



FEASIBILITY STUDY FOR THE DEVELOPMENT OF PUBLIC-PRIVATE SEED DELIVERY SYSTEMS IN BENIN



REPORT ON BENIN SEED SYSTEMS

Benin

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Introduction

The development of agricultural production systems aimed at better management of natural resources (plant, animal and fish) to meet the needs of populations. These systems value diversity across species through mixed polyculture involving the main crops based subcultures. These polycultures are specific to different agro-ecological zones and allow to have:

- Integrated systems of crops and livestock on farms where crops and small livestock consists of poultry are practiced, small ruminants and cattle traits etc. ;
- integrated crop and fish production systems on farms where are practiced cultures and fish breeding in fish ponds;
- Integrated systems of animal and fish production which are practiced poultry small ruminants cane rat, pig and fish farming.

This study particularly concerns vegetable production systems associated with small animals and where fish farming. These systems are based on major crops: corn, rice, sorghum, millet, groundnuts, cowpeas, soybeans, Bambara groundnut, pea angoles, yam, cassava, sweet / taro potato, pepper, tomato, onion etc which suits them in crop associations or variable rotations rotations based on agro ecological areas and the importance of the main culture.

Despite efforts to date, many challenges remain in the face of socio-economic development issues for agriculture transformation on the edge in 2025.

The development of plant production in the current production systems is subject to the use of quality seeds in sufficient quantity.

From this perspective, a national seed policy in perfect harmony with agricultural policy is implemented. It is based on self promotion donnants producers held a formal seed system semi private guy.

Strengthening the availability and accessibility of quality seeds prove critical to improving agricultural productivity.

The subsector national seed is organized around four functions (regulation, control / certification, production and marketing) animated by actors of the public sector and the private sector.

It should manage the seed sub-sector in an inclusive participatory approach and realistic management control of the production and marketing of vegetable seeds.

1. Background and rationale for Benin

Benin, like many African countries south of the Sahara, is facing the challenges of the persistence of a population growing steadily, malnutrition, low agricultural productivity and a low level of development agricultural sector.

Despite, the efforts made by the government with the support of the technical and financial partners (TFP) for over three decades, these challenges could not be fully identified. Promoting development of varieties adapted to local agro-ecological conditions and their use by small and medium farmers noted the importance and the vital role of quality seeds in addressing the major concerns of rural and urban populations of Benin.

The reforms undertaken in agricultural policies have led to the establishment of a national seed policy whose implementation has failed to establish a sustainable supply system quality seeds of improved varieties.

Thus, the adoption of these varieties by farmers is still low because of inadequate mechanisms of production, quality control, certification, packaging and distribution / marketing of plant seeds with development issues sustainable sub-sector national.

However, the approaches developed during the 2010s put a special emphasis on the development of multiple partnerships, public / private and private / private based on the negotiation and governance analysis method (Mango) with the families of actors of all stakeholders for a greater convergence in the adoption of quality vegetable seeds (WAAPP PSAO etc.). From these approaches emerge a production device framed by a harmonized seed regulation of West African States, which sets the rules and procedures and the role of different actors.

Therefore, capacity building of structures in charge of managing the sub-sector and actors of all seed categories (pre-basic, basic, certified) for their professionalization / specialization is needed- it to improve seed supply and strengthen their adoption by farmers.

Promotion of Small and Medium Enterprises Pickups seed (MSMEs) generated by these approaches started in 2014 with no less encouraging results. It is therefore appropriate, to support and build on these achievements to make the national seed system more efficient, competitive, viable and sustainable.

To do this, the Group's proposal Seed Systems (SSG) to conduct an assessment of the seed system in ten recipient countries including Benin is welcome to support the improvement of its potential for efficient and compliant with sustainable development the socio-economic realities of the country.

Therefore, this study is carried out to facilitate the development and implementation in the target countries a coherent and realistic support to the improvement of a credible seed system.

2. Goal

The objective of this study is to achieve a comprehensive assessment of the national seed system in Benin and its potential for improvement in order to establish a realistic program, inclusive of plant seeds of professional actors from the public and private for the promotion and consolidation of a seed industry for socio-economic development.

3. Methodology

The study was conducted using a participatory approach involving the Directorate of Plant Production and Technical Services (PVD), National Agricultural Research, agricultural universities, agro-entrepreneurs, Consular Chambers of Agriculture, Industry and trade etc.

Four phases have marked this study:

3.1. Preparatory phase

It was marked by a working session with Dr. Joseph DeVries, President of SSG and Beninese executives involved in the management of the national seed sub-sector to exchange for the understanding of its mission to Benin and ownership content terms of reference of the study. A work plan was developed for the conduct of the various stages of the study.

This plan includes:

- The information to be collected and potential collection sites;
- The contact persons;
- Developing a common thread of exchanges with the actors;
- Developing an agenda of meeting with identified stakeholders.

3.2. Phase documentary

This phase identified the identified resource centers for the data needed for the study. The centers visited are respectively:

- The Directorate of Forecasting and Programming (DPP APRM / Cotonou)
- The National Seed Service (SNS); the Plant Protection Control and the plant protection service (SPVCP) and the Promotion of Quality and Packaging of agricultural products service (SPQC) of the Plant Production Directorate (DPV)
- CRA-North and South / INRAB
- The center of the former ONASA / Cotonou.
- The Documentation Center of the National Institute of Statistics and Economic Analysis (INSAE) in Cotonou.
- The Documentation Center of the Federation of Unions of Farmers of Benin (FUPRO).

3.3. field visit phase

The organization of field visits to some sub-sector of activity sites was used to assess the characteristics of the components pre-basic, basic and certified through the different areas of seed production.

The features taken into account concerned the actors, infrastructure, materials and production equipment, packaging, storage / preservation and distribution of vegetable seeds. The need for capacity building (infrastructure, organization / structure, technical performance and entrepreneurial) were identified to facilitate the development and implementation of the improvement plan.

3.4. Phase processing and synthesis

All data collected in the field allowed to update the information on the situation of the national seed system and to highlight the challenges still hinder its proper functioning.

4. Description of the study area

The study covers all the national territory of the Republic of Benin is a coastal country in West Africa. It stretches from the Atlantic Ocean to the Niger River on a length of 700 Km between the parallel $6^{\circ} 30'$ and $12^{\circ} 30'$ north latitude of the hemisphere. Its width varies from 125 Km along the coast 325 Km in the northern part between meridians 1° and $3^{\circ} 40'$ longitude East. Its total area is 114,763 km².

Entirely within the tropics, the Republic of Benin is as a little rugged flat country essentially of plains and plateaus.

The average altitude rarely exceeds 200m and location gives it a warm and humid climate whose characteristics allow a division of the country into two very different ecological zones.

4.1. Southern Ecological Zone

It brings together the departments of Atlantic, the Hills, Couffo, Mono, Ouémé, Plateau and Zou representing approximately 30% of the national territory.

It is characterized by a bimodal rainfall in four seasons (originally two rainy seasons of April-July and mid-September to mid-November and 2 dry seasons (mid-November to late March and mid-July to mid-September). but lately, rainfall disturbances are observed due to the adverse effects of climate change.

Average temperatures range between 20°C and 35°C and annual rainfall is between 800 mm and 1500 mm

The floors consist of:

- a coastal lowland plains (below 10 m) Made of coastal sand spits, lowland wetlands, lagoons and lakes and dominated by coconut palms and mangroves,
- a bar of soil tray area (very deep lateritic soils) surrounded by an irregular slope: depression Lama clay soil (kaolinite and montmorillonite) very fertile.
- following trays begins composed base area of tropical ferruginous leached soils overcome by place of average hills altitude of 200m 300m.

The vegetation is savannah where cultivates maize, rice, groundnuts, cowpeas / beans, soybeans and various peas, cassava, yam, sweet / taro tomato potato, peppers, leafy vegetables, cotton and cashew, coffee, oil palm and coconut etc.

Occupants populations that area belong to ethnic groups: Aizo, Adja, Mina, Fon, Tori, Wémè, Nago, Yoruba, Idatcha, Tchabè, Mahi who engage in agriculture, hunting, farming and trade .

The vegetation is unusual because the natural forest has largely given way to a grassy savannah bushy well met there in places sacred forests.

4.2. Northern Zone

It represents 65% of the country and covers the regions of Atacora-Donga and Borgou-Alibori.

She has a varied climate with rainfall regime monomodal two seasons (dry season from November to May and a rainy season from June to October. As in the southern zone, the seasons are influenced by climate change. This results in shifts at the beginning or the end of the season with at least one to two pockets of drought

during the rainy season. the average temperatures oscillate between 25 ° C and 35 ° C indeed 40 ° C day and night 15 ° C at 20 ° C.

The recorded rainfall amounts vary from north to south of the area between 400mm and 1300mm.

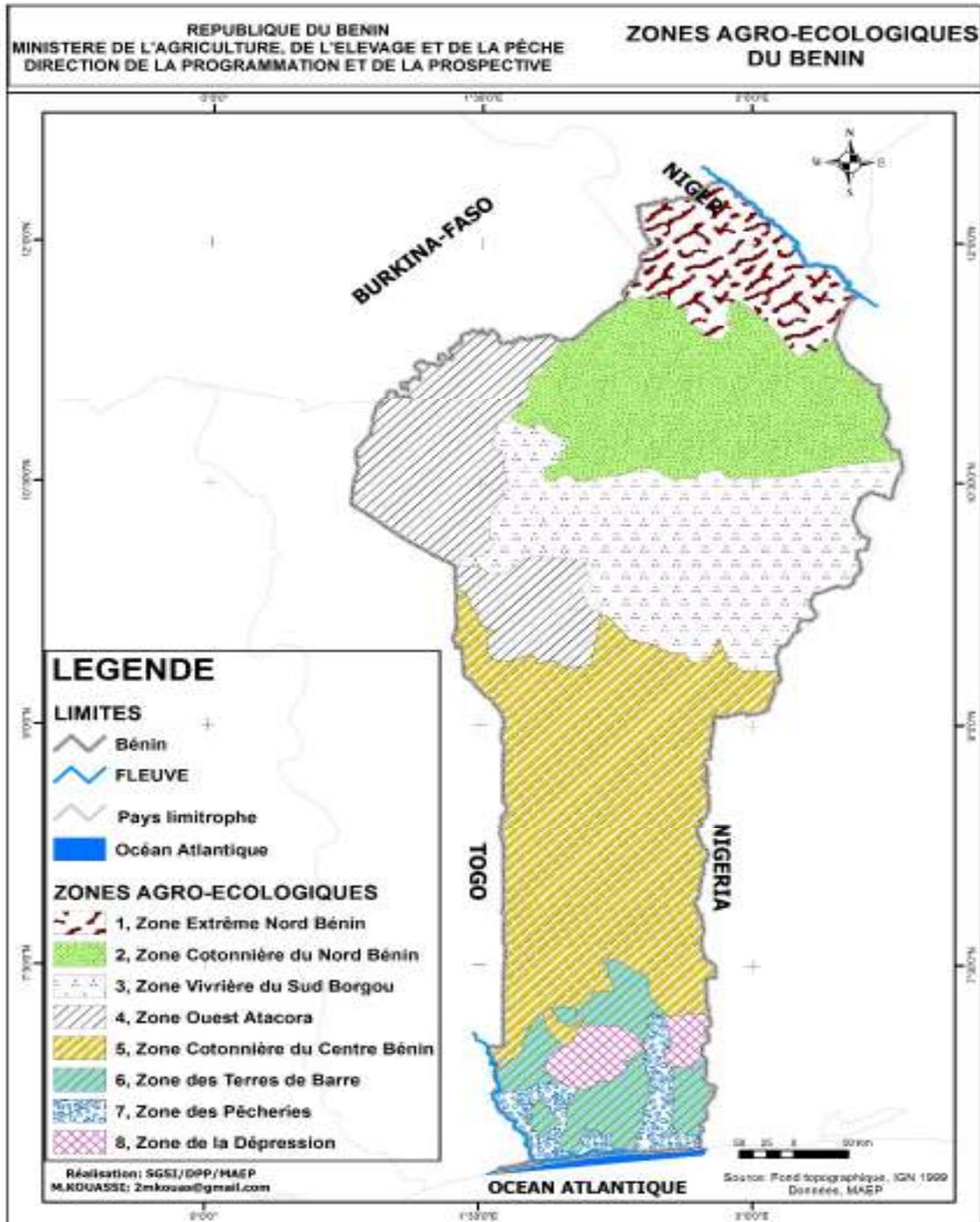
Floors are constituted by a crystalline peneplain: this is the area of the base ferruginous tropical soils ferrous concretions on kaolinitic materials.

The average altitude is between 300 m and 800m. They support a very degraded savannah from shrub to tree where one meets the baobab trees, the locust, shea, kapok, cotton. It ends in the northwest by the chain of Atacora.

The people of this area consist of the ethnic groups Batonu, Dendi, Yoom, Natimba, Nyende, wama, Berba, Germa Fulani who engage in agriculture, livestock and hunting and small businesses.

The main crops grown are: sorghum, millet, fonio, corn, rice, yams, cassava, sweet / taro potato, groundnuts, cowpeas / bean soy, pea variety, vegetable crops, cotton, cashew etc.

Map 1: Areas of study



5. target groups

The target groups involved in this study consist of:

- The selectors of the national agricultural research system including INRAB, agronomy faculties of science and technology;
- The CAE and technical services;
- The promoters of seed companies;
- The chambers of agriculture, industry and commerce;
- The National Federation of Seed Producers (SSPF) and the Union of Producers (FUPRO);
- The National Fund for Agriculture Development (FNDA), micro finance institutions and development banks.

6. results

The completion of the study to collect data covering four (4) additional results areas and interdependent. They are available as follows:

6.1. crop production system

6.1.1. Levels current production of the main staple crops, average yields and trend, by Culture

The current level of production of the main staple crops is presented in Table 1 in the Appendix.

The assessment of the table data, it appears that in the grain group, corn is as the most important staple crop with an annual average production for the period 2014 to 2018 is 1 375 564.2 T. it accounts for 77.38% of total cereal production. The

average yield of production at national level is 1.3 to 1.4 t / Ha varies from one region to another based on the different ecologies. The varieties in operation belong to four different groups of maturation that are:

- Group of late varieties (120 days)
- Group of intermediate varieties (110-day cycle)
- Group of early varieties (90 day cycle)
- Group of varieties extra-early (75 day cycle).

Rice occupies 2th up and production will continue to increase gradually as the facilities lowland come true. The varieties used are upland varieties of NERICA varieties group and lowland irrigated and belonging to the range of IR. Their yields are nationally of 3.26 t / ha.

Millet and sorghum are marginal because they are mostly of local varieties. The production areas are concentrated in the far north and in Atacora-West (ecological zone 1 and 3). Their yields are between 0.84 and 1.17 t / ha.

By observing the grain legume group, peanuts leads with an average annual production over the period 2014 to 2018 140 871.4T. Average yields are around 0.84 t / ha with local varieties (almost 80%) and low productivity from self-seeding.

Soybeans whose production is on the increase comes as both a food crop (local transformations in cheese, milk, mustard, flour infant) and industrial culture (oil and meal). The average annual production over the period from 2014 to 2018 is 130 534.4 T 0 with a yield of 96 t / ha.

Cowpea and Bambara groundnut products are widely and helped to save respective levels of production 102 976.8T 129 44.4T during the period 2014 to 2018. The varieties used are over 60% of local varieties whose seeds are produced

in the traditional system (mass selection and self-seeding). Average yields are respectively 0.81 and 0.95 t / ha.

The roots and tubers, cassava production appears the largest with an average annual production 3409 935.3T for an average yield of 12.81 t / ha. Planting material used is 80% improved clones and 20% of earliest local clones with lower productions. Cassava is very plastic and can be produced anywhere in the country.

Yam is the second crop of the family. Its production is concentrated in the center and north to latitude 10 on tropical ferruginous leached soils. The national average production of the last five years is 1524 539.7 T with an average yield of 14.01 t / ha.

The sweet potato is widely produced in the South and other areas where it is considered lean food. National production is of the order of 1219 907.17T with an average yield of 5.82 t / ha.

The market gardening and vegetable crops are grown in the valleys with interesting productions for the main species:

- tomato: 342,314.4 T with an average yield of 8.30 t / ha
- Pepper: 79855, T 6 with an average yield of 2.94 t / ha
- Onion: 61,786.6 t with an average yield of 17.51 t / ha
- Leafy 38472,33T with an average yield of 7.76 t / ha

For all of these staple crops, improving crop management will improve their agronomic and economic performance.

NB: For details of crops, see Table 1 in the appendix

6.1.2. Description of major agro-ecologies of the country and their culture systems

The Benin extending between the parallel 6 ° 30 and 12 ° 30 of the Northern Hemisphere has a large ecological variability supported by a diverse range of crops. The characteristics of the different agro-ecological zones are as follows:

1. ecological zone in the far north:entirely within the Sudan Sahelian zone is characterized by a bushland and a rainfall pattern monomodal. The heights of rains annually do not exceed 400mm and hardly lasts just three months (3).

Due to the presence of the Niger River, the area has wide valleys surmounted by two plains (2) cultivation systems are developed:

- ✓ Rice fields associated with vegetable crops (tomato, pepper, onion and potato),
- ✓ Sorghum / millet mixed cropping with cowpea, groundnut, okra associated with small livestock (poultry, small ruminants and cattle traits).

2. ecological zone of the cotton basin,dominated by trees Sudan savanna and enjoying a unimodal rainfall pattern of the type. The rainy season lasts an average of four (4) months and can record rainfall amounts between 400 and 800mm. Thesoil are constituted by a crystalline peneplain: this is the area of the base ferruginous tropical soils ferrous concretions on kaolinitic materials. crops grown systems are borne by the cotton, corn and sorghum / millet mixed polyculture associated with small livestock. Secondary cultures entering the crop combinations are: peanuts, cowpea, soybean, cassava, yam.

3. ecological zone of Atacora-West Entirely located in the Sudanese region of savannah area topped by the chain of Atacora. As the zones 1 and 2, this area also has the same conditions of rainfall and soil as zone 2. The dominant production system is mixed polyculture based on sorghum / millet associated with small livestock (poultry, small ruminants, cattle traits and pigs) or rice associated with vegetable crops. The secondary cropping and crop rotation or rotation are: peanut, cowpea, Bambara groundnut, soybean, peas, sesame, fonio.

4. Ecological Zone food crops (Borgou, Donga). It is dominated by the northern Guinea savanna shrub very degraded and, in the most important monomodally. The last rains of 5 to 7 months and the rainfall amounts recorded annually from 800mm to 1300mm. The floors are the types of tropical ferruginous concretions leached supporting a range of food and industrial crops. who practiced cropping systems are of two types:

- ✓ yam based system with maize, sorghum / millet, groundnut, cowpea, soybean, cassava, sweet potato, sesame, tomato, pepper etc;

- ✓ system based on cotton with maize, sorghum / millet, groundnut, cowpea, soybean, cassava, sweet potato.

5. central ecological zone (Hills). It represents the northern and southern area, considered a transition zone despite its membership in rainfall bimodal two rainy seasons.

Soils are leached tropical ferruginous types surmounted by place of average hills altitude of 200m 300m.

The vegetation is savannah where cultivates maize, rice, groundnuts, cowpeas / beans, soybeans, peas and various, cassava, yam, sweet / taro tomato potato, pepper, leafy vegetables, cotton and cashew etc.

Production systems encountered are worn by yam, maize and rice mixed polyculture associated with small livestock.

6. *Ecological Zone trays*. It groups Couffo trays, Zou and Ketu, consisting of deep lateritic soils. Rainfall is bimodal and can record rainfall amounts ranging between 800mm and 1500mm.

Staple crops are perennials (oil palm, citrus, mango etc.) and annual crops such as maize, rice, groundnuts, cowpea and incidentally cotton etc.

practiced production systems are mixed polyculture associated with small livestock and agroforestry systems.

7. *ecological zone of southern Benin*. It is characterized by the offshore comprised lowland, lakes, river, surmounted by bars degraded land adjacent to the depression of the Lama. The vegetation is degraded savannah favorable for food crops and market garden with pineapple, coconut tree, the palm oil and coffee.

The crops grown systems are actually mixed polyculture associated with small breeding or fish farming. Staple crops are maize, rice, groundnuts, cowpeas / beans, sweet potato, taro and pineapple crops and market garden.

6.1.3. Current Status of Agricultural Extension

▪ public extension system capacity

The national agricultural extension system (SNVA) is organized to accompany the transfer of technology, agricultural advice and monitoring and

evaluation of the implementation of agricultural policy at the regional level based on the potential of each region.

Thus, the country initially divided into six (6) natural regions each administered by a Regional Action Center for Economic Development Rural (CARDER). CARDER is organized in General Management and Technical Departments subdivided into technical service with divisions in agricultural sectors based in the capitals of Commons. Technical Department which coordinates agricultural extension activities is the Department of Agricultural Extension and Rural Organizations (DVAOP). It has within a service charge of Extension and Research Development (SVRD) and another in charge of Operational Training and Cooperation. The first is responsible for monitoring the implementation of extension activities on the ground and the second of capacity building of extension agents based in agricultural areas. This Specialized Technicians (TS) and Plant Production Consultants for close monitoring of producers.

But since 2017, the reforms carried out in the agricultural sector have helped to redefine the more or less homogeneous areas considered poles Agricultural Development (PDA). In the poles, Technical Services Extension of frames and accompanying producers are divided into two categories:

- ✓ The category of technical services responsible for controls placed under the Departmental Directorates of Agriculture, Livestock and Fisheries (D / SBD).
- ✓ The category of technical services responsible for the extension of the monitoring and advisory support producers attached to the Territorial Agricultural Development Agencies (ATDA).

With this device, a new strategy for agricultural extension was passed. This is the approach based on the agricultural board whose performance is ensured

with the support of approved private bodies. These private organizations operate under the supervision of ATDA and DDAEP on the basis of a service provision contract.

- **entities activity level of non-government and private sector in agricultural extension**

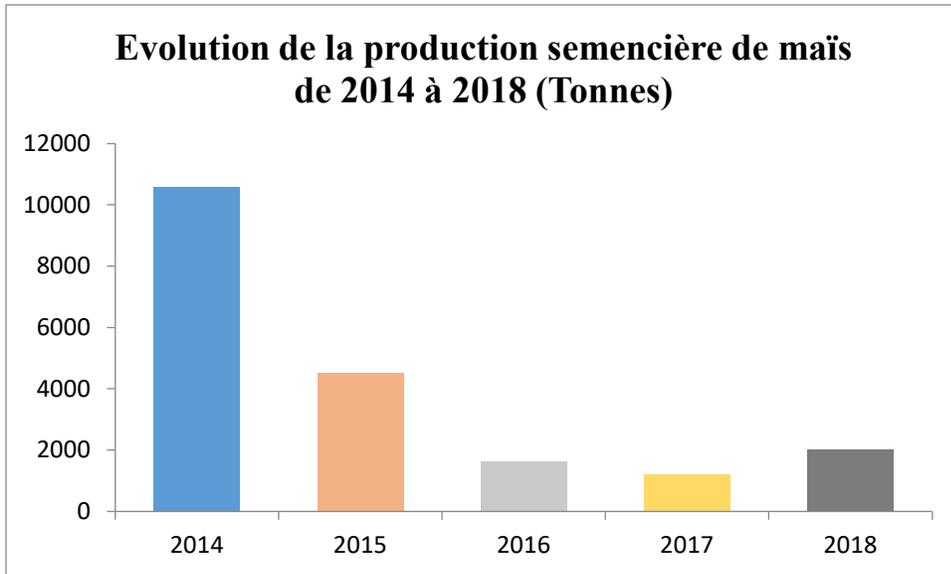
To supplement the coaching staff shortages, government responsible for extension services rely on NGOs to provide quality services under their supervision.

Note that these NGOs are mostly managed by mixed retired already under teams, unemployed graduates and often foreign technical assistants from partner technical cooperation financing partners. The impact of their action is not always visible because of the often short-term funding they receive.

6.1.4. Level of adoption of improved varieties for cultivation

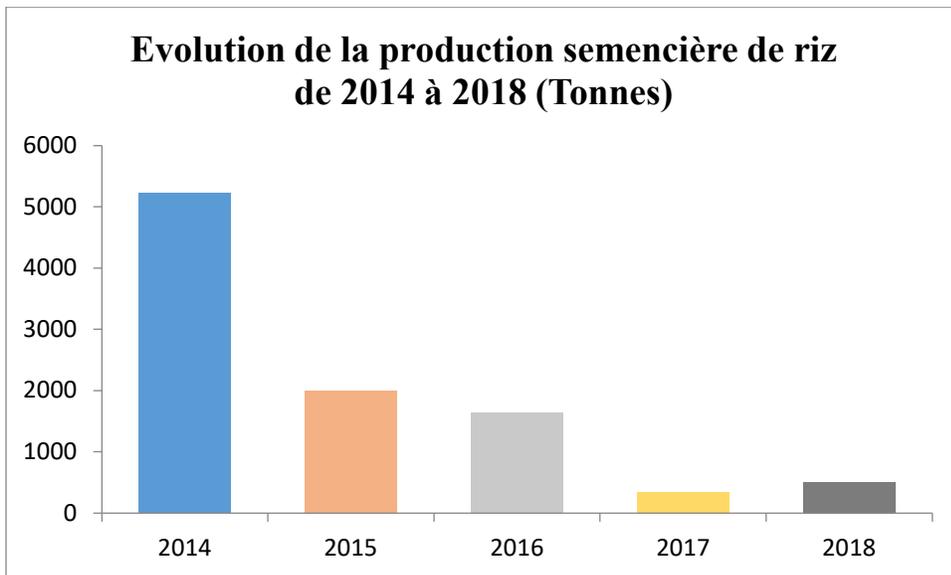
The national seed system develops improved seed varieties mainly in maize species, rice and soybeans. For other species, there is not a program to support the valuation of acquired research to implement seed multiplication activities. Thus, tables 2, 3 and 4 respectively the evolution of certified seed production of maize, rice and soybeans over the period 2014-2018.

Analysis of these tables allowed to note a shift sawtooth different seed production. It follows an unmet needs that require producers to deduct from their seed production to achieve their production goals. This is clearly observed in corn consumption for grain production achievements are made with a high proportion of seeds from self-sown varieties.



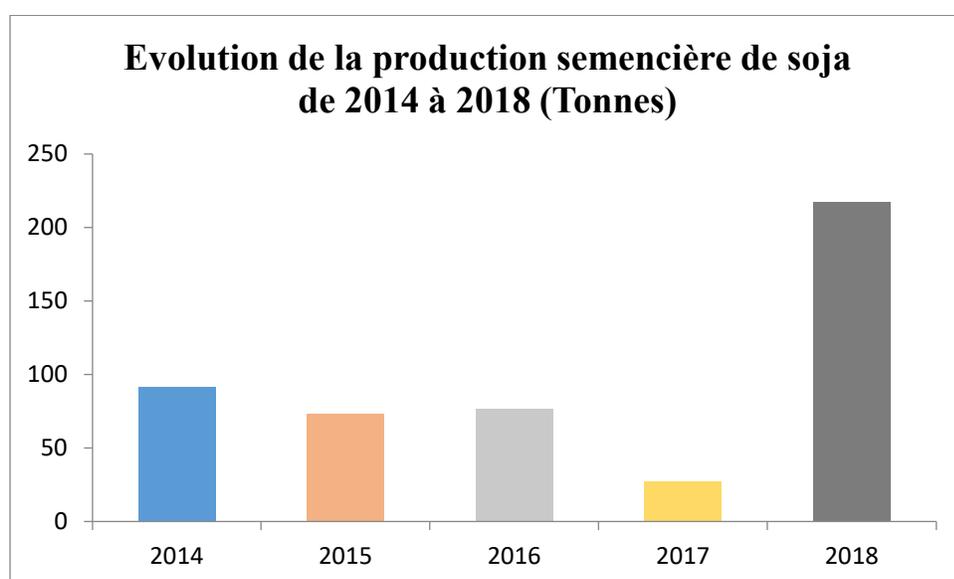
graph 1: Evolution of production seed corn 2014 to 2018

The shape of the graph 1 shows a regressive evolution of seed production due to the disengagement of the State which was the main buyer and the weakness of the emerging private sector to support the organization of marketing.



graph 2: Evolution of the seed production of rice in 2014 to 2018

The shape of the graph 2 shows the same trend of regression of seed production due to the disengagement of the State which was the main buyer, the weakness of the private sector to support the organization of marketing and practice of self sowing unfavorable to the promotion of rice seed companies.



Graph 3: Evolution of the soybean seed production from 2014 to 2018

From the analysis of production data on soy, the gradual decline in the graph shows that, seed production has evolved sawtooth until 2017 before experiencing a strong growth due to the intervention of new NGOs and project / program occurring on soybeans.

Tables 5, 6 and 7 show the evolution of the coverage achieved by culture on corn species, rice and soybeans from 2014 to 2018 (see details in appendix).

6.1.5. fertilizer usage level and manure to increase crop yields by

The implementation of PSRSA helped to gradually establish an efficient procurement mechanism for producers of cotton inputs and specific inputs for food crops. Thus from 2009 to 2014, it was set up on behalf of food crops and market garden 53799.65 tons of chemical fertilizers, which represent 58.1% compared to the quantities 34,022 tonnes consumed in 2009.

These fertilizers are compounds:

- Complex NPK-, SB whose titles range from 14-23-14,5-1 or 10-20-20 or 15-15-15.
- Urea (N) titrated to 46%.
- KCL or K₂ (SO₄).

Chemical fertilizers are used in combination with organic fertilizer (manure, compost) based on cow dung, poultry droppings, droppings of small ruminants and swine and crop residues. Richness nutrient (NPK-MgO-S etc.) of organic fertilizer depends on the degree of maturation (mineralization) of the elements that compose it.

The organic matter intake was also with the incorporation in the fields of cover crops (ameliorative).

6.1.6. General description of the current system of production and marketing surplus of staple crops

The current system of production and marketing of seeds of staple crops mainly focuses on corn, rice and soybeans. Seed production in these species does not fully

cover the national needs in terms plantings made for the production of grain consumption.

Thus, from 2014 to 2018 the consumption of corn acreage evolved from 973,453 to 1,166,766 Ha Ha for certified seed needs between 19469 and 23335 T T. Out, seed accomplishments during the same period have helped cover that on average 15% of needs. If current consumption of maize production levels have been achieved, it is precisely because the operating varieties are composites that allow the collection of seeds directly on the crop for two (2) successive seasons.

In reality, this situation could have been lived differently if the operation maize varieties were hybrids that require the systematic renewal of the seed to all production seasons.

It therefore does not yet exist an organized production and seed marketing system that generates surpluses for which the search for a flow external market would be necessary.

The same situation is also observed in rice which displays 68259 to 99831 Ha Ha for certified seed needs between 2048 and 2995 T T.

As for soybeans, the coverage rate is practically zero with a realization from 95,107 ha to 185,251 ha for certified seed needs between 38043 and 74100 T T. The achievements of recent years were made possible thanks to imports of certified seed Nigeria and Ghana.

6.1.7. Trend in the development of markets for staple crops

Current levels of production of certified seed are low to cover the needs of realization of basic crops and allow the development of markets.

6.2. seed supply status

6.2.1. *History of plant breeding and seed supply in Benin*

The supply of vegetable seeds for food crops and market garden was always the workhorse producers agricultural and government authorities in charge of agriculture for quality seed availability.

The increasing trend of production of the main food crops and market gardening in recent decades is the result of the effective use of volumes increasing importance of improved seed varieties. To address food insecurity and persistent extreme poverty in rural areas.

Varieties operating in the production device are local varieties to maintain traditional agriculture and improved varieties with use of fertilizers, pesticides and technical innovations in agricultural mechanization for the modernization of agriculture to make it more effective in the fight against:

- The food and nutrition insecurity of a population growing steadily, as an example of 2005-2015, the population has evolved from 7447457 to 10315244;
- income improvement of farmers facing a market increasingly demanding;
- Promotion of plant production carriers chains;
- Eradicate extreme poverty especially in rural areas.

Indeed, the seed supply is as well in the traditional seed system and in the community-based system moving towards the conventional system formal said.

✓ **traditional system** is characterized by subsistence farming practiced by smallholders with low incomes. It is the ancestral seed selection and preservation system based on empiricism and mass selection. It involves taking samples of specimens of cultivated local varieties. The sample size is based on the socio-economic importance of the variety and species. These

samples are carefully stored and maintained differently by region in dry and ventilated; usually in clay granaries, straw or even on the ceiling of the kitchens. The well preserved seeds are not conditioned on the eve of their cultivation. These seeds undergo no control and not subject to any regulation. They are sold locally.

The management of family farms using traditional seeds does not require a significant level of investment for field preparation, no mineral fertilizers, chemical pesticides or even light mechanization. The operations are almost manual where the low profitability of the system. All the seeds in this system are from local varieties or old improved varieties popularized already degenerated as a result of several years of self seeding.

NB: These varieties are species plant genetic heritage and are on the list C of Benin Catalog of Species and Plant Varieties (CaBEV).

✓ **system community-based progressing to the conventional system formal said** is based on the intensification and diversification of crops

to promote plant sectors practiced by large farmers and private traders to significant revenue. This is a more organized system built on the principles of a market economy. He wants to formal semi private type where a privileged partnership develops between the public and the private sector. It is highly regulated and based on pre-established standards and traceability of the production supply and distribution / marketing of seeds.

In this system, improved seed varieties are multiplied by research (pre-basic and basic) and in state seed farms (certified), distributed in the six natural regions of the country to bring the seeds of their zone use. It is :

- Department Alibori-Borgou with seed farm Alafiarou.

- Department of Atacora-Donga with seed farms Gahounga and Koufor-Pissiga;
- Department Atlantic Coast with the seed farm Agbotagon;
- Department of Mono-Couffo with seed farm Devé;
- Department of Ouémé Plateau with the seed farm Kétou;
- Department Zou Collines with seed farms Zapkota and Avlamè.

These farms producing certified seed of corn, sorghum, rice, peanut, cowpea, soybean, cassava cuttings, seedlings yam etc and disposal of materials and agricultural equipment and seed conditioning.

The seeds produced were put in place in the agricultural sectors in each region to facilitate the supply there by local producers. The kilogram of the selling price varied species 100f to 150f for cash purchases and 125f to 175f for credit sales

After formulation, the seed policy in 1990 with the support of FAO, the organization of seed multiplication categorical amended. The new system to offer:

- pre-basic seed multiplication by Agricultural Research Centers of INRAB
- basic seed multiplication entrusted to the seed farm Alafiarou (Borgou) for the northern area and the farm Agbotagon (Atlantic) for the Southern District. It should be noted that for socio-political and technical reasons, the farm Agbotagon was abandoned for that of Ketu in the tray.
- Other seed farms in the regions have been mandated to produce certified seeds in collaboration with local farmers' organizations in order to facilitate the transfer of skills in seed management. That link did not work because the new agricultural policy sets from 1996 to put a highlight on self-promotion of producers.

Thus, farmers' organizations in each rural community should take ownership and implement certified seed self-sufficiency strategy.

This new approach should permanently resolve the issue of seed supplies led to outright failure due to non mastery of supply and demand and to significant downgrades seed volumes for consumption. Given these failures, government authorities have taken over the hand by entrusting the collection and the establishment of certified seeds to a former state company: SONAPRA, programs, projects financed by technical partners: GIZ, FAO, IFAD, World Bank, USAID, IDB, ADB and NGOs etc: Bond Forden, Benin Plan (Italy) etc.

In recent years, the compliance of the national regulatory framework with the directives of the harmonized regulations, a public / private partnership is gradually taking place with the creation and emergence of small micro and medium sized seed companies (MSMEs) by private accredited the official service quality and assurance control (SOCC) plant seeds. These present startups already significant technical performance and deserve a technical support consolidation in order to build a competitive national seed industry

6.2.2. Recent and ongoing for the dissemination of improved varieties for cultivation

The decade of 2000 was affected by the high food crisis has mobilized the energies of all stakeholders to initiate and implement bold revival of the agricultural sector program (2008). To this end, particular attention is paid to any intensification of the availability and accessibility of quality seeds of improved varieties.

In this context, all support programs for seed development of various projects / programs have focused on supporting the development of varieties of major staple species. The activities at the corn focused on intensifying varietal tests across the country with the participation of extension services and producer organizations to select the most suitable varieties for different ecologies and responding to user concerns (PVS). These activities are carried out in collaboration

between INRAB and IITA for new creations varieties of corn and hybrid composite resilient to climate change.

Field days are organized by region to provide an opportunity for producers in the regions to discover new varieties and give their opinions on those whose performance interest. The program of activities participatory breeding of new varieties of rice runs the same way as for maize. In the case of rice, the collaboration develops between INRAB and Africa Rice varieties for trays, lowland and irrigated.

Regarding soybeans, the same activities are conducted in collaboration with IITA. It is the same for vegetable crops including tomatoes where INRAB in collaboration with the World Vegetable Center (WVC) is testing a series of new tomato varieties to select the most adapted to the different ecologies of Benin.

At the end of the activities of PVS programs on major crops, varieties selected and their characteristics are published in the monthly bulletin INRAB information. Technical promoters accompany micro, small and medium seed companies, farmers-multipliers by organizing training workshops / discussions on the specific modules to new varieties is a new varieties dissemination.

In order to increase food crop production, the state has started as early as 2008 free distribution policy of certified improved varieties of maize and rice seeds. The collection and the establishment of seed were organized and an effective means of dissemination of improved varieties of maize and rice in operation. (Tables 2, 3, 4.5 confers attached)

6.2.3. Recent and ongoing to increase the supply of improved seed varieties.

The seed supply is determined by effective demand. Thus, certified seed needs are identified at the base and reassembled at the municipal level to be

consolidated and at department before being forwarded to the national public seed DPV.

The needs of all departments are studied and are subject to an annual program multiplications categorical seeds (pre-basic, basic and certified). This program takes into account the quantities of seed to produce varieties and species by.

The breakdown by companies, individuals or groups multiplier is compared to the demand in each region. This seed supply mechanism is based on the planning / programming and structuring of the private sector which led to the creation of the National Federation of Farmers plant seeds (SSPF) which provides virtually all of the offre certified seed in all species. The reinforcements capacity (infrastructure, technical, entrepreneurs seed etc.) family of actors of the subsector national seed can improve their technical and economic performance. This support was made possible thanks to the contribution of the project / program:

- ProCAD / WAAPP financing World Bank
- ProCAD / PSAO USAID funding,
- PROCAR IFAD financing,
- PAIAVO ADB financing,
- PAPVIRE-ABC IDB financing,
- PAPAPE IDB financing,
- ProAgri, ProCIVA financing GIZ
- PCT / Rice 2010-2011;
- PCT / Corn 2012-2015, PCT / market garden crops 2013-2015 funding from
FAO.

These different support focused on maize, rice, soybean, tomato, pepper, onion, potato, cassava, and yams for food crops and, pineapple, cashew, cotton crops for operating / annuities. Similarly, in the context of ongoing reforms in the Ministry

of Agriculture, Livestock and Fisheries, it is envisaged in the implementation of activities of the National Agency for Agricultural Mechanization (ANAMA), the acquisition of materials and equipment mainly processing / packaging plant seeds.

6.2.4. Seed supply Prospects for improvement

Strategically, this will generally ensure the availability and accessibility at the right time and the right place to plant seeds of constant and sustainable way to support the promotion of plant production chains.

Good management of the sub-sector will meet the challenges determinants below:

- The intensification and diversification of agricultural production while taking into account the specific demands of seeds;
- Compliance with the standards of products marketed;
- The economic profitability of the activity;
- The professionalization / specialization of players;
- The availability of technical and economic specifications accompanying the seed of improved varieties marketed.

Ultimately, this combination of operations will help to achieve two important issues:

- Social (food and nutritional security and improved incomes for small and medium farmers);
- Economic (improved significantly from the contribution of the vegetable seed sector to competitiveness When added values Chains (CVA) of export crops dies).

Analysis of the mechanism of production, quality control, certification, packaging and distribution / marketing of plant seeds adopted so far revealed that expectations are not fully addressed in the light of broad and strategic areas identified for the development of the subsector.

Indeed, it has limitations that reveal persistent challenges such as:

- ✓ Controlling supply and solvent demand;
- ✓ The availability of a realistic five-year national seed plan with priority crops;
- ✓ The strengthening of infrastructure capacity, organizational, technical, entrepreneurial and economic system;
- ✓ Operation actual organs and sub-sector management tools provided by the harmonized seed regulatory development activities;
- ✓ The establishment of a credit system adapted to agricultural activities and especially seed.

These challenges demand prospects for improvement to be considered for the development of an integrated mechanism to monitor the production and marketing of vegetable seeds. It is :

- ✓ Creation of speculative seed or inter speculation group (value chains);
- ✓ Development of trade in plant seeds.

6.2.5. Current option for small farmers to access improved seed varieties

During the 2010s, projects / programs and some international NGOs (Bornefonden, Plan- International-Benin, ENABEL, etc.) involved in rural development in different localities according to their mandate, support the indigenous peoples in the struggle against the food and nutrition insecurity. Indeed, these organizations buy basic seed to make them multiply from farmers / multipliers members of beneficiary groups of the project so close as possible certified seed use zones. The so produced seeds are purchased to be distributed to producers on the basis of the following mechanisms warrantage procedures revolving found or cash sale at moderate prices.

Without adequate physical conditioning equipment, treatments and operations of Seed, are difficult and labor intensive, which negatively influences the certified seed of disposal costs vary from 300f to 500f CFA kg by region.

The review of the seed regulatory framework has created favorable conditions for the emergence of micro, small and medium-sized seed companies in the areas of crop production.

6.2.5. Number of private seed companies operating in the country and their annual rates.

The different development strategies subsector national seed allowed the light of the administrative and technical requirements of the harmonized regulations to promote the creation of MSMEs across the country to effectively meet the producers of quality seed needs in the conditions agroecological specific to each production area. Thus, since 2014 thirty business were created and approved by the MPD to multiply, process / package, store and market seeds or basic (12 SME's) and certified (20 PMES).

Lists PMES accompanied by changes in production (see table in appendix).

1. List of corn PMES

The PMES approved for the production and marketing of basic and certified seeds of maize are thirteen (13) distributed over the entire national territory. Their total deals of 2014-2018 seed is: 1280 T 25% of the quantitative objective of the DPV in the period.

View details (Table 8) in annexes.

2. List of SME Rice

The PMES approved for the production and marketing of basic and certified seeds of rice are ten in number (10) distributed over the entire national territory. Their total deals of 2014-2018 seeds of 1240 T 50% of the quantitative objective of the DPV in the period.

See details (Table 9) in annexes.

3. List of soybean PMES

The PMES approved for the production and marketing of base and certified soybean seed are thirteen (13) distributed over the entire national territory. Their total deals of 2014-2018 seeds of 134 T representing approximately 10% of national needs for soybean certified seed.

View details (Table 10) in the appendices.

6.2.3. Other non-governmental organizations and farmers' organizations active in the production and supply of seeds

Non-governmental organizations and other private organizations actively engaged in the production and supply of seeds of different species are as follows follows:

- Imports and market garden seeds distributions: Home Peasant Sarl Sarl Benin seeds, Yerevan Sarl Benin, Songhai Center Benin, Agri-seed and CRM
- Seed Imports for provender production: AgriSatch, fields brothers
- Collection and distribution of seeds: Coop DICPA, AF-Power Sarl Benin, Mr Jean Michel BEAU, Royal Service Plus.

6.2.4. Facilities and equipment available for processing and packaging of seeds

Benin, after the restructuring of the seed sector has set in 1984 a conditioning chain of dry seeds of a yield of 7 tons per hour. This string treated maize seed, sorghum, soybeans and cowpeas / bean. It worked because of its large capacity, two weeks per season.

Agricultural research centers involved in the production of pre-basic (Ina and Niaouli to the north to the south) each have a cleaning-calibration unit with interchangeable grilles. The remaining operations are done manually.

Some seed business developers locally acquired equipment designed for the calibration of corn and soybean seeds. Recently, FAO has installed two mini processing chains / conditioning seed paddy rice seed processing center Glazoué on behalf of INRAB and the seed farm state Kétou for maize seed , soybean and cowpea.

Strictly speaking, there is a chain of processing / conditioning installed modern seed by seed company JINUKUJA in the town of Dassa-Zoumé (department hills). This chain is operational despite minor adjustments to facilitate optimal performance of all cleaning-calibration operations, sorting, and bagging coating on cousage-dose packaging of 5kg, 10kg and 20kg for species seeds corn, rice, soybeans, cowpeas / bean and peanut shell.

6.2.5. certified seed tonnage marketed over the last five years by Culture

The quantities of certified seed sold from 2014 to 2018 are presented by species as follows:

- Corn: 19699.107 T
- Rice: 9729.45 T

- Soybeans: 485.965 T

Production statistics and marketing of the main species of seeds (corn, rice, soybeans) during the last five years are appended (see details with the contribution of each region per year Table 2, 3, and 4).

6.2.6. Number of agro traders currently active region.

The number of agro traders currently in operation by region is 29 distributed in all regions as follows:

- Alibori: 3; Atacora: 2; Atlantic: 3; Borgou: 4
- Hills: 4; Couffo: 1; Donga: 2; Coastline: 3
- Mono: 2; Ouémé: 2; Plateau: 3; Zou: 2

NB: The Benin Seed company has its base in the Atlantic and branches in the Littoral Borgou and Alibori.

6.2.7. certified seed level of imports from countries neighboring per crop

Imports from the country voisins focus on:

- Vegetable crops seeds (tomato, pepper, carrot, lettuce, parsley, cucumber, beet, turnip, cabbage, eggplant, watermelon, onion) which cover 75 to 80% of national needs;
- Soybean seeds to improve from 10 to 15% of the local market needs;
- Hybrid varieties of yellow corn seed to feed the mills with raw material.

6.2.8. Outlook Summary Seed supply improvement

The prospects for improved offers quality seeds exist and are summarized as follows:

- A wide dissemination of technical regulations appendices

Seed varieties productions in the main base food and vegetable species, for greater ownership of administrative and technical requirements;

- Better structuring of seed actors that promotes development of public / private and private / private essential for effective management and sustainable seed system;

- The technical capacity of seed actors through training workshops / recycling and diploma training for managers and field technicians and laboratory research organs, regulation, control / certification as well as developers and managers of MSMEs;

- Promoting the installation of at least one independent center processing / conditioning plant seeds in each department (regions);

- The creation of an agricultural bank offering easier access to credit proponents of MSMEs in order to contribute to the consolidation of the national seed industry.

6.3. National Agricultural Research System

The National Agricultural Research System (NARS) of Benin is supported by the National Institute of Agricultural Research of Benin (INRAB) and is mandated to:

- Evaluation of potential natural resources in plant, animal and aquaculture.
- The collection, documentation and management of specimens; priority species for social and economic development.

Research in the areas of plant, animal and aquaculture. Management training in specialties related to these areas.

6.3.1. Description of public institutes and universities actively engaged in plant breeding

Outside INRAB, other public research institutions are:

- University of Abomey (UAC): Faculty of Agricultural Sciences (FSA) and the Faculty of Science and Technology (FAST) through its laboratory genetics and biotechnology company specializing in the production of vitro-plants;
- Agricultural University Ketou;
- University of Parakou: Faculty of Agronomy.

6.3.2. The nature of the improvement of recent or ongoing crop by crop activities

The main public institution to develop varieties to meet the concerns of users is INRAB. It is organized in Agricultural Research Centers (ARC) distributed over the entire national territory according to their mandate respectively. Those are:

- CRA-South Niaouli: food crops, southern area;
- ARC center Savè: pulses and forestry;
- CRA-North Ina: food crops, forage and market garden;
- CRA-cotton and fiber in Cotonou: cotton and exotic fibers;
- CRA- Northwest Natitingou: food crops, market garden fruit and vegetables;
- CRA- PP Pobè: perennials and vegetable crops;
- CRA-Agonkamey / Calavi housing the central support laboratories (Laboratory of ground water science and the environment; laboratory crop protection, the agricultural policy analysis program, the research unit livestock and veterinary, food technology program.

Each of these centers have a technical staff of good bills but not enough and in the specialties required to carry out all the center's activities.

Each center also has a team of technicians responsible for the implementation of research activities, and multiplication of breeder seed varieties in preparation of operating in its area of intervention.

varietal improvement research activities focus on:

- strains characterization testing to facilitate their use in variety trials;
- Varietal multiple local tests with elite varieties in order to identify the best varieties for peasant environment testing and pre-extension tests.

In other public institutions for training and research in agronomies, teachers researchers conduct of breeding and selection work of specific varieties identified concerns in the environment farmer participatory diagnosis. These works combine students from different disciplines to better assess the behavior of plant material in different ecologies. They have significant resources and develop close technical cooperation with INRAB and other sub-regional institutions and international research.

6.3.3. Level of capacity of public institutions for plant breeding

✓ scientific staff

The scientific staff dedicated to agricultural research in Benin consists of multidisciplinary managers whose levels are between the agricultural BA (research assistant), vocational license (Research), the master in science and technology (research associates); PhD - PHD (Fellow) and aggregation (teachers researchers).

The specialization of disciplines agronomy, crop science, genetics, physiology, entomology, weed science, plant pathology, biometrics, etc. They are sufficient in faculties including doctoral students while their number INRAB decreases as a result of retirements.

For example, INRAB currently has only one coach on rice and on any other cereals. On cotton, there are two breeders and on perennials.

In universities, researchers active teachers in research are level aggregation; doctorat- PHD and incidentally doctoral thesis on year. While at INRAB all levels except the aggregation are found in different research teams.

✓ **infrastructures**

In the national agricultural research system infrastructure are of several types:

1. Reception Facilities which includes the installation site
different structures of the system, administrative buildings, technical (laboratories, classrooms, treatment centers, hangars and various warehouses);
2. The experimentation and research infrastructures: test plots, irrigation systems, greenhouses, access roads to plots;
3. The infrastructure of production and treatment / seed packages: equipment and tillage equipment, seed packaging;
4. Infrastructure monitoring and analysis: meteorologies stations and equipment, materials and laboratory equipment, cold storage facilities for the storage of stem.

The means necessary for the implementation of programs in the centers are insufficient. The materials and seed production and packaging equipment is obsolete or unusable and cause too high maintenance costs. This increases the difficulty of the processing / conditioning and generates a negative impact on production costs and sale of pre-basic seed (1500 FCFA per kilogram).

6.3.4. Recent collaborations or during public institutions, farmer organizations and the private sector for the provision of pre-basic seed

INRAB retains stem seeds of varieties listed in CaBEV, produces and provides seed companies pre basic seed. In this context, INRAB establishes a business relationship with all companies licensed by the MPD to produce basic seed of varieties selected by species in the annual program. This relationship is now materialized through direct purchase and cash of pre-basic seed by corporate sponsors.

INRAB also working with professional agricultural organizations and private economic operators in an annual national forum for the presentation of features and new varieties production techniques routes development in food crops and vegetable base.

6.3.5. Current situation of crop varieties license agreements for seed production by third party entities

The varieties multiplied from national research programs, regional, international Benin, IITA, of AfricaRice World Vegetable Center, ICRISAT which put them at the disposal of countries within the framework of international technical cooperation. At the moment none of these varieties is protected to require the obtaining of a license agreement before its multiplication.

6.4. National Strategic Framework on seeds

The subsector national plant seeds in Benin enjoys a political, strategic, sectoral and thematic favorable to the emergence of promising crop production chains. The strategic framework that characterizes the subsector national plant seeds is perfectly

consistent with harmonized seed regulatory frameworks UEMOA, ECOWAS and the African Union.

At the regional level, Benin has adhered to the WAEMU development initiatives through the adoption of the Common Agricultural Policy of the Union (PAU) and ECOWAS through the adoption of the Common Agricultural Policy of the Economic Community of States West Africa (ECOWAP) and the African Union with the adoption of the Detailed Program for the Development of African Agriculture (CAADP) of the New Partnership for Africa's Development (NEPAD). The development of vegetable seed varieties and performing perfectly adapted to local agro-ecological conditions is the foundation of all these policies.

Nationally, the Strategic Development Orientations (OSD 2006-2011) and the Strategy for Growth and Poverty Reduction (GPRS 2009-2011 and 2011-2015) retained the agricultural sector as a priority poles diversification economy.

The Strategic Development Plan for the Agricultural Sector (PSDSA) which fits perfectly into the strategic national and regional policies is above the reference framework for the development of the agricultural sector. The promotion of vegetable production chains of food crops and market garden priority is a major focus for the intensification of production and distribution / marketing of quality seed performing varieties to local agro-ecological conditions. Thus, strengthening the availability and accessibility of quality seeds constituent- they retained the first strategic axis for the promotion of industries by PSDSA.

From this point of view, the national seed policy document proposing a five-year action plan (2016-2020) was approved in February 2015.

The problem of production and distribution / marketing of plant seeds highlights two major challenges:

- (i) the coverage of at least 25% of needs in plant seeds by species whose varieties are in operation,
- (ii) professionalism and attractiveness of the business of production and distribution of vegetable seeds.

To meet these challenges, the vision at the edge 2025 is the option of a sub-sector organized national seed, efficient, safe and durable, meeting constantly the need for productivity and the challenge of competitiveness.

The development strategy of the national seed sub-sector is to ensure seed availability in quantity and quality and accessibility to meet seed requirements of farmers. To achieve this, the involvement of all stakeholders (regulators, researchers, growers, seed distributors, agro-industrial, funding agencies etc.) is necessary to improve productivity and socio-economic environment and the functioning of the system .

This will involve:

- make available annually at least 25% of certified seed needs improved varieties timely and affordable selling price,
- expand the range of improved varieties by species to better meet the specific requirements of each agro-ecological zone,
- sustain and support the development of micro, small and medium viable seed companies in all regions, as for multiplication, for processing / packaging and in marketing.

6.4.1. Records of controls on the production and supply of seeds

The documents that verify the authenticity of a seed are:

- The approval issued by the CAE,

- The professional card,
- The admission control,
- The crop declaration,
- multiplication contracts
- Inspection reports of cultures
- Seed analysis reports,
- The certification certificate,
- Contracts for the supply / good seed control,
- Delivery notes / reception.

6.4.2. official publication process improved varieties

The formal publication process of improved varieties is based on the approval and registration of varieties CaBEV then diffusion CaBEV.

6.4.3. Seed Certification Procedures

Certification is the administrative act by which the traceability of the quality of a batch of seeds for multiplication is certified compliant with standards established by seed category within a species.

The conduct of vegetable seed certification procedure falls within the sovereign role of the State and is implemented by the technical services of the Directorate of Plant Production (CAE). It is:

- National Seed Service (SNS);
- Service Promotion of Quality and Packaging (SPQC);
- Protection Service Plant and Phytosanitary Control (SPVCP).

These three services are grouped to form the Official Control and Certification (SOC).

The rules of the certification process are recorded in the harmonized seed regulatory and Regulations Technical Annexes (RTA) in force in the West African States, including Benin since 2008.

The certification procedure is applied to varieties bred for approval for inclusion in the catalog CaBEV to be eligible for national production mechanism and categorical seed distribution (pre-basic, basic, certified).

It also applies to all categories of seeds for propagation and subject transaction.

In the national seed system certification process is to control the quality of seed varieties and lots of all categories following the predetermined standards whose rigidity decreases as a function of generation. The audits of compliance with the standards established by species and categories are made through inspections of field crops, lots of controls in the laboratory seed testing. These inspections are a priori control.

Seed lots stored for conservation and are available for sale in stores and seed sales shops, pesticides and fertilizers are also periodically checked to ensure their viability and they are healthy. These controls are called a posteriori.

The controls in the certification process are manifold

- Administrative control that consists of a number of check the parentage of the farmer-multiplier, checking his multiplication contract, variety to multiply, its origin, the generation of the seed, the location of the field, the area to sow and previous crops. This control allows admission to the multiplier control for recording his statement crops (DC). It is made locally by sworn officers duly authorized by the DPV.

- The controls of seed fields are made through inspections in three steps:

- ✓ First step: general observations of the field to verify the statements of the seed and enjoy uniformity of the plants.
- ✓ Second step: counting seedlings selected according to a model used to assess the suitability for cultivation of the field.
- ✓ Third step: scoring the culture and registration information in a co-signed inspection report by the multiplier which receives a copy.

The inspection procedure in Benin is standardized to be applicable by all sworn officers involved in the operations. It should be noted that the number of inspection culture is determined by species according to the duration of the growth phase.

Parameters whose test results are necessarily considered to attest to the quality of a seed lot are:

- Varietal purity (genetic contamination by pollen from a variety of the same species)
- Analytical purity (off-types, plant pests, plants of other species)
- Control seed lots.

It is exercised on representative samples from the batches kind of packaged seeds. Samples taken are carefully labeled and sent to the seed laboratory. The sample size is significant to facilitate analyzes and maintain a buffer sample for testing against possibly opinion. The most common laboratory analyzes include:

- Grain moisture in%
- Analytical purity of the batch%
- Batch germination rate in%
- Health status of the lot
- Weight of 1000 grains
- Strong and viable seedlings.

The recommended standards are contained in the appendices Technical Regulations (ATR) analysis and procedures conform to ISTA rules.

6.4.4. Current situation of the regulatory agencies responsible for seed certification.

The national seed system is fully structured to comply with the guidelines of the current harmonized seed regulations in all the Member States of ECOWAS. Institutional organs regulation management are:

- **DPV and technical services that are:**
 - National Seed Service (SNS);
 - Service Promotion of quality and packaging (SPQC);
 - Protection Service Plant and Phytosanitary Control (SPVCP)
 - the National Committee of Plant Seeds (CNSV) and its operating arm, which is the Commission Approval and Registration of Varieties (CHIV).

The CAE and its services have two essential functions: function control and certification control function which enshrine the sovereign role of the state in managing the seed policy. They are operational in the organization, implementation and coordination of all seed production activities. They are responsible for disseminating general technical regulations of texts and related technical regulations to facilitate their ownership by stakeholders to improve their technical performance.

The resources for its functions are insufficient to impact them positively.

- **personal assets**

The staff working in the services of the CAE is threefold:

- ✓ Personal field techniques that are sworn in and perform the inspection missions (administrative, cultures and constitutional nature batches)
- ✓ laboratory workers who are also sworn in and take care of sampling operations, management and conduct of seed analysis,
- ✓ technical managers responsible for the design records, overseeing their implementation, preparation of activity reports, animation training workshops recycling agents and seed the private sector and participation in technical meetings national and regional level.

They are in short by disciplinary profile and variable skill.

- **Infrastructure**

Infrastructure is an essential component in the development and proper functioning of the national seed system. Their number, size and quality are critical.

In Benin, infrastructure seeds for each category are as belowafter:

- ✓ Pre-basic seed

This category of seed is produced in the Agricultural Research Center (ARC) of INRAB where infrastructure is installed following:

- Blocks multiplication of seeds well insulated and secure, of varying sizes;
- varying capacities of cribs for pre -Drying cereals (corn and sorghum panicles and candle millet);
- drying areas concrete for threshing and drying to develop grains after threshing or gin;
- treatment room / packaging of seeds with a cleaning-calibration unit type HELIOS 30 in CRA-Ina (north) and a conditioning treatment boombox rice seeds to Glazoué (center);

- laboratory analysis for self-seed and cold room for the conservation of germoplasms and reference seeds of operating varieties;
- store storage / conservations pre basic seed lots packaged;
- storage stores specific inputs (fertilizers, pesticides, empty packaging containers etc.);
- warehouses / sheds for various equipment and tools;
- tracks access to blocks of usable crops in any season;
- administrative buildings and logistics.

✓ Basic seed

The basic seeds are produced simultaneously on two Alafiarou state farms (Borgou in the north) and Ketu (plateau in the south-east) and in ten private enterprises of small and medium size seed companies approved for this effect and distributed throughout the national territory.

In the existing infrastructure of state farms are:

- Isolated blocks of varying sizes cultures in a secure area;
- access roads to passable blocks crops throughout the year;
- The cribs for pre-drying corn cobs despathés.
- drying concrete areas for threshing / shelling and point to drying the seeds;
- Shops storages / conservations basic seed lots packaged;
- Sheds and warehouses for production equipment and small tools;
- Stores storage of specific inputs (fertilizers, pesticides and empty packaging containers etc.);
- Storage Halls / Buildings for the various equipment and tools;
- Office Buildings servants for technical staff;

- On the farm Ketu, there is a shed-workshop, office and store houses a mini packaging chain.



picture 1: Conditioning Mini System corn Kétou

In holdings of the promoters of private companies, the available facilities are very modest and consist of:

- varying sizes multiplication blocks between two to five hectares of land for all crops and conditions of lowlands for rice;
- drying areas in precarious materials;
- Cribs varying capacities for corn companies;
- Stores storage / conservations variable capacity depending on the size of the company;
- shops selling basic and certified seeds;

NB: A complete factory processing / conditioning seed company-owned seed JINUKUNJA to Dassa-Zoumé in the hills is operational.



Photo 2: String processing / packaging of the seed company JINUKUNJA

✓ certified seed

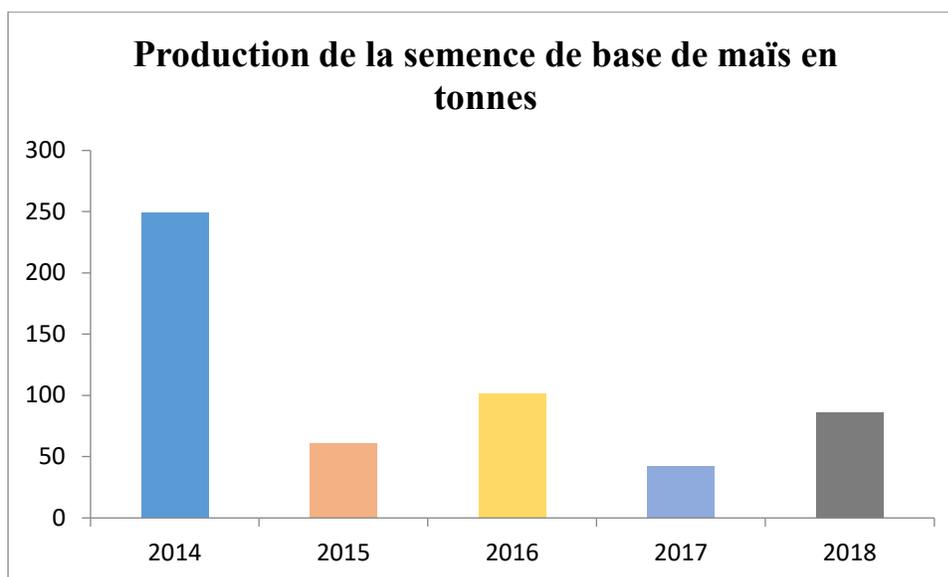
This category of seed is produced by individual multipliers in consortium or cooperative Ex: GIE Parakou:

- Small and medium private not always secure farms where the respect isolation problem;
- Huts flimsy materials;
- Stores storage / conservations community;

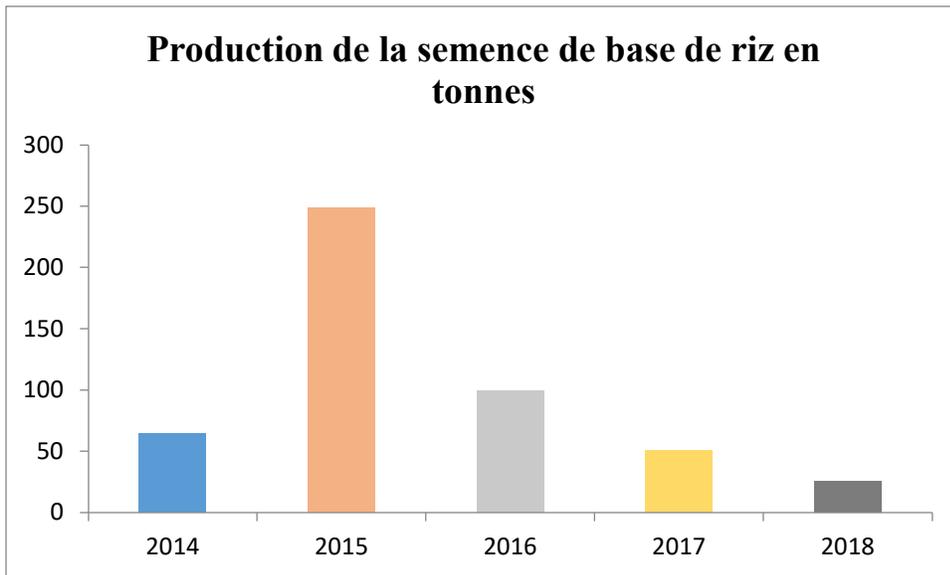
seed trade enterprises have shops in urban centers and in some communes, exotic seed distribution shops, vegetable crops, pesticides and fertilizers often Specific inorganic or organic. These stores are not always the standards of biosecurity.

6.4.5. Current state of the supply of basic seed

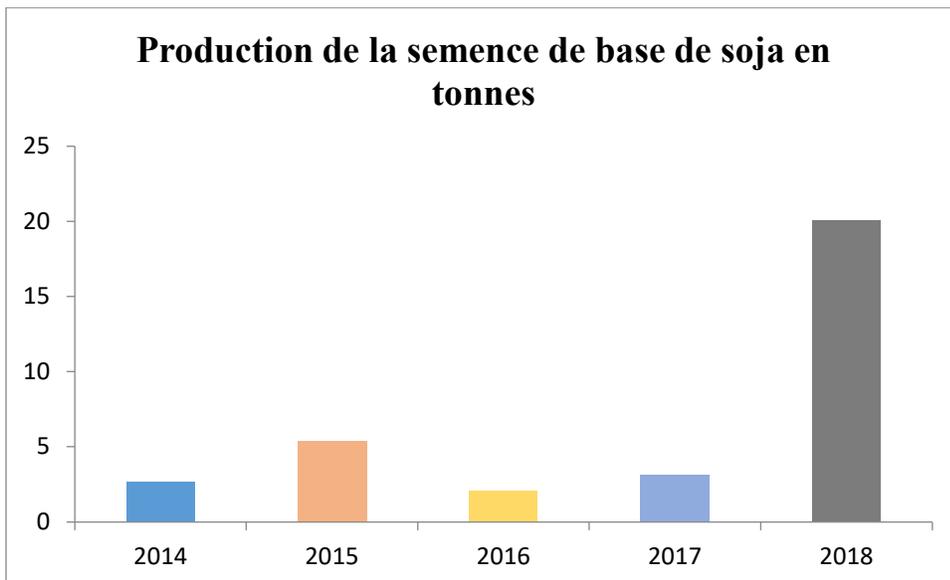
Offers basic seed during the five (5) years have evolved sawtooth. They are carried out by both state seed farms Alafiarou and Ketu and ten business spread over the country. Graphs 4 and 5 show the change maize seed and rice tenders from 2014 to 2018 confirms the downward trends (Table 12 details in annex). Regarding soybeans, the situation is much better because the soybean research program long dormant resumed production and supply of pre soy activities. The availability of pre-basic seed has helped revive the multiplication on farms as confirmed by the data in Table 12 and the look of the graph 6 These trends justify the difficulties of mastering effective demand. This is also explained by the fact that the approved seed companies for the production of the seed category are young (5 years) and do not have a well-developed marketing strategy. They operate on the basis of requests from projects / programs of support for agricultural producers to use improved seed varieties. Similarly, companies do not have sufficient financial strength to engage in contract-production. The approuvisionnement basic seed is very small to support satisfactory production to effectively combat food insecurity and promote the emergence of chains.



graph 4: Evolution basic seed deals Corn 2014-2018



graph 5: Evolution offers rice seed 2014-2018



graph 6: Evolution offers soy seed 2014-2018

6.4.6. Procedures for production and supply of basic seed

- ✓ **Access private seed companies to basic seed**

The companies approved for the production of certified seed buys directly in state seed farms or from the companies producing basic seed in their region. Currently, supply is through direct purchase in cash. There is not a procurement strategy based on service contracts

✓ **Policies supply of basic seeds by the private sector.**

The basic seed supply policy by the private sector is based on self-promotion and self-reliance of farmers seed region. The private seed sector is not sufficiently structured to effectively lead this policy of supply of basic seed. It is desirable that its capacity is built both in structural, technical, entrepreneurial economic (finance).

7. Encountered difficulties

Conclusion

- a. Current state of access to improved seeds among small farmers.
- b. Current state government support to improve seed system.
- c. Trends and opportunities to improve seed systems.
- d. recommendations
- e. Likely impact of improving smallholder access to improved seeds.

Attachments

Board 1: Production Location (T) of the main staple crops

CULTURES	YEARS					Average	Percentage	Avg Yield (T / ha)
	2014	2015	2016	2017	2018			
But	1345821	1354344	1286060	1376683	1514913	1375564.2	77.38	1.3
Rice	206943	234145	204310	281428	361336	257,632.4	14.49	3.26
Sorghum	114750	100249	129674	129665	154548	125,777.2	7.08	1.17
Mil	22881	23668	21640	25182	-	18674.2	1.05	0.84
Deputy total1						1777648	100.00	
Peanut	134230	141689	134323	137214	156901	140,871.4	36.37	0.84
cowpea	93488	95794	99104	101821	124677	102,976.8	26.59	0.81
Soy	96944	99066	139909	156901	159852	130,534.4	33,70	0.96
voandzou	14201	12569	10409	14049	13494	12944.4	3.34	0.95
Subtotal 2						387327	100.00	
Cassava	3695514	4066711	3420665	3892287	4078558	3409935.3	55.41	12.81
Yam	3177265	3191385	2650498	3041245	2885225	1524539.7	24.77	14,01
Yam	64860	65488	55405	58145	55881	1,219,907.17	19.82	5.82
Subtotal 3						6,154,382.17	100.00	
Tomato	331793	400572	303893	335412	339902	342,314.4	65.52	8.3
chilli pepper	67264	75953	75722	88268	92071	79855.6	15,29	2.94
Onion	43870	42838	71147	81177	69901	61786.6	11.83	17.51
leafy vegetables	58682	56735	-	-	-	38472.33333	7.36	7.76
Subtotal 4						522,428.93	100.00	

Source : (DSA / MAEP, 2018)

Board 2: Evolution of production seed corn 2014 to 2018 (Tons).

No.	departments	2014	2015	2016	2017	2018
1	ALIBORI	1923.05	943.55	214.35	325.4	359.1
2	ATACORA	2286.8	986.65	412	115.975	443.1
3	ATLANTIC	17,05	11.35	9	2,432	3.9
4	BORGOU	3522.75	1385.75	328.6	410.85	515.65
5	HILLS	1398.05	485.95	186.6	114.95	92.9
6	COUFFO	47.15	50.6	21.8	8.15	24.05
7	DONGA	901.1	355	243.55	142.95	190.4
8	LITTORAL	0	0	0	0	0
9	MONO	40.4	18,55	30.5	12.65	15.7
10	OUEME	3.2	0	1.5	0	0.55
11	TRAY	77.45	41.8	20.3	11.65	20.2
12	ZOU	379.5	252.95	157.55	82	52.15
TOTAL		10596.5	4532.15	1625.75	1227.007	1717.7

Source: (DPV / MAEP, 2019)

Board 3: Evolution of the seed production of rice in 2014, 2018 (tons).

No.	departments	2014	2015	2016	2017	2018
1	ALIBORI	787.02	350.34	71.4	43.71	19.1
2	ATACORA	645.76	547.42	289.82	1.5	143.43
3	ATLANTIC	15.5	10.14	23.9	1.4	0
4	BORGOU	15.38	9.15	0	0	3.12
5	HILLS	993.44	283.68	271.05	113.66	145.85
6	COUFFO	113.4	69.48	50.7	27.36	44.4
7	DONGA	296.52	190.26	148.71	0	140.04
8	LITTORAL	0	0	0	0	0
9	MONO	34.68	52.14	40,32	4.44	0
10	OUEME	0	0	60.12	21.9	55.95
11	TRAY	1414.58	0	418.38	78.68	33.54
12	ZOU	902.7	488.28	270.66	58.8	53.64
TOTAL		5218.98	2000.89	1645.06	351.45	513.07

Source : (DPV / MAEP, 2019)

Board 4: Evolution of the seed production of soybean 2014-2018 (tons).

No.	departments	2014	2015	2016	2017	2018
1	ALIBORI	0	0	2.5	0	0

2	ATACORA	0	0	0	0	0
3	ATLANTIC	0	0	0	0	0
4	BORGOU	60.9	61.25	64.45	17,15	102.35
5	HILLS	30.6	4.4	7.7	0	82.685
6	COUFFO	0	0	0	0	1.5
7	DONGA	0	7.5	0	8.25	27,85
8	LITTORAL	0	0	0	0	0
9	MONO	0	0	0	0	0
10	OUEME	0	0	0	0	0
11	TRAY	0	0	0.88	0	1
12	ZOU	0	0	1	2	2
TOTAL		91.5	73.15	76.53	27.4	217.385

Source: (DPV / MAEP, 2019)

Board 5: Evolution of certified seed in coverage of improved maize varieties

But					
Year	2014	2015	2016	2017	2018
Areas (Ha)	973453	968030	1003715	1000361	1166766
seed needs	19469	19361	20074	20007	23335
Amount of seed consumed (T)	4940	4532.15	1625.75	1227	1720.95
Coverage (%)	25	23	8	6	7

NB: seed rate per hectare 20 kg

Board 6: Evolution of certified seed in coverage of improved varieties of rice

Rice					
Year	2014	2015	2016	2017	2018
Area (Ha)	68259	74586	65305	82351	99831
Need to seed	2048	2238	1959	2471	2995
Amount of seed consumed (T)	1500	2000.89	1645.06	351.45	513.07

Coverage (%)	73	89	84	14	17
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NB: seed rate per hectare 30 kg paddy

Board 7: Evolution of the coverage of certified seed of improved soybean varieties

Soy					
Year	2014	2015	2016	2017	2018
Area (Ha)	95107	97783	152138	153162	185251
Need to seed	38043	39113	60855	61265	74100
Amount of seed consumed (T)	91.5	73.15	76.53	27.4	217.385
Coverage (%)	0.2	0.2	0.1	0.0	0.3

NB: seed rate per hectare 40 Kg

Source: (DPV / MAEP, 2019)

Table 8: List of SME corn with their evolving 2018-2014 offers

Speculation: Corn									
N o.	seed companies	Location	Full Name of the promoter	Contacts (229)	Evolution of seed deals				
					2014	2015	2016	2017	2018
1	AKJ Seed	Banikoara- Alibori	Agban-KESSE Joshua	64 20 45 15/96 15 96 03	50	13	16	6	35
2	SAHGUI et Fils	Tanguiéta- Atakora	Paul SAHGUI	97 24 April, 02	24	20	10	11	20
3	THE LAMA Sarl	Toffo- Atlantic	Louise AYLARA	97 17 67 35	0	0	4	3	3
4	BORGALI Sarl	N'Dali-Borgou	BIO Amadou GORADO	94 71 02 05/97 32 07 00	106	65	39	63	75
5	GIE-Alafiarou	Parakou Borgou	Antoine HOUSSOUDEGBO	97 72 07 85	43	61	34	38	41
6	SIMAGRO	Savalou- Hills	MILOHIN Simon	97 85 20 71	28	3	9	6	8
7	JINUKUNJA Sarl	Dassa-Zoumè- Hills	Dossouhoui C. Gaston	65 49 57 57	4	0	1	1	3
8	AGBLEGNON Sarl	Klouékanmè-Couffo	Satchi GBONDJE A. Peter	97 33 38 82/65 36 19 99	27	11	10	7	21
9	DALLAS CITY Sarl	Djougou- Donga	Pauline EDJADESSIBA	97 87 39 71	43	2	14	33	38
10	OGOUTOYOSSI and Son	Ifangni- Plateau	OGOUTOYOSSI Firmin	97 08 74 07/64 25 45 89	10	8	3	0	0
11	GAT	Kétou Plateau	AHOLOU Gbewa	96 34 88 57	2	3	6	1	1
12	AMOUSSA Farm and Son	Kétou Plateau	AMOUSSA Sadicou Séidou	97 71 16 03	12	8	18	31	25
13	Tugan and Son	Djidja-Zou	Tugan Felix	95 77 22 19	25	32	16	20	10

Table 9: List of SME rice with the evolution of their 2014 rates to 2018

Speculation: Rice

No.	seed companies	Location	Full Name of the promoter	Contacts (229)	Evolution of seed deals				
					2014	2015	2016	2017	2018
1	MONKASSADO Sarl	Malanville-Alibori	BOSSOU Arouna	97 29 58 64 / 64 63 86 52	117	114	31	42	20
2	OROUSANGUI & Son	Banikora- Alibori	OROU SANGUI Mere		2	1	0	1	0
3	YENI BANSEM Sarl	Matéri- Atakora	Catherine GNARIGO	96 88 43 03 / 95 35 74 95	0	0	11	5	11
4	DJROWANOU	ZE Atlantic	MEDJAGBONON Paulin	66582840	2	5	1	1	0
5	Seed company Sarl Center	Savalou- Hills	DAMASSOH Firmin	97 55 28 90 / 94 03 91 96	13	0	3	0	8
6	AWEDE and Son	Houéyogbé-Mono	AWEDE Euloge	95 82 62 90	0	2	0	2	0
7	Bognon and Son	Aguégués- Ouémé	Bognon Bartholomew	97 22 22 38 / 94 99 22 68	17	0	4	3	3
8	SERIB Sarl	Adja-Ouèrè Plateau	GODONOU Bartholomew	96 55 89 05	370	0	141	7	15
9	AGUENNENGOUE and Son	Covè-Zou	Victor AGUENNENGOUE	95 84 15 81	140	83	30	6	10
10	AGBLEGNON Sarl	Klouékanmè Collines	Satchi GBONDJE Pierre	97333882	6	6	2	2	3

Table 10: List of soybean SME's with the evolution of their 2014 rates to 2018

Speculation: Soybeans

No	seed companies	Location	Full Name of the promoter	Contacts (229)	Evolution of seed deals				
					2014	2015	2016	2017	2018
1	AKJ Seed	Banikoara- Alibori	Agban-KESSE Joshua	64 20 45 15/96 15 96 03	0	0	0	0	0
2	SAHGUI et Fils	Tanguiéta- Atakora	Paul SAHGUI	97 24 April, 02	0	0	0	0	0
3	THE LAMA Sarl	Toffo- Atlantic	Louise AYLARA	97 17 67 35	0	0	0	0	0
4	BORGALI Sarl	N'Dali-Borgou	BIO Amadou GORADO	94 71 02 05/97 32 07 00	10	0	40	10	46
5	GIE-Alafiarou	Parakou Borgou	Antoine HOUSSOUDEGBO	97 72 07 85	0	0	0	4	10
6	SIMAGRO	Savalou- Hills	MILOHIN Simon	97 85 20 71	0	0	0	0	2
7	JINUKUNJA Sarl	Dassa-Zoumè- Hills	Jules KPOTAN	65 49 57 57/97 29 68 86/60 34 33 39	0	0	0	0	1
8	AGBLEGNON Sarl	Klouékanmè-Couffo	Satchi GBONDJE A. Peter	97 33 38 82/65 36 19 99	0	0	0	0	0
9	DALLAS CITY Sarl	Djougou- Donga	Pauline EDJADESSIBA	97 87 39 71	0	0	0	0	3
10	OGOUTOYOSSI and Son	Ifangni- Plateau	OGOUTOYOSSI Firmin	97 08 74 07/64 25 45 89	0	0	0	0	0
11	GAT	Kétou Plateau	AHOLOU Gbewa	96 34 88 57	0	0	0	0	0
12	AMOUSSA Farm and Son	Kétou Plateau	AMOUSSA Sadicou Séidou	97 71 16 03	0	0	0	1	3
13	Tugan and Son	Djidja-Zou	Tugan Felix	95 77 22 19	0	0	0	2	2

Tableau11: Directory agro-dealers in activity by region

No.	Region	Number	seed companies
1	Alibori	3	AKJ Seed
			MONKASSADO
			Benin Seed
2	Atakora	2	SAHGUI et Fils
			Yeni Bansem Sarl
3	Atlantic	3	THE LAMA Sarl
			DJROWANOU
			Benin Seed
			JINUKUNJA Sarl
4	Borgou	4	BORGALI Sarl
			GIE-Alafiarou
			Benin Seed
			DEDRAS NGOs
5	Hills	4	Seed Center Corporation
			JINUKUNJA Sarl
			UNIRIZ
			APrSeV
6	Couffo	1	AGBLEGNON Sarl
7	Donga	2	DALLAS CITY Sarl
			S & K
8	Mono	3	2 5 Bread Pisces
			Green area
			Hessou & Son
9	Ouémé	2	Bognon & Son
			Songhai
10	Littoral	3	Home Farmer
			Benin Seed
			YEREVAN
11	Tray	3	OGOUTOYOSSI & Son
			GAT
			Farm AMOUSSA & Son
			SERIB Sarl
12	Zou	2	Tugan & Son
			AGUENNEGOUE & Son

Table 12: Evolution of maize seed deals, soy and rice from 2014 to 2018

Cultures	Year				
	2014	2015	2016	2017	2018
But)	248.8	60.7	101.5	42.2	86.3
Rice (T)	64.7	248.4	99.2	50.6	25.5
Soybean (T)	2.7	5.4	2.1	3.1	20.1
Total	1027.9				