Strategy for the Development of Sustainable Seed Supply Systems in Congo Republic

SEED SYSTEMS GROUP

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Country Snapshot

Population- 6 million

8.9% Agricultural share to GDP

0.55 m ha Arable land

40.3% Undernourished population

Age group < 15 -45.6%; 15-65 -51.7%; > 64 – 2.8%

36% Agricultural employment

Climate Risk index- 116

Global hunger index- 31

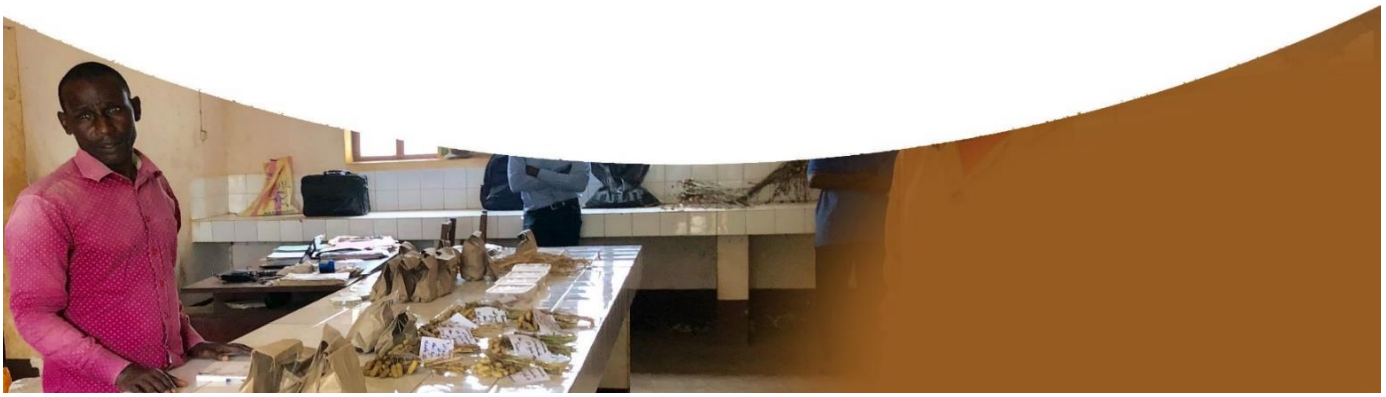
Figure 1: Country Snapshot - Congo Republic

Nutrition Profile

- Although it performs well against other developing countries, the Congo still experiences a malnutrition burden among its under-five population.
- High levels of poverty and malnutrition persist in the Republic of the Congo (ROC), despite recent economic growth. Low domestic food production covers approximately 30 percent of the country's food needs
- Over-resilience on a single crop (cassava) contributes to malnutrition. Need for crop diversification through introduction of improved rice, maize, vegetables, and legume varieties

Food insecurity	Nutrition	Dietary diversity	Average per capita Fruits & Vegetable intake
• Poverty rate- 41 %	• < 5 stunting-21.2% • <5 Wasting-8.2% • Anaemia in women of 15-49 years age -51.9 %	• 61% of energy source derived from cereals, roots and tubers representing low dietary diversity	• 178.6 and 102.6 g/ day against recommended guidelines 200-250g/day

Figure 2: Nutritional Profile - Congo Republic



Crop Profile

Major food crops of Republic of Congo are cassava, bananas, plantains and beans (Figure 3). Cassava is the primary food crop in the country except in the southern region, where bananas and plantains are more prevalent.

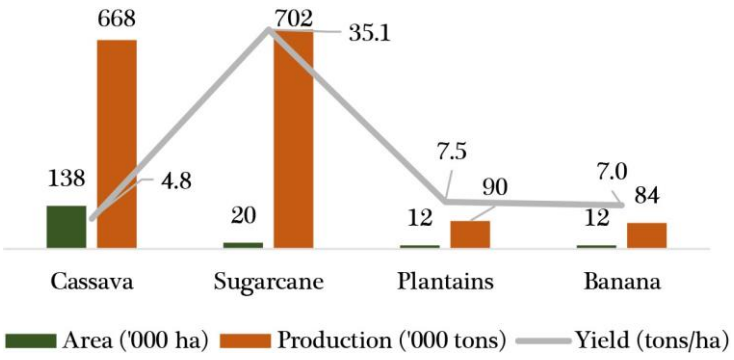


Figure 3: Crop Profile (2017) - Congo Republic

Bitter varieties of cassava are preferred by farmers as they can be stored longer in the field and are late maturing. Cassava yields are affected by the incidence of cassava mosaic virus. There is an increase in Soybean production due to chicken rearing.

The most important cash crops are sugarcane, tobacco, oil palm (Savannah Region), cocoa, and coffee. There is no formal seed sector in Congo; the country relies heavily on imports from DR Congo and Cameroon. The yields of key crops have been stagnant since 2008 (Figure 4).

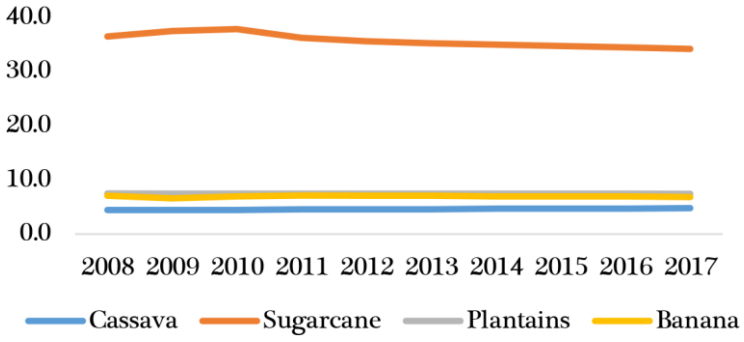


Figure 4: Yield Trends (tons/ha) - Congo Republic

The cassava program has improved cassava production (4,629,222 tons of fresh tuberous roots in 2016). As part of this program, the following results were obtained: (i) 916.5 hectares of woodlots established with households, (ii) 12,665,117 healthy cassava cuttings distributed to producers to strengthen the network distribution, (iii) 7,500 vitro plants of sanitized local ecotypes produced in collaboration with the National Institute for Agronomic Research (IRA). The production of maize to support the livestock feed production chain reached around 20,700 tons in 2016. Under the new National Development Plan (PND) 2018-2022, the Congo is focusing on the development of the agricultural, pastoral, forestry, and fishery sectors through, among other things, the promotion of entrepreneurship among young people (representing 47.7% of the population). The area, yield, and agricultural production statistics for the 2017-2018 campaign for the individual producers of the PDAC project are presented in the following table.

Table 1: Agricultural Statistics of PDACP Project, 2017-18

Agricultural products	Total area (ha)	Average area (ha)	Yield (kg / ha)	Production Total (kg)	Average production (kg)
Maize	2,112	5.6	325.3	686,962	1,831.9
Cassava	1,822	1.8	1,398	2,546,862	2,475.1
Banana	439	2.1	2,261	992,418	4,913
Groundnut	466	1.7	1,125.1	524,284	1,935
Vegetables	464	1.2	5,286.9	2,453,135	6,720.9

Table 2: Agro-ecological Zones of the Congo and the Main Uses

Ecological zones	Annual rainfall (mm)	Vegetative growth (days)	Main crops
1. Coastal Basin (Pointe Noire and Kouilou departments)	Bimodal 1000-1 200	233	cassava, banana, taro, corn, peanuts, vegetables, mango, citrus, African plum, avocado, cocoa
2. Mountain range Mayombe (Departments of Kouilou)	Bimodal 1200 - 1700	240	cassava, banana, yam, taro, corn, citrus, African plum, coffee, cocoa;
3. Forest Massif Chaillu (Departments of Niari and Lékoumou)	Bimodal 1200 - 1700	260	cassava, peanut, squash, plantain, banana dessert, bean, sugar cane, palm, coffee
4. Niari Valley (Departments of Niari and Bouenza)	Bimodal 900 - 1000	203-260	cassava, paddy, maize, beans, plantain, banana dessert, peanut, pumpkin, mango, African plum, citrus, sugar cane, palm, coffee tree;
5. Plateau Cataractes (Departments of Bouenza and Pool)	Bimodal 1200 - 1700	235	Production of vegetables and food (mainly cassava); Paddy
6. Department of Brazzaville (tray Cataractes and Bateke Plateau)	Bimodal 1200 - 1700	235	cassava, vegetable, beans, mango, litchi, mangosteen, citrus, avocado, safoutier;
7. Tray Batéké (Departments of Pool and Plateaux)	Bimodal 1600 - 1800	240 to 300	cassava, yam, plantain, potato, pumpkin, corn, onion, peanut, citrus, safoutier, avocado, kola, tobacco, coffee
8. Cuvette Congolaise (Departments of Cuvette)	Bimodal 1600 - 1800	300	cassava, yams, dessert banana, citrus, African plum, palm oil, coffee, cocoa;
9. Massif Northwest Forest (Departments of Sangha and Likouala)	Bimodal 1600 - 2 000	365	cassava, yams, dessert banana, citrus, palm oil, coffee, cocoa

NB: Vegetative growth on the favorable period of high vegetation for each agro-ecological zone

Breeding, Variety Development and Release

The **National Agricultural Research Institute (IRA)** is the Republic of Congo's principal agricultural research agency. Most activities of IRA are focused on crop genetic improvement and production of breeder seed. In addition, IRA conducts training of farmers and extension agents.

The main partner to IRA is the Ministry of Scientific Research, and other partners include Tolona farm owned by Spaniards. IRA has collaborations with national, regional and international organizations such as Agri Congo, CARBAP, CORAF/WECARD, IITA, and AfricaRice, and focuses on legumes, peanuts, beans, cereals (maize, rice), and cassava. Institutionally, the IRA resources are:

- **The Directorate General**: Located in Oyo statutorily, it is provisionally in Brazzaville in the premises of the former Central Veterinary Research and Zootechnique shared with the General Delegation for Scientific and Technological Research (DGRST).
- **The Brazzaville Area**: It extends its activities in the Pool Region and has within the former Veterinary and Zootechnical Research Center, the former Research Center for Genetic Improvement of Plants (CERAG) and stations for Kindamba of Odziba and Madibou.
- **Research Zone Loudima**: Enjoying basic scientific infrastructure of the former Center for Agricultural Research Loudima (SARC), it operates in the Departments of Bouenza, Lékoumou and Niari. Therefore, it has stations Malela (seat of the area), the packing-house Loudima and Moulimba station (Sibiti).
- **Area of Oyo**: It covers the Departments of Plateaux, Cuvette and Cuvette-Ouest and is headquartered in Oyo, on the premises of the former CRRAFO. It has within the Lekana research stations, Gamboma, Ewo, Mossaka and Abala.
- **The Area Pointe-Noire**: It extends its activities in the Department of Kouilou (the littoral forest and Mayombe). It has within the Agricultural Research Center of PointeNoire and Research Station the Saras.
- **Zones Research Ouesso and Impfondo**: Called to operate respectively in the departments of Sangha and Likouala, they are not yet operational (IRA activity report 2014-2018).

IRA has a legume program with 64 varieties of soybean of which IT 223, IT 235, Jupiter and TGX are the four varieties preferred by farmers. Four main varieties of peanuts (JL24, Rouge de Loudi-

ma, Bland de Loudima, 28-206 and 69-101, recently received from Senegal); Vigna Radiata and Vigna angulais varieties of mung beans, pigeon pea varieties from ICRISAT (25 kg seed of improved varieties of beans will be received from Cameroon this year). The main challenge to cassava pro- duction is African Cassava Mosaic Virus (ACMV). Crosses have been made between varieties from IITA and local varieties. Some of the IITA varieties are resistant to ACMV. At Loudima (Bouenza), there are improved varieties (0162; 0325; 401) adapted well with a good performance and crop duration of 14 to 15 months (late varieties: good conservation). The cassava breeder based at the research station in Loudima has developed several new, resistant varieties which are scheduled for release in 2020.

Under the cereals program of IRA, 10 MT of maize seed of two varieties, Obatanpa (white) which yields 2.5 tons/ha and Samarou (Yellow) which yields 4 tons/ha, has been produced, and a participatory varietal selection on 100 varieties from AfricaRice was recently implemented. Seven multinational companies (Corteva Agriscience, East-West Seed, Limagrain, PopVriend Seeds, Sakata, Seed- Co and Technisem) sell seeds in the Republic of the Congo, but Technisem is the only one with extension services, and it is also the sole company with a testing location in the country. No other companies have breeding locations in the country. The private sector's involvement in the rural sector is limited and mainly involves the sale of vegetableseeds.

Table 3: Adoption of the Technology by the Producers, POs and MSMEs

Technologies	Individual producers		Organization of producers		MSMEs	
	Effective	%	Effective	%	Effective	%
For banana: use of the method of plants from fragments	34	1.9	9	5.5	3	10.34
Cassava: use of improved cuttings	269	15.1	22	13.4	4	13.79
For corn / peanut: use of improved seeds	189	10.6	28	17.1	4	13.79
Use of improved seeds	0	0	0	0	0	0
Using bio fertilizer and bio pesticides	217	12.2	48	29.3	4	13.8
Installation of irrigation system (pump, water tower, distribution pipes	93	5.2	8	4.9	2	6.9

The scientific and technical staff of the IRA is composed as follows Table 4:

Table 4: Statistics of the Scientific Staff of the IRA by Grade and Gender

No.	Grade	Sex		Total workforce
		M	F	
1	Research Master CAM	1	0	1
2	Researcher CAM	2	0	2
3	Researcher	5	1	6
4	Research Associate	10	3	13
5	Engineer	3	3	6
6	Senior Technical Assistant	4	2	6
7	Technical assistant	6	4	10
8	Research assistant agent	20	4	24
9	Total workforce	50	17	68

Proposed Interventions

- Varieties of cassava, hybrids of maize, beans, cowpea, soybean and vegetables will be introduced and superior performers will be released for commercial production.
    - *Cassava:* Varieties resistant to African Cassava mosaic virus (ACMV) from IITA, Tanzania, Uganda, and Kenya will be obtained and tested
    - *Maize:* Yellow and white maize hybrids will be sourced from private companies, IITA, and CIMMYT
    - *Cowpea:* Varieties will be sourced from IITA, Nigeria and Burkina Faso
    - *Beans:* Varieties will be sourced from Uganda and via the PABRA and Harvest Plus breeding networks
    - Vegetables –Onion, tomatoes, peppers will be introduced in collaboration with mid- sized global vegetable companies such as East West, Advanta, Technisem, Sakata and the World Vegetable Center. These hybrids will be validated with the help of IRA and local seed companies for commercialization
- Strengthen IRA and CNSA as they are at the forefront of all the breeding and seed multiplication program and lack pretty much everything to perform their duties (basic needs such as water, vehicles, basic equipment, etc.). Private companies and seed dealers won't be efficient without an operational IRA and CNSA
- Train additional plant breeders for existing and new crops, especially vegetables, by awarding fellowships to six MS and one Ph. D (Vegetables) students
- Enhance the R&D capacity of four seed companies for hybrid seed production and validation trials

Seed Systems

Pre-basic seed of cereals such as rice and maize are produced solely by the National Agricultural Research Institute (IRA), and further multiplied by the National Centre for Improved Seed (CNSA). One of the main priorities of the national agricultural research institute is to increase local maize production to reduce dependency on imports used for poultry production. Breeding and production as well as seed marketing are also at an embryonic stage. There is no private seed company operating in seed production. Since the withdrawal of the state with the dissolution of the OCC and the OCV, no private enterprise has emerged.

One NGO that is involved in the production and supply of seeds is GECOBIDE, which is located in the department of Bouenza in Loutété. The GECOBIDE occupies an area of 6.4 ha and has a warehouse of 24 m^2 for maintaining the viability of seed. A freezer of 500 liters acts as the cool room. Using its own resources, it conducts characterization, adaptability, and comparison testing. On financing of some projects and participation in other programs, the GECOBIDE could benefit from additional resources.

Nine active members who are all top researchers supervise students in post-graduate studies or in preparation for Master and PhD work. Students at the University Marien Ngouabi conduct research on soybeans, pigeon peas, beans, maize, groundnuts, and cowpeas. GECOBIDE introduced material from ICRISAT, IITA, Cameroon, Senegal, Burkina Faso, DRC, FAOCongo, CNSA, and IRA. GECO- BIDE has two sites at Loutété, and Kimbimbi. Kimbimbi is the site for seed multiplication. GECO- BIDE mainly deals in the production and increase of soybean seeds, pigeon peas, beans, maize, groundnut, and cowpea, and also produces the PIF for banana and plantain. The average weight of the stock sold by year for maize is five tons, and the capacity of the warehouse is six tons.

It should be remembered that in the Congo, food-based farms operate in an environment that does not have a seed circuit capable of making available good quality seeds. On the Congolese market, there does not exist today any company operating in the production and the distribution of improved seeds of the food crops. The seed sub-sector is also restrained by the absence of a seed law organizing interventions and laying down the rules of the game.

Throughout the country, vegetable seed dealers are active, mostly representing CONGOSEM, established in 2011. These dealers sell seeds at sub-regional level. The company is specialized in the import and distribution of vegetable seeds and other agricultural products adapted to tropical climates. CONGOSEM partners with Technisem and Takii, among others. AgriResources, with its headquarters in Monaco, has 25,000 ha of land and has performed a trial with 'seca 90', a variety of rice on 2000 ha. The center intends to produce rice, onion and hot peppers.

Several large-scale maize farms have been established and are focused on production of rice and maize, using imported seed. Hybrid maize seed is imported from Vietnam and sold by agro-dealers in Brazzaville and Pointe Noire, at a price of USD 10/kg. At present there is no private seed production in the country.

The IRA station in Loudima has an area of 1,500 ha. In the 2018-2019 campaign, the center has 4.6 hectares for the production of improved seed with 2 ha for basic seed (bean and soy) and 2 ha for seed multiplication groundnut, soybeans, pigeon peas and maize. Rice seed was produced in 625 m^2. IRA has a cold room that can hold 4 tons and a cool room with a capacity of 15 tons. At Brazzaville, there is a vitrothèque containing the in vitro collection of varieties of cassava and yam.

Level of adoption of improved seeds, by crop: Several cassava clones were introduced in 2014 in the departments of Plateaux/ Cuvette/ Cuvette Ouest as part of PADEF (Mabiala Nguyi, I93/ 0029 and I97/ 0162). The introduction of virus-resistant varieties has greatly reduced the incidence of mosaic and has allowed yields to be increased. After two years of introducing new varieties, IPCC members and households in surrounding villages have these varieties. In the sites where these varieties have made more than 3 crop cycles, some information on the yield per hectare has been provided verbally. This indicates that the variety I93 / 0029, which has a great dormancy at emergence, is the most productive. It is very appreciated in the Cuvette-Ouest whereas it is less appreciated in the Bouenza due to its early maturity (the farmers prefer late varieties for a long conservation at ground level).

Current situation of recent or current varietal selection, by species: Currently, within IRA, varietal selection is almost no longer done, as senior researchers who were responsible for selection in different cultures are all retired. Since the 1990s there has been practically no recruitment at the level of state structures. In 2016, there was a resumption of the activity of creating some varieties from hybridization of cassava in Loudima which led to the defense of a doctoral thesis of a junior researcher.

State of play of seed research institutions with public vocation: Agricultural research work started in 1935 with the creation of the Loudima Station by the Territorial Agriculture Services. The Congolese National System of Agricultural Research (SNRA) includes a dozen institutions (CRAL, CERAG, CRVZ, CRCRT, GERDIB, CRRAFO, CRFL, CRFO, CRDPI, CRHM) which are mostly ineffective because of very insufficient funding and deteriorated work (infrastructure, scientific equipment and others conditions). In the past, however the Congolese national research system has produced interesting results, notably on cassava, maize, rice, peanuts and soybeans.

***Recent or ongoing collaborations with the private sector and farmer organizations in seed supply*:**

It should be noted that, due to the lack of a structured institutional framework for the needs of the seed subsector, farmers depend entirely on self-produced seed. Development projects put in place most often distribute free seeds to farmers rather than selling them. The extent of seed purchases by producers is only 13.7%. This indicates that the seed market is still in its infancy in the Congo. The revitalization of the national seed market should constitute a solid lever in the improvement of agricultural production.

Recent and ongoing activities to increase the seed capital of the country:

Agricultural research activities revolve around programs for the selection and genetic improvement of food crops at the ARI level: root and tuber crops (cassava, yams), legumes (peanuts, beans and soybeans) and cereals (rice, corn). The NSAT, an agro-pastoral farm, produces maize on very large areas to meet the needs of the company and the breeders for livestock feed. Basically, it should be remembered that in the Congo, food-based farms operate in an environment that does not have a seed circuit capable of providing producers with good quality seeds.

With the validation of the National Seed Policy (PSN) of the Republic of Congo and its Action Plan, the Government's priority for improved seed is adequately reflected. In addition, aligning with the regional strategy for the promotion of the seed sector, enshrined in the regional seed regulations of the Economic and Monetary Community of Central Africa (CEMAC), shows that the Government plans to provide farmers with benefits of improved seed. Indeed, the CEMAC regional seed regulation, which is the national law of each of the member states: (i) clearly defines the roles and responsibilities of each player in the Seed Value Chain, professionalizing the seed sector; (ii) facilitates the regional seed trade, the procedures, rules and principles being agreed regionally (principle of harmonization); (iii) gives farmers more choice of seeds of improved plant varieties, and easier access to the plant varieties listed in the national catalogs of the Member States of the Community (principle of mutual recognition and equivalence); (iv) creates an environment conducive to private sector investment in the seed industry, the legal and economic environment being organized, and (v) strengthens the partnership of the public and private sectors.

This national seed policy, along with its action plan, was formulated to facilitate access to all of these benefits. The implementation of this action plan should contribute to the achievement of the Government's objectives in the context of the implementation of the 2018-2022 PND, namely:

making agriculture one of the main pillars of diversification, growth, competitiveness and creation of sustainable jobs, with a particular emphasis on empowering private actors, for a progressive assumption of the production and marketing functions of seeds.

Proposed Interventions

- Seed grant funding to four start-up seed companies to function as local seed companies to
    - Increase the capacity of quality seed production – aim to increase the quality seed production of existing varieties/hybrids and newly introduced ones by 35% of the current quality seed production Cowpea: Varieties will be sourced from IITA, Nigeria and Burkina Faso
    - Production of hybrid seeds and capacity development
    - Expand the seed distribution network – expand their reach to farmers
    - Enhance business entrepreneurship skills of 48 personnel through professional training courses over a period of 5 years
    - Select 4-5 improved cassava varieties from IRA breeding initiative for rapid multiplication and sale by lead cassava farmers
- Strengthen the capacity of private companies in seed production/processing through infrastructure development
- Establish sales agronomy staff in private companies to train farmers on best varieties and agronomic practices
- Strengthen seed processing infrastructure – installation of additional capacity of 2 tons/day at private sector premises
- Agro dealer development
    - Provide grant to 300 agro dealers in Congo Republic to open new outlets, renovate or relocate shops, procure inventory supplies and build cost- effective storage units.
    - Capacity building of the agro dealers on aspects related to storage, quality control and safe handling of products, and how to better manage micro enterprises through courses on book- keeping, cash management, inventory management, quality standards, customer relations and compliance. All the 300 agro dealers will be trained on these modules over a period of 5 years
    - Strengthening of agro dealer network and association building

- Extension and knowledge dissemination
    - Enabling wider adoption of improved varieties through Grants to NGOs for demos, small packs, etc
    - Promotion and introduction of ICT enabled infrastructure through various stakeholders to accelerate adoption of quality seeds.
    - Professional trainings will be provided to over 50 extension professionals over a period of 5 years. Trainings will be provided on aspects related to farm demonstrations, farmer training through deployment of ICT tools
- Seed Policy and advocacy
    - Continued dialogue with public sector stakeholders for sensitization on national seed laws implementation and outreach methods to stakeholders, seed standards and regulations refinement and oversight of the seed delivery by national and international players and harmonization of regional policy
    - Professional trainings will be provided to more than 40 seed inspectors on proper seed quality assessment and seed certification aspect.

Budget

Table 5: Congo Republic Budget

Components	Amount (USD million)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Component 1: Crop Variety Improvement						
NARS varietal Trials	0.25	0.20	0.13	0.00	0.00	**0.58**
Early generation seed production	0.03	0.05	0.00	0.00	0.00	**0.08**
MSc fellowships	0.07	0.07	0.07	0.00	0.00	**0.21**
PhD fellowships	0.15	0.00	0.00	0.00	0.00	**0.15**
Component 2: Seed Enterprise Development						
Grants for start-up seed companies	0.15	0.15	0.15	0.15	0.00	**0.60**
Multiplication support for vegetative crops	0.20	0.20	0.00	0.00	0.00	**0.40**
Hybrid seed production training	0.13	0.38	0.13	0.00	0.00	**0.70**
Professional trainings	0.05	0.05	0.00	0.00	0.00	**0.09**
Component 3: Agro-dealer Development						
Grants to agro-dealer development agencies	0.15	0.15	0.15	0.00	0.00	**0.45**
Capacity Development (Book keeping, information dissemination, inventory management etc.)	0.01	0.01	0.00	0.00	0.00	**0.02**
Component 4: Seed extension						
Grants to NGOs for demos, small packs, etc.	0.18	0.18	0.00	0.00	0.00	**0.35**
ICT, infrastructure and training support	0.38	0.00	0.00	0.00	0.00	**0.38**
Professional trainings	0.03	0.05	0.02	0.00	0.00	**0.09**
Component 5: Seed Policy and Advocacy						
Seed Policy and Advocacy (grantee and stakeholder meetings)	0.05	0.05	0.00	0.00	0.00	**0.10**
Professional trainings	0.02	0.02	0.00	0.00	0.00	**0.03**
Total	**1.83**	**1.53**	**0.71**	**0.15**	**0.00**	4.22