BIOPAL PROJECT

Agricultural project for the economic and social development of Kayes, Mali

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In cooperation with the local NGO ALD (Association du Logo pour le développement)

Project Biopal

Agricultural project for the economic and social development of Kayes, Mali and its people

It effects the 250.000 citizens of Kayes and the 19 surrounding villages

- Creating a sustainable and self-sufficient project that stimulates the economic and social development of the rural community of Kayes, Mali.
- Development and stimulation of the chicken cattle for food security in the Sahel zone - an area with very high temperatures and little rainfall.
- Breeding of day-old chicks by using a modern breeding machine to prevent the import of unhealthy, overgrown chickens.
- Inhibition of the import of chicken waste from Europe.
- Production and sale of biological and sustainable poultry feed.
- An environmental friendly and sustainable project through the use of renewable energy sources.
- Training of the rural population and promoting entrepreneurship.
- Expansion of the sales market to support local producers, peasants and organizations.
- Increased, fair wages and health insurance.
- Creating perspectives to counter migration

Letter of the major stating the positive effects of the Biopal project

COMMUNE RURALE DE LOGO
CERCLE DE KAYES

REPUBLIQUE DU MALI
UN PEUPLE – UN BUT – UNE FOI

Nous, autorité communale de la Commune Rurale de Logo, attestons tout fièrement que la réalisation du Projet d'Aviculture de l'Organisation Non Gouvernementale/ Association du Logo pour le Développement (ONG/ALD) en partenariat avec Biopal-ml de l'Europe dans notre commune est une grande entreprise.

Cette réalisation : bâtiments, couveuse, panneaux solaires, moulins, appareils de chauffage et de rafraichissement etc ; donne un rayonnement éclatant à la commune.

A travers son projet, Association du Logo pour le Développement (ONG/ALD) et son partenaire Biopal-ml de l'Europe vulgarisent la bonne qualité de volaille et est la plus grande pourvoyeuse d'emplois et par ricochet contribuent fortement à la lutte contre la pauvreté.

Toute chose qui nous engage à encourager l'ONG/ALD et Biopal-ml de l'Europe à solliciter des appuis en leur faveur.

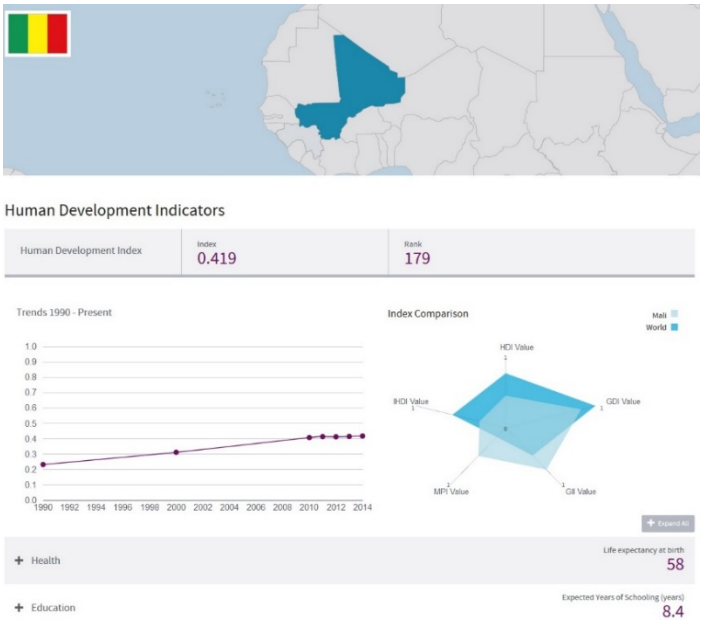
Fait, le 09 Janvier 2017

LE MAIRE :

Mohamed COULIBALY

Abstract

Persistent droughts, lack of know-how, few to no financial resources and extremely worrying social and demographic conditions, ensuring Mali's fourth place on the list of the poorest countries in the world.



After a visit to the country in 2009, it became clear that a sustainable and self-sufficient project is necessary to stimulate the economic and social development of the rural community. The idea to hedge a healthy chicken breed for the agricultural, development project has been created with collaboration of a local, Malian NGO "ALD" and the cooperation "Biopal. Due to the cooperation between the project and the University of Bamako the breed ¾ as well as the CouNu and Brahma were advised. Ensuring food security, a regular income and generating entrepreneurship among the Malines population are the main objectives of the "Biopal" project.

The project supports the participating families with knowledge, training, animal feed, vaccinations and the first kit of chickens. An economic network among the various villages is promoted. Due to the fact that more than 80% of the Malian population is dependent on agriculture, this project supports the most vulnerable and acts as the key for self-employment. This main target group of the project will achieve a more self-determined life. Through the use of renewable sources of energy (sun, water) the ecological aspect of the project is also included.

Table of contents

Social, demographic and economic figures of the Kayes region..... 5
The challenges of chicken production in Mali..... 8
The main objectives of the Biopal project..... 12
Location of the project..... 14
Sales strategy 21
Conclusion 23
SWOT- analysis..... 25

Social, demographic and economic figures of the Kayes region

The population of Mali is 14.5 million with an average of the population being 15.4 years. Islam was introduced to West Africa in the 11th century and remains the predominant religion in much of the region. An estimated 90 percent of Malians are Muslim, approximately 5 percent are Christian (about two-thirds Roman Catholic and one-third Protestant) and the remaining 5 percent adhere to indigenous or traditional animist beliefs. Atheism and agnosticism are believed to be rare among Malians, most of whom practice their religion on a daily basis.

Mali is a sparsely populated, predominantly desert country with a highly undiversified economy. It is vulnerable to commodity price fluctuations and to the consequences of climate change. Desertification is one of the main challenges of the region which leads - in combination with a high population growth rate and droughts - to food insecurity, poverty, and instability. Over half of the Malian population lives on less than US$1.25 per day. One in eight primary school-aged children do not attend school. Only 34.6 percent of all secondary age children receive secondary education. Limited access to basic health care, insufficient quality of care and low immunization coverage contribute to very high young child and maternal mortality rates.

Malnutrition, as a consequence to food insecurity, is a serious problem. Approximately one in every three children under the age of five is stunted. Poor nutrition affects physical and cognitive development. Although moderate, acute malnutrition rates have stabilized, there are regional disparities, with some population experiencing malnutrition rates well above the World Health Organization's emergency threshold.

Paradoxically, the population is predominantly rural and largely engaged in the agricultural sector, which is the mainstay of the economy. The situation is further worsened by limited access to safe water in rural areas and lack of adequate sanitation.

In the context of a strong development of the agricultural sector and an observed improvement of the food security situation, Mali currently has opportunities to improve agricultural diversification and the nutritional quality of the diet. This is the main objective of the Biopal-project. Create agricultural opportunities to fight against hunger, malnutrition and enable the Malian population to secure their livelihood.

Population growth rate (average annual %)	2010-2015	3.0
Urban population (%)	2015	39.9
Urban population growth rate (average annual %)	2010-2015	5.1
Fertility rate, total (live births per woman)	2010-2015	6.4
Life expectancy at birth (females/males, years)	2010-2015	57.0/57.4
Total dependency ratio (Pop. aged 0-14 & 65+ per 100 pop. 15-64)	2015	100
International migrant stock (000/% of total pop.)	mid-2015	363.1/2.1
Infant mortality rate (per 1 000 live births)	2010-2015	84
Health: Total expenditure (% of GDP)	2014	6.9
Education: Government expenditure (% of GDP)	2014	4.4
Education: Primary gross enrolment ratio (f/m per 100 pop.)	2014	73.0/81.2
Education: Secondary gross enrolment ratio (f/m per 100 pop.)	2014	37.4/49.4
Education: Tertiary gross enrolment ratio (f/m per 100 pop.)	2014	4.1/9.6

Climate:

Month	Y	J	F	M	A	M	J	J	A	S	O	N	D
Average max (° C)	35	31	34	37	40	40	36	32	31	32	35	35	31
Average Min (° C)	24	18	21	24	28	30	28	26	25	25	25	21	18

Hot, dry climate is characterized by alternating three seasons:

Three seasons a year:

- The rainy season (June to October) from 25 to 35 ° C
- The cold season (November to February) 23-33 ° C
- And the hot season (March to May). 35-45 ° C

Since the years of severe drought the area is experiencing endemic decreased rainfall (up to 800 mm). Most often been exacerbated by its poor distribution.

The challenges of chicken production in Mali

One of the biggest challenges of the African chickens is disease. The enormous heat causes a weak immune system and the rainfall enhances the problematique of insects and fungi, which constantly attack the chickens.

The European hybrid chickens are particularly vulnerable. The local chicken breeders buy these European chickens from Bamako (650 km) or from Dakar (Senegal, 750 km). Only 1/3 survives this journey. The rest will become unhealthy, expensive and overgrown chickens. These fowl chickens are hybrid chickens. By combining genes from two parents who look quite normal, chickens are breed who cannot get chicks on their own. When these chicks break out of the egg, it immediately gets very hungry. The only thing the chicks think about is pecking. After five to seven weeks (an average of 42 days, depending on food and climate), it weighs two kilograms and is slaughtered. If you do not slaughter the animal at this age, it becomes helpless and can no longer stand on its own feet. As a consequence, the farmers suddenly have to deal with a large number of slaughtered chickens, and they have to store them in freezers. The regular power failures causes very serious problems. In the end the meat is lost. These purchased chickens are also kept in primitive crates, but cannot stand the heat of March, April May, June, July and August. These factors cause overpricing of chicken ($ 5 to 6 for 1.5 kg), plus one can only purchase chicken meat in the “cold” season. Chickens are therefore more expensive than sheep or cattle.

In collaboration with the Institute for Animal Breeding in Bamako the breed 3/4 was selected for the project Biopal. Although very well adapted to the environment, this breed is very hard to find.

The institute in Bamako hopes to change this, with the help of Biopal. In addition to 3/4, the CouNue and Brahmas are also in great demand and very suitable. Although the growth rate of these chicken breeds is much lower, this is just their advantage. They are robust, heat resistant and very resistant to diseases.

The 3/4 chicken lays fewer eggs (150 / year), but these eggs can be used to breed. The breed also takes longer (90 days) to grow, nevertheless this makes them healthier and more natural. In addition, you can simply let them run around freely and when they are grown up, they can

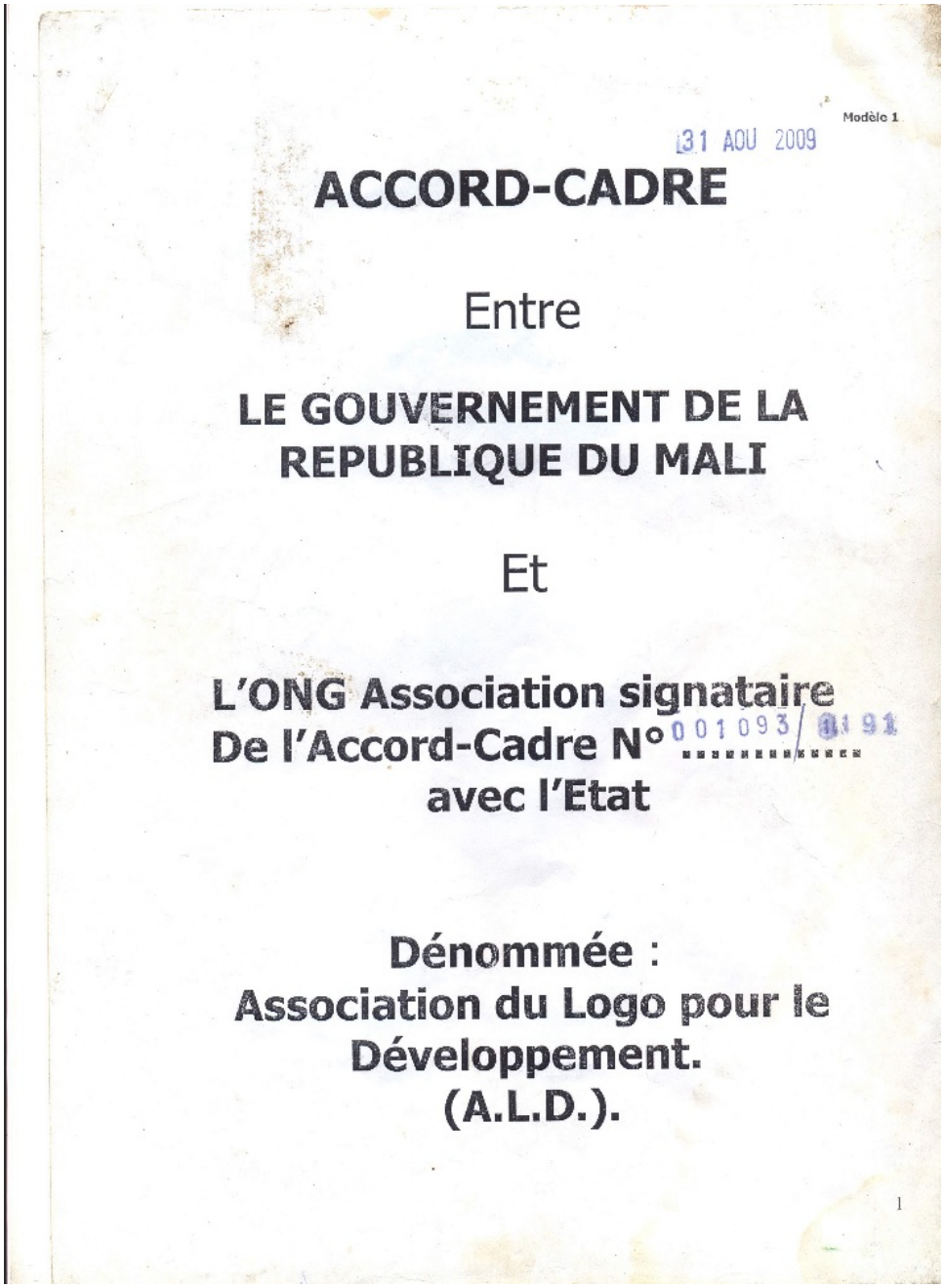
be sold or eaten. For the breeding of our chickens, three different, natural cocks are selected to make the chickens even more robust and healthy.

The most useful and meaningful projects in these countries are based upon agriculture and livestock. Given the problem with chicken, eggs and meat in general and the associated high price, our project is focused on this area.

The local farmers can raise and sell the hatched chicks. The stables and infrastructure are built with our knowledge and are thereby adapted to the great heat, which is one of the main problems in Mali.

The training of workers and farmers in the area is necessary for the proper operation of the project. This is done in collaboration with the local non-governmental organization (Association pour le développement du Logo), that exists since 2003.

Official registration of the local NGO



Modèle 1

31 AOU 2009

ACCORD-CADRE

Entre

LE GOUVERNEMENT DE LA REPUBLIQUE DU MALI

Et

L'ONG Association signataire De l'Accord-Cadre N° 001093/ 0191 avec l'Etat

Dénommée : Association du Logo pour le Développement. (A.L.D.).

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Letter of recommendation of the local imam

Alhassane DRAME
Imam à Sabouciré, Kayes.
Tél : 60 23 30 37

L'ouvrage d'aviculture de l'Organisation Non Gouvernementale / Association du Logo pour le Développement (ONG/ALD) en partenariat avec Biopal-ml de l'Europe, à Sabouciré, dans la Commune Rurale de Logo, qui, depuis son implantation nous offre l'occasion d'accéder à l'achat des œufs et des poulets pour la consommation quotidienne, est d'une importance inestimable.

Cette réalisation, jusqu'au niveau village, contribue à la lutte contre la pauvreté et à l'amélioration nutritive des populations rurales.

Nous prions le seigneur qu'il accorde toute faveur à cette ONG pour permettre de pérenniser cette action.

Cela, au bénéfice du bonheur qu'elle apporte et voir même son extension au plus grand nombre.

Sabouciré, le 06 Janvier 2017

Alhassane DRAME

الحسن DRAMA

الإمام Sabouciré، كايس.

الهاتف: 60 23 30 37

في (NGO / ALD) التنمية جمعية / منظمة الحكومية غير الشعار الدواجن كتاب منذ والتي ،الشعار من الريفية بلدية في ،Sabouciré ،أوروبا مل Biopal مع شراكة للاستهلاك والدجاج البيض شراء إلى للوصول الفرصة لنا تتيح تأسيسها بثمن تقدر لا أهمية ،اليومي.

التغذية وتحسين الفقر مكافحة في والإسهام ،القرية مستوى إلى ،الإنجاز هذا الريف لسكان.

الإجراء هذا على للحفاظ الحكومية غير للمنظمات الدعم كل تقديم لرب نصلي.

عدد أكبر ليشمل نطاقها توسيع نرى وحتى السعادة يجلب ان في الفائدة أن.

Sabouciré، 6 يناير 2017

الحسن DRAMA

V/Sabouciré Mosquée
L'IMAM
C. De Logo - Kayes

Main objectives of the Biopal project

- Stimulation of the economic and social development of the rural community of Kayes. Be sustainable and be an engine for the local economy.
- Economically justified, it is financially self-wearing and durable.
- The investment is based on cost-effectiveness and necessity.
- The project is a technological and economical example and has potential for replication in other places.
- Integration of the local population and the cooperation of the local authorities is a necessity and required.
- Production in a sustainable and environmentally friendly manner. Self-sufficient is the aim, that's why the electricity and hot water for example are produced with solar panels.
- Development and stimulation of the chicken cattle for food security in the Sahel zone
- Breeding of day-old chicks by using a modern breeding machine to prevent the import of unhealthy, overgrown chickens.
- Inhibition of the import of chicken waste from Europe

- Production and sale of biological and responsible chicken feed
- Push-back methods against desertification
- Training of the rural population and promoting entrepreneurship
- Expansion of the sales market to support local producers and organizations.
- Increased, fair wages and health insurance
- Creating perspectives to counter migration

Location of the project

Mali is one of the poorest countries in the world (182 on the index of 187). The landlocked sahelian country is the eighth-largest country in Africa, with an area of just over 1,240,000 square kilometers.

The project itself, is located in Logo, an area east of Kayes, next to the Senegal River. The population of Mali is 14.5 million, the city of Kayes inhabits 250.000 citizens while 19 villages lay around the project with approximately 11.541 people. Logo is lacking common economic infrastructure. Nowadays economic investments such as: village banks, formal cereal banks, weekly markets, transit stations, petrol stations etc. are nonexistent. Training facilities are inadequate and poorly distributed. There is no secondary or vocational school.

VILLAGES	POPULATION
Bankamé	748
Dembagnouma	303
Dinguira	642
Djimékon	510
Fanguiné-koto	600
Fanguiné-kouta	500
Farakotossou	152
Kakoulou	1520
Karaya	650
Kérouané	1092
Lakafia	310
Mallam	612
Maréna	284
Marintouro	338
Modincané	1050
Moussawaguya	300
Sabouciré	960
Sambaga	620
Tintiba	350
Grand total	**11541**

The terrain consists of two premises along 50,000 sq., as well as the possibility to use the surrounding grounds to plant crops and vegetables. This may all grow to more than 250,000 sq. The Biopal-project is located along the Senegal River with a 200 meter river bank on one side and on the other side the main road between Kayes-Bamako and Kayes-Dakar. It is an arid area where trees are scarce. Essentially there are baobabs, thorny, as the "zéguéné" jujube, species whose presence indicate soil depletion.

Advantages of the location:

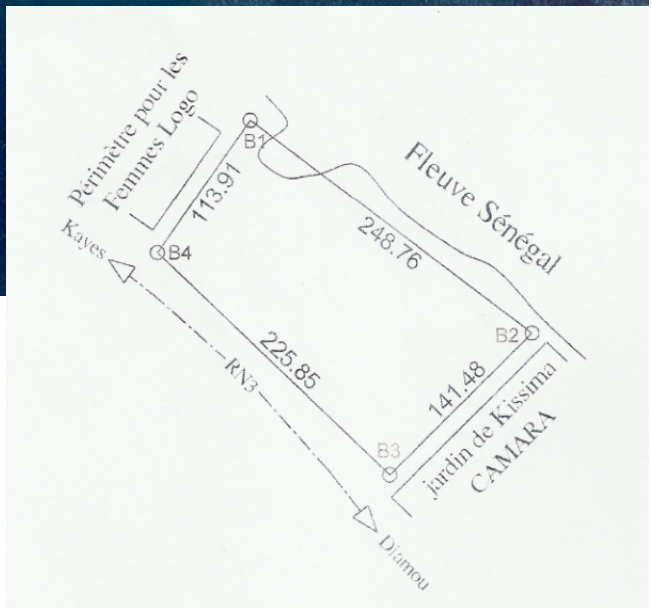
- ✓ The second largest city in the country with around 250,000 inhabitants
- ✓ Biopal is the only project within a radius of 500 km that is active within chicken breeding and at the same time possesses an incubator.
- ✓ Central connections to Dakar (Senegal), Bamako (capital of Mali), Burkina Faso, Niger and Mauritania.
- ✓ Safe area, since the risk of terrorist activities is particularly high in the north.
- ✓ The site is located near the Senegal River, which ensures access to water. The water level of the river varies little. In addition, the plot is 12m above sea level, making it impossible to flood the area.
- ✓ Around the Biopal-project is a large number of unused, fertile agricultural land.

✓ The local population is characterized by a strong desire to strive for progress and are motived to find work.

✓ The Non-governmental organization ALD, is based in Sabouciré (Logo, Kayes) and is a very trustworthy and ambitious partner.

Structures on the premises

- ✓ Four stables with air / water cooling for 1500 grown chickens.
- ✓ The main technical building:
- ✓ Bureau and training area
- ✓ Breeding cabinets
- ✓ Cooling rooms
- ✓ Power supply
- ✓ Storage
- ✓ Kitchen, common room for the staff and the plumbing.
- ✓ Room for the up to 10 days-old chicks.



The buildings on the terrain are divided into different areas. The left side of the project is used for the breeding and rearing of the chickens as well as for the technical area and training of the rural citizens. Here, the stables (casés) for the parent animals, the rearing, rooms for the storage and production of chickens are located.

The main building, with a length of 20m, contains a technical department and an administrative department: batteries, equipment for the solar modules, incubator. The administrative area consists of the office space, kitchen and the sanitary. Bookkeeping, the lounge and the morning meeting place can also be found in this area. At the beginning of each day, the participants gather to discuss the day's goals. Suggestions and questions are very welcome.

The Biopal- project consists of a change system. Each participant takes part in all workstations to ensure the best teaching process. In this way, the Malines youth can not only find their interests, but is also able to learn entrepreneurship and self-initiative.

The right side of the premise is used as farmland and garden. Here, the necessary crops for the chickens can be produced and, at the same time, the participants of the project will be educated in harvesting various vegetables and fruit varieties.

The Casé

The "Case" is a round African hut with a diameter of 4 meters. These are used as a warehouse, chicken stall and barn. The roof consists of corrugated iron sheets and reed. This protects the case from rain and sun. Due to the rain, the outer walls are cemented, since clay and water do not fit well. Cement also prevents the penetration of termites and insects. The absence of bricks in this area, gave us the possibility to introduce a new method and create new working possibilities. Our bricks are made from a mixture of 5% cement and 95% laterite.

Laterite is a mixture of clay which is abundant on the Biopal property and is available in Kayes. In pressed form and wetted with water, it produces a hard red stone. The presence of this raw material prevents expensive imports and at the same time has a *high HQE* (high environmental quality standards). There is also no contamination of the soil and no waste products. In addition, the stones are produced by means of a cold process, which means that there is no emission of heat and CO2.

The incubator

Since the temperature of the incubator has to be 37.7 degrees day and night, the incubator has been reprogrammed and adapted to the difficult climatic conditions. At night it is heated with hot water and radiators that control the temperature.

The hot water is supplied with a sun collector that stores 900 liters of warm water in an insulated tank. This tank is additionally heated with electricity surplus of the solar collectors. The system automatically switches to night mode (hot water) at 6:00 pm.

In the day, the solar panels ensure the 37,7 degree Celsius of the incubator. Batteries, for the necessary storage of electricity, have a capacity of 16 KW.

The capacity of the solar panels is 9000 WP. These are located both in the field next door and on the roofs. The inverters each have a power of 4 kW and 6 kW. Two different circuits are used, so the incubator is separated from other consumers (light, refrigerator, radio, feed mill, etc.).

The maximum capacity of the incubator is 26,000 eggs per month. Our efficient rate is at a standard of 80%, which means we can hedge up to 20,800 chicks a month. The Eggs, which are imported from fattening fowls, have an efficiency rate of 60%.

The efficiency of our own local chickens is, as mentioned above 80%, since they are placed daily in the incubator. All chicks must go through a vaccination program against diseases in the first 10 days, before being sold to several participants.

Sales strategy to enhance entrepreneurship

1. Different sales points are established in the city. For example: at the market, in front of government buildings. Here, adult chickens are offered.

2. Several sellers make their rounds on their bikes in the city and in the suburbs. They sell mainly medium sized chicks.

3. In the center of the city at the main station, a shop is opened, which sells both chickens and animal feed.

4. With a transporter, grown chickens are transported to the market and other, larger customers.

5. The surrounding villages, farmers associations and merchants are supplied with chicks and chickens. The participants receive a small stable to place before their house or on the market and will also get chicken feed. At the moment, we have 15 stables active in Kayes. They can decide to sell directly or to keep same of the chickens to earn more when they grow older. The aim is to give impulses to the development of the area.

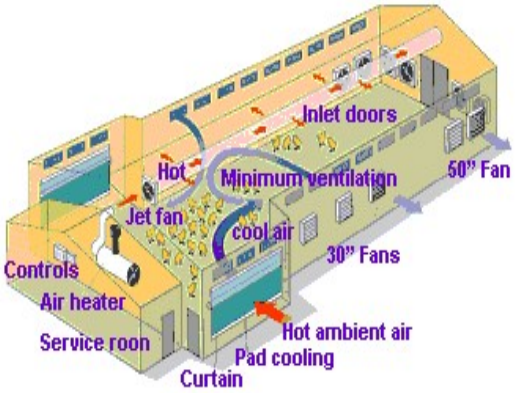
Due to our breed, they can also hedge with the chickens and more importantly the chickens can live several years. The European hybrid breed, only lives for maximum of 40 days, because it will grow extremely and will no longer be able to stand on its own feet.

The local NGO “A.L.D”, with Tingalla Couma as president, teaches the participants the necessary skills: math, economics, sanitary. This is part of the project and enables the people of Kayes to ensure their livelihood. The farmers will play a dual role of learning (school workshops). The farmers are an important tool for linking producers with private services (health, credit, acquisition…) and integration into the market (sales remain individual).

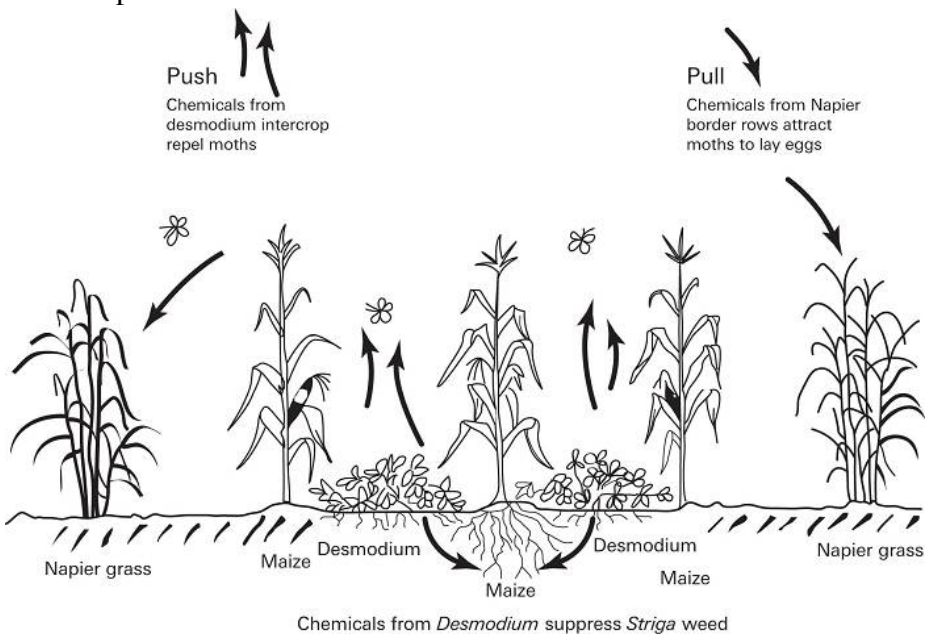
Conclusion

Biopal value chain and business model in Mali

- ✓ Biopal breeds chickens and chicks in the Kayes region. These are going to be available for the local farmers who produce for the local market to generate a higher income.
- ✓ Production of hatching eggs with our own chickens, so there is no need for import.
- ✓ These eggs are then placed in our incubators (26,000 / month). This installation is very modern and fully functional on solar energy. An example that it is possible, to improve the circumstances even with no electricity.
- ✓ Chicks will be delivered to the farmers of the region, who will raise them and then sell them on the market, or keep them to serve.

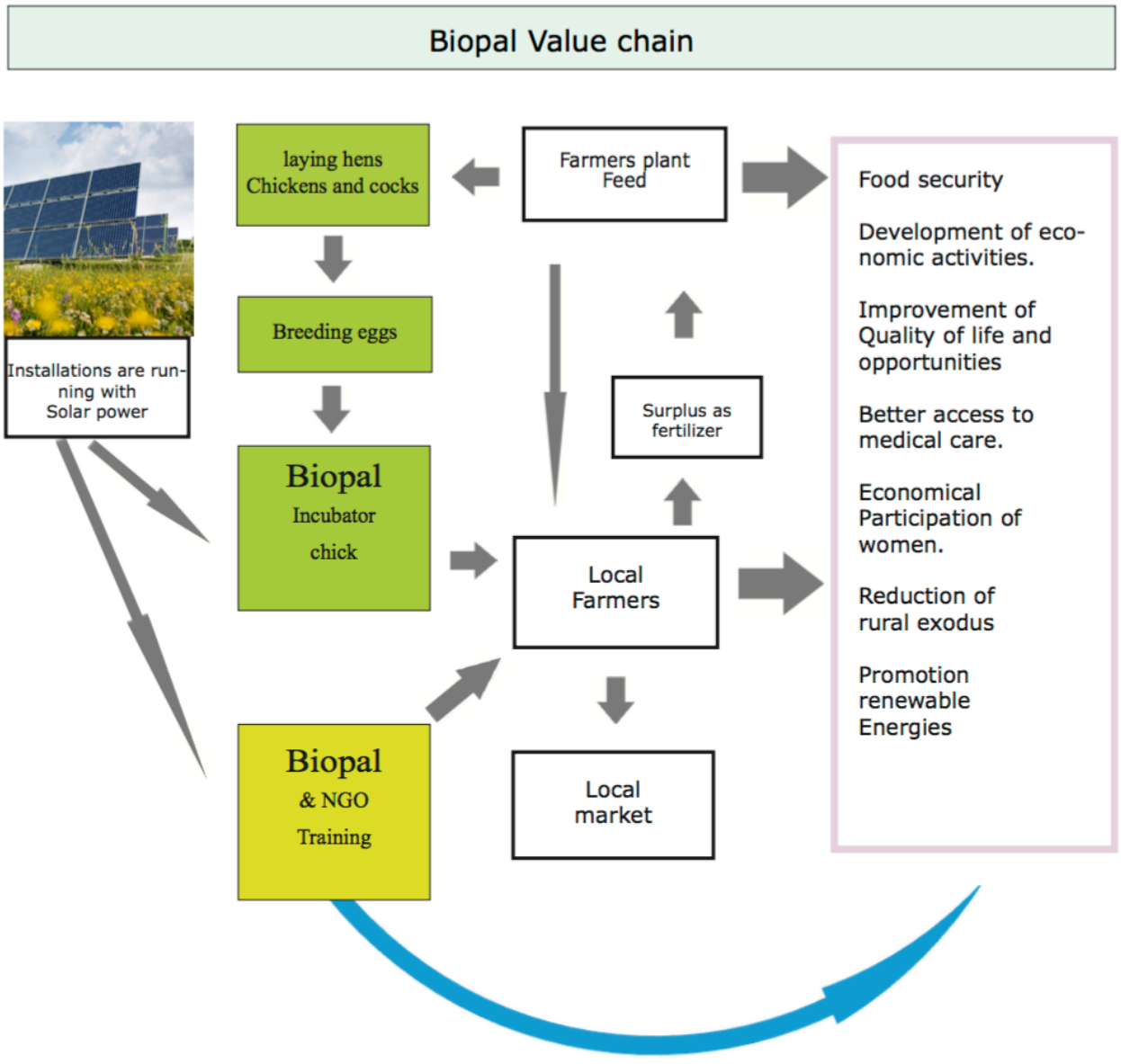


- ✓ The farmers will be trained in agriculture and farming (especially in the poultry breeding), through our cooperation with the local NGO.
- ✓ Necessary fodder is locally planted with "Push-Pull" Bio Principe.



Push-pull technology is a biological method for controlling insects. Specific plants are put as repellent and the other a gravitation for the insects between different crops.

- ✓ The results are: Better harvests, less hunger, sustainable agriculture, no genetically modified maize



SWOT-analyse

✓ Strength

- ✓ Technological know-how and modern technology.
- ✓ Feeling for entrepreneurship and environmental aspects is aroused.
- ✓ Little to no chicken breed available.
- ✓ The majority of the population of Kayes is very committed and show strong self-initiatives to improve their lives.
- ✓ Working together with the local NGO, the cultural aspects are respected and the project has good contacts with decision-makers at higher administrative levels, the imam and the major.
- ✓ There is a narrow social network, accessible to all population groups.
- ✓ The Kayes population is interested in ecological measures to protect themselves against desertification and is committed to environmentally-friendly energy sources.
- ✓ The project has a strategic location due to the proximity of the airport and the centrality.
- ✓ The Malinese youth are explicitly involved and have a high decision-making freedom.

Weaknesses

- The extreme climatic conditions ask for very well thought-out and adapted methods, both in the generation of electricity and in the supply of the chickens
- Low literacy rate
- Constant power supply
- Corruption rate
- The interest of the actors at higher administrative levels is very low.
- Currently, the capacity of the solar panels and batteries is too low due to the extreme heat and the sky being frequently clouded.

- **Opportunities**
  - Possibility of spreading, both in terms of other animal species and food as well as other locations
  - Increasing demand can simply be answered by expanding the number of chickens.
  - Chicken waste, imported from Europe is being halted.
  - Other opportunities for merit are created for local youth.
  - Promising perspectives to counter land run - Pull-back effect –

- **Threats**
  - Diseases and extreme heat periods
  - State arbitrariness
  - Uprisings and terrorist attacks

Confirmation of a possible expansion with 200 hectares.

ATTESTATION

Nous soussignés, Mamadi KONATE maire de la commune rurale de Logo, Sandiakou KOUMA chef de village de Kérouané et Noumou Sissoko, chef du Hameau de "MAMADI Yayon Na Nianié", autorisons que la terre d'une superficie d'au moins deux Cent (200) hectares, situé au nord de village de Kérouané, limité à l'Est par Singouroumin, au sud par le Hameau dit "Mamadi Yayon Na Nianié" et au nord et nord-Ouest par la commune de Diombokhou et le village de Lomba, soit à la disposition totale et exclusive de l'organisation non gouvernementale - Association du logo pour le Développement (ONG/ALD) pour toutes fins utiles et pour une durée minimale de Cinquante (50) ans.

En foi de quoi nous delivrons la présente attestation pour servir et valoir ce que de droit.

Lue et Approuvée

Ont Signé :

Le chef de village de Kérouané
Monsieur Sandiakou KOUMA

Le 1er Conseiller du chef de village
de Kérouané
Mr. Simballa SISSOKO

Le 2e Conseiller du chef de village
de Kérouané
Mr. Mamadi DJIKINE

Le chef de Hameau de " Mamadi Yayon Na Nianié "
Mr. Noumou KONATE

Vu pour la légalisation
Kab... le ... Décembre 2008

Commune Rurale de LOGO
LE MAIRE