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# Angola Seed Recovery Phases I, II & III Final Report

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## **List of Acronyms**

|                |   |
|----------------|---|
| <b>ASR</b>     | <b>Angola Seed Recovery</b>   |
| <b>CDRA</b>    | <b>Consortium for Developmental Relief in Angola</b>                    |
| <b>CRS</b>     | <b>Catholic Relief Services</b>   |
| <b>DRP</b>     | <b>Development Relief Program</b>                                       |
| <b>FAO</b>     | <b>Food and Agriculture Organization</b>                                |
| <b>FSV</b>     | <b>Farmer Selected Varieties</b>  |
| <b>IARC</b>    | <b>International Agricultural Research Centres</b>                      |
| <b>IDP(s)</b>  | <b>Internally Displaced Person(s)</b>                                   |
| <b>IDA</b>     | <b>Institute for Agrarian Development</b>                               |
| <b>IIA</b>     | <b>Instituto de Investigação Agrária (Agronomic Research Institute)</b> |
| <b>MINADER</b> | <b>Ministry of Agriculture and Rural Development</b>                    |
| <b>NGO</b>     | <b>Non-Governmental Organization</b>                                    |
| <b>SENSE</b>   | <b>Servico Nacional de Sementes (National Seed Service)</b>             |
| <b>SCUS</b>    | <b>Save the Children US</b>   |
| <b>UN</b>      | <b>United Nations</b>   |
| <b>WFP</b>     | <b>World Food Program</b>   |
| <b>WVA</b>     | <b>World Vision Angola</b>  |

## **I. Program Overview and Performance**

The Angola Seed Recovery program (ASR) funded by USAID and Chevron Texaco extended the results of the Seeds for Freedom Program that evaluated numerous varieties of maize, beans, groundnuts, cowpeas, cassava and sweet potatoes for productivity and for acceptability to smallholder farmers in Angola.

The Angola Seed Recovery Program represents a major achievement in producing locally a high volume of seeds of smallholder farmer selected crop varieties to meet the demands of resettling smallholder farmers following the peace accord in April 2002. The peace accord enabled a massive number of war displaced persons to return to their areas of origin and created a huge demand for seeds of maize and beans to enable the returnees to rapidly return to food self sufficiency. Overall, the ASR met or exceeded expectations in both producing seed and in distributing the seeds in a timely manner in response to the needs of 274,175 resettling families in the provinces of Huambo, Bié, Huila, Benguela, Kwanza Sul and Malange. For the 2004/05 seasons the ASR provided 80% of the total seed distributions in the central highlands of Angola. In addition planting material was distributed to 57,850 families. These distributions reduced the need for food aid and restored food security for an estimated 1,660,000 persons in the central highlands of Angola.

### **Seed Production**

The seed production grew from just 31.9 Mt of seed in 2002 to produce a total of over 5,325 Mt of seed by the end of the program. The scope of the program greatly expanded when the central province of Huambo was included in Phase II of the program and where the majority of seed (>95%) was produced. The province had long been the heart of the Angolan Highland breadbasket and therefore had a significant number of large-scale crop producers that could supply large quantities of seed, a situation vastly different from that found in Malange and Kwanza Norte. The producers were of such ability that in the third year of the project 3,136 Mt of seed was produced and an objective was added to identify a commercial seed company that would establish an Angolan Seed Company and thus utilize the seed producers to continue commercial seed production.

### **A Sustainable National Seed Industry**

SeedCo, a Southern African regional seed company, was identified through a competitive process as a private sector partner to ensure sustainability. Seed Co has formed an Angolan subsidiary to contribute to the creation of a national commercial seed industry as it has done in several other countries in Sub-Saharan Africa. SeedCo involvement allowed for a smooth transition to commercial production for rural seed producers with contracts for maize seed production issued for the 2004/2005 season. Seed Co has a five-year business plan in place.

### **Seed Distributions for Population Resettlement**

The seed produced for the 2003/04 planting season was distributed to 104,044 returning families, as summarized in Table 1:

**Table 1: Summary of Seed Distributions to Resettling Smallholder Farming Families for the 2003 Dry Season “Nacas” and for the 2003/04 Rainy “Lavras” season**

| HUAMBO                     |                                  | MALANGE                          | TOTAL<br>Number of<br>Families |
|----------------------------|----------------------------------|----------------------------------|--------------------------------|
| “Nacas” Dry<br>Season 2003 | “Lavras” Rainy<br>Season 2003/04 | “Lavras” Rainy<br>Season 2003/04 |                                |
| 45,224                     | 48,557                           | 10,263                           | 104,044                        |

An additional 249.2 MT of seed went to CDRA partner NGO’s for further seed multiplication and direct distribution. In addition to the seed distributions, a total of 2,096,550 cassava and sweet potato cuttings/vines were produced and distributed to 45,648 families.

For the 2004/05 seasons a total of 170,131 families received maize and bean seed for planting (Table 2). The seed was delivered to all families by the start of the rainy season in October allowing timely planting by the returnee families.

**Table 2: Summary of Seed Distributions for Smallholder Farming Families for the 2004 Dry Season “Nacas” and for the 2004/05 Rainy “Lavras” season**

| HUAMBO                     |                                  | BIÉ, N HUILA AND<br>KWANZA SUL   | TOTAL<br>Number of<br>Families |
|----------------------------|----------------------------------|----------------------------------|--------------------------------|
| “Nacas” Dry<br>Season 2004 | “Lavras” Rainy<br>Season 2004/05 | “Lavras” Rainy<br>Season 2004/05 |                                |
| 20,000                     | 125,464                          | 24,667                           | 170,131                        |

In addition, a total of 198 Mt of Irish seed potatoes were distributed to 1,000 potato producers. Cassava (40 pieces) and/or 50 sweet potato cuttings were distributed to 11,202 families.

### **Coordination and Collaboration**

The program attracted significant additional resources. A total of 48,274 sets of hand tools (hoe, machete and file) were distributed with the seed for the 2003/04 rainy season in both Malange and Huambo provinces. The tools were contributed by WFP and FAO (estimated value US\$ 250,000).

Food aid distributions for “seed protection” were provided through World Vision and CDRA Developmental Relief Program food distributions and other NGO food distributions in partnership with World Food Program.

Some seed distributions (<15% of total) were undertaken in partnership with other NGOs to respond to the greatest humanitarian needs; SOLIDARITES in Mungo municipality of Huambo province; CLUSA in Northern Huila; and CDRA partners CRS, SCF, Africare and CARE in the provinces of Benguela, Kwanza Sul and Bié.

### **Cost Effectiveness and Sustainable Food Production**

The production of seed locally proved very cost efficient, enabling the provision of seed to approximately twice the number of families that would have been served had the seed been imported. WVA conservatively estimates, using present prices, that every ton of maize seed produced locally saves US\$ 550 and that every ton of bean seed produced locally saves US\$ 300 as shown in Table 3. The saving is considerable, as the amount

saved on 2,686 Mt of seed maize was US\$ 1,477,300 or a little more than the purchase price of the maize.

**Table 3: Comparison of the Cost Effectiveness of Local Seed Production Compared to Imported Seed**

| Improved Crop Variety<br>Crop | Imported Seed<br>FOB Durban<br>US\$/Mt | Imported Seed<br>CIF Huambo<br>US\$/Mt | Seed Recovery<br>Contracted Price<br>Huambo<br>US\$/Mt | Huambo Cost<br>Saving over<br>Imported Seed<br>US\$/Mt |
|-------------------------------|--|--|--|--|
| Maize ZM521/SAM3              | 850                                    | 1,050                                  | 500  | 550  |
| Beans A286                    | 850                                    | 1,100                                  | 800  | 300  |

In addition to a very significant cost saving in relation to imported seeds the advantages of local seed production also include the following:

- The crop varieties are tried and preferred by local farmers and well adapted to the local agro-ecological conditions;
- The seed grower has a guaranteed market that gives stability to farmer income, recapitalizes rural enterprises after 30 years of war and stimulates the local economy;
- Ability to supply seed in time for the “nacas” season in June/July as well as the rainy season in September/October thereby allowing returning families to produce a harvest during the “hunger period”;
- Growing seed crops require good management which has a positive influence on overall farm management;
- Local seed production saves foreign exchange and has future potential as a foreign exchange earner through the export of high quality seed;
- Creation of employment and technical expertise for over 3,000 people in a fledgling seed production industry.

A joint Ministry of Agriculture and Rural Development and World Vision evaluation of the 2004 harvest concluded that the seed distributions in 2003 were highly successful in restoring food security, despite the poor distribution of rainfall during the 2003/04 growing season. The evaluation found that from a base line of virtually zero food production in the previous season; overall 57,206 families in the evaluated area produced 35,772 MT of grain of maize and beans. The value of this food production compared to the cost of providing food aid was estimated at US\$ 16 million.

The overall program performance for ASR is summarized in three Logical Frameworks, one for each phase of the program (Attachments 1, 2 and 3). A Flow Chart for Seed Multiplication and Distribution reflecting the experience gained is shown in Attachment 4.

## II Background

The overall program goal during the three phases of the project was to enhance food security for selected at-risk communities. The first year of the program focused on IDPs and at-risk residents in the provinces of Malange and Kwanza Norte. In the second phase of the project, Kwanza Norte was phased out, but work continued in Malange and, with the signing of a lasting peace accord, WVA established a base in Huambo where at-risk areas were becoming accessible as security improved and roads were reopened. The project rapidly increased in size and capacity to serve an anticipated one million returnees to the Planalto, principally in Huambo province. The needs in Malange had been satisfied by the beginning of the third phase of the project. Offices in Malange were closed to allow total focus on provision of seeds and services to over three quarters of the more than one million returnees to the Planalto in Huambo province and areas of the surrounding provinces of Bie, Kwanza Sul, Benguela and Huila.

OFDA supported World Visions Seeds of Freedom Program during the late 1990s. The first phase of Angola Seed Recovery in 2002 produced over 100 Mt seed and benefited 10,000 families with farmer selected improved crop varieties. During 2003 the program increased access to improved varieties of maize, bean and groundnut by producing and distributing a total of 2,155Mt of seed. A total of 104,044 resettling smallholder families received seeds in the provinces of Huambo, Malange, Benguela, Huila, Kwanza Sul and Bié.

The Phase I and Phase II parts of the program were fully funded by USAID, while the Phase III program was implemented with the equal support of USAID and Chevron-Texaco Sustainable Development Company, a wholly owned subsidiary of Chevron-Texaco (CTSDC).

Chevron-Texaco, whose wholly owned subsidiary company Cabinda Gulf Oil Company Limited has operated in Angola since the 1950s, has been one of the largest foreign investors in the country. With the ending of the war, and the opening up of areas beyond the coast that were previously off limits, Chevron Texaco decided to expand their ongoing community programs in the country that would have a meaningful impact in helping the people of Angola begin to recover from their decades of strife.

After considerable research and discussion with key stakeholders, Chevron Texaco initiated a major new program, which is called the Angola Partnership Initiative (API). The Chevron Texaco Sustainable Development Company ("CTSDC") was formed to implement API. The mission of API is to build human capacity with a focus on the development of small and medium-enterprises. The four pillars of the program, or areas of intervention, are to strengthen the supply of vocational training; expand the supply of micro-credit; introduce business development services and to work toward strengthening the enabling environment. In addition, the company wanted to build on the principle of "partnership" by seeking to create new alliances with like-minded institutions in order to leverage capabilities and funding. Therefore, partnership agreements have been signed with the United States Agency for International Development (USAID) and the United

National Development Program (UNDP) with a combined goal to raise \$50 million to support this initiative, and additional partnerships and alliances are under discussion. Chevron Texaco has committed an overall amount of \$25 million to support this effort. Chevron-Texaco contributed \$2.1 million dollars to the third phase of the ASR.

### III. Progress towards Project Goal and Objectives

#### a) Project Objective 1

*To provide seed and planting materials of improved, higher yielding and farmer acceptable varieties of appropriate crops to recipients to allow a rapid return to food security.*

Contracting with local producers produced specified quantities of seed of stated varieties. The tonnages of seeds produced in each phase of the project are presented in Table 1.

Maize and beans are major crops both in the sub planalto and the planalto and sweet potato is an important secondary starch crop in both areas, while cassava is the major starch crop in many areas of the sub planalto, followed by maize, but is not as important as a starch crop in the planalto. The leaves of both sweet potato and cassava are used as a spinach crop in all area and, in fact, constitute the major use of cassava in the planalto. Groundnuts are a secondary crop in both regions, but are more important in the sub planalto than the planalto. The production of maize and beans seeds was a major activity in all three phases of the project, as was the production of vegetative planting material of cassava and sweet potato. Major production of groundnut seed was discontinued after the second phase as the crop was not as important in the planalto and was problematic to produce due to low seed yields.

**Table 1. Summary of Seed or Vegetative Planting Material Produced by Crop for the Three Phases of the Seed Recovery Project.**

| Crop               | Phase I   |                                | Phase II                              |                            | Phase III   |   |
|--------------------|---|--------------------------------|---------------------------------------|----------------------------|---|---|
|                    | Mt production   | Percent of target              | Mt production                         | Percent of target          | Mt production   | Percent of target                           |
| Maize              | Mataba 59.2 Mt<br>Obatampa 29.3 Mt<br>ZM521 20.7 Mt           | 248 % of 45 Mt target          | 1,719.7 Mt of SAM3 and Branco Redondo | 115 % of 1410 Mt target    | 2685.8 Mt of SAM3 and Branco Redondo                              | 92.6 % of 2900 Mt target                    |
| Beans              | A286 29.5 Mt<br>CAL145<br>O.15Mt                              | 88.4 % of 35 Mt target         | 354.0 Mt acquired                     | 71 % of target of 450 Mt   | 11.75 Mt of bean seed produced, 450.126 Mt of bean seed purchased | 128.3 Mt of bean seed produced or purchased |
| Groundnut          | Mucabo C. 7.2 Mt<br>Damper C. .878 Mt<br>Natal Common 1.07 Mt | 36.6 % of 25 Mt target         | 78.3 Mt of seed produced              | 55.9 % of target of 140 Mt |   |   |
| Moringa trees      | 6,555 seedling distributed                                    | 60 % of 11,000 seedling target |                                       |                            |   |   |
| Green manure crops | Seeds of green manure crops                                   | 37 % of target of 1.4 Mt       |                                       |                            |   |   |

|                      |  |                                       |  |   |   |  |
|----------------------|--|---------------------------------------|--|---|---|--|
|                      | 0.515 Mt                                 |                                       |  |   |   |  |
| Cassava cutting      | Expected output 1,380,000 cassava stakes | 197.1 % of a target 700,000 stakes    | 1,731,400 stakes and 71,000 seedlings produced | 85.8 % of 2,100,000 planting stake target | Estimated production of 200,000 stakes  | 198% of target of 101,000 stakes distributed |
| Sweet Potato cutting | Expected output 1,207,000 cuttings       | 150.9 % of target of 800,000 cuttings | 366,150 cuttings produced                      | 69.3 % of target of 528,000 cuttings      | Estimated production of 800,000 cutting | 100 % of the target of 800,000 cuttings      |
| Irish Potato seed    |  |                                       |  |   | 203.7 Mt of Irish potato seed produced  | 203 % of a target of 100 Mt of potato seed   |

The production of moringa trees and green manure crops were discontinued after the first year as the project’s focus grew in the planalto where WV had no sufficient experience with these crops. Moreover, seed production difficulties required more effort than the perceived value of these two crops. Also, the demand for seed of the major food crops was so large, particularly in Phase III, that the entire seed production effort was focused on maize and beans, as well as vegetative planting material of cassava and sweet potato. That said, small productions of groundnut, soybean, peas, sunflowers and wheat were grown in limited quantities at local demonstration areas as part of the extension program, particularly during Phase III. Lastly, production of Irish potato seed was initiated in cooperation with IDA staff in Phase III, as the crop was significant in many areas of the planalto.

Vegetative planting material was generally provided from multiplication plots that were established in areas where the recipients lived since the live material was not easily shipped. The major problem encountered was not having enough planting material to establish fairly large multiplication areas. Often it was necessary to use the initial material produced to establish a larger production that was sufficient to produce the volume of material needed for the planned distribution. While the process was straightforward, it usually required more than the 10 to 12 months provided by any one phase of the funded project; however, in spite of this constraint, the production of material was successful, if a bit late for the final distribution.

**Table 2. Summary of Families Served during Two Seasons in Each of Three Phases of the Seed Recovery Project.**

| Phase | Planned number of families (target) | Nacas (dry) Season             |                           | Lavras (rainy) Season          |                           | % of target (families) |
|-------|-------------------------------------|--------------------------------|---------------------------|--------------------------------|---------------------------|------------------------|
|       |                                     | Kg seed distributed per family | Number of families served | Kg seed distributed per family | Number of families served |                        |
| I     | 10,000                              | -                              | -                         | 5.5                            | 5,783                     | 57.8 (5,783 )          |
| II    | 100,000                             | 15                             | 45,224                    | 21                             | 58,820                    | 104 (104,044)          |
| III   | 150,000                             | 17                             | 20,000*                   | 21                             | 151,134                   | 101 (151,134)          |

\* seed sourced outside of project; families not treated as part of 150,000 goal

The rapid growth in the number of families being served reflects the rapid return of IDP’s to areas of origin after a stable peace accord was signed. The return was most marked in

Huambo province where return had been nearly impossible prior to the peace accord signing. In both Kwanaz Norte and Malange, where there was greater central government control, the return of IDP's had been more gradual over a longer period of time and by the time the major IDP return was under way in the central highlands, principally Huambo province, these two provinces were effectively resettled. Whereas 5,783 families were served in Phase I in both Kwanza Norte and Malange, the number of families served in Phase II in Malange was 10,263 families and in Huambo province increased to 93,781 (45,224 during the Nacas season and 48,557 families during the Lavras season). The number of families again increased to 121,134 in Phase III (plus 30,000 families in other provinces). The major difference between Phase II and Phase III was the number of families served during the Nacas (dry) season distribution, with an approximately equal number being served in both seasons of Phase II. Only 20,000 were served in the Nacas season of Phase III as opposed to 151,134 in the Lavras season.

Past experience has shown that returnees need two consecutive seed distributions to achieve food self-sufficiency, and to a large degree this was achieved for 45,000 families in Phase II. The fact that the project serviced only 20,000 families in the Phase III Nacas season and 151,134 families in the Lavras season resulted from lack of availability of seed production from the 2003/04 season until the Nacas planting was passed, consequently seeds distributed were purchased with funds from other sources for the 20,000 families that were served (these families were not counted in the final total of families served in Table 2).

The establishment of a World Vision office in Huambo in September of 2002 resulted in a rapid expansion of seed distribution to returning IDP families in Phases II and III; the peak period for returnees to the planalto and particularly to Huambo province. In spite of clear needs, due to funding unavailability, the distribution of tools were truncated in Phase III. Assuming that somewhat more than 45,000 families in Phase II and 150,000 in Phase III, as well as 5,000 in Phase I, were supported with seed packs, the three year project served more than 200,000 families or more than 1,100,000 individual IDP returnees. The vast majority of these IDP's, more than 166,134 IDP families or 913,737 individuals, were served in Huambo province during the two year period, when over a million and a half IDP's are estimated to have returned from numerous areas external to the province.

## **b) Project Objective 2**

*To provide sufficient information to enable the recipients to maximize the food production from the seeds and vegetative planting materials that were supplied.*

Project and IDA extension personnel in the form of farmers meetings and field demonstrations supplied this information. The process was facilitated by the formation of numerous farmers associations.

**Table 3. Summary of Numbers of Farmers Associations, Leader Farmers and Farmers Served by Extension Activities.**

| Phase         | Farmers targeted | Number of farmers Associations | Number of Leader Farmers | Number of farmers field days | Number of training sessions | Number of farmers served | % of target |
|---------------|------------------|--------------------------------|--------------------------|------------------------------|-----------------------------|--------------------------|-------------|
| I             | 10,000           |                                |                          | 40                           |                             | 2482                     | 24.8        |
| II assoc      | 6,000            | 25                             |                          |                              |                             | 1714                     | 28.5        |
| II L.F.       | 500              |                                | 150                      |                              |                             |                          | 30.0        |
| II field days | 3000             |                                |                          |                              |                             | 6,862 (4,223 women)      | 228.7       |
| III           | 8,000            | 130                            |                          | 143                          | 764                         | 4844                     | 60.5        |

The provision of crops production information to farmers was accomplished via field days where a demonstration site served as the focal point for the field day. The contact with farmers was simplified by the organization of farmers associations headed by a leader farmer. In established situations such as Kwanza Norte and Malange where WV had been active for a number of years and farmers associations had been established, attendance rates of 50 to 60 percent is reasonable. However, in new areas the establishment of farmers associations and the identification of leader farmers requires more than one year as evidenced by the limited number of farmers associations and leader farmers reported in Phase II. With only 30 percent of target achieved, by Phase III numbers had grown to the more usual 60 percent. As the number of field days reported for Phase II indicates, people will readily come to a field day, but the development of an organization, as the numbers of farmers associations and leader farmers indicates, is a longer term process that requires more than one season to be successful.

### c) Project Objective 3

*In year 1, the key focus was on dissemination of results and other information learned from the SOF to local implementing partners.*

The first year of seed production highlighted the problems that existed in the national seed production system resulting in the evolution of objective three to the establishment of a sustainable Angolan seed production system. The Angolan seed production system would link national/regional seed demand and the production activities of basic seed by IIA at Chianga and of commercial seed production by the production enterprises.

**Table 4. Summary of Basic Seed Produced Over the Three Phases of the Seed Recovery Project.**

| Phase | Crop         | Goal       | Seed purchased or received (Mt) | Seed produced        | % of Goal          |
|-------|--------------|------------|---------------------------------|----------------------|--------------------|
| I     | Maize        | Not Stated | 25 (imported)                   |                      |                    |
|       | Beans        | Not Stated | 15 (imported)                   |                      |                    |
|       | Groundnuts   | Not Stated | 9.148                           |                      |                    |
| II    | Maize        | 90         | 98.5                            |                      | 109.4              |
|       | Beans        | 50         | 51.35                           |                      | 102.7              |
|       | Groundnuts   | 10         | 16.8                            |                      | 168.0              |
|       | <b>TOTAL</b> | <b>150</b> | <b>166.65</b>                   |                      | <b>111.1</b>       |
| III   | Maize        | 100        |                                 | 65.05*(97.05)        | 65.1 (97.05)       |
|       | Beans        | 40         | 8.5                             | 0.250                | 21.9               |
|       | soybean      | 1          |                                 | 0.536                | 53.6               |
|       | Groundnuts   | 1          |                                 | 0.312                | 31.2               |
|       | Wheat        | 1          | 2                               |                      | 200.0              |
|       | <b>TOTAL</b> | <b>143</b> | <b>10.5</b>                     | <b>66.148(98.15)</b> | <b>53.6 (75.9)</b> |

\* Another 40 hectares of dry season production has yet to be harvested; yield estimated at 35 Mt.

The principal objective of Phase I was to produce and distribute seed of crop varieties found to be preferred by farmers under the previous Seeds of Freedom (SOF) program and to provide partner organization with this information in the form of an approved variety list. There was no stated plan to produce basic seed initially, however, as Phase II appeared on the horizon, funds were used to purchase basic seed of selected maize and bean varieties externally, as well as earmark much of the Phase I maize and bean seed production for use in the planting of commercial seed multiplications for the Phase II program.

*Phase II and III objectives included the internal production of specified quantities of basic seed of enumerated crops.*

The basic seed production in Phase II consisted of inspecting production fields and saving seed from the best fields for future commercial seed production. A concerted effort was made in Phase III to strengthen the ability of IIA Chianga to produce basic seed as part of an effort to develop domestic basic seed production expertise. As can be noted in Table 4, all seed was produced at Chianga with the exception of the beans and wheat. The effort was not as successful as planned due to the unusual rainfall pattern in 2003/04 which curtailed the growing season due to the failure of rains in March and April and reduced the amount of basic seed produced; overall 75.9 percent of the stated goal of 140 Mt. The amounts produced were sufficient to meet 2004/05 planting requirements and, given a reasonable season in 2004/05, acceptable levels of basic seed production will be achieved for future use in the plantings of commercial seed productions.

#### **d) Project Objective 4**

*The fourth project objective, added in the third phase of the project, was to facilitate the establishment of a commercial seed company to respond to future seed demands of the central highlands, and potentially, the whole nation.*

It was envisioned that the company would initially utilize Huambo seed producers associated with the Seed Recovery Program.

The success of the seed production effort in Huambo province by local commercial growers in Phase II was sufficient to suggest the possibility of commercial seed production activities. To this end, an invitation for establishment of a partnership with WVAngola was sent to all seed companies operating in Southern Africa in November 2003. The only serious response to this call was received from SeedCo International, the external commercial arm of the Zimbabwe Seed Company, which has a successful operating history of some 40 years in Zimbabwe. Since that initial contact in November 2003, SeedCo has sent 4 seed inspectors for visits of 2 to 4 weeks each, to interact with seed growers and World Vision field staff during the 2003/04 season. The General Manager has visited several times with the aim of establishing a legally registered Angolan Subsidiary (which is near completion) and SeedCo has contracted the production of 1,309 Ha of the improved maize variety, ZM521, during the 2004/05 seasons. The crop will be harvested in June and July of 2005, the seed will be processed in the SeedCo seed processing facility in Huambo and the seed will be sold under the SeedCo brand name for planting in the 2005/06 seasons. This will mark the initiation of an independent Angolan seed company, the first to be fully functional in Angola.

A number of benefits have accrued from the development of an independent Angolan seed industry, including a mechanism for rapidly introducing seed of locally developed varieties and for meeting domestic demand for seed of currently available varieties. The seed industry provides economic back stopping to the basic seed production initiative of IIA by providing a known reliable market for basic seed produced. In the context of the present situation in Angola, the seed producers have provided a small, but critical market for fertilizer which has resulted in fertilizer supplies becoming available in Huambo province, and thereby enabling other growers to access fertilizer for their crops production, specifically Irish potatoes. The net result has been the reestablishment of a stockist network for fertilizer and potentially other agrochemicals and farm supplies. The production of maize and bean seed has increased the number of local cash crops that are profitable for the local growers to produce.

A detailed description of the project's progress towards goals and objectives in phases I, II and III are summarized as **Attachment 1, 2 and 3: Log frame Summary**.

#### **IV. Project Constraints**

The cropping year in the Angolan highlands starts in October at the start of the fiscal year. Due to delays in proposal approval, each season started with uncertain funding and the financial situation was not clearly defined until November or December. As a result, seed contracts had to be agreed to in September without confirmed funding; only expected funding, and consequently start-ups were always disjointed and initiated at dates later than desired. Fertilizer purchases were always delayed, to the detriment of seed yield.

The road conditions deteriorated over the three years of the project, as a result of large tonnages of goods being moved on thirty-ton trucks over roads designed for ten-ton trucks. The province did not start repairing roads with any certainty until February of 2005 after Phase three had ended. The road conditions resulted in very high transport costs for distribution of seed, as well as, necessitating continual repair of project vehicles that at times was limited by the availability of spare parts.

The economy was still on a wartime basis that required cash transactions with most suppliers. Certainly, the purchase of small quantities of bean seed was only accomplished on a cash basis, as was the purchase of most local supplies, while seed contract payments with medium and large scale seed producers in Huambo province could be done by bank transfers once bank accounts were established. However, in the first year growers required a great deal of assurance before the bank transfers were taken seriously.

Seasonal rainfall was problematic in the lower elevations where unreliability was the rule; however, the rainfall was reputed to be reasonably reliable in the Planalto and was during Phase II but was not during Phase III. A widespread regional drought resulted in poor rainfall at the end of the season in March and April of 2004.

The state tractor service, Mechanagro, was said to be reliable for land preparation, but proved to not be reliable both for land preparation at Chianga in Phase II and for seed producers in both Phase II and Phase III. In addition the service was very expensive monetarily and in terms of lost time at the start of the season.

Successful crop production in the Planalto requires the use of modest amounts of phosphate and nitrogen fertilizer to achieve reasonable crop yield. The fertilizer supply situation throughout the life of the project was chaotic at best. The only certain supply was from external suppliers, which required at least two months lead time and known funding. The funding precluded timely ordering of fertilizer for application at planting, and allowed for acquisition of modest amounts of nitrogen fertilizer at topdressing time.

## **V. Overall Performance of the project: Refer 1. Program Overview and Performance**

## **VI. Conclusion and Summary of Cost Effectiveness**

The Seed Recovery Project was implemented during a time when donor financial resources were constrained and the question of cost effectiveness was raised. The main expenditure in the seed recovery project was the purchase and distribution of maize and bean seed followed by the cost of staff and transport to distribute the seed to recipient families. There were two means of acquiring the seed, either by external purchase or domestic production, while there was no alternative to local transport and to deliver the seed. WVA local staff distributed the seed, whatever the source, from World Vision provincial or municipal warehouses to returnee families. An analysis of the cost of

locally produced versus imported seed was performed and the results are presented below.

**1. Table 5: Comparison of the Cost Effectiveness of Local Seed Production Compared to Imported Seed for Three Phases of the Seed Recovery Program**

| Improved Crop Variety<br>Crop | Imported Seed<br>FOB Durban | Imported Seed<br>CIF Huambo | Seed Recovery<br>Contracted Price<br>Huambo +Treatment<br>and Packaging | Huambo Cost<br>Saving over<br>Imported Seed |
|-------------------------------|-----------------------------|-----------------------------|---|---|
| 2001/02 (Phase I)             |                             |                             |   |   |
| Maize ZM521/SAM3              | 532                         | 815                         | 619*  | 196   |
| Beans A286                    | 703                         | 986                         | 857   | 129   |
| 2002/03 (Phase II)            |                             |                             |   |   |
| Maize ZM521/SAM3              | 532                         | 815                         | 634   | 181   |
| Beans A286                    | 703                         | 986                         | 857   | 129   |
| 2003/04 (Phase III)           |                             |                             |   |   |
| Maize ZM521/SAM3              | 850                         | 1,050                       | 534   | 516   |
| Beans A286                    | 850                         | 1,100                       | 857   | 243   |

Figures are US\$/MT, \*processing and packaging costs are taken at 34USD/Mt for maize and 57USD/Mt for beans

The imported price of bean and maize seed, cif Huambo, was constant for the first two years of the project, but increased significantly in the third year as a result of drought that affected the entire southern African region and thereby decreased available seed quantities and increased demand for the seed that was available (see Table 5). The price WVA paid for bean seed was constant for the three years while the price of maize varied from 619USD in the first year to 634USD in the second year-reflecting initial contracting in Huambo- and to 534USD in the third year when the contracted price in Huambo was renegotiated. The cost savings for domestic production of seed was similar in Phase I and II and markedly increased in Phase III by 28% for bean seed and by 97% for maize seed. Since production targets were not always met and since production in excess to distribution requirements was carried over to the next season, the tonnages used for the calculation were either the tonnage of seed produced or the tonnage of seed distributed; whichever was lower; thereby calculating the minimum savings accrued. The cost savings presented in Table 6, for each year and for the entire project, show a total savings of 1,839,417USD. The same tonnage of seed reported in Table 6 was purchased for 3,076,397USD by WVA over the three years of the project. The saving realized were 59.8% of the purchase price, which allowed the project to distribute seed to over one third more returnees than would have been possible if the seed had been purchased externally. Thus the domestic production of seed for distribution to returnees was an outstanding success whether measured by financial savings or humanitarian service.

**Table 6. Summary of Cost Savings for Locally Produced Seed Vs Imported Seed Distributed During Three Years of the Seed Recovery Program.**

| YEAR                 | CROP  | SAVINGS/Mt | Mt   | TOTAL SAVINGS (USD) |
|----------------------|-------|------------|------|---------------------|
| 2002                 | MAIZE | 196        | 28.6 | 5,605               |
|                      | BEANS | 129        | 3.3  | 426                 |
| <b>SUBTOTAL 2002</b> |       |            |      | <b>6,031</b>        |
| 2003                 | MAIZE | 181        | 1511 | 273,491             |
|                      | BEANS | 129        | 354  | 45,666              |
| <b>SUBTOTAL 2003</b> |       |            |      | <b>319,157</b>      |
| 2004                 | MAIZE | 516        | 2720 | 1,403,520           |
|                      | BEANS | 243        | 453  | 110,709             |
| <b>SUBTOTAL 2004</b> |       |            |      | <b>1,514,229</b>    |
| <b>TOTAL SAVINGS</b> |       |            |      | <b>1,839,417</b>    |

Thus, this is overwhelming support for the domestic production of seed. However, there are two conditions that need to be met before this option can be pursued.

The contracting of production in the first year was problematic as both Kwanza Norte and Malange had very few growers with medium or large acreages. While small acreages are suitable for the production of bean seed, growers with medium or large acreages best do the production of maize seed. Such growers can more easily control isolation distances to prevent pollen contamination from other maize crops, so that genetically pure maize seed and not maize grain is produced. The second condition that is necessary for successful domestic seed production is an understanding that a contract has significant meaning and that selling to the first trader that presents a few Kwanzas is not an acceptable strategy. If this situation exists, the seed acquisition process will succeed only if the program has buyers present with cash in-hand when the crop is harvested, a complicated and potentially difficult process. The idea that payments can be made to bank accounts is mythical and failure of the seed acquisition is ordained. Unfortunately Kwanza Norte and Malange suffered from both situations.

Huambo province was ideal for contract seed production as there were over 30 medium and large scale growers who had the ability to produce maize seed, as well as bean seed, and who had sufficient business experience to understand contracting. They also had bank accounts to allow transfer of large sums of money by traditional banking methods. The fact that there was a history of traditional business methods did not preclude the necessity for a significant confidence building program as these growers had just come through several years of a war time economy where the only method of operating was cash in-hand. However, the rapid production of large quantities of seed was possible in large part to the existence of this exceptional group of growers. While the exceptionally successful seed production experience in Huambo province was, in part, the result of a previous history of commercial crops production, this should not discourage future attempts to establish local seed production in other areas. However, it must be recognized that a longer time period may be required to meet the large production levels that were achieved in Huambo.

Attachment 1. Phase I Logframe  
Angola Seed Recovery Program Final Report

| <b>Objective</b>                    |  | <b>Increase agriculture production and productivity in Kwanza Norte &amp; Malanje provinces.</b>               |  |  |   |  |  |
|-------------------------------------|--|--|--|--|---|--|--|
| <b>Project Activity Description</b> |  | <b>Detailed Activities</b>   | <b>Project Expected Outputs</b>  | <b>October to December 2002</b>  |   | <b>Final Results</b>   |  |
| I.R. 1                              | Multiplication and distribution of farmer-selected crop seeds and planting materials with high nutritional value | 1.1 Multiplication and distribution of vegetative materials for selected varieties of sweet potato and cassava | Sweet potato ( <i>Zapallo, Lanceolado, Jonathan</i> , LO0323, L-312) - 800,000 vines with approx. length of 30 cm. Cassava (TMS30211, TMS42025) - 700,000 cuttings with approx length of 100 cm each | Additional 3.0 ha of sweet potato fields were planted for production of vines. While cassava field were extended with additional 22.1 ha | 10 farmers associations were involved in the establishment of village sweet potato banks with a total area of 3 ha.                           | 11.5 ha of sweet potato (12,070,000 vines) and 69 ha of cassava multiplication under cultivation (1,380,000 stakes) represents 115% and 138% respectively of total land required | Activity indicator fully met and exceeded. Expected cuttings and vines to fully service the target beneficiary group.                                      |
|                                     |  | 1.2 Multiplication and distribution of selected varieties of Maize   | Maize ( <i>Matuba, ZM607/ZM521, Obatampa, S91SIWQ, PL12Q</i> ) - 45MT  | No additional area was cultivated  | 111.5MT of maize seed received and stored. Variety; Matuba – 59.2 MT, Obatampa – 29.3 MT, ZM521 - 20.7 MT                                     | 175% of the maize area required.<br><br>28.6 MT maize distributed in Malanje   | Target collection exceeded 45MT required, 111.5MT collected to date.<br><br>Benefited 5,000 families   |
|                                     |  | 1.3 Peanut and Bean Seed production and distribution   | Peanut ( <i>Mucaba Castanho, Damba crème, Samba Caju, Gabela</i> ) - 25MT.<br><br>Beans (A286, A344, CAL 143) - 35MT   | No additional areas for peanut.<br><br>Additional 20 ha of beans planted during the reporting period                                     | 7.2MT Mucaba C. 0.878MT Damper C – 1.07MT Natal common.<br><br>29.5MT of A286 variety of bean seed were collected and stored. 0.150 MT CAL145 | 47% total area required for peanut,<br><br>100 % area required for beans cultivated by the end of December<br><br>3.3 MT beans distributed in Malanje                            | Total peanut collected 7.2MT -(28 of the required amount). Total beans collected 29.68MT -(88.4 %of the total requirement)<br><br>Benefited 1,650 families |
|                                     |  | 1.4 <i>Moringa olifera</i> seed production, distribution and utilization                                       | Miracle tree ( <i>Moringa Olifeira</i> ) - 11,000 seedlings available to farmers and NGOs  | Additional seeds were ordered for seedling production.   | 6,555 seedlings distributed and 4,910 seedlings established and growing in farmers fields in six municipalities of Malanje and K. Norte       | 60 % of the seedlings requirements achieved by the end of the first three quarters.  | Target not met due to inadequate seed availability. 6,555 families benefited in Kwanza Norte   |
| I.R. 2                              | Promotion of low -cost, sustainable soil fertility improvement practices   | 2.1 Promotion of the use of green manure leguminous crops  | Green manure seeds ( <i>Mucuna sp. Lablab sp. Magoye Soybean, Cajanas sp. Crotolaria sp.</i> ) - 1.4MT   | No additional area was cultivated  | 0.515 MT of assorted seeds of green manure plants collected and stored  | 21% of the total area required for green manure seed production  | Low target (37%) accomplishment due to late arrival of seeds of green manure plants  |
| I.R. 3                              | Proper dissemination of results, lessons   | 3.1 Development of a National list of  | Document and develop extension materials for   | Field crop manual for bean seed production developed by IIA, WV and CIAT is available and  |   | Farmers' field manual for management and production of seeds for field beans   |  |

Attachment 1. Phase I Logframe  
 Angola Seed Recovery Program Final Report

|  |  |  |                                   |  |   |  |
|--|--|--|-----------------------------------|--|---|--|
|  | <p>learned, and information from the previous phases of SOF to local implanting partners</p> |  | <p>recommended crop varieties</p> | <p>dissemination and sharing with partners</p> | <p>awaits translation into Portuguese for future distribution to farmers and small holder seed producers.</p> | <p>available in English. Translation under way. CIAT will publish in Portuguese as soon as the translation is available. IIA now has a National List of recommended varieties for each agro-ecological zone of Angola.</p> |
|--|--|--|-----------------------------------|--|---|--|

**Attachment 2**  
**Angola Seed Recovery, Phase II – Logframe**

| Project Activity Description  |  | Expected Outputs  | First Quarter Results                                 | Second Quarter Results   | Third Quarter Results  | Fourth Quarter Results  | Final Results   |
|---|--|---|---|--|--|---|---|
| <b>Objective 1-</b><br>Increase farmers` access to seeds and planting material of improved, higher yielding varieties   | Detailed Activities<br><br>Multiplication of seeds of cereal and legumes of selected varieties | Project Production Target<br>2,250 MT of seeds and 2,628,000 cassava & s. potato cuttings |   |  |  |   | <b>2,154.8 MT of seed produced with a target of 2,250.0 MT; 96% success rate, and 2,096,550.0 out of 2,628,000 target of cassava and sweet potato cuttings/vines were produced (80% of target).</b> |
| <b>IR 1.1 Commercial farmers and farmers associations multiply 2,100 MT of Seed and 2,628,000 of cuttings and vines</b> |  |   |   |  |  |   |   |
| <b>Indicator 1.1.1 – Production of 2,100 MT of seeds of cereal and legume crops prior to the 2003/04 season</b>         |  |   |   |  |  |   |   |
| Seed multiplication of farmer selected varieties  | 1.1.1.1. Multiplication of selected varieties of maize   | SAM3, Matuba, Obatampa, ZM521-1,410 MT  | 1,042 MT contracted (i.e., 69.5% of the total target) | 486 MT contracted (i.e. 32.4 of the total target)  | 561.65 MT of Maize seed have been received from an estimated 1,507 MT                | 944.9MT of maize seed received at WV A warehouses   | <b>1,719.7MT of maize seed produced; 115% of target</b>   |
|   | 1.1.1.2. Multiplication of selected varieties of beans   | A 286 and CAL 145 – 450 MT  | 145 MT contracted (30.8% of the total target)         | 132 MT contracted i.e. 26.4% of the total target   | 149.76 MT of beans out of 408.50 MT are available at WV warehouse                    | 17.49MT of beans seed received contract growers and 137.8 MT purchased from small-scale growers. Quarter total 155.29 MT. | <b>354.0 MT of bean seed produced; 71% of target.</b>   |
|   | 1.1.1.3. Multiplication of selected varieties of peanuts                                       | Mucaba Castanho, Natal and damper C 140 MT  | 750 kg basic seed supplied by WVA                     | Monitoring peanut fields in Cabinda/Uige with the expectation of getting 60 MT of shell peanut | 50.255 MT of peanuts out of 60 MT revised target have been received In WV Warehouses | 10.145MT of groundnut seed received at WV warehouses  | <b>78.3 MT of groundnut seed produced; 52% of target.</b>   |

|  |  |   |  |  |   |  |   |
|--|--|---|--|--|---|--|---|
|  | 1.1.1.4  | Multiplication of IT-18 cowpea 100 MT   |  | Unable to contract production  |   | With program focused on Huambo, program has no interest in producing cowpea as crop not important in the province. | <b>With change of program focus to Huambo province production deemed unnecessary. 2.8MT of soybean were produced instead.</b> |
| <b>Indicator 1.1.2.-</b> Production of 2,628,000 of cassava cuttings ad sweet potato vines   |  |   |  |  |   |  |   |
| Multiplication of farmers selected varieties of cassava and sweet potatoes   | 1.1.2.1.- multiplication of vegetative materials for selected varieties of sweet potato and cassava  | 528,000 vines of sweet potato of 30cm long and 2,100,000 1m long cassava cuttings | 336,150 30 cm long vines of s. potato produced or being produced and 1,461,400 1m long cuttings of cassava produced or being produced  | 30,000 30 cm long vines of s. potato being produced and 270,000 1m long cuttings of cassava being produced                         | 366.150 30 cm long vines of s. potato produced (69% of total target) and 1,730,400 (82% of total target) cuttings of cassava produced | 71,000 cassava seedlings produced in Malange   | <b>2,096,550 improved cassava and sweet potato cuttings/vines, 71,000 cassava seedlings; 82% of target.</b>                   |
| <b>IR 1.2 Distribution of Farmer Selected Varieties of Annual and Perennial Crops to Seed and Food Insecure Families</b>   |  |   |  |  |   |  |   |
| <b>Indicator 1.2.1. -</b> 449 MT seeds and hand tools distributed to 23,650 families prior to 2002/03 planting season with a return of 200 MT of seed at harvest time (150% seed return at 60% success rate) |  |   |  |  |   |  |   |
| Distribution of seeds of farmer selected crop varieties  | 449 MT seeds and hand tools (FAO supplied) distributed to 23,650 families prior to 2002/03 planting season with return of 200 MT at harvest time | 200 MT of seeds of improved varieties reimbursed                                  | 211.5 MT of maize variety Kalahari distributed<br>118.2 MT of beans variety carioca distributed<br>113.25 MT of peanuts distributed<br>15 MT of millet distributed<br>22,650 machetes distributed<br>41,300 hoes distributed<br>18,650 files distributed | Distribution activity was concluded during the first Quarter<br>A return of 30% of the target is expected during the third Quarter | 66. MT of maize, 3.8 MT of beans reimbursed.  |  | <b>457.95 MT seed distributed. 102% of target.<br/>66.2 MT of maize, 3.8 MT of beans reimbursed. 35% of target.</b>           |
| <b>Indicator 1.2.2. -</b> 100,000 families receive seeds (21kg) of improved crop varieties for the 2002/03, 2003/2004 seasons  |  |   |  |  |   |  |   |

|   |  |  |  |  |   |  |   |
|---|--|--|--|--|---|--|---|
|   | <b>100,000</b><br>families receive seeds of improved crop varieties over the 2002/03 2003/2004 | <b>100,000</b><br>families prepare the land for cultivation                                    |  | Identification of 70,000 beneficiary families in Huambo and 10,000 in Malange that will receive seeds in Sept/October 2003 | 70,000 beneficiaries in Huambo and 10,000 beneficiaries in Malange identified. Registration in progress. A total of 38.1MT of beans & 174.628 MT of maize, 427.2 kg veg. Seeds & 1000 tools were distributed in Bailundo & Lomduimbali municipalities to 21358 families | 31,967 families in Huambo out of 55,000 registered , received 575.6 MT of maize, 94.2 MT of beans and 31,967 hand tools. 27604 families in Bailundo and Lomduinbali received 276.04 MT of maize seed and 552.08 kg of vegetable seeds. | <b>104,044 families received seeds of improved crop varieties (104% of target).</b><br><br><b>Breakdown:</b><br><b>Huambo: 45,224 families received seed during the Lavras, Nacas,48,557 received seed during the Lavras, Malange 10,263 families received seed during the lavras</b> |
| <b>Indicator 1.2.3. - 52,000 families receive cuttings of cassava and/or sweet potato and/or moringa or fruit trees</b>   |  |  |  |  |   |  |   |
|   | 52,000 families receive improved planting materials  | 52,000 families receive cassava cuttings and /or s. potato vines and/or moringa or fruit trees |  | Improved cassava cuttings and/or s.potato vines being distributed to 38,253 families                                       | Target numbers for September/October 2003 distribution of cassava cuttings/seedlings and sweet potatoes vines reduced to 21,600. A total of 6,955 families received 6,955 Moringa seedlings in Malange and Kuanza Norte   | A total of 440 seedlings of Moringa distributed to 440 families in Malange   | <b>45,648 families out of 52,000 (88%) received improved cassava cuttings and/or sweet potato vines and Moringa seedlings</b>   |
| <b>Objective 2. - Optimum use of improved planting materials and improved crop varieties to increase household food production</b>  |  |  |  |  |   |  |   |
| <b>IR 2.1. – Agricultural extension services improved and expanded for seed quality control</b>   |  |  |  |  |   |  |   |
| <b>Indicator 2.1.1. - At least 6000 farmers are organized in groups and associations receive technical assistance provided by MINADER and WVA agronomists and technicians</b> |  |  |  |  |   |  |   |

|   |  |   |  |  |   |  |   |
|---|--|---|--|--|---|--|---|
| Extension support and seed quality control  | Organization of farmers groups and associations by MINADER and WVA agronomists and technicians | 6,000 farmers organized in groups and associations  | 9 farmers associations in Malange and K Norte involved in seed multiplication under the supervision of WVA technicians | 25 farmers associations representing a total of 1,714 farmers in Malange, K. Norte and Huambo are involved in seed multiplication under technical supervision of WVA technicians   |   | 13 small/medium scale farmers and farmers associations were successful in producing maize seed. 1 small-scale farmer and 1 association were successful in producing bean seeds Only 3 small-scale farmers produced small amounts of beans. Fairly good amount of bean (137.8 MT) was purchased from over 500 farmers | <b>24 small/medium scale farmers and 25 farmers' associations comprising 1,714 farmers. Over 500 farmers involved in the sale of beans</b>  |
| <b>Indicator 2.1.2. – At least 500 leader farmers are implementing best techniques for improved crop production, seed selection/storage, quality seed production and low cost, sustainable soil fertility, improvement practices in the provinces of Huambo, Cabinda, Kwanze Norte/Sul, Malange and Huila</b> |  |   |  |  |   |  |   |
|   |  | At least 3,000 farmers are trained in the use of legumes in their farming system and/or are using techniques for soil fertility improvement by September 2003 |  | 150 leader farmers in Huambo participated in rural extension activities; 1468 farmers, among which 967 women, participated in farmer field days held by a rural extension group on improved techniques of seed production 1375 farmers in Huambo have received new | 4,105 farmers, among which 2,457 women, participated in farmer field days held by the rural extension groups on harvest, seed control & treatment, selection and storage of seeds | 30 farmer field days were held in Huambo and Malange. 1,289 farmers amongst which 799 were women attended the field days on vegetable new technology, cassava and sweet potato rapid multiplication, seed sanitation and certification, seed processing, treatment and storage                                       | <b>150 leader farmers in Huambo and 6,862 farmers among which 4,223 women attended farmer field days on improved crop technology, improved techniques of seed production, selection, certification, processing, treatment and storage</b> |

|  |  |  |  |  |   |   |   |
|--|--|--|--|--|---|---|---|
|  |  |  |  | cassava and sweet potato varieties   |   |   |   |
| <b>IR 2.2.</b> – Farmers exposed to and trained in improved seed saving and storage techniques   |  |  |  |  |   |   |   |
| <b>Indicator 2.2.1.</b> - Average > 50% farmer adoption rate for improved technology and best practices for seed selection and storage   |  |  |  |  |   |   |   |
|  | Farmers adoption of improved technologies for seed selection and storage | Adoption by farmers of at least one new crop variety |  | 1,375 farmers in Huambo have received new cassava and sweet potato varieties |   |   | <b>1,375 farmers in Huambo received new varieties of cassava and sweet potato</b>   |
| <b>Objective 3.</b> – Establish a sustainable Angolan seed supply and production network linking the International Agricultural Research Centers, Ministry of Agriculture, and local seed production enterprises |  |  |  |  |   |   |   |
| <b>IR 3.1.</b> - Ministry of Agriculture field stations producing basic seeds for seed production enterprises and farmers associations/groups in a sustainable manner  |  |  |  |  |   |   |   |
| <b>Indicator 3.1.1</b> - At least 150 MT of basic seed production to allow ongoing seed bulking for the 2003/04 season   |  |  |  |  |   |   |   |
| Developing and strengthening a national seed delivery network  | Basic seed production in IIA stations                                    | 150 MT of basic seed produced                        |  | An estimated 40.0 MT of basic seed i.e. 26.6% of the target contracted       | A total of 172 MT of basic seeds (100 maize, 60 beans , 10 groundnuts were expected | A total of 166.4 MT of basic seeds (98.25 maize, 51.35 beans and 16.8 groundnuts) were produced | <b>A total of 166.3 MT of basic seeds (98.2 maize, 51.3 beans and 16.8 groundnuts) were produced. This was 111% of target</b> |
| <b>Indicator 3.1.2.</b> - Effective partnership with IARCs and at least 10 on-station and on-farm demonstrations established   |  |  |  |  |   |   |   |

|   |                                       |   |  |  |  |  |  |
|---|---------------------------------------|---|--|--|--|--|--|
|   | Establishment of demonstration trials | At least 10 on-station/on-farm trials established | 2 IIA/CIMMYT trials in Malange and K Norte<br>9 demonstrations in K Norte<br>1 cassava trial set up in Malange | 3 maize trials, two with 12 varieties and one with 7 were set up in Malange  | 2 on-station trials of maize and wheat set up at Chianga station in Huambo,  | A maize variety trial and a wheat variety trial were harvested at Chianga.<br>An Irish potato and a bean variety trial were established at Chianga.<br>Two maize variety trials and a cassava variety trial were harvested at Carianga Station in Malanje. | <b>10 On-station trials on Maize, wheat, bean, cassava and Irish potato have been established at various stations in Malange, Kwanza Norte and Huambo. To date 5 have been harvested.</b><br><br><b>9 On-farm demonstrations installed in Kwanza Norte</b>                   |
| <b>Indicator 3.1.3. - Participation in the International experimental variety testing trials with IARCs in order to identify new germplasm</b>  |                                       |   |  |  |  |  |  |
|   |                                       |   | IARC germplasm under evaluation at 2 trials of maize with 4 new varieties                                      |  | 10 varieties of Irish potatoes from CIP(Peru) multiplied in Chianga & will be included in the trials next growing season |  | <b>10 new varieties of Irish potatoes from CIP and 4 new varieties of maize from Cimmyt under evaluation</b>   |
| <b>Indicator 3.1.4 - Experimental Stations in Malange, Kwanza Norte and Huambo are functioning with germplasm banks</b>   |                                       |   |  |  |  |  |  |
|   |                                       |   |  | 1 germplasm bank of 27 varieties of cassava and five varieties of sweet potato in Malange established.<br>1germplasm bank of 17 varieties of cassava and 8 varieties of sweet potato in Kwanza Norte | 4 on- station trials set up in Huambo Province.  | A collection of 6 varieties of Irish potatoes, 5 varieties of sweet potato and 3 varieties of cover crops maintained at Chianga.   | <b>Germplasm bank of 27 varieties of cassava and eight varieties of sweet potato established in Malange and Kwanza Norte.</b><br><br><b>A collection of 6 varieties of Irish potatoes, 5 varieties of sweet potato and 3 varieties of cover crops maintained at Chianga.</b> |
| <b>IR 3.2. Local Enterprises Producing Quality Planting Material</b>  |                                       |   |  |  |  |  |  |
| <b>Indicator 3.2.1. - PVO partners actively participating in seed multiplication scheme and receiving at least 225 MT of basic seed and 500,000 cuttings/vines of cassava and sweet potato.</b> |                                       |   |  |  |  |  |  |

|  |  |   |   |  |   |   |  |
|--|--|---|---|--|---|---|--|
|  |  | PVOs receive at least 225 MT of basic seed and 500,000 cuttings/vines of cassava and sweet potato                     | 2,000 vines distributed to SCUS<br>6,000 cuttings distributed to SCUS<br>Seeds and materials under production | 6,000 cuttings of cassava, 4000 cuttings sweet potato distributed to CRS. 20,000 cuttings of cassava distributed to Lutheran World Federation (LWF)              | 172MT of basic seeds expected & 300,000 cuttings/vines produced for PVO'S   | 249.2MT of basic seeds produced and distributed to PVO partners   | <b>249.2MT of seeds produced and distributed to PVO partners.<br/>2,000 vines distributed to SCUS<br/>6,000 cuttings distributed to SCUS<br/>6,000 cassava cuttings and 4000 sweet potato cuttings to CRS, 20,000 cuttings of cassava distributed to Lutheran World Federation (LWF)<br/>total of 38,000 cuttings or 7.6 % of target</b> |
| <b>Indicator 3.2.2.</b> At least 20 rural seed multiplication enterprises are established and strengthened |  |   |   |  |   |   |  |
|  |  | At least 20 rural seed multiplication enterprises are established and strengthened and involved in seed certification | WVA is providing technical assistance to some rural seed multiplication enterprises                           | 35 rural enterprises, 18 in Huambo, 7 in Malange, 2 in K. Norte and 8 in Luanda are involved in seed multiplication with technical assistance of WVA technicians | 25 rural enterprises (125% of target), 18 in Huambo, 4 in Malange and 3 in Luanda successfully participated in seed multiplication with technical assistance of WVA technicians | 25 seed multiplication enterprises involved in seed multiplication among which 15 were successful   | <b>51 seed enterprises involved in seed production, among which 17 (85% of the total target) delivered seed to WVA.</b>  |
| <b>Indicator 3.2.3.</b> - Reduction (>50%) in the importation of the seed in Angola                        |  |   |   |  |   |   |  |
|  |  |   |   | Indicator to be determined at the end of the Project   |   | Annual national imported seed demand for Angola taken to be 10,000MT. Therefore, the total import demand was reduced by 2154.8 MT tons of seed. | <b>An estimate of reduction of imported seed was 2154.8 MT or 22 % of total import demand.</b>   |

**Attachment 3.**  
**ASRP Phase III Logical Framework**  
**Final Report**

| Project Activity Description   | Expected Outputs   | First Quarter Results                          | Second Quarter Results   | Third Quarter Results   | Forth Quarter Results   | Fifth Quarter Results   |          |
|--|--|--|--|---|---|---|----------|
| <b>IR 1.1 Seed producers multiply 3260 MT of commercial seed of maize and beans prior to 2004/05 rainy season.</b> |  |  |  |   |   |   |          |
| Multiplication of seed of selected varieties   | 1.1.1 Multiplication of selected varieties of maize            | 2900 MT of SAM3, Matuba and ZM 521             | 1533 ha of maize contracted; 3066 tons anticipated. 12.7 MT of ZM521 purchased from Lobito producers for use in Nacas in May | 1732 ha of maize have been verified; urea was applied to 1,496 ha; projected yield is 3,000 MT. | Approximately 1500 ha of maize harvested, ears are drying prior to shelling. 237.4 MT of seed (8% of target) already delivered to WV warehouse. | All certified maize seed has been received for a total of 2685.8 Mt; 2535.1 Mt SAM3, 150.7 Mt Branco Redondo  | Complete |
|  | 1.1.2 Multiplication of selected varieties of beans            | 160 MT of A286 and selected manteiga varieties |  | 103 ha of beans have been contracted with a projected yield of 41 MT.                           | 167 ha of beans contracted, but production very low due to drought. Estimated production is 30 MT.  | A total of 11.75 Mt of bean seed received from producers. 4.7 Mt of Manteiga and 7.05 Mt of A286  | Complete |
|  | 1.1.3 Purchase of standard seed of selected varieties of beans | 200 MT of Local varieties                      |  | The purchase of 150 MT is on-going  | Purchase of 400 MT of selected bean seed is ongoing, 272.5 MT in hand (68% of target).  | 173.9 Mt of bean seed purchased during the first buying season and 276.226 Mt purchased during the second season. For a total of 450.126 Mt of bean seed purchased. | Complete |

| <b>IR 1.2 Distribution of seed of improved crop varieties to 150,000 families for 2004/05 season</b>     |  |   |  |  |   |   |   |
|--|--|---|--|--|---|---|---|
| Distribution of seeds of improved crops varieties  | 1.2.1. – 50,000 families receive 17 kg of seed for planting in the Nacas for the dry season        | 15 kg of maize and 2 kg beans distributed to 50,000 families by the end of August 2004          |  | Bags, seed treatment and packing materials were ordered  | Waiting for treating and bagging materials to arrive. | Reimbursed beans and maize, purchased from private funds, distributed to 20,000 families for the naccas season  | Complete  |
|  | 1.2.2. – 100,000 families receive 24 kg of seed for planting in upland areas for the rainy season. | 21.5 kg of maize and 2.5 kg of beans distributed to 100,000 families by the end of October 2004 |  |  |   | Distribution plans finalized for distribution of maize and bean seed to 150,000 (instead of 100,000) families for the Lavras or main season   | 18 kg maize seed and 3kg of bean seed distributed to 151,134 families.  |
| <b>IR 2.1. Production of 991,000 tubers/cuttings of Irish potato and/or cassava and/or sweet potato.</b> |  |   |  |  |   |   |   |
| Production of vegetative propagated planting materials   | 2.1.1 – Production of 100 tons of Irish potato seed  |   |  | 2 MT of seed potato variety Romano was purchased and are being distributed for multiplication. | 2.75 ha of production now planted in Nacas areas.     | From the 2.75 ha 7.3 MT of potato were produced of which 4.1 MT was distributed to 250 producers and 3.2 MT reserved for further multiplication. Production of 6 ha of Irish Potato at Chianga; production in cooperation with MINADER of 208 ha of seed potatoes in Caala and E Cunha. | In cooperation with Chianga, 5.5 Mt of seed potatoes produced. In cooperation with Minader 198.2 Mt of seed potatoes produced for distribution to potato producers. Total of 203.7 tons of potato seed produced. 203 % of target. Number of tubers produced estimated at 2,037,000. |

|  |   |  |  |   |   |   |   |
|--|---|--|--|---|---|---|---|
|  | 2.1.2. –<br>Production of<br>101,000 25cm<br>cassava stakes           |  |  | 25,000 one m.<br>Precose de<br>Angola cassava<br>stakes have been<br>purchased in the<br>Vila Franca area<br>for<br>multiplication<br>purposes. 6.19<br>ha of cassava<br>planted. | 7.52 ha of<br>cassava<br>multiplication.  | 7.52 ha of cassava<br>multiplication.                                       | Crop harvested<br>and cassava<br>stakes distributed<br>to returnee<br>families. The<br>area was<br>estimated to have<br>produced at least<br>200,000 planting<br>stakes.  |
|  | 2.1.3. –<br>Production of<br>800,000 30cm<br>sweet potato<br>cuttings |  |  | 0.87 Ha area<br>planted for each<br>of 6 varieties at<br>Chianga for<br>further increase.   | 2.78 ha of<br>multiplication of<br>sweet potato at<br>the municipal<br>level as well as<br>.87 ha at<br>Chianga | 2.78 ha of sweet potato<br>multiplication in<br>Bailundo and<br>Londumbali. | An additional<br>0.22 Ha of sweet<br>potato<br>production<br>established at<br>Londumbali<br>sede. 2.78 ha<br>harvested for<br>cutting that were<br>distributed to<br>returnee families.<br>Number of<br>cuttings<br>estimated to be<br>at least 800,000. |

**IR 2.2. Multiplication and promotion of the important annual secondary crops: groundnut, soybean, pea and wheat.**

|  |  |  |                            |  |   |                             |          |
|--|--|--|----------------------------|--|---|-----------------------------|----------|
| Multiplication of<br>seed of 4 of the<br>more important<br>secondary crops at<br>the community<br>level. | 2.2.1.<br>Multiplication<br>of groundnuts<br>at 5 sites  |  | 0.7 ha planted at<br>Ganja | 2.39 hectares<br>planted at six<br>sites   | 2.39 ha to be<br>harvested                      | Estimated 400 kg<br>shelled | Complete |
|  | 2.2.2.<br>Multiplication<br>of soybean at<br>5 sites     |  |                            | 0.18 hectares<br>planted at four<br>sites  | To be harvested                                 | Estimated 500 kg seed       | Complete |
|  | 2.2.3.<br>Multiplication<br>of other crops<br>at 5 sites |  |                            | 0.07 hectares of<br>sunflower, 0.05<br>hectares of pea<br>and 0.01 hectare<br>of sesame<br>planted | Harvested and<br>seed stored for<br>next season |                             | Complete |

|   |   |  |                      |                      |  |   |   |
|---|---|--|----------------------|----------------------|--|---|---|
|   | 2.2.4.<br>Multiplication<br>of wheat at 5<br>sites                            |  |                      |                      | Waiting for seed<br>to arrive from<br>Seed Co. | Seed arrived too late for<br>planting; will be held<br>for planting next year.  | Complete  |
| <b>2.3. 10,000 families receive cuttings/tubers of cassava and /or sweet potato and/or Irish potato prior to the 2004/05 season.</b>  |   |  |                      |                      |  |   |   |
| Distribution of<br>vegetative<br>planting material<br>to 10,000 families  | 2.3.1. – 2020<br>families<br>receive 50<br>25cm cassava<br>stakes.            |  |                      |                      |  | Distribution of material<br>planned for 4,000<br>families for next quarter  | 11,202 families<br>received either<br>40 cassava<br>planting stakes<br>and/or 50 sweet<br>potato cuttings.<br>This is 112% of<br>target.  |
|   | 2.3.2. – 8000<br>families<br>receive 100<br>30cm sweet<br>potato<br>cuttings. |  |                      |                      |  | Distribution of material<br>planned for 2,500<br>families for next quarter  | See above, 2.3.1  |
|   | 2.3.3. – 10,000<br>families<br>receive 10 kg<br>of Irish potato<br>tubers.    |  |                      |                      |  | 250 growers received<br>16.1 Kg of tubers<br>Distribution of material<br>planned for 3,000<br>families for next quarter | 198.2 tons of<br>seed potatoes<br>distributed to 41<br>individuals,<br>government<br>agencies and 8<br>associations. It<br>is estimated that<br>approx 1000<br>small scale<br>potato producers<br>in Caala and<br>Ecunha received<br>seed. A total of<br>1250 families<br>received at least<br>10 kg of seed<br>potatoes. |
| <b>IR 2.4. Establishment of at least 20 community based multiplication areas within 8 communes of the DRP project areas of major focus for resettlement and social integration. ,</b> |   |  |                      |                      |  |   |   |
|   | 2.4.1. -  |  | 14<br>multiplication | 20<br>multiplication | Multiplications<br>on-going at 15              | 20 Multiplication areas<br>are on-going at 15   | An additional six<br>multiplication   |

|  |  |  |  |  |  |   |  |
|--|--|--|--|--|--|---|--|
|  |  |  | areas have been established.   | areas established for sweet potato and for cassava.  | locations  | locations.  | areas established for multiplication of Irish potato and soybean   |
| <b>IR 2.5. At least 8,000 small holder farmers are organized in associations/groups and participate in Farmer Field Schools or receive technical assistance by IDA and WVA agronomists and/or technicians.</b> |  |  |  |  |  |   |  |
|  | 2.5.1. – Promotion of an improved crop technology package and/or selection and storage techniques and/or sustainable soil fertility improvement practices. |  | 33 field days have been held and 2278 farmers, 1548 women, have attended | Held 468 training sessions and 31 farmer field days covering topics such as: improved crop varieties; cultural practices; natural resources management; post harvest and seed saving and nutrition. Participants were 8,011 farmers (64% women) and 4,067 farmers (58% women), respectively. | 111 new farmers groups established with 4,506 farmers (52% women) and 108 existing groups with 2974 farmers (65% women) were strengthened. This represents a total of 7480 farmers in groups ( 93.5% of the target). 52 farmers field days and 167 training sessions were held covering the following topics: vegetable production issues, timely harvest and, seed selection of maize and beans and seed storage. | Continued to strengthen 111 farmers associations with 4,506 farmers (52% women). 30 farmers field days and 129 training sessions held, mainly focused on vegetable production. 5,453 farmers (50% women) attended these training sessions and 2,394 farmers (60% women) attended the farmer field days. | 19 new farmers groups formed with total membership of 788 members, 52% women. The existing 111 farmers groups with 4,506 members strengthened in 3 municipalities. Total membership is 4844 farmers or 60.5 % of target. |
| <b>IR 3.1. At least 140 MT of basic seed produced to allow ongoing seed bulking for the 2004/05 season.</b>  |  |  |  |  |  |   |  |
|  | 3.1.1 – Produce 100 MT of basic maize seed   |  | Planted 9 ha of ZM521, planted 7 ha of SAM3.                             | Another 5 ha of ZM521 planted as well as 1.5 ha of Matuba.   | Harvest of maize multiplication plots just   | Produced 32.8 mt of ZM521 seed and 26.1 mt of SAM3 seed with producers. Produced  | Projected yields of dry season basic seed production are:  |

|  |   |  |  |   |  |   |   |
|--|---|--|--|---|--|---|---|
|  |   |  |  | 14MT of ZM521 held in stock                                       | starting. 10.5 ha ZM 521, 7 ha SAM3 and 1.5 ha Matuba.     | 5.8 mt of ZM521 and 0.35 mt of Matuba at Chianga. 20 ha each of ZM521 and Matuba planted under irrigation. 0.16 ha of AK93 under production at Chianga. | 15 Mt of Matuba 5 Mt of ZM521 and 400 Kg of AK93. The total basic maize seed will be approximately 97.048 Mt or 67.7 percent of target. |
|  | 3.1.2 – Produce 40 MT of basic bean seed      |  |  | Planted 4 ha. of beans variety manteiga and .2ha of variety A286. | Beans harvest just starting and will be finished in July . | 8.5 Mt of bean seed purchased and 250 kg of Manteiga produced at Chianga.   | Seed used to plant increases in Feb. 2005.  |
|  | 3.1.3. – Produce 1 MT of basic soybean seed   |  |  | Planted 1.5 ha. of soybean  | Harvest just starting.                                     | 222 kg of Soprano and 314 kg of Local produced at Chianga, for a total of 536 kg.   | 1.3 ha planted at Huambo for trials in 05/06 and commercial production  |
|  | 3.1.4. – Produce 1 MT of basic groundnut seed |  |  | Planted 1.5 ha. of groundnut.                                     | Harvest will start in late July.                           | 312 kg of shelled seed of Macuba Castanho produced at Chianga.  | 1 ha. planted for reselection   |
|  | 3.1.5. – Produce 1 MT of basic wheat seed     |  |  |   | Waiting for seed from Seed Co.                             | Seed arrived late and was not planted.  | To be planted in March 05 for increase  |

**IR 3.2. Field Stations and Agronomic Posts at Huambo are functional with field gene banks.**

|  |   |  |                                  |                                  |  |                        |   |
|--|---|--|----------------------------------|----------------------------------|--|------------------------|---|
|  | 3.2.1. – Cassava gene bank established at Chianga.      |  | 17 varieties planted at Chianga  | 17 varieties planted at Chianga  | Collection of additional local varieties in process. | Collection continuing. | An additional 6 varieties added to germplasm collection.  |
|  | 3.2.2. – Sweet potato gene bank established at Chianga. |  | six varieties planted at Chianga | six varieties planted at Chianga | Collection of additional local varieties in process. | Collection continuing. | An additional 19 varieties added to germplasm collection. |
|  | 3.2.3. Irish potato gene                                |  | 13 varieties in warehouse        | 13 varieties in warehouse        | Collection of additional local                       | Collection continuing. | An additional 16 varieties added                          |

|   |   |  |                                  |   |  |   |  |
|---|---|--|----------------------------------|---|--|---|--|
|   | bank established at Chianga.  |  | waiting to be planted when ready | waiting to be planted when ready  | varieties in process.  |   | to germplasm collection.   |
| <b>IR 3.3. At least 30 rural seed production enterprises are established and strengthened with technical assistance.</b>  |   |  |                                  |   |  |   |  |
|   | 3.3.1. – Extensionists provide training on harvesting, selection and storage techniques |  |                                  | WV and Seed Co technicians working with 38 seed multiplication enterprises. | WVA and Seed Co technicians continue to provide support and advice to 38 seed producing enterprises. | Extensionists provided information to support harvest and post harvest handling of seed.  | Extensionists will be transferred to other projects and replaced by SeedCo staff. ASR program sponsored a seminar to review development activities and to frame experiences in a conceptual framework. |
|   | 3.3.2. – Sufficient basic seed supplied on an annual basis                              |  |                                  |   |  | Sufficient basic seed is in hand to plant 2004/2005 certified seed production.  | Required acreage planted.  |
| <b>3.4. At least 80 % of the certified seed requirements for improved crop varieties in the planalto are supplied by local seed multiplication enterprises for the 2004/05 season</b> |   |  |                                  |   |  |   |  |
|   | 3.4.1. Determine seed demand for planalto   |  |                                  |   |  | FAO plans to supply seed for 38,000 families at the national level for the 2004/05 season. The ASR plans to supply seeds of improved crop varieties for 150,000 families. This is 80% of seed available for distribution at the national level. | Complete   |
| <b>3.5. Market transition strategy is defined for donor and private sector driven seed supply in Angola.</b>  |   |  |                                  |   |  |   |  |
|   | 3.5.1   |  |                                  |   |  | Seed Co are registering   | No change in   |

|   |  |  |  |   |  |   |   |
|---|--|--|--|---|--|---|---|
|   | Mechanism established to determine demand.   |  |  |   |  | as an Angolan seed company and have estimated commercial demand for the 2005/06 season at approximately 2,000 MT of open pollinated maize seed                                    | plans.  |
| <b>3.6. Reduction in importation of seed into Angola.</b>   |  |  |  |   |  |   |   |
|   | 3.6.1. Develop 3 year trend line for seed imports.   |  |  |   |  | Awaiting a market survey  | Chevron/Texaco are in process of hiring staff to do market survey |
|   | 3.6.2. Determine seed importation for 2004/05 season.  |  |  |   |  | Seed imports in 2004 were less than 80% of total seed distributions.  | Complete  |
| <b>4.1. Links established between at least one commercial seed company and rural producers of certified seed.</b> |  |  |  |   |  |   |   |
|   | 4.1.1 – Regional or international seed company selected to partner with SRP seed producers to form a national commercial seed production enterprise. |  | Seed Co Int'l has been identified as company to partner with SRP and to initiate development of an Angolan commercial seed production and sales company. | The process of legally establishing Seed Co as an Angolan company is ongoing. | Paperwork for establishing company in process. Staff have discussed pending seed legislation with SENSE. | Registration is in process for Seed Co Angola Ltd.  | SeedCo Angola Ltd is to be registered by end of May 2005.         |
|   | 4.1.2 – Some seed for the 2004/05 season will be supplied under the brand name of a commercial seed company.   |  |  | A mobile seed plant is being built in Zimbabwe for shipment to Huambo.        | Awaiting completion of plant.  | Mobile seed plant to be delivered after company registration completed. Limited quantities of seed brought in to do demonstrations of SeedCo material, maize, beans and soybeans. | Complete  |

|  |   |  |  |   |  |   |  |
|--|---|--|--|---|--|---|--|
|  |   |  |  |   |  |   |  |
|  | 4.1.3. – Commercial seed company is able to supply nationally produced seeds of appropriate crop varieties to meet market demand, emergency donors and private sector, from the 2005/06 season forward. |  |  | Contacts made between Seed Co and Banco Sol to provide finance for seed producers for the 2004/05 season. | Seed Co standard contract for the production of open pollinated varieties of maize seed has been translated into Portuguese in anticipation of use in July/August. | Seed contracts have been signed by Seed Co with 30 producers for a total production area of 1,309 ha. of ZM521. | Crop presently looking very good; estimated production of 2000 Mt of maize expected. |

