REPORT ON PUBLIC PERCEPTION ON BIOFUELS

JUNE 2011

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LIST OF ABBREVIATIONS AND ACRONYMS

ANADEB : National Agency for Biofuel Development
CIRAD : Centre of International cooperation in Agronomic Research for Development
ENR : New and Renewable Energies
FAO : Food and Agriculture Organization
IER : Institute of Rural Economy
IPR : Rural Polytechnic Institute
GTZ : German Cooperation for Development
MS : Dry Matter
PNUD : United Nations Development Program
PEN : Mali's National Energy Policy
PP : Public perception
ONG : Non Governmental Organization
ONUDI : United Nations Industry Development Organization
SEAF : Sustainable Energy Advisory Facility
TV : Television
UEMOA : West African Economic and monetary union

I. INTRODUCTION

1. CONTEX OF THE STUDY AND METHODOLOGY USED

The energy crisis which started in 1973 on the international market has seriously imperiled the socio economic development policy of many countries, in particular developing ones. Since analyses are pessimistic about a future decrease of the price of oil products on the international market, it doesn't seem that the solution will be found soon[1]. Seeing this continual situation, the promotion of biofuels seemed to be the solution to a way out and to ensure to the countries of the world energy independence. Unfortunately, so far biofuel projects haven't prospered because of the criticism of some persons on biofuels throughout the world, not only in industrialized countries, but also in developing ones. Mali is not the exception.

The current study proposes an evaluation of public perception (PP) (case of Mali) on biofuel development. This evaluation requires an analysis of public perception on biofuels, which is considered by the actors of the domain as a prerequisite of biofuel and bioproduct throughout the world since it determines public acceptation, and therefore the demand in biofuel/bioproducts, as well as the possibility to develop their supply[2].

It was recognized that there are big differences on the way experts and the public perceive the risks associated with environmental issues. Therefore, subjective decisions (personal and exclusive decisions of experts: environment protection, poverty alleviation) must take into account the opinion of people. There is a growing awareness of decision makers about the importance of taking public opinion into account when making a decision, and about the need to properly inform the public on the possible advantages and drawbacks of biofuel projects, so that their perception and opinion can be more favorable.

PP is recognized by the experts of the domain as an important element of the success of renewable energy programs, but few studies were made to analyze its real impact and the way these perceptions are made. This lack of analysis was identified by actors who tried to evaluate the relationship between acceptation of biofuels by the public and the development of the sector[3]. This issue was less studied in countries such as Mali where there is not much market development and adoption/innovation of technology associated with biofuels.

For the case of Mali, no study was made on public perception on biofuels. All the documents available on biofuels were the result of the perception of experts of specialists of this sector. Seeing the results expected in this domain, an evaluation to analyze public perception (expert and non expert) become necessary in order to make recommendations on the way to take into account public perception in the policy certification and biofuel sustainability documents in view of the success and the future, in mid and long term, of biofuels in Mali.
The methodology used to carry out this study is composed of the following stages:

- ***Exploitation of existing studies on biofuels*:** This consisted in making documentary and internet research to identify the actors who intervened in the different variables, the external influences and crises, the cultural parameters which influence public perception on biofuel use, as well as that of national media on biofuel issues. The results of that documentary review were used to complete this study.

[1] cf. Study report on biofuels in Mali -2007 P. 14 *(www.cilss.bf/predas/aDP4Etudes.php)*
[2 & 3] cf. Methodology and Guides for the evaluation of Public Perception on Biofuels and Bioproducts (Global Bio Pact -March 2011). Part Introduction P.1.

- ***Field survey:*** To complete the analysis of public perception on biofuel development in Mali made in the part « exploitation of existing documents on biofuels », a survey was made among a sample of 30 persons who are not experts in the domain of biofuel development in Mali. The strategy that was adopted for the selected of these 30 persons (non experts) was as follows

- Some of the surveyed persons (24) were selected among the urban population of Bamako according to their age, sex, level of study and occupation.

- The other strategy adopted to complete the sample to 30 persons was the choice of the public (potential beneficiaries of biofuel projects) in rural area. This strategy consisted in making a public consultation in Garalo (village located in the south of Mali in the Bougouni circle, Sikasso region), with contacts who are likely to provide information that can permit to analyze the perception of this category of persons on the advantages and drawbacks of the use of biofuels in Mali. We thought that the information provided by this social layer (farmers) enables us to better analyze the perception of farmers on biofuel development in general and jatropha development in particular, simply because these persons are growers of this oilseed and knew this plant long before the discovery of its energy value. (See in Annexes the report of the public consultation that took place in Garalo, on public perception in rural area and the list of the participants in this meeting).

Therefore, the age groups selected for the survey are: less than 30; between 31 and 45; between 46 and 65 and more than 65.

2. OVERVIEW OF MALI'S ENERGY POLICY AND VALORIZATION OF NRE POTENTIAL

Mali is a Sahelian country located south of the Sahara with no access to the sea, the closest coastlines being at more than 1000 km. With a population of about 14 millions inhabitants in 2010, it is characterized by a dry climate, with high temperatures and a low rain average[4].

2.1. The National Energy Policy (PEN)

It is centered on five major goals[5]:

- Ensure the widest possible access of the populations of the country to cheap sustainable energy in quantity;
- Valorize the potential in national energy resources;
- Preserve the existing resources in woody fuels [6]
- Liberalize the sector by mobilizing more the initiatives of decentralized communities and private capitals;
- Adapt institutions to the requirements of the energy sector through building the strategic direction and control capacities of the government.

Arrangements are underway to translate into action the above mentioned goals of the energy policy.

2.2. The potential of national energy resources[7]

Mali is a neat oil product importer, but has important national energy resources which are not sufficiently valorized among which biomass. No significant valorization of the latter is being made, except fire wood or charcoal. Now, as an agro pastoral oriented country and first producer of cotton in the south of Sahara, Mali has every year important quantities of agricultural and agro industrial residues, namely

-around one million tons of cotton stalks after the harvest;
- and an important quantity of rice ball and residue of other cereals (millet, corn, etc)

Moreover, the rice growing area of Office du Niger is invaded by *Typha australis which is a serious nuisance for irrigation schemes. The irrigation network of Office du Niger is very important and is composed of 75 km of main channels, 153 km of distributing channels, 50 km of large collectors, 491 km of diverters and more than 2000 km of sprinklers.*

(4), (5) & (7) cf. MEPRED : Etude sur la stratégie nationale pour le développement des biocarburants au Mali Janvier 2008, P.18 &19

(6) Oil (electricity production) and cakes (biogas for cooking) permit to reduce the pressure on the existing woody resources and that permits to preserve the environment.

The area of falas (natural arms of waterways) colonized by typha is 269 km long and 2 km wide in average. The estimated potential in Typha australis is around 100 tons of dry matter (DM)/ha. This source can be used as an alternative fuel to energy wood but still remains non valorized.
Besides, many oilseeds grow in natural state, or are grown in Mali: zèkènèn (Balanites aegyptiaca), npeku, castor, jatropha, cotton, etc. The oils that can be extracted from the seed of such plants can provide fuels, in particular the jatropha plant (**Jatropha curcas**), which exists in many areas (3rd 4th and 5th administrative regions of Mali) presents a very high fuel potential (see quantitative goals for jatropha)
In the country, few of these oilseeds have been the object of extensive studies and research, in view of determining their energy properties and estimate their technico economic value as biofuel: (comparison costs/advantages associated with their large scale development; assets and constraints characterizing their production/operations)
Potentialities of biofuels also exist in the form of ethanol, by-product of sugar industry or starch. Ethanol constitutes a possible alternative for transport, electricity production and cooking heat (gel fuel). It's namely the case of sugar cane (in the Office du Niger area), sorghum with sweet stalk (nyimi–kala), and many other varieties of grass, as well as tubercles (sweet potatoes, yam) and fruit trees (cashew, npeku, ngunan, etc).

2.3. National biofuel development strategy (Link between PEN and biofuel development promotion policy)

Indeed, the Government of Mali approved in 2006, a document of unified energy policy which holds among the goals of the sub sector of Renewable Energies the one of « developing the biofuel sector namely the jatropha, for many uses (electricity production, transport, agricultural engine etc»[8]
The national strategy for the development of biofuels implemented by ANADEB (National Agency for Biofuel Development) appears clearly in the 2nd and 3rd specific goals of the national energy policy qui justify the emphasis placed upon the valorization of the country's potentials in renewable energy in general and biomass (biofuel development) in particular.

Therefore, the use of vegetable oil and ethanol will largely contribute to the access of populations, mainly rural ones, not only to cheap energy, but also to the increase of their income and job creation. Besides, it permits woody resources preservation, and thus environment protection and preservation [9].
Thus, the valorization of this potential is perfectly in line with the goals of the national energy policy.

The charts below[10] indicate the quantitative goals of biofuel production in Mali as planned by ANADEB by the year 2023

[8] cf.Rapport d'étude sur les biocarburants au Mali -2007, P. 15 *(www.cilss.bf/predas/aDP4Etudes.php)*

[9] cf. MEPRED Mali : Etude sur la stratégie nationale pour le développement de biocarburants au Mali - 2008 (Rapport final), P. 29.

[10] Source ANADEB Mali *(Site web anadeb mali)*. It is currently admitted that the 2 most promising biofuel sectors in Mali are jatropha oil and ethanol. These quantitative are translated in terms of strategy for the development of these 2 sectors, but in terms of percentage in the national matrix, there is currently no exact figure outside these prospects.

❖ **Quantitative goals for jatropha**

Table1 : Jatropha oil production goals

Time	Production goals in percentage of imported volumes of hydrocarbons		Jatropha quantities (in litres)
	Jatropha	Others[11]	
2008 to 2013	Replace 10% of diesel oil and DDO by jatropha oil	To be specified after deepening the surveys	39.200
2014 to 2018	Replace 15% of diesel oil and DDO by jatropha oil	To be specified after deepening the surveys	56.000
2019 à 2023	Replace 20% of diesel oil and DDO by jatropha oil	To be specified after deepening the surveys	84.000

Table2: Jatropha oil production goals

Time	Seed production needs (tons)	Seed productivity estimates		Areas to be sown (ha)
		kg/arbre	ha	
2013	224.000	5	3,125	71 680
2018	336.000	10	6,25	53 760
2023	448.000	15	9,375	47 787

❖ **Ethanol production goals**

Table 3 : Quantitative in ethanol production

Time	Cultivated areas (hectares/year)	Quantities of alcohol 95° produced (litres/year)	Quantities of Ethanol (in ton/year)
2013	25 000	25 000 000	25 000
2018	25 000	25 000 000	25 000
2023	25 000	25 000 000	25 000

2.4. Biofuels and other development sectors

The use of biofuels is seen by decision makers as well as by actors of the sector, in developing countries in general, and in Mali in particular, as a means to improve the living conditions of the most vulnerable populations in rural areas.

For the case of Mali, as it was said above, the biofuel which brings much hope is the jatropha which has been well known for long by Malian populations (as shown by the results of the sample selected on the knowledge of jatropha). This plant already announces itself as the green oil of Mali because of the expected results seen its many advantages in the domain of health, agriculture and environment.

The biofuel projects implemented in Mali, namely the case of the jatropha, have had great impacts (I*mprovement of the living conditions of rural populations through the collection and sale of jatropha seeds and also lighting, TV, the conservation of vaccine in health centres, the use by the farmers, of pressing residues as organic fertilizer in the fields, in the localities of Garalo, Keleya, Dialakoroba, Niosombougou, Ouelessebougou, Falan, etc.*) on these development sectors in rural areas.

[11] These are oilseeds other than jatropha (ex. sunflower, cashew, etc.)

This is shown among others by [12]:

- The commitment of farmers with a great potential of job creation;
- The improvement of energy supply in rural area (energy autonomy);
- The contribution to the fight against desertification (valorization of degraded lands and fight against erosion) ;
- The contribution to the alleviation of poverty (improvement of health and education, promotion of the know–how of local entrepreneurs and creation of income generating activities;
- Environment protection (reduction of greenhouse gases by diesel oil substitution).

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[12] cf. UEMOA 2006 : Document de vision et de stratégique régionale pour la valorisation énergétique de la biomasse pour un développement durable, P.24.*(www.globalproblems-globalsolutions-files.org/...files/.../RapportbioenergieUEMOA.pdf)*

II. MAPPING OF ACTORS

1. Categories of actors or protagonists

During the last 20 years, the ministry in charge of energy in Mali, took many actions, in collaboration with technical and financial partners, namely GTZ, UNDP, SEAF, CIRAD, UNIDO, etc. These partners contributed in the establishment of the technical economic feasibility and the environmental advantages of various forms of valorization of these energy crops, especially the jatropha[13].
In the framework of applied research, we can essentially cite: the Rural Polytechnic Institute (IPR/IFRA), the Institute of Rural Economy (IER) and NOVARTIS.
In the framework of the planting and transformation of the jatropha for jatropha oil production, and of sugar cane for ethanol production, many NGO and national and international companies are taking part (see the complete list of actors and category of actors in Annex, with their domains of activity and response areas : source ANADEB

2. Own analysis and additional contribution of other experts *(Hamata Ag HANTAFAYE General Manager of ANADEB, Aboubacar SAMAKE ANADEB)*

Being considered as alternatives to fossil fuels, biofuels are a solution for the alleviation of the reverse effects of climate change. They have a lot of advantages and their development offers the best development prospects for the country.
Mali has an important potential in renewable energy in general and biofuels in particular, their development is considered by the Malian decision makers and public (be they expert or not) in general as something good because they are seen as the energy of the future.
The decision makers and other actors of the sectors must make biofuels an absolute priority by agreeing to invest and by multiplying biofuel projects all around the Malian territory. The development of biofuels like the promotion of the jatropha is a means to fight against poverty in rural areas and protect the environment. Its cultivation permits to create jobs, to improve the income with the collection and sale of the seeds by local producers.

The other aspect of the cultivation of the jatropha biofuel is that there is the possibility to produce it, transform it and use it locally as a fuel for electricity production, driving force production, to permit the mechanization of agriculture. The electricity produced is a catalyst of opportunities for the development of Small and Medium size Enterprises/industries in rural areas.
The development of biofuels allows Mali to ensure its energy independence like in many countries all around the world in general and in developing countries in particular. They (biofuels) permit to react to the problems caused by the rise of the costs of fossil fuels (gasoline/diesel oil).
In spite of the numerous advantages of the development of biofuels in Mali, there can be economic, social and economic risks as well as the risk of food insecurity.

Risk of food insecurity

Some (the opponents of biofuels) criticize biofuels for competing with food production. This competition can manifest itself, either by the diversion of a food plant towards an energy use (groundnut, sunflower…) and/ or the affectation of production factors to energy use (case of jatropha or sugar cane for example).

[13] cf. Rapport d'étude sur les biocarburants au Mali -2007, P. 27 *(www.cilss.bf/predas/aDP4Etudes.php)*

Another analysis of experts [14] also showed that contrarily to the common idea, the other oilseeds (food) have the advantage of permitting local farmers to look for better market opportunities by targeting according to their own choice, either the food market or the energy market depending on the relative prices on the two markets, if the energy market is flexible enough to adapt to changes in supply (case of electricity production)
Contrarily to non food oilseeds like the jatropha, this kind of plants permits to overcome risks (changes in prices, short ROI (return on investment) time, specialization and dependence…) and has the great advantage of valorizing their cake for animal food. However, the problem of competition in terms of the use of soils between energy plants and food plants, which will have to be produced in great quantities, remains[15].

- **Risks and impacts associated with the mode of production of biofuels**

Many possible risks and impacts of the development of biofuels in the conditions of Mali depend on the scenario selected : (either the development of energy (short sector, local production of crude vegetable oil for driving force/rural electrification : case of the multifunctional platform) in rural area : jatropha and other oilseeds, that is, the substitution of vegetable oils to diesel oil for electricity production : jatropha and other oilseeds, that is, the use as fuel in transportation : substitution of ethanol to gasoline or of biodiesel to diesel oil).
But some risks are transversal to these scenarios, these are for example the risks associated with the absence of an incentive legal framework or more generally the absence of an economic and institutional framework that is secured around productive processes brought about by the development of biofuels (access to credit, access to intrants, access to markets, access to information and to training…). The risks and impacts associated with the modes of production (on communal lands, farmer modes, agro industry) can be associated in this category. The modes of production will largely determine the impacts on land, whether in terms of deforestation or of competition on fertile agricultural lands or on pastoral resources[16].

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(14), (15) &(16) cf. Etude sur les opportunités de développement des biocarburants au Burkina Faso-Décembre 2008,P.138-139*(www.cirad.bf/fr/anx/bioenergie-kfw.php)*

III. EXTERNAL INFLUENCES AND CRISES

The analysis of external influences and crises on public perception on biofuels leads us to consider the external influences and crises at two levels: comestible biofuels (drawn from sugary plants and starchy plants) and non edible biofuels (jatropha oil).
In the first case, their development has been and is still controversial all around the world. They are considered by many persons as cultures which compete with food production, as the General Director of FAO said: « The worldwide increase of biofuel production threatened the access of the poor populations of the third world to food stuff. This has already caused riots all around the world such as the ones which took place in Haiti, in the Philippines or in Egypt in 2008 (Salim Lamrani 2008)[17].Still according to FAO in one of its reports presented in Brazil: "The production of biofuels is made at the cost of subsistence crops by drawing from water supply, and by diverting lands and capital, what pulls the increase in prices of foodstuffs and "will put in danger the access to foods for the most discriminated elements" [18].

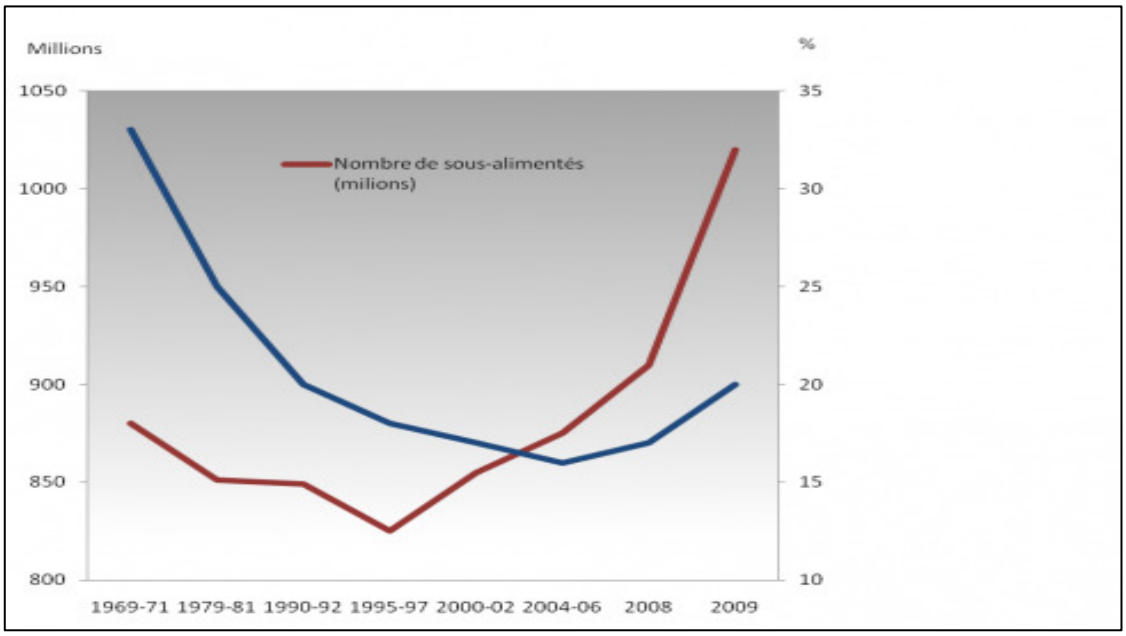
Besides, the market of biofuels was associated by opponents to biofuel development (ex FAO and other institutions defending food security) with, at least in part, the sharp rise in prices of edible products, which led to the important food crisis that erupted in the world in 2008(19). However, the origin of this crisis is complex and seems to be associated with many factors (Nellemann, 2009). Among them, we can cite [20] *1) the post war green revolution which influenced the agricultural production modes 2) the world demographic explosion, 3) the slowing down of the economic growth and the macro economic imbalance, 4) the increase of oil and fertilizer price, 5) the reduction of stocks and the growing demand of developed countries which saw a rise of their family incomes, 6) the reduction of research and development in agriculture, 7) financial speculation, 8) The disturbances of the offer caused by the climatic chances (Ajanovic, 2010 ; Paiment 2008 ; Werly, 2009).* The sharp rise in prices which resulted led around 130 million people under the poverty line in 2009 according to the World Bank (Headey, 2010).

For the case of Mali, this situation manifested itself throughout the country at many levels, namely the soaring of the price of food crops generally called staple commodities and the price of fossil fuels. This disastrous situation still has effects on the Malian population.

For the case of biofuels drawn from non edible resources like jatropha, they offer a lot of advantages and promising socio economic and environmental solutions. The jatropha doesn't compete with other food crops because its oil can't be consumed. However, It remains to confirm if the jatropha plant (in association with the food plants) does not have damage in the food cultures due to the fact that the interactions between associated cultures are badly known.
This graph indicates the number and the percentage of underfed individuals in the world between 1969-2009 (22)

[17 &18] According to an article on biofuel and food crisis on April 22th 2008 by Salim Lamrani « Les émeutes de la faim en Haïti (the riots of hunger in Haiti) » (www.mondialisation.ca)
[19 & 20 & 22] cf. Food crisis, sustainable development and biofuels : prospects for the future www.vertigo.revues.org/10734: la revue électronique en sciences de l'environnement, volume 11 Mai 2011

[21]cf. Etude sur les opportunités de développement des biocarburants au Burkina Faso-Décembre 2008, P.138 *(www.cirad.bf/fr/anx/bioenergie-kfw.php)*



Source : adapted from Dubuis 2009

IV. MEDIA'S ANALYSIS

In Mali several media are interested in biofuels. In a lot of their publications or their broadcasts, a part is dedicated to the promotion of biofuels in the column " Economics *Environment ". All the events for the promotion of biofuels are covered by the media to inform the populations about the importance of the development of biofuels. The main media of information in Mali are among others: the national television, the newspapers of the place, Journal du Mali.com etc.

This is how the National Agency for the development of Biofuels launched a vast Information campaign through State and private national channels, namely the Office of radios and Television of Mali (ORTM) and a private TV channel, Africable. Many privates such as Mali Folkecenter and Mali Biocarburant organize TV magazines and newsletters towards the actors who are members of the Network of reflection on the promotion of the biofuels in Mali. It would still be necessary to recognize that often the language of communication or the support constitute obstacles to the access to a wide Public.

1. Influence of media revealed by the answers to the questionnaire

The media play a large part in the knowledge of biofuels on behalf of the public at every level (age, social standing, academic level and profession). These charts and graphs below indicate the trends of the public perception according to the sample chosen in Bamako (24* persons) and Garalo (6 ** persons).

Chart 4.1: Perception of the sample chosen by age group /sources of information

Age group	Public perception by age/sources of information					
	Size/Age group/Sex		TV	radio	Newspapers	Workplace
	Male	Female	%	%	%	%
Less than30	3	4	100	0	0	0
Between 31-45	10	6	88	6	0	6
Between 46 -64	4	2	100	0	0	0
More than 65	1	0	0	0	100	0

We see according to figure 1 below, for the selected sample, that:

- All the age groups get informed through TV;
- The age group of less than 30 gets informed only through TV;
- The group between 31-45 gets informed TV; through Radio, on their workplace.
- The group of more than 65 gets mainly informed though newspapers.

* The 24 persons were chosen in Bamako at random based on our social network of profile / profession / different age (State employee / Student). We were able to do this work by using their e-mail addresses for the sending. This survey was realized between May 09th and 31st, 2011 in these two places (District of Bamako and the village of Garalo).

** The 6 persons were chosen in Garalo (village situated at approximately 217 km from Bamako in the South of Mali, in the region of Sikasso) on May 14th, 2011 during a public consultation

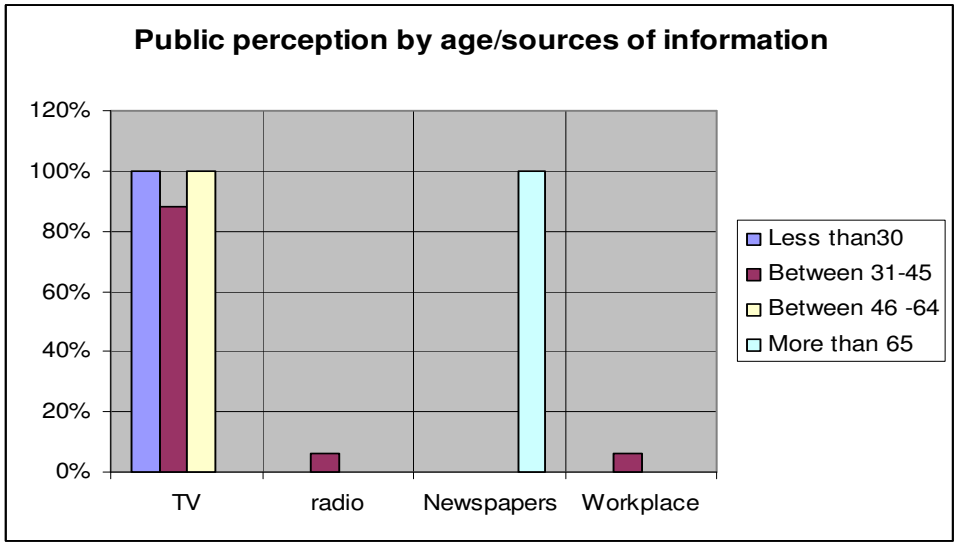


Fig.1: Public Perception by age/sources of information

Chart 4.2: Perception of the selected sample by occupation/sources of information

	Public perception by occupation/sources of information			
	TV	radio	Newspapers	Workplace
Occupation	%	%	%	%
Engineer in agriculture and rural engineering	100	0	0	0
Consultant in environment and sustainable development	100	0	0	0
Town and country planner	100	0	0	0
Teacher	75	0	0	25
Accountant	100	0	0	0
Administrator	75	25	0	0
Farmer	67	0	33	0
Information officer/archivist	100	0	0	0
Administrator	100	0	0	0
Mining engineer	100	0	0	0
Student	100	0	0	0
Specialist in local development	100	0	0	0
Sociologist	100	0	0	0
Engineer in electricity	100	0	0	0
Pharmacist	100	0	0	0
Socio economist	100	0	0	0
Forestry expert	100	0	0	0
Engineer in cattle breeding	100	0	0	0

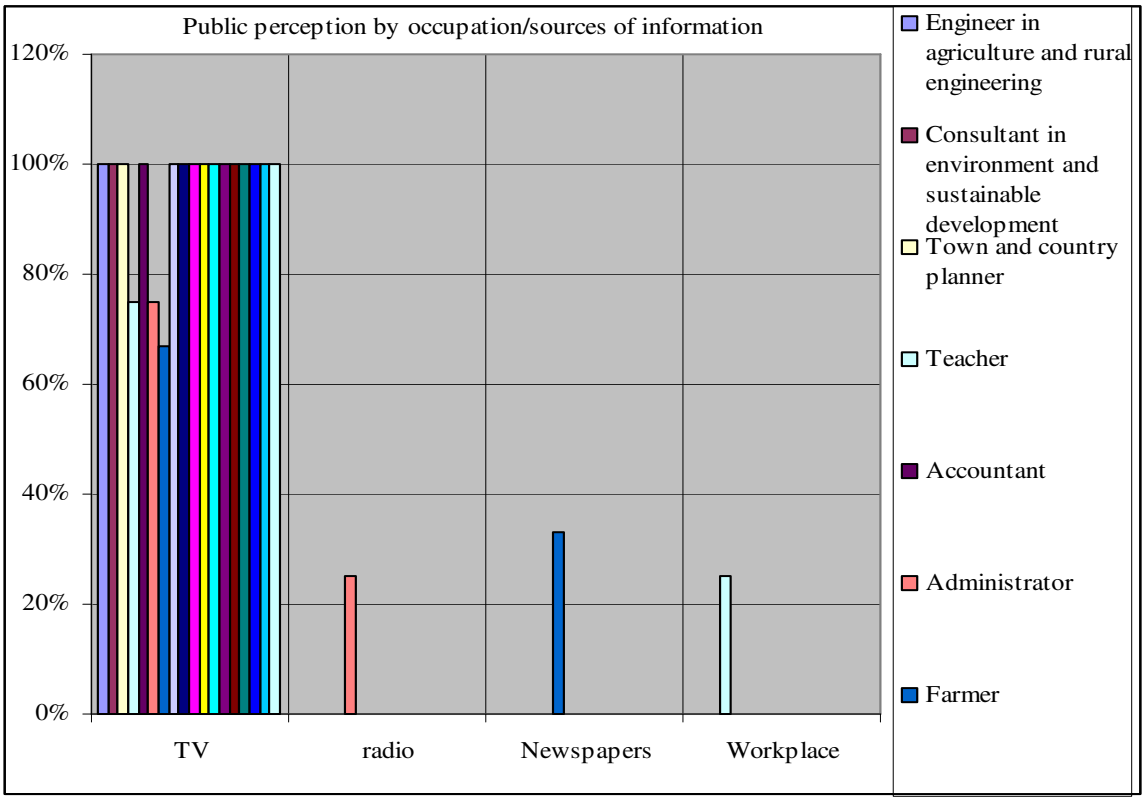


Fig. 2 : Perception of the selected sample by occupation/sources of information

According to this graph, all the investigated persons chosen according to their occupation get informed on biofuels for the greater part through the television (TV) and few people from the other sources of information such as radio, the newspapers, and workplace and during big events.

It shows how much televisions (national and foreign) play a large part in the knowledge of biofuels on behalf of the public (especially not expert).

V. CULTURAL PARAMETERS

In Mali, the majority of the population, whatever their social standing and their rank, support the development of the jatropha biofuel (which is the most known in the country) according to a socio historic point of view. Historically, the production of the plant Jatropha " Bagani in Bamanan language introduced by the colonists at the level of the service(office) of Niger since the 1932s for energy purposes, was very quickly forbidden by Dakar which was the capital of French West Africa (AOF) currently western Africa, so that it should not compete with fossil fuels. This is how this dimension was erased from the popular consciousness

The populations, knowing well the plant, began to use it for its virtues of soap, medicinal, and others. The jatropha was used by the women in rural areas for the manufacturing of the soap, the treatment of some skin diseases and dislocations.

It is only the works of the German cooperative Hebnning Reihart (for the sake of ex GTZ, current GIZ) who relaunched the energy dimension of the jatropha plant in Mali:

These charts and graphs indicate the level of knowledge of the plant (Jatropha) and the biofuels projects (in particular jatropha) implemented (that is locally or in the country) for the chosen sample (survey realized between May 09th and 31st, 2011). Indeed for this case the choice was made from their age group.

Chart 5.1: Level of knowledge of the selected jatropha sample by age group

Age group	Knowledge of Jatropha by age group			
	Size/Age group/sex		no	yes
	Male	Female	%	%
Less than 30	3	4	25	75
Between31-45	10	6	0	100
Between46 -64	4	2	0	100
More than 65	1	0	0	100

We notice for our sample that:

- All the age groups know the jatropha plant in Mali;
- Only a few young people aged less than 30 don't know the jatropha plant.
- The age group of more than 65 couldn't be represented for lack of sample that correspond to it

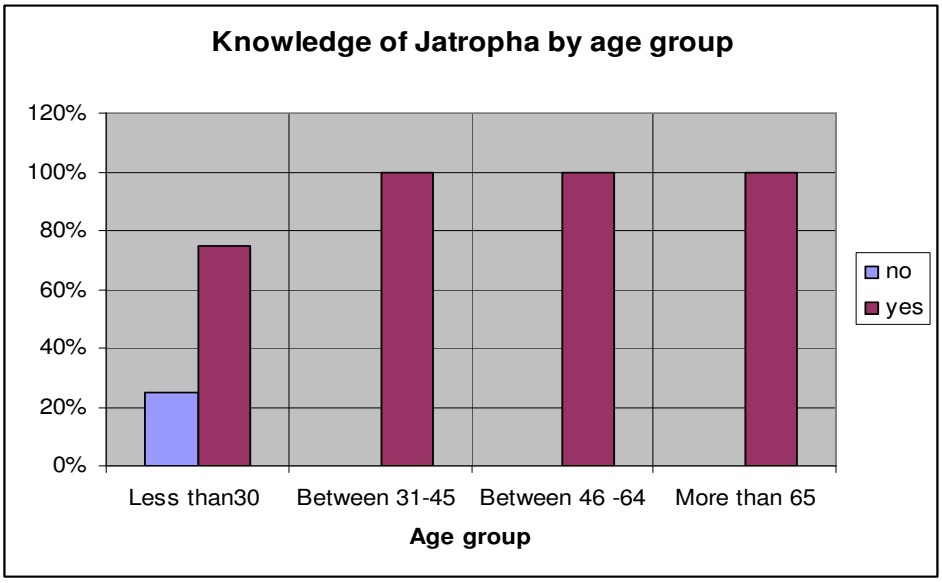


Fig 3

Chart 5.2: Zone of knowledge of the selected sample of biofuel projects (like jatropha) in Mali by age group.

Age group	Zone of knowledge			
	Size/Age group/sex	Size/Age group/sex	Locally	In the country
	Male	Female	%	%
Less than 30	3	4	12,5	87,5
Between31-45	10	6	40	60
Between46 -64	4	2	80	20
More than 65	1	0	0	100

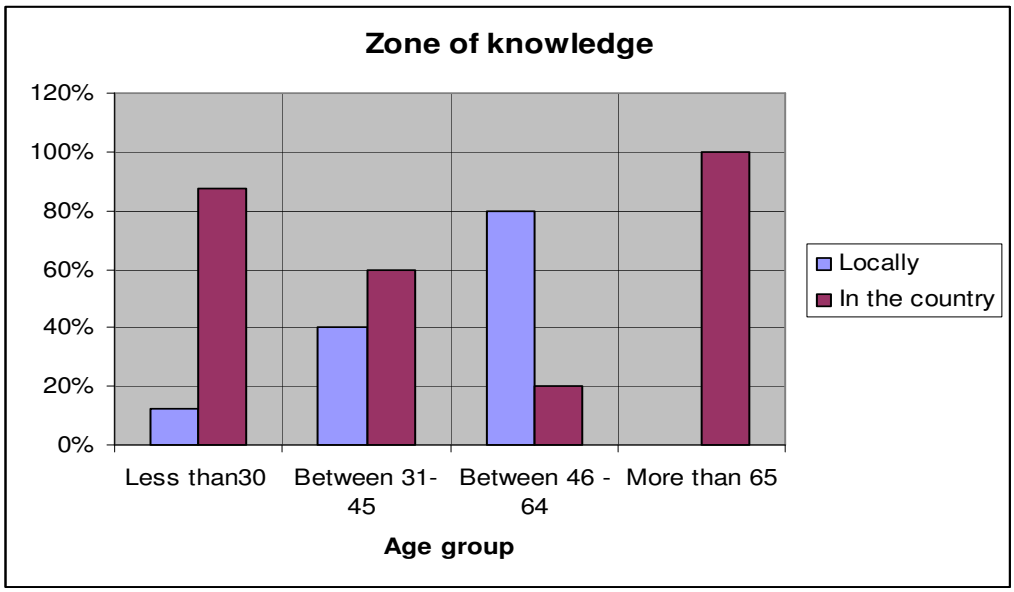


Fig.4: Zone of knowledge of the selected sample of biofuel projects (like jatropha) in Mali by age group.

For the selected sample:

- Less than 20% of those aged less than 30 know biofuel projects implemented locally against 80% in the country.
- 40% of the age group (31-45) know biofuel projects implemented locally against 60% in the country.
- 20% of the age group (46-64) know biofuel projects implemented locally against 80% in the country.
- 100% of the age group aged more than 65 know biofuel projects implemented in the country.

Chart 5.3: Zone of knowledge of the selected sample of biofuel projects (like Jatropha) in Mali by occupation

Occupation	Zone of knowledge	
	Locally	In the country
	%	%
Engineer in agriculture and rural engineering		
Consultant in environment and sustainable development	100	0
Town and country planner	100	0
Teacher	67	33
Accountant	0	100
Administrator	0	100
Farmer	33	67
Information officer/archivist	0	100
Administrator	100	0
Mining engineer	0	100
Student	0	100
Specialist in local development	100	0
Sociologist	0	100
Engineer in electricity	0	100
Pharmacist	0	100
Socio economist	100	0
Forestry expert	100	0
Engineer in cattle breeding	100	0

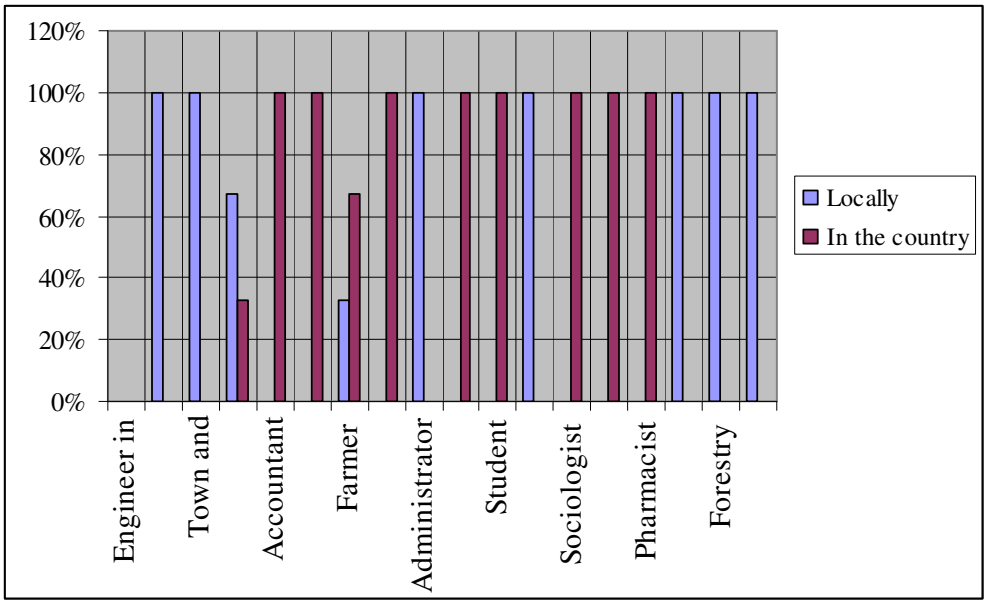


Fig.5 : Zone of knowledge of the selected sample of biofuel projects (like Jatropha) in Mali by occupation

All the occupations of the sample know the biofuel projects implemented either locally or in the country.

VI. SYNTHESIS

The targeted public thinks (for all the criteria of the choice of the sample) that the development of renewable energies in general and that of the biofuels is a good thing because of the uncountable advantages that they (biofuels) present for developing countries in general and Mali in particular. They can contribute to job creation, to the generation of income and the improvement of the living conditions of the rural populations through culture, electricity production, the production of driving force, etc. Another important aspect of the development of biofuels is the environmental protection against the reverse effects of climate change (reduction of greenhouse gas emissions effects which contribute to global warming).

Their large-scale development in Mali would not only allow to fight against the poverty of rural populations, but also to reach energy independence for the country from oil products.
In spite of this support to the development of biofuels because of its uncountable advantages, some evoke worries about the success of the domain because of the difficulties encountered by some biofuel projects already implemented (in the country or locally). See the case of Garalo (Page 19)

6.1 Public perception according to selected age groups on the development of biofuels in Mali

For the majority of the persons surveyed on whether they are for or against biofuel development in Mali:

Table 6.1: Perception of the sample selected on « For or against biofuels »

Age group	For or against the development of biofuels, cultures energy valorization, Jatropha			
			No	yes
	M	F	%	%
Less than30	3	4	12	88
Between31-45	10	6	6	94
Between46 -64	4	2	0	100
More than 65	1	0	0	100

- The age groups of more than 45 are for (100%) the development of biofuels;
- 88% of the public aged less than 30 are for, and 12% are against the development of biofuels;

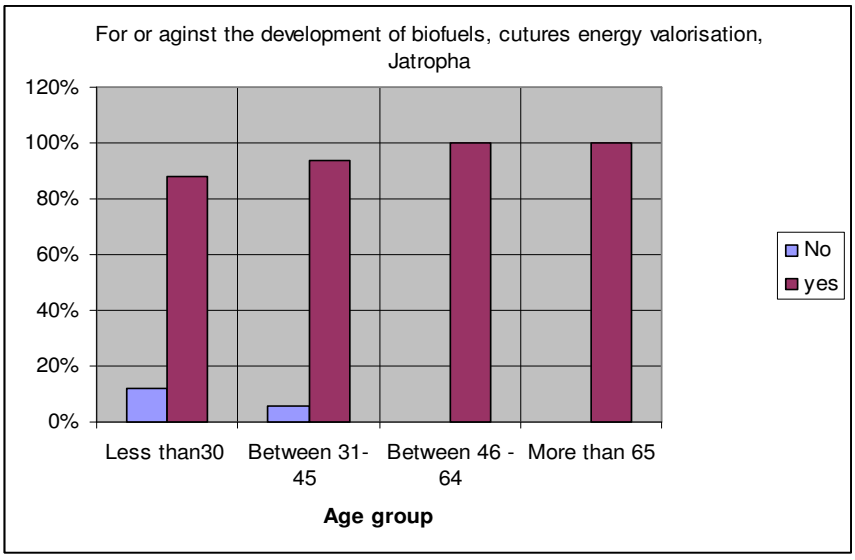


Fig.6 : Perception of the sample selected on « For or Against biofuels »

- The age group 31-45 is for a proportion of 95% and 5% against the development of biofuels. The majority of the persons surveyed think that biofuels are a good thing for the country because of some of the many advantages they have, either socio economically or environmentally.

6.2. Public perception on the sustainability of the development of biofuels in Mali

According to the figures below (either by age group or by occupation), the majority of the persons surveyed think that the development of biofuels for energy valorization or jatropha is sustainable. However, some think that it isn't sustainable, but in a very low proportion.

Chart 6.2: Perception of our sample by age group on the sustainability of the development of biofuels

Age group	Perception on the sustainability of the development of biofuels, of cultures for energy valorization, of Jatropha			
	Size/age group		No	yes
	M	F	%	%
Less than30	3	4	12	88
Between 31-45	10	6	18	82
Between 46 -64	4	2	0	100
More than 65	1	0	0	100

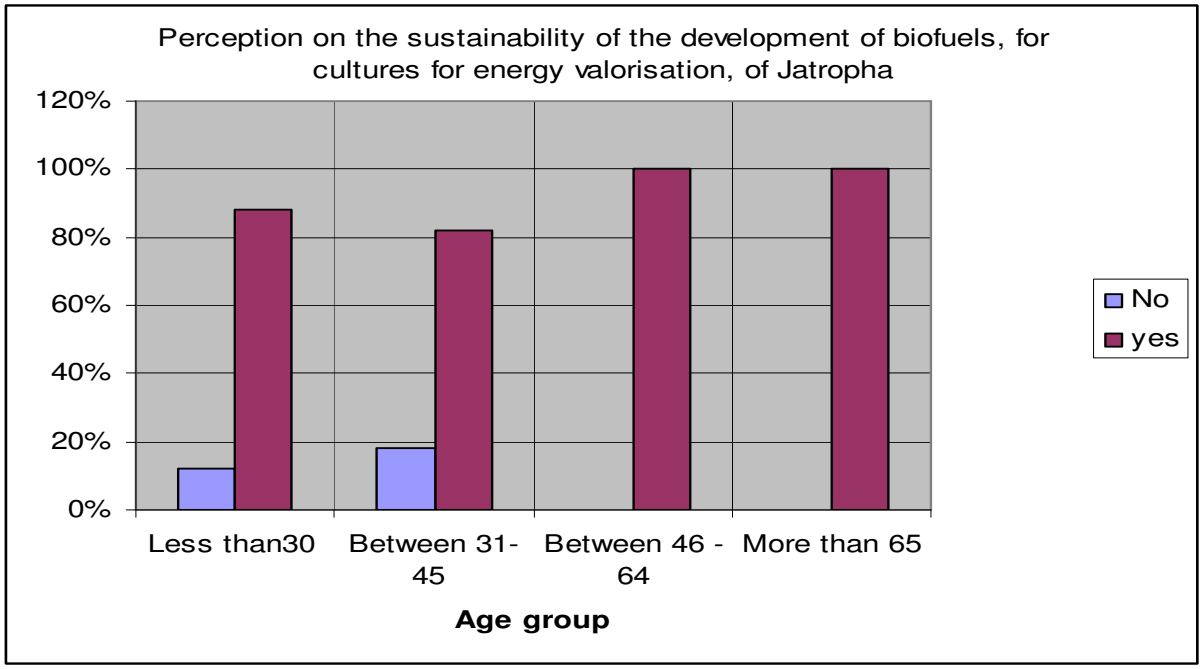


Fig.7 : Perception of our sample by age group on the sustainability of the development of biofuels

Chart 6.3: Perception of the sample by occupation on the sustainability of the development of biofuels

Occupation	Perception on the development of biofuels, of cultures for energy valorization, of Jatropha	
	No	Yes
	%	%
Engineer in agriculture and rural engineering	0	100
Consultant in environment and sustainable development	100	0
Country and town planner	0	100
Teacher	0	100
Accountant	0	100
Administrator	50	50
Farmer	0	100
Information officer/archivist	0	100
Administrator	0	100
Mining engineer	0	100
Student	0	100
Specialist in local development	0	100
Sociologist	0	100
Engineer in electricity	0	100
Pharmacist	0	100
Socio-economist	0	100
Forestry expert	0	100
Engineer in cattle breeding	100	0

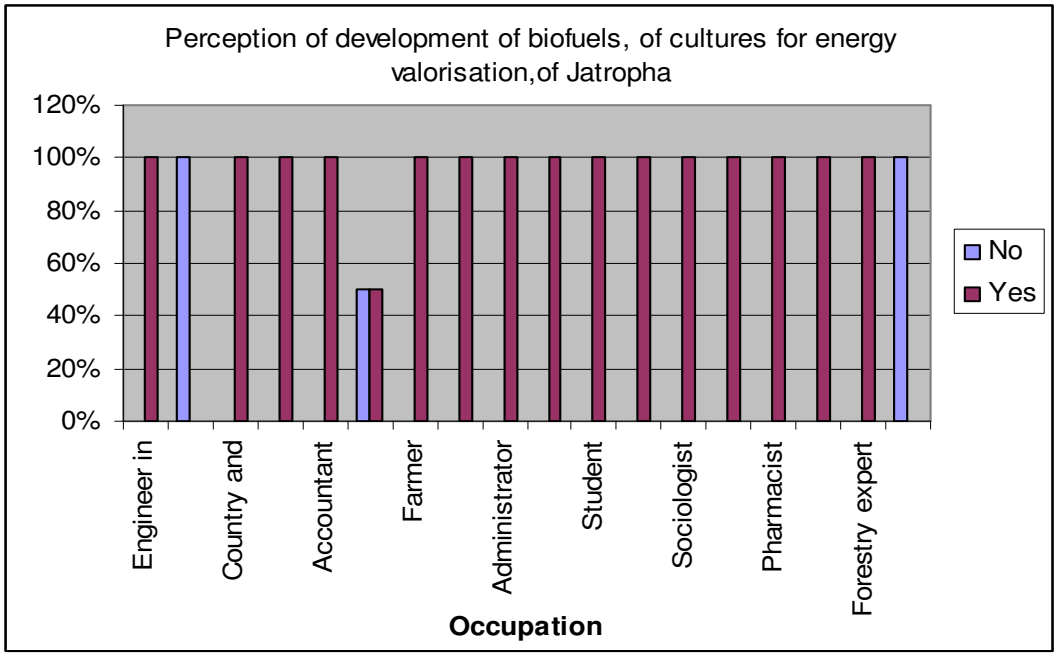


Fig.8: Perception of the sample by occupation on the sustainability of the development of biofuels

6.3. Perception of the farming public in rural area: Case study

For our case study in this milieu and seeing the answer collected during the public consultation with farmers in the village of Garalo, this category of the social layer appreciates much the development of biofuels, namely the jatropha. The jatropha plant had been well known by the populations of area long before the discovery of its energy value. With the project of jatropha based electrification in their locality, it permitted to boost the socio economic development of the area through the improvement of the living conditions of the populations in the domain of health, education, agriculture and also the generation of income through productive and commercial activities. In spite of the craze they showed for the cultivation of the jatropha in the area, farmers (producers or not) are asking themselves a lot of questions about its success at mid and long term, which are translated into the difficulties cited as follows: 1) the poverty of the lands fitted out for the cultivation of the jatropha, 2) the lack of fertilizer contribution to the plant, 3) the lack of maintenance of the plots of jatropha by the producers, 4) the more and more visible disinterestedness of the producers in the existing plantations, 5)the price of the kilogram of jatropha seeds which the producers consider low.
By analyzing the perception of these farmers on the development of biofuels in Mali, namely the jatropha, the following elements come out: i) the poverty of the lands sheltering the jatropha plants; ii) the price of the kilogram of jatropha seeds (considered trustworthy); and iii) the land problem. For the case of the competition of biofuels with subsistence crops, they remain convinced that the large scale development of biofuels intented for consumption (food) can compete with other subsistence crops, but this is different with the case of the jatropha because its oil is not edible.

6.4. Variables influencing public perception on biofuels in Mali

The variables which influence public perception on biofuels can be the lack of possible interest of producers and consumers in the development of biofuels.
In Mali, agriculture is considered as the engine of development, which has the potential to favor economic growth and reduce poverty. In this logic, its production and profitability must be favored. Malian agricultural producers work in a difficult socio economic and environmental context. The poor soils and biotic constraints, the erratic rainfalls, but also the volatility of agricultural markets and the difficulties of access to credit for the producers, are as many challenges that Malian farmers must take up.
However, the opening of agricultural markets for biofuels (food oilseeds) has the advantage of allowing local farmers to look for the best market opportunities, by targeting their choice, either the food market, or the energy market according to the relative price on these two markets, if the targeted market is flexible enough to adapt to the variations of the supply, namely for the case of electricity production. For the case of non food biofuels, namely the jatropha, they permit not to depend on certain risks (price variation, short ROI time, specialization and dependence…). In addition to the opening of agricultural markets, the training, the information and the sensitization of populations remain a means to get to evolve the perception of the Malian public (urban or rural) on the development of biofuels in Mali.

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ANNEXES :

1. Categories of actors in the sector of biofuels in Mali

ACTORS AND NGO WORKING IN THE JATROPHA SECTOR			
N°	Names of actors	Sectors of activity	Areas of intervention
N°	Names of actors	Sectors of activity	Areas of intervention
1	Mali Biocarburant SA	Production et transformation of jatropha oil into biofuel.	KOULIKORO and KAYES regions
2	Malifolkecenter Nyetaa	Production and pressing of the jatropha seeds.	SIKASSO and Koulikoro regions
3	AEDR (TERIYA BUGU)	Production and pressing of the jatropha seeds	SEGOU region
4	Jatropha Mali Initiative (JMI)	Production and pressing of the jatropha seeds.	KAYES region
5	Bagani SA	Production of jatropha seeds.	SIKASSO and SEGOU regions.
6	ONG AMEDD/GERES	Production of jatropha seeds and pressing of jatropha seeds	SIKASSO region
7	Association desJeunes pour l'Appui au Développement de Banamba (A.J.A.D.B.)	Production of jatropha seeds.	KOULIKORO region
8	Association des ressortissants des villages de Ségouna et Kamita (A.R.S.K.)	Production of jatropha seeds	KAYES region
9	Mali Bioénergie	Production of jatropha seeds	SEGOU region (Markala)
10	Sud Agro-industrie	Production of jatropha seeds	SIKASSO region
11	Gaoussou FOFANA	Production of jatropha seeds	KOULIKORO region
12	Association pour le Développement de la Commune de Kendié (A.D.E.C.K.)	Production of jatropha seeds	MOPTI region
13	SOCIMEX	Production of jatropha seeds	SIKASSO region
14	Association BENKADI	Production of jatropha seeds	KAYES region
15	Société Coopérative Multifonctionnelle Noupagagnon de Simona (S.C.M.N.S)	Production of jatropha seeds	SIKASSO region
16	Crest Global Green Energy SA (C.C.G.E. SA)	Production and transformation of jatropha oil into biofuel.	SEGOU region (Circle of San)
17	Petrotech-ffn Agro Mali S.A Biocarburant	Production et transformation of jatropha oil into biofuel.	SEGOU region
18	ONG ASADES-MALI	Production of jatropha seeds.	GAO region
19	NOOR BIO ENERGIE	Production of jatropha seeds.	SEGOU and KAYES regions
20	ONG/AVAC	Production of jatropha seeds.	SIKASSO and KOULIKORO regions
21	Union Locale de Sociétés Coopératives des Producteurs de Pourghère de Koulikoro (ULSPP)	Production of jatropha seeds.	KOULIKORO region
22	Honore FOMBA	Production of jatropha seeds.	KOULIKORO region
23	Association Villageoise de Koualé	Production of jatropha seeds.	SIKASSO region
24	Association Féminine le	Production of jatropha seeds.	SEGOU region

ACTORS AND NGO WORKING IN THE JATROPHA SECTOR			
N°	Names of actors	Sectors of activity	Areas of intervention
	Jardin Olivier KEITA de Gualabougou		
25	Consortium pour la Promotion du Développement de la Filière Pourghère au Mali (CPRODEF-Mali)	Production of jatropha seeds.	KAYES, KOULIKORO, SIKASSO, SEGOU ; MOPTI, TOMBOUCTOU regions
26	ONG-Association Jitumu Kunkan	Production of jatropha seeds.	KOULIKORO region
27	OREMAP	Production of jatropha seeds.	KOULIKORO and SEGOU regions
28	Groupe de Recherches et d'Applications Techniques (GRAT)	Promotion and Development of the jatropha network	SIKASSO region
29	Association « BACIRI »	Production of jatropha seeds.	SEGOU
30	CFDM	Production of jatropha seeds.	KOULIKORO
31	Groupe d'Appui au Développement de la Femme (GADEF)	Production of jatropha seeds.	KAYES

ACTORS WORKING IN THE SUGAR CANE SECTOR			
32	SUKALA	Production of alcohol	SEGOU (Office du Niger area)
33	N-SUKALA	Production of ethanol	SEGOU (Office du Niger area)
ACTORS WORKING IN THE VEGETABLE BIOMASS SECTOR			
34	TISSINA SARL	Production by the gasification method	SEGOU (Office du Niger area)

Source : ANADEB

2. Results of the surveys (Qualitative questionnaire)

2.1. Report of the public consultation in rural area (village of Garalo)

Time of the beginning of the meeting: 11h00

End of the meeting: 13h30mn

INTRODUCTION

On Saturday, May 14th, 2011 took place under the shed of the Power plant of Garalo a meeting to collect the perception of the public on the use of biofuels in Mali within the framework of the project Global Bio Pact coordinated by the NGO Malifolkecenter.

PROGRESS OF THE ACTIVITIES

The meeting began with welcoming words accompanied with the greetings of Mr Ousmane OUATTARA, Executive Secretary of the NGO Malifolkecenter, Coordinator of the activities of said project, to the participants.

After the greetings Mr Ouattara, explained the objective of the day meeting. Before giving the floor to the participants, he gave the floor to Mr Adama SANGARE, 1st deputy mayor of

Garalo. The latter, in the same dynamics, spoke about the importance and the advantages of the cultivation of jatropha in his village.

In his explanations, Mr OUATTARA exposed the theme on which the activities of the meeting will have to take place. In his introduction, he explained the craze which the development of liquid biofuels arouses worldwide generally and in Mali in particular. But in spite of the uncountable advantages that biofuels have, whether they are used for the development of energy in rural areas (Production of driving force, PTF): Jatropha and other oilseeds, that is the replacement of crude vegetable oil in the diesel oil for electricity production: Jatropha and other oilseeds, or the use as fuel in the transport: replacement of gasoline by ethanol or diesel oil by biodiesel, they still have difficulty in prospering in the world in general and in Mali in particular. Further to these constraints, Mr OUATTARA indicated that, according to the experts of this domain, the necessity of estimating and analyzing the perception of the public becomes a prerequisite for acceptation by the public and for the success of biofuels in the world and Mali is not an exception to the rule.

After this brief introduction, Mr OUATTARA gave the floor to the participants through questions ranging from knowledge of biofuels particularly the jatropha, and dealing with the risks and the impacts of biofuels, the difficulties and measures to be taken for the success of the jatropha plant so that they give their opinion with regard to the development of biofuels in general, but especially, in particular, the constraints which hinder the success of the cultivation of jatropha particularly in their zone and the measures which they consider necessary to take.

Interventions after interventions, the answers of the participants were especially centered on the jatropha biofuel. They explained that they knew the jatropha plant well before today, and that in the old time, the women used it to make some soap, as well as to treat dislocations and to treat some skin diseases.

They also explained unanimously that there is a lot of craze around the cultivation of jatropha in their zone, but that it is necessary to note that there are difficulties for the success. These difficulties are among others:

The poverty of the lands fitted out for the culture of the plant;

The lack of contributions of fertilizer to the plant**;**

The lack of maintenance of the plots of land of jatropha by the producers;

The more and more visible disinterestedness of the producers in the existing plantations of jatropha, which sometimes leads to the lifting of jatropha plants to grow other crops;

The problem of the price of the kilogram of jatropha seeds which the producers consider low.

By analyzing these enumerated difficulties, they amount to two major constraints which are: the problem of fertilizers and the problem of the price of the kilogram of the jatropha seeds.

As regards the knowledge by the participants of other biofuels, the answers given are: cotton oil, peanut oil, sunflower oil and other oilseeds.

As regards their perception on the competition of biofuels with subsistence crops, the participants think (without giving many details) that the oil intended for consumption can compete with subsistence crops, but that for the case of jatropha, it is different because its oil is not edible.

On the closure of the public consultation towards 13h30mn, a sample of six (6) persons was chosen among the participants, to whom questionnaires elaborated for that purpose were administered.

CONCLUSION

In view of the elements of the perception of the participants on the meeting, there emerge two even three major constraints which hinder the development of the cultivation of jatropha:

The poverty of lands sheltering the plantations of jatropha;

The price of the kilogram of jatropha seeds (considered reliable);

The land problem;

With regard to the solutions brought by the participants to these difficulties, there is:

Ensure the fertilization of the fields of jatropha through the implementation of a financial mechanism;

Increase the price of the kilogram of jatropha. It will allow the producers to be interested in the culture of jatropha and in the collection of seeds;

Things being what they are, the development of the jatropha plant in this zone depends widely on these enumerated factors. Their resolution will, according to the participants, spur the cultivation of jatropha. It will also be a key element for the success of the jatropha plant in the zone in the short, mid and in long terms.