication project has no chance of economic viability or much effectiveness in promoting the use of good seed. The modification of this price policy is the single most critical element now facing the project. Without this policy being changed the project is dead!

(a) Seed Price Policy

Price policy for "certified" seed was set by ministerial decree on April 4, 1975. The price paid to producers is fixed at 30% above the official price for food grain of the same crop for all seed, except peanuts which are bought at 15% above the official price. An additional fixed margin above the producer price is set each year to cover collection, cleaning, storage and marketing of seed. This margin has been about 4-5 FCFA/kg.

The seed price policy is based upon the food grain price policy. The official food price levels are often little more than half the free market price for the same grains at planting time (April-May). A price survey completed in early April 1978 by the NSS revealed the free market food prices shown in Table 6. These are compared with the officially established food and seed prices.

Table 6. Price of free market food grains in Ouagadougou April 1978 compared to official food and seed price levels.

Units: F.CFA/kg.

Crop	Free Market Consumer	Official Food Prices (1) Producer	Official Food Prices (1) Consumer	Seed Prices (2)(3) Price Paid Seed Producer	Seed Prices (2)(3) Selling Price
Rice	60(150[4])	na	na	55	72
Millet	75	32	45	42	53
Sorghum	75	32	45	42	52
Corn	70	32	45	42	51
Peanut	51	na	na	45	50

na - not available

Source:

(1) Bulletin Quotidien No. 2258 of December 21, 1977

(2) For rice and peanuts - Ministerial Decree Ministers of Rural Development #64/PL/DR/E-T/DSA of December 30, 1975.

(3) For millet, sorghum and corn - Official food prices of December 21, 1977 plus 30% plus 10 CFA/kg. for millet and sorghum and 9 CFA/kg. for corn.

(4) Price of milled rice of medium quality 5/5/78.

These figures give only a partial idea of the magnitude of the problem. For example, at the IRHO station in Niangoloko, near the Ivory Coast border, the market price of peanuts was reportedly as high as 100 CFA/kg. during the pre-planting period (April-May). The free market peanut price in this area has been 70-80 CFA/kg. The result has been the station has difficulty recoverin seed peanuts from the peasant producer even when paying 55 CFA/kg., 10 CFA/kg. over the official seed price.

A similar situation was reported by the ORDs in Bobo-Dioulasso and Ouagadougou. The peasant seed producer contracted by the ORD to multiply seed can sell his seed on local grain market, pay (the ORD) for the fertilizer, fungicide and seed supplied and still make a profit.

The present seed price policy has two major detrimental effects on the seed program: a) It is impossible to determine the demand for seed. With the seed price considerably lower than the free market grain price of the same produce it is difficult to tell how much seed goes into the ground and how much goes into the mouths of the population as "cheap" food. There have been a number of examples of such a diversion of seed (See section V.B.2.); b) The second problem created by the seed price policy is that seed prices are also considerably lower than the cost of production (Sec. V.B.5.b). Thus, a production subsidy is necessary to have seed produced

The basic problem is the seed price policy is based on the food price policy. The government has been fixing prices of food since 1960 but with little or no effect on actual food grain prices. In 1970 it created OFNACER (Office National de Cereales) the National Grain Office. OFNACER was to implement the GOUV food price policy. This policy was to reduce food cost to the urban population. However, free market food prices have been consistantly higher than "official" prices, with possible exceptions in some areas at harvest time. By fixing the seed price level to this artificially low official price, the nacent seed program is badly crippled and will eventually be destroyed.

What should the seed policy be? It is essential that the price of seed be above the pre-planting free market price of grain. If not, as indicated above, there is no incentive to use the valuable seed for planting. How much the price of seed should be above the grain price is a matter of choice. A common rule of thumb is that seed prices should reflect its value in increased production to the farmer. Thus, if the improved variety is twice as productive as the variety it replaces, it should cost twice as much as the grain price at the pre-planting period. In Upper Volta the government has arbitrarily put the purchase price of

threshed, uncleaned seed at 30% above the official grain prices. The 5 FCFA/kg. allowed for processing, storage and distribution costs cover little more than the cost of a new bag and transport to the warehouse.

Additionally, there should be a price differential among seed classes. Foundation seed should be priced higher than multiplied seed not only to reflect its higher purity and cost of production but to insure its use as seed rather than grain.

At present, there is no differential in seed prices by class. Price differences now existing are the reverse of the desired differential. Multiplied seed actually cost more than foundation seed due to the added marketing costs.

(b) Cost of Production

There have been a number of estimates of the costs of seed production. The issue of production costs has become important due to the artificially low seed price and the request for subsidies by the seed producers to cover their production costs. The table below gives the range of estimates of production cost by crop from various sources.

Table 7. Estimates of cost of production by crop in Upper Volta and Senegal.

Unit: F.CFA/kg.

	Source of Estimate					
Crop	IRAT(1) Farako-Ba	IRAT(2) Saria	Potts/ IRHO(3)	Traditional (4)	Senegal (5)	White (6)
Sorghum	154	106	-	82	102	90
Millet	-	134	-	-	114	90
Corn	144	100	-	46	153	63
Rice	107	-	-	93	116	86
Peanuts	-	-	78	146	-	-

Sources:

(1) Prix de Revient Cutural - IRAT Farako-Ba, prices taken on estimated average yield in country.

(2) Rapport Campagne 1977-78 IRAT Saria, Calculation made from figures given based on average yield.

(3) Calculation made for peasant farmer contract produced peanuts for IRHO Niangoloko from conversation with M. Roussel, director of the station, M. Roussel estimate cost of peanut production at about 100 F/kg. (yield 2 MT/ha.).

(4) Marketing, Price Policy and Storage of Food Grain in Sahel, CRED/USAID, cost of production figures for traditional farmer 1974-75 multiplied by estimated 20% inflation for three years.

(5) Les couts des semence selectionnees et conditionees d'espere vivriere, Beno, Reyes, Vandivenne, IRAT. Costs given are without cost of technical service which should be considered a government service not a direct production cost.

(6) Seed Multiplication Project, T. Kelley White - 1975 figures.

As can be seen the range of estimates for any given crop is large. This probably reflects different accounting methods and variation in production methods. When asked what price level of seed would cover production cost, the almost universal answer from research and ORD producers was 120 F.CFA/kg. From the data available that estimate seems to be more or less accurate for mechanized production. Conventional wisdom is that production costs for peasant multipliers is lower than on-government farms. The cursory data we have seen seem to indicate this is true. Multiplication by peasant farmers should be encouraged.

(c) Subsidies

Given the present seed price policy and the seed production and handling costs, subsidies are required to encourage production and marketing seed of improved varieties. The original Pro-Ag for the seed multiplication project provided $9,000 per year to cover operating costs of equipment at the seed multiplication centers for each of the five years of the project. In addition $6,000 was earmarked for each of the four centers to purchase pesticides bags and seed stocks. Also some 60 tons of fertilizer valued at $20,000 was given to each seed production center. Thus, $35,000 of operating money or inputs was given and/or programmed for each of the NSPCs during the first three years of the project. This money should be considered as a production subsidy.

The four RSPCs were to receive the same 60 tons of fertilizer valued at $27,000 and a revolving fund of $15,000 per ORD to purchase seed from the peasant seed multiplier. This latter fund was to be replaced at each ORD from the sale of seed to farmers or other ORDs. No production subsidies per se were to be given the ORDs. When it costs from 100 to 120 CFA/kg. to produce seed and, because of the seed price policy, the ORDs can only receive 72 CFA/kg. for the seed, the ORDs lose 28-38 FCFA on each kilo of seed produced. Under such circumstances without some sort of subsidy the ORDs will not produce seed and they should not be faulted for their position. The project recognized this fact and rather than have the project stop in mid-stream it established a production subsidy fund for each multiplication center with the provisions that the funds be accounted for and that they must be used for seed multiplication.

The financial situation at the RSPCs and NSPCs has been made worse by non-payment for the seed they sold to other ORDs, The current outstanding debts for seed, some dating back to 1972, are almost 10,000,000 FCFA ($43,478) representing 160 tons of seed. Thus, all seed production centers are in an untenable financial situation, as a result the production centers turned to the NSS and its USAID benefactor for financial relief. After all, it was argued, it was the NSS program that gave them the equipment and supplies and pushed for increased seed production.

Subsidies for the 1978-79 season have been requested. Most stations will not start planting until the money is provided. Unfortunately, there are two obstacles to releasing more subsidy money. One, except for the IRAT and INRO stations, (both French run) no justification and/or accounting has been received by NSS for the 500,000 FCFA sent as the first of two installments of operating subsidy given last year. (See V.B.5.d.) NSS and AID obviously are not willing to provide funds without proper accounting of their use.

The second problem is that such subsidies were not part of the original Pro-Ag. A revised Pro-Ag. is needed to shift funds into this use before additional subsidy funds can be released. USAID made a proposition to the GOUV in September 1977 for a re-allocation of funds and indications are that the Ministry of Rural Development is now ready to act on the AID Recommendations. Unless something is done soon the project is liable to come to a standstill and loose a full year of operation. This could and probably should be fatal to the project.

The release of funds for subsidies is a short term problem. More important is the need to get the project out of the production subsidy business. This can only be accomplished by a rational seed price policy. Seed production and marketing should operate in a more business-like manner recouping the cost of production and marketing seed sales at reasonable prices. This is not going to happen overnight. Initially, the seed production centers should try to cover their variable costs. It is assumed the government will cover much of the fixed costs of salaries of ORD and other personnel. Eventually, as the volume of the seed market increases, both the fixed and the overhead cost should be recovered but this will take many years. In developed seed programs, the processing and marketing costs are 80-100% of the price paid the seed producer. In developing seed programs, processing and marketing costs are usually even higher because of the smaller volumes handled.

It is the view of the evaluation team that NSS should become involved in the production and marketing of foundation seed only. Production should be contracted with the NSPC's for specified quantities of seed of specified quality and at a price two to three times the official

grain price. The NSS should in turn sell the seed to the RSPC's, AVV or other agencies who will multiply the seed. NSS should no longer subsidize the total seed production in Upper Volta.

The project paper indicates that the NSS should be self financing within a moderate time period. This point overlooks the role of NSS as both a quality control and certification agency as well as a seed production and marketing agency. Quality control and certification of seed is a government service which should be paid for out of general revenues. Such an operation will never be self-financing and it shouldn't be. On the other hand, the foundation seed production and marketing role of NSS can and should be operated without need of substancial outside financial support. This should be accomplished in 3-5 years. Again the continued assumption has to be that a revised seed price policy will be made and implemented.

The final question on subsidies concerns the basic food crops - sorghum and millet. At present there is little demand for multiplied seed for these two crops. There has been some argument made to subsidize the seed price for these two crops in view of their extreme importance as the basic food grain of the country. In general, we believe this idea is unsound. The reason there is so little demand for multiplied sorghum or millet seed is that the "improved" varieties are not significantly better than local ones under traditional farming practices. There is no point of subsidizing something that has no particular value. Once a truly improved variety is developed there may be a need to subsidize seed to encourage farmer adoption, but even this is questionable. Efforts via extension to increase farmer demand rather than lower price is the preferred approach.

(d) Accounting and Reporting

The evaluation team was generally surprised at the relaxed nature of reporting and accounting by the NSPCs and RSPCs to NSS. There are two important roles good reporting can play:

a)

a) Justification and accountability of funds given, and

b) Gathering of necessary and useful statistical and economic data.

Each of the nine seed production centers have been given a considerable amount of money as operating funds to produce seed. But, with the exception of IRAT and IRHO, little or no accountability of this money has been provided to NSS. In 1977, the operating funds were broken into two installments, the second installment to be sent after the first had been accounted for to NSS. Aside from IRAT and IRHO, only one RSPC

asked for the second installment and then with insufficient accountability of the use of the first installment. The other RSPCs and one NSPC neither sent in an account on how the first installment was spent nor asked for the second installment, although it was available. This was at a time when there was supposed to be an urgent need for additional funds to purchase seed from the peasant producer. Lack of clear guidelines from NSS contributed to this problem. The funds were sent out with a letter asking only for justification. The type and form of this justification was not spelled out, and the ORD's we visited seemed unsure about what to do.

Each ORD was allocated a $15,000 revolving fund to purchase seed from the peasant seed producer. Only the Bobo-Dioulasso ORD has requested this fund. Unfortunately, instead of setting up a separate account to revolve the fund, the Bobo ORD put the $15,000 into a general account and can't separate the revolving fund for purchase of seed from funds for production inputs for seed. Here again NSS did not send out adequate instruction on the use and control of these funds.

Without more strict accountability of these funds the chance for misuse is great. The initial burden to assure proper reporting of these funds lies with NSS, the giver of the funds.

The second important aspect of good reporting is the gathering of data about the seed sector. The seed multiplication program has been in operation three years yet little data has been gathered. The NSS has a general idea concerning the quantity of seed produced but no idea about its use and distribution. This information appears to be available at the various production centers. With the exception of IRAT and IRHO, this data is not being sent to NSS. The burden of collecting this data lies with NSS. It should prepare standard reporting forms along the lines previously suggested by White in March of 1976. They should include not only production by quantity and variety but type of disposal (seed, held for multiplication, consumption, in stock, etc.). The data concerning to whom the seed were distributed by quantity and variety is also important. A standard series of reports could allow NSS to project demand for seed, its use and distribution. This is a proper role for a national seed service.

(e) Making the Seed Multiplication Project Viable

The seed multiplication project at this time is neither economically or financially viable. It will not be as long as the present seed price policy is in effect. Assuming this price policy will be changed, what steps should the project take to increase its viability? The evaluation team looked at this question and recommends the following:

The seed multiplication project is now faced with three levels of decisions. The first question is what to do with the project over the next 3-6 months. The project needs to keep going and that means seed need to be produced for this year. The rains have started. It is time to plant. The multiplication centers and ORDs are awaiting production money to begin planting. The revised pro-ag must be signed to release this money as soon as possible.

Work should begin immediately to start changing the seed price policy. Efforts have already been started in this direction by the Chief of the NSS and the Director of Agriculture. They sent a letter to the Minister of Rural Development requesting a change in seed pricing policy. Another positive item is the current reorganization of OFNACER under the Ministry of Rural Development (formerly under Ministry of Commerce). Hopefully, it will change its orientation from the urban population to the rural farmer.

The second question facing the project is what to do with the project between now and its termination in December 1979. There are still a number of USAID inputs to be supplied. The most important is to fill the open junior agronomist slot. Additional training should also be undertaken. The vacant positions in the NSS should be filled as work of NSS increases. The National Seed Committee (or its replacement) should be activated.

The most important job to be done is to strengthen the managerial and organizational capabilities of NSS. This includes the need to improve its reporting system; expand the use of its laboratory possibly by testing other seed such as vegetables; and, expand its field survey and collection of seed samples. Before production fields can be effectively inspected, the inspector must learn the characteristics of every variety being multiplied.

The final question facing the project is establishing its long term objectives. There are two elements desired in the extension of the project: a) limiting the role and better definition of the NSS operations and b) the development of seed multiplication capabilities in the remaining ORDs.

NSS should conduct two distinct activities: a) the control of seed quality, a job it has begun but needs considerable work to become fully effective and b) operation as the national foundation seed organization.

NSS should only work with foundation seed because: a) quantities of foundation seed needed are small. It is within the amount that can be handled by NSS with its limited staff and finances. b) NSS control of foundation seed is an effective way to implement GOUV decisions concerning varieties of improved seed used. c) if

only NSS handles foundation seed it has leverage with the RSPC's to guarantee payment for seed. d) High quality standards needed for foundation seed are within capabilities of NSS and cooperating research stations. And, e) by limiting NSS to only foundation seed it has an opportunity to operate at a break-even level in the next 3-5 years.

The multiplication of foundation seed to multiplied seed should be made by the RSPC's. Capability to multiply seed in the remaining ORDs should be developed. This could take place in a similar manner as the original project. Given past experience, particular attention should be given to the question of operating funds for any new ORD seed multiplication centers. Even with a rational seed price policy there will be a need for at least an initial operation fund for these new centers to produce seed. It is suggested that these funds be channeled through the Ministry of Rural Development rather than the NSS to avoid future problems concerning the NSS's responsibility for the financing of general seed production.

VI. Future Program and Assistance Needs. The question should be faced, whether AID will continue or should continue support to the NSS when the funding in the present project is disbursed or terminated. The team recommends continued support provided the NSS is working along the lines recommended earlier in this evaluation.

A seed program is not a short-term thing. Developing improved varieties of the basic subsistance crops - millet and sorghum - which will give reliable, higher yields without the application of fertilizers and other chemicals, not practically available to subsistence farmers, will not be soon nor easily accomplished. Competant people are at work on it. They have hope, but they are not forecasting an early breakthrough. They are in-country. They have adequate financing for their research. It would be foolish not to maintain the National Seed Service in readiness against the day of their success. In the interim, moreover, there are improved varieties of corn, rice, peanuts, sesame and soybeans, appropriate for distribution by the NSS, appropriate because they are sources of food in a food-deficient area, appropriate because they are quality seed that should enable the farmers who plant them to improve their lives. It must be borne in mind that a seed program is an organic process. It cannot be interrupted without dying.

It should also be borne in mind that the development of improved varieties is but one piece of the many pieces that must be put together for rural development. The seed program cannot live in isolation. It must be part of a larger program of rural development. In Upper Volta the largest part of this task has been assigned to the ORDs. They have the encadreurs - the extension agents - who seek to demonstrate and teach the benefits of

improvements over the traditional agricultural practices. The ORDs too, like the NSS, are in a process of growth. They cannot exist apart. Together they have a chance of breaking the sad cycle of rain, growth, drought and disaster.

We have deliberately not mentioned a technological package - that mythic Aladdin's lamp that, once rubbed, ushers in the Green Revolution. We do not believe it is appropriate at present. Survival in the Sahel region requires production in harmony with the ecology. Production that can be sustained by subsistance farmers. Production that will replenish the scant resources of the Savannah, not now so cruel as the Sahel but perilously close to becoming the Sahel.

Accordingly we recommend that AID continue to support the NSS, help it to harness the resources being developed by the research institutions, help it to demonstrate the advantages of improved varieties, help it to control the quality of foundation and multiplied seed, help it to devise a process for identifying the real needs for multiplied seed, help it to assist the farmer in living with some measure of abundance in his harsh environment.