



ENDA

Project: Development and energy Project in Africa

Evaluation of Improved Stoves impacts on poverty reduction in Senegal

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I - Introduction

This study is a contribution to the elaboration of methodological tools for evaluating the impacts of energy interventions on development. It gives information on indicators related to benefits and impacts of the dissemination of improved stoves on the economic, social and environmental levels. It focused on households, economically-oriented women groups (GIE), small businesses (improved stove manufacturers, retailers) and on public services (health services) located in rural and peri-urban areas. In the peri-urban area in the Dakar region, enquiries have been conducted in the constituencies of Medina district, Thiaroye-Gare and Thiaroye-sur-Mer, Pikine Ouest, Sahm Notaire, Diacksao and Malika while in rural areas; they are conducted in Gandiaye, Dya and Thiombly constituencies in the region of kaolack. They were conducted from August 9- September 17, 2006.

3 The methodology

The present study is far from being exhaustive. It covered about 80 peri-urban and rural households, 6 businesses, 2 women groups of which a federation composed of 51 GIE, 3 public services.

3.1 Methods of data collection


The variety and number of targets reached, justify the fact that we had resorted to various methods of investigation namely inquiries, focus group, observations and crosschecking

Enquiries

They allow collecting more quantitative than qualitative data on economic, social and environmental impacts of improved stoves on households, businesses (Restaurants, improved stoves manufacturers, the GIE and retailers) and health services. Among the various inquiry tools, we resorted to:

- **Questionnaire reviews** targeting rural and urban households using improved stoves. They contributed to collect essentially quantitative data in each household interviewed
- **Interviewers** who conducted interviews with businesses (restaurants, GIE of improved stove manufacturers and retailers) health services and focus groups. They facilitated data collection related to energy expenses, production and sale statistics, etc.

For each category of stakeholders, we wrote an appropriate interview handbook. This why the interview handbook for restaurants is different from the one used for health services, though there can be some common aspects. The contents of the questionnaire and the interview handbooks are annexed in the inquiry report.

 **The focus group** is used as an animation technique for women groups. It was animated by the overall interviewers' team. Its main role is to collect data on how women groups use and promote improved stoves, to complete and confirm data collected on households.

- 🚧 **Observations and crosschecking.** In order to check and complete collected data on households, businesses and public services, the interviewers resorted to other investigation techniques of which direct observations and data crosschecking.

3.2 The choice of areas

The choice of urban and peri-urban areas for conducting enquiries has been made on the basis of information contained in the list of ATI ex-partners provided by a former employee of the so-called project. The constituencies of Medina, Thiaroye-Gare and Thiaroye-sur-Mer, Pikine Ouest, Sahm Notaire, Diacksao and Malika are areas where improved stoves have been introduced. We have selected these areas after a triangulation of areas in which enquiries should be conducted, so as to diversify sources for collecting data. The choice of the rural area of kaolack Department, namely the constituencies of Gandiaye, Thiombly and Dya has been made following crosschecked information collected from Kaolack community development services and the grassroots organisation “Ngel Jam. According to results from Kaolack and Fatick regions where improved stoves have been introduced by state services through projects notably PAGERNA and PROGEDE. It concerns rural communes of Gandiaye and Sokone and constituencies of Sibassor, Ndiedieng and Gandiaye. The criteria that guided the choice of targeted areas are the degree of introduction of improved stoves in the area; the dynamism of groups, the interest of population focuses on improved stoves and their promotion; the importance and presence of development partners in the area, who worked on the topic and on the accessibility to the area.

	Dakar	Gig Cities	Towns
Households	252.060	115.810	96.617
% of users of charcoal as the main fuel	21.6%	35%	23%
Households using mainly charcoal	54.450	40.530	22.300
% of users of firewood as the main fuel	1.7%	48%	59%
Households using mainly firewood	4.285	55.590	57.200

Sources : SEMIS, 1998

3.3 The choice of households

The criteria for choosing household:

- In urban and peri-urban areas, households using charcoal as the main fuel and equipped with improved stoves (called Diambar)
- In rural areas, households using firewood as the main fuel and possessing improved stoves.

The table below indicates the distribution of households according to the use of the main fuel and the area.

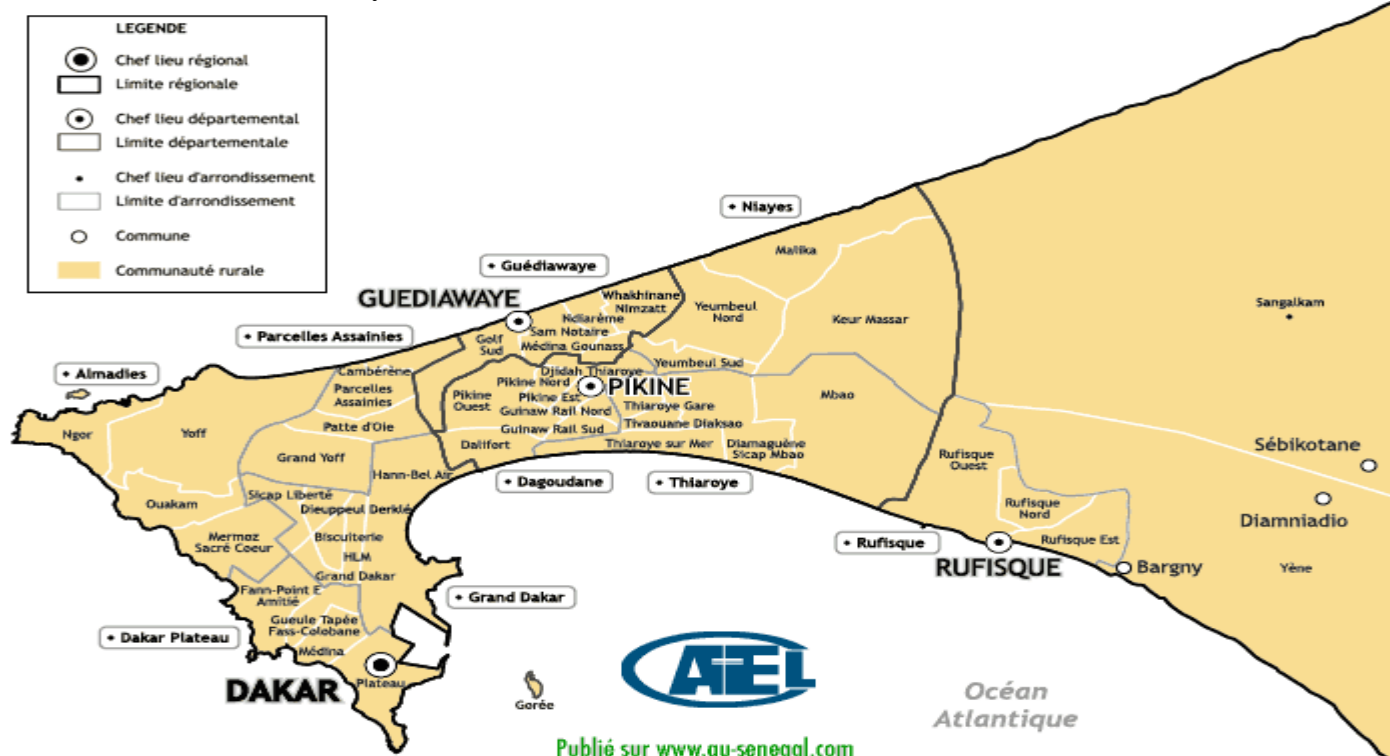
	Urban	Rural
Households	464,484	660,828
% of users of charcoal as The main fuel		5%
Households using charcoal as the main fuel	117000	33000
% of users of firewood as the main fuel		93%

Households using wood fire as the main fuel	117000	615000
Total	234000	648000

Sources: ENDA: According to SEMIS enquiries results, 1998.

3.3.1 The choice of households in urban and peri-urban areas

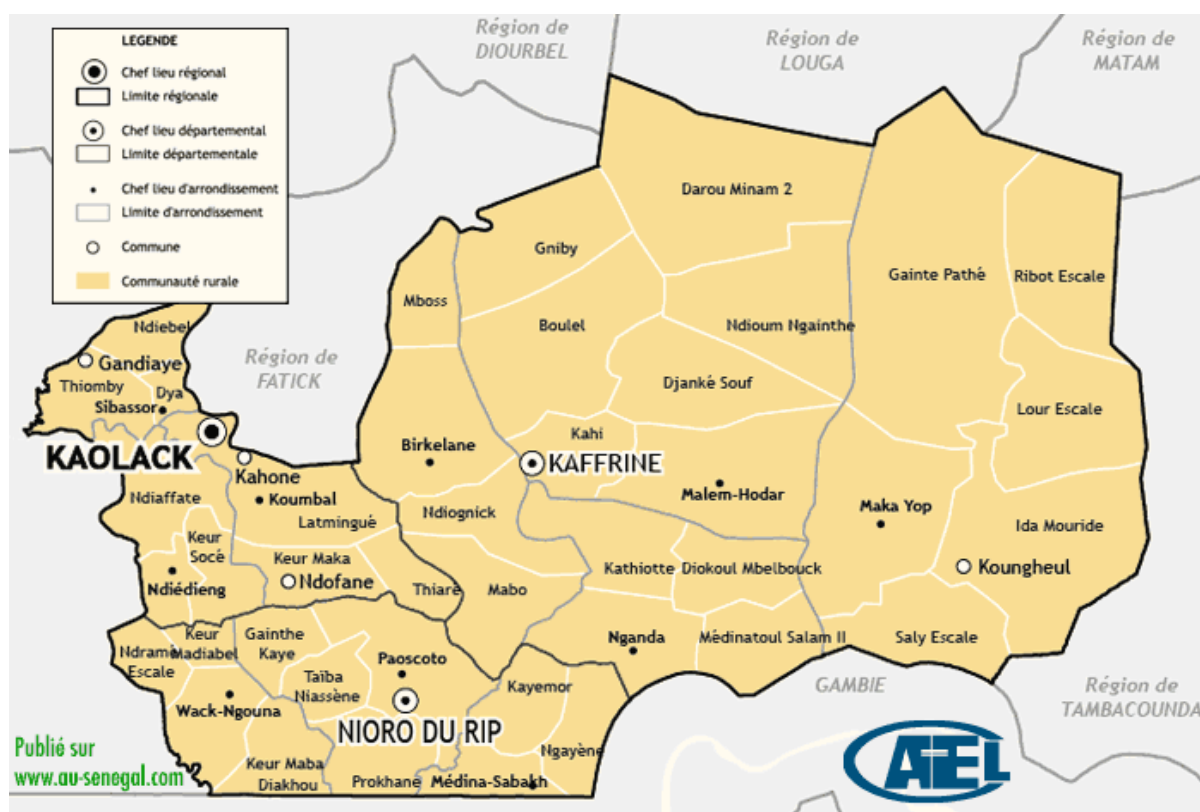
The choice of households in urban and peri-urban areas has been done on the basis of statistics of improved stoves customers provided by the retailers and the GIE of improved stoves manufacturers. A total of 35 urban and peri-urban households were interviewed. They are distributed as follows: Medina 10 households; Thiaroye-Gare 07; Thiaroye-sur-Mer 06; Pikine Est 06; Sahm-Notaire 04 and Diacksao 02. The number of households interviewed in constituencies did not abide by defined standards but was done at random.



3.3.2 The choice of households in rural areas

If in urban areas it is with the help of retailers that the selection of households had been done, in rural areas, women responsible for groups promotion provided names of households using improved stoves in each visited areas. In most cases, they facilitated the introduction of and sometimes would accompany interviewers to households. A total of 45 rural households were interviewed and broken down as follows: Dya (25); Thiombly (15); Gandiaye (05). The number of households depends on the degree of introduction of improved stoves in the area.

This is the reason why in Dya out of 30 women of the group 25 are using improved stoves Ban ak suuf and Sakanal for cooking. As a whole enquiries on households reached 80 families of which 35 are urban and peri-urban and 45 are rural.



3.3.3 The choice of businesses (GIE that manufacture improved stoves, restaurants, etc.) and retailers.

The selection of businesses has been done partly from the list of improved stoves manufacturers and from the customers of improved stoves manufacturers. Identified businesses are: improved stove manufactures restaurants, local grain processing units and retailers. 6 workshops units, 3 restaurants, 7 retailers and 1 local grain processing unit have been visited.

3.3.4 The selection of women groups

The selection of women groups in which focus groups have been organised was guided by a number of conditions, of which the dynamism and activities of the GIE in the field of promotion and dissemination of improved stoves. These are the two criteria that allowed selecting in urban areas the Federation Dioko and Ligguey from Malika gathering 52 women GIE and in rural areas the GIE Boko Diom from Dya comprising 3 women.

3.3.5 The selection of health services

Concerning the selection of health structures in which the impacts of improved stoves on the population health should be measured, we have decided that they should be done in rural

areas, for it is in these localities that the smoke has evident adverse effects on the life of populations. The selection of the rural constituency of Gandiaye health centre can be justified by the important role it plays in the area, its geographical position, its equipment, the number of sick people it receives and by the fact that the populations of the rural localities involved in the inquiry go to the health centre when they are ill. The Gandiaye health centre receives almost thirty 30 patients in a day.

3.3.6 The limits of the study

Though the study provides satisfactory results concerning the tool, it contains a number of limits:

- Lack of disseminating improved stoves at a wider scale in the rural areas; this would allow making a triangulation of areas under inquiry
- Low introduction of improved stoves in school canteens (rural educational system) despite the potential provided by this market segment.

III Results of inquiries

The investigations conducted in the field involve, among other things, household's enquiries, focus groups, and interviews with the manufacturer leaders, the improved stoves retailers, businesses (restaurants), and public services such as health services. The objectives were to evaluate and quantify impacts of improved stoves on poverty reduction at the economic, social and environmental levels.

Type of Stove	Description of the stove	Energy efficiency
Traditional stoves Three-stone hearth Malgache stove	Three-stone hearth, triangular device Stove made of metal	14%
Ban ak suuf (Clay and sand)	This type uses firewood and was designed in 1985 in Senegal. It is made of clay and sand. Its lifetime is 1 year	19%
Improved three-stone hearths	This type of hearth using firewood is also made of clay. Its lifetime is 1 year.	24%
Sakhanal Mono	It is a stove made of metal of metal. It was designed in Senegal by CERER (Centre for Studies and Research on renewable energies) Cost: 3500 F.CFA	22%
Sakhanal Multi	The same design but can adapt to many cooking pans. Cost: 3500 F CFA	29%
Sakhanal PPAM	The same design but can adapt to many cooking pans for family ceremonies	-
Diambar	This type is made of a sheet metal on which a piece of ceramic is applied. Its lifetime is 2 years. This model comprises many stoves (stoves for tea, from 2 to 4 kg, 4 to 7 kg	30 – 50%



During the enquiry, the performances of traditional stoves and improved stoves highlighted the real consumption of charcoal, the time for cooking the main meal and the frequency of renewal of kitchen utensil.

3.1 The enquiry results in urban and peri-urban areas

3.1.1 Traditional stoves in urban and peri-urban areas

- Type of traditional stoves used in urban and peri-urban areas

The Malgache stove is the main traditional stove used by urban and peri-urban households in the region of Dakar. Its main fuel is charcoal.

- Performances of traditional stoves in urban and peri-urban areas

According to the results of the enquiry, the average consumption of the Malgache stove is 2.5 kg of firewood per day/household. It corresponds to an energy expense of 410 F CFA. The average time for cooking the main meal was estimated at 2h50mn. Urban households used to renew their kitchen equipment (Malgache stove) every four months.

3.1.2 Improved stoves used in urban and peri-urban

Diambar stoves are the most utilized in Dakar suburbs

The level of urban household equipped with improved stoves

The distribution of improved stoves among 35 urban households is as follows:

- 6 households have each 2 Diambar stoves (1 of 10 kg called diabote) and 1 for tea.
- 2 are equipped with 4 Diambar stoves (2 of 10 kg and 2 of 3 to 5 Kg).
- 1 uses 3 Diambar stoves 1 of 15 kg Called Bana (1 of 10 kg and 1 for tea:
- 1 is equipped with a Sakhanal stove
- 25 households have 1 Diambar stove of 3 to 5 kg

Performances of improved stoves in urban and peri-urban areas

In the urban and peri-urban area of Dakar, the average consumption of charcoal per day/household is 1.3 kg. It corresponds to an expense of 200 F CFA¹. The time for cooking the main meal is estimated at 1h40mn and the average lifetime of the stove is 4 years.

¹ 1 Euros = 655,9 Fcfa

3.1.3 Comparison of performances between traditional and improved stoves in urban and peri-urban households.

Table I : Comparison of performances between Madagascan stoves and Diambar stoves.

Type of stove	Quantity of charcoal used per day (kg)	Daily expenses in charcoal (F cfa)	Time for cooking the main meal	Frequency of replacement of the stove (month)
Madagascan stove	2.7	410	2h50mn	4
Diambar stove	1.3	200	1h40mn	48
Amount saved	1.4	210	1h10mn	

When looking closely at table I you notice that urban and peri-urban households save at least 1.4 kg of charcoal per day when they change the type of the stove used. It corresponds to an amount of 210 F CFA..

What the households save when they renew their stoves amounts to 3400 F CFA.

3.2 Results of inquiries in rural areas

3.2.1 Traditional stoves used in rural areas

- Types of traditional stoves used in rural areas

In rural areas, the two main traditional stoves are used: the three-stone hearth and the metallic three-legged hearth.

- Performances of traditional stove in rural areas

In rural areas, a traditional stoves consumes half a bundle of firewood in a day and per households buying firewood, which amounts to 280 F CFA. The time for cooking the main meal is estimated at 2 hours. A household in rural area renews its traditional stoves every 20 months.

3.2.2 Improved stoves in rural areas

Three types of improved stoves are used in the villages under inquiry: improved “Ban ak suuf”, Sakhanal and Diambar. In this part of Kaolack department, the system of improved “Ban ak suuf” is predominant. It is a system that has experienced various improvements varying according to the type of material and the number of fireplaces. In Gandiaye and Thiombly, the fireplace system is predominant while in Dya, the Ban ak suuf stove with two fireplaces is pre-dominating.

- The level of rural household equipment

The distribution of energy equipments according to types of improved stoves used by households in kaolack rural area are as follows:

- ❖ Number of households possessing Ban ak suuf stoves: 32

- ❖ Number of households possessing Sakhanal stove: 9
- ❖ Number of households possessing both Sakhanal and Diambar stoves: 2
- ❖ Number of households equipped with Sakhanal and Ban ak suuf: 1

- Performances of improved stoves in rural areas

In the rural area, an improved stove consumes in a day and per household, 4 bundles of firewood. It amounts to 150 F CFA for households buying fuel. The time for cooking the main meal is 1h 20mn, and at the same time every 34 months, the rural household buys and/or manufactures a new improved stove.

3.2.3 The comparison of performances between traditional and improved stoves used by household in rural areas.

Table II: Comparative table of performances between traditional and improved stoves in rural areas.

Types of stoves	Quantity of wood fuel used in a day per household (bundle of firewood)	Daily expense for buying wood fuel (F. CFA)	Time for cooking the main fuel	Frequency of replacement of stoves
Traditional stove	12	280	2 hours	20
Improved stove	4	150	1h 20mn	34
Saving	8	130	40mn	-

If you look closely Table II, you notice that rural households using improved stoves save 8 bundles of firewood in a day, it corresponds to 130 F CFA (for someone buying firewood in Gandiaye), and the time for cooking the main meal goes from 2h 00 to 1h20 mn. Women gain 40mn. This time is essentially used by women for having a rest and/ carrying out other domestic activities.

IV - Results of focus groups within women groups

The Malika Federation Dioko And Ligguey

It is composed of 52 women GIE supported by ENDA GRAF of which 12 are active in promoting and disseminating improved stoves. The Federation is involved among other activities in microfinance, dyeing, sewing, market gardening, fruit and vegetable processing and marketing grains either processed or not. For disseminating improved stoves, the Federation resorts to promotion, as a strategy, through action and demonstration of 4 improved stoves such as Diambar Bana.

The GIE Bokh diom of Dya

It is located in the rural constituency of Dya in the local government of Sibassor and gathers 30 women. Among other activities conducted by the GIE, apart from promoting and disseminating improved stoves, there is the protection and preservation of their forest by the application of prohibition of grazing technique. The strategy adopted by women in order to allow each of them getting an improved stove Ban ak suuf with two fireplaces.

Focus groups have confirmed the results obtained from households. It concerns the reduction by half of charcoal and firewood consumption; gaining 1 hour in the current time and reduction of smoke-related diseases.

V Impacts of improved stoves on households.

Through the condensed data in the table of cumulative performances of traditional and improved stoves, we can make a relevant analysis of economic, social and environmental impacts of improved stoves.

Table III: Table of cumulative performances of traditional and improved stoves in urban and peri-urban areas.

Area under inquiry	Types of stoves	Quantity of fuels/day/household	Daily expense CFA	Time for cooking the main meal	Frequency of stove replacement (month)
Urban area	Traditional stoves	2.7	410	2h50mn	4
	Improved stoves	1.3	200	1h40mn	40
Rural area	Traditional stoves	9.6	280	2 hours	40
	Improved stoves	3.2	150	1h20	34

By calculating averages in savings per household/day due to the use of improved stoves in rural and urban area, one notices that:

- For fuels there is a difference in consumption of 1.4kg for charcoal and 6.4 kg for firewood
- For daily expenses a household saves 170 F CFA/day in the domestic energy in Senegal
- The time for cooking: each woman gains 55 mn that is to say 1 hour in cooking meals
- The frequency of replacement of stove is 29 months that is to say 2 years and 5 months

5.1 Economic impacts of improved stoves on households

The results of the inquiry show that improved stoves have positive economic impacts on households in Senegal. The use of improved stoves by a household generates gains in energy expenses and costs of the renewal cooking utensils. These gains are estimated at 63710 F CFA per year. The structure of financial gains presents as follows: savings cumulated from energy expenses are 62050 F CFA while those generated by the renewal of cooking equipments is estimated at 1660 F CFA. In reducing expenses of households, improved stoves contributes largely to poverty reduction in both rural and urban community.

5.2 Social impacts of improved stoves on households

Contrary to traditional systems, improved stoves have positive social impacts on woman who are now less subjected to physical and psychological strains caused by tensions between husband and wife when incidents occurred (burn of children, pouring meals) 55mn are gained in cooking, that is to say almost 1 hour. It allows having a rest and carrying out other domestic activities, participating in group activities. Improved stoves contribute to the blooming and promotion of the Senegalese women. Improved stoves allow having time to devote to children education notably young girls. The introduction of stoves in areas under inquiry reduces time and efforts to collect firewood. From 2 or 3 wood collection per week, women now collect firewood ounce a week. They have time to learn their lessons and do their homework. The time gained by women over firewood collection is devoted to the care and education of their children notably young girls. In fact they gain 2h 30mn every 48 hours.

5.3 Impact of improved stoves on environment

The introduction of improved stoves has a positive impact on environment. The introduction of Diambar stove in urban areas allows using less charcoal for cooking; this induces a reduction of firewood consumption by 1.4 kg per household/day. According to the Forestry, Hunting and Soil Preservation Department (DEFCCS) the production of charcoal represents 25% of the wood fuel produced. A projection of savings in charcoal is as follows:

Table IV: Projections of savings in charcoal, firewood in stere and cubic meter of wood fuel per households.

Projection	Saving made by the household on charcoal consumption	Equivalent of saving made in firewood	Equivalent of savings made by stere of wood fuel	Equivalent of savings made in cubic meter of wood fuel
Month	42	168	0.37	0.22
Quarter	252	1008	2.24	1.34
Year	504	2016	4.48	2.70

NB. 1 stere equals 450 kg of firewood; 1m³ corresponds to 750 kg of firewood with the stove from Casamance, 450 kg of firewood allow producing 112.5kg of charcoal.

When we analyze table IV, we can notice that the Diambar stove contributes to the protection and preservation of forests. Improved stoves prevent the exploitation of forest resources by 2.70 m³ per household and per year. Through this analysis we can say that improved stoves may allow us to better managing and exploiting judiciously forest resources of our country. In rural areas, improved stoves contribute to the protection and preservation of forest resources and thereby to the preservation of environment.

5.4 Impacts of traditional stoves on the population health.

All of the people interviewed have declared unanimously that traditional stoves had negative impacts on population health. Among the main respiratory problems, we can mention skin disorder and sore eyes. The results obtained during the inquiry are treated according to different types of diseases, the time of recovery, costs and modes of treatment.

In urban and peri-urban areas: the results of the inquiry are as follows: 11% of interviewed people have declared that they have been never affected by a smoke-related disease; 66% were suffering from respiratory problems 14.43% were suffering from skin disorder and 8.57% from sore eyes. The treatment with *Guiera senegalensis*, is the most current and costs about 350 F CFA.

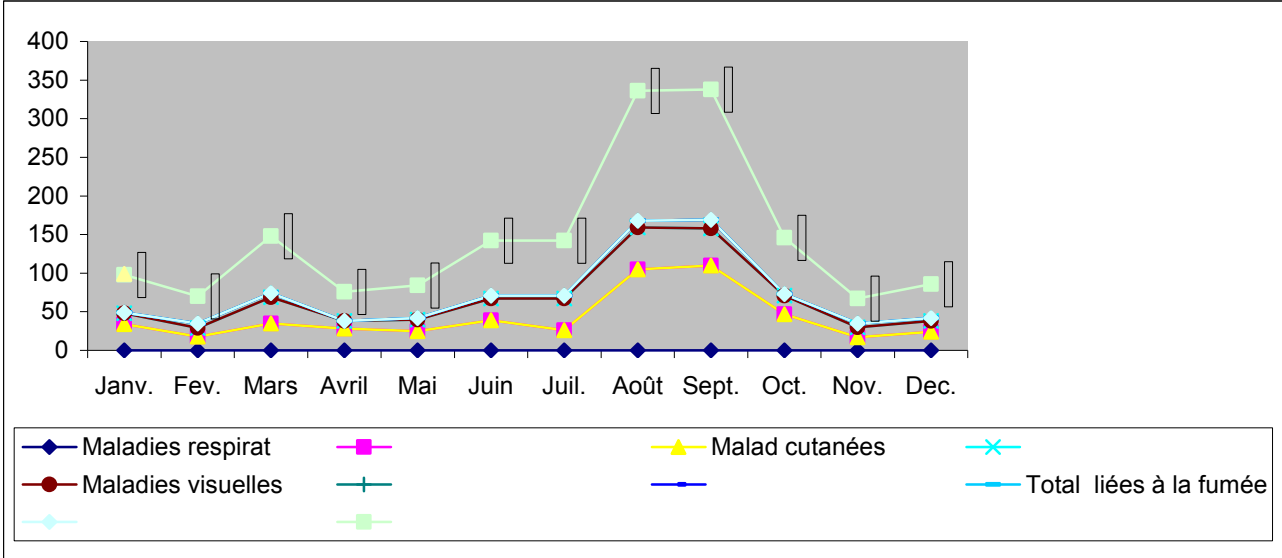
In rural area we have the following results 50% of affected individuals suffer currently from respiratory problems, 34% from sore eyes and 16% from various other diseases. The average cost of treatment of smoke-related diseases is 1925 F CFA according to the results of the inquiry. This figure is in harmony with those provided by the head of Gandiaye health centre; they vary from 1000 to 2000 F CFA in conformity with the Bamako initiative.

Correlation between women, children health and improved stoves

According to the head of Gandiaye health centre there exists a correlation between the population health mostly women and children health and the introduction of improved stoves in Gandiaye area. According to the statistics of smoke-related diseases acute respiratory problems are pre-dominant, pneumonia is rare but bronchitis is still persistant.

In Gandiaye, 869 patients, suffering smoke related health troubles were treated, which is 13% of the people diagnosed in 2005. In Malika, this proportion is around 16%: 813 out of 5056 medical diagnostics in 2005 (see the following graphic)

Figure 1 Evolution of deseases (2005)



The graphic shows that the “peak” of the demand for smoke related medical diagnostics occurs during the rain seasons (July-September). This situation is due partially to the increasing smoke generation caused by the high rate of the wood moisture in the rainy period.

The authorities of the health centre have noticed over this decade, a drop by 50% of smoke-related diseases in Gandiaye and 10% in Malika. We can say that this significant drop of smoke-related diseases cannot be attributed entirely to the introduction of improved stoves; however it coincides with the interventions of many projects or services intervening in the dissemination and promotion of improved stoves such as PAGERNA/GTZ, CERP, etc. It requires thorough studies. We can say safely that improved stoves have contributed to a

significant drop of respiratory diseases, skin disorders and sore eyes and to the reduction of population health care expenses and to the welfare of the family.

VI The results of the inquiry on businesses

6.1 In the restaurants

The inquiry has been conducted in three restaurants located in Medina and Pikine districts. These restaurants use improved stoves with charcoal as the main fuel. These restaurants have reduced their quantity of consumed charcoal. From 5.5 kg per day with traditional stoves they consume now 2.8 kg with improved stoves. It induces a gain of 2.7 kg per day which is equivalent to a saving of 350 F CFA. If it is estimated over a year, the savings amount to 103680 F CFA and they are reinvested in the improvement of the premises and modernisation of equipment to attract the costumers. At the same time improved stoves contributed to the reduction of cooking time in restaurants; it goes from 3h06 with the Madagascan stove to 2 hours with a Diambar stove. The time gained is 1h06mn. With regard to these results, inquiries in restaurants confirm those obtained in households: Reduction of charcoal consumption, cooking time, increase of incomes due to the reduction of smoke-related diseases.

6.2 The GIE that manufacture improved stoves

The inquiry revealed that most of the businesses that manufacture improved stoves are GIE. Indeed a workshop makes at least 61 improved stoves per month and sells 54. We should mention that most of improved stoves are ordered before they are manufactured. The main improved stoves are the Diambar stoves of 15 kg, 10 kg, 3 to 5 kg, the Diambar stoves with firewood; the Diambar stove for tea and the Diambar Sakhanel 7 kg and others. Their selling price varies between 1500 and 12000 F CFA depending on the type, capacity and quality of the metallic sheet and clay. The lifetime of improved stoves is estimated at 3 to 4 years depending of the type, but 6 months for the Sakhanel from the manufacturers' point of view. The production of improved stoves is mostly marketed in Dakar, Touba, Saint-Louis, Mbour, Kaolack, and Casamance and sometimes in the sub-region (Gambia). The favourable periods for selling improved stoves are Muslim feasts such as Tabaski (Aïd el Kebir), Korite (Aïd el Fitr) and Tamkharite, but also during butane gas (LPG) shortages. This was the case three months ago. Each manufacture unit has 2 permanents and 4 apprentices. The salary of the permanent is 31300 FCFA per month while the apprentice is paid 11300 F CFA. The incomes of apprentices come generally from small works they do for their own business.

6.3 The retailers

The indirect employees met in the chain of production and supplies of improved stoves are retailers. A few days before the feasts retailers make orders to the improved stove manufacturers and then sell them to their customers scattered in Dakar and other parts of the country and the sub-region. The results of the inquiry prove that favourable period for selling is on the eve of religious feasts such as Tabaski, Korite and Tamkharite and during LPG shortage. The retailer sells in average 12 improved stoves per month. He earns 13110 F CFA per month.

6.4 The local grain processing unit

The local grain processing unit of the women Federation” Dioko and liguey” of Malika, markets by-products of grains such as thiacy and Sankhal. It employs 27 women with 4 improved stoves of 15 kg for preparing the couscous of which two improved stoves use charcoal while the two others use firewood. The results of the inquiry reveal that the reduction of energy expenses for each operation has moved from 3000 to 1250 F CFA, this represents a saving of 1750 F CFA. Women operate twice in a week, it represents a gain of 3500 F CFA per week, and 14000 FR CFA per month. They reduce the time for preparing couscous; it moved from 3 hours with traditional stoves to 2 hours with improved stoves. They gain 1 hour. It gives them time to rest, to participate in the Federation activities have leisure. Results obtained confirm also the positive impacts of improved stoves on the economic, social and environmental life of populations.

VII - Conclusion

Improved stoves have positive impacts on the economic, environmental, social life and health of the population

The economic field: the introduction of improved stoves contributed to:

- A saving of about 63710 F CFA per year made by households in the acquisition of fuel and new cooking equipments
- Generate employment for manufacturer groups: two permanent employments and 4 apprentices
- Income generation: the average salary of a permanent is 31.300 F CFA and the apprentice earns 11300 F CFA.
- A saving of 103 680 F CFA for restaurants using improved stoves.

Social field: Improved stoves contributed to:

- Gain time in the collection of wood fuel (7 hours per week) and cooking the main meal (1 hour) for women.
- Be less exposed to heat and smoke-related diseases such as respiratory problems, skin disorders and sore eyes and dehydration. In the area under inquiry, the health staff noticed that patients would expend at least 1500 F CFA to treat one of these affections. This figure has been largely confirmed by the inquiry (1925 F CFA for the treatment of affection).

The environmental field: improved stoves contributed to sustainable management of forest resources, in the sense that a household that uses improved stoves with charcoal saves 2.70 m³ of wood fuel per year; while a household using improved stoves with firewood save 3.9 m³ of wood fuel per year.

As a whole inquiries show that improved stove contribute positively to poverty reduction and to improve population income in urban and rural areas thanks to activities generated, as well as savings made in the acquisition of wood fuel (firewood and charcoal).

ANNEXES

Outils de collecte des données sur le terrain

Questionnaire ménage

Numéro du questionnaire :.....
Date d'administration du questionnaire :.....
Nom de l'enquêteur :.....

I. Identification du ménage

1.1 Responsable du ménage :

Prénom :.....
Nom :.....
Quartier ! Village de :.....
Commune d'arrondissement :Commune :.....
ou Communauté rurale :.....Arrondissement :.....
Département de :.....Région de :.....
Profession :.....
Age :.....

II. Foyers utilisés

2.1 Les foyers traditionnels

2.1.1 Quel (s) type(s) de foyers traditionnels votre ménage utilisait - il ?

- Trois pierres : ف
- Ban ak Souf : ث
- Autre (à préciser) :

2.1.2 Quelle était le principal combustible utilisé par votre foyer traditionnel ?

- Bois de chauffe ف
- Charbon de bois :ث
- Autre (à préciser) :ث

2.1.3 Quelle quantité de combustibles consommiez - vous pendant la journée ?
NB :(préciser l'unité de mesure en Kg, fagots et autres) .

.....
.....

2.1.4 Quel était le prix d'achat de l'unité de ce combustible?

.....
.....

2.15 Combien de temps (en heure) mettiez – vous en moyenne pour préparer vos repas ?

.....
.....

2.16 Quelle est la fréquence de remplacement de votre foyer traditionnel?
.....
.....

2.17 Quelle est la fréquence d'utilisation de votre foyer traditionnel amélioré?
(Nombre de fois que le foyer est utilisé dans la journée?)
.....
.....

2.18 Quels sont les principaux usages ou utilisations de votre foyer traditionnel ?
.....
.....

2.19 Quels sont les impacts occasionnés par l'utilisation des foyers traditionnels?
.....
.....
.....

2.20 Etiez-vous confronté à des maladies respiratoires liées à la présence de la fumée et combien de temps mettez-vous pour guérir ?
.....
.....
.....

2.2 Les foyers améliorés

2.2.1 Disposez –vous de foyer amélioré ?

Oui :

Non

2.2.2 Si oui ; combien et quel type de foyers améliorés disposez– vous ?

- Sakhanal Nombre :
- Diambar Nombre :
- Foyer amélioré à bois Nombre :

2.2.3 Quel est le prix d'achat de votre foyer amélioré
(selon les différents types) ?
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.....

2.2.4 Quel est le service ou le projet qui a introduit le foyer dans votre localité ?
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.....

2.2.5 Quel est votre fournisseur actuel ?
.....
.....

2.2.6 En quelle année avez-vous acquis votre foyer amélioré et quelle est sa
durée de vie?
.....
.....

.....
2.2.8 Quelle est la fréquence de remplacement de votre foyer amélioré?
.....
.....
.....

2.2.9 Avec quel combustible fonctionne votre foyer amélioré ?
• Bois de chauffe
• Charbon de bois :
• Autre (à préciser) :.....

2.2.10 Quelle quantité de combustibles par jour consomme votre foyer amélioré par jour? NB :(préciser l'unité de mesure en Kg et autre à préciser)
.....
.....
.....

2.2.11 Quel est le prix d'achat de l'unité de ce combustible?
.....
.....

2.2.12 Quel est votre temps actuel de cuisson des repas (heure par rapport au repas principal ?
.....
.....

2.2.13 Quelle est la fréquence d'utilisation de votre foyer amélioré?
(Combien de fois le foyer est utilisé par jour)

.....
2.2.14 Quels sont les principaux usages ou utilisations de votre foyer amélioré ?
.....
.....

2.4.1 Quels sont les avantages ou bénéfices que vous offrent les foyers améliorés par rapport aux traditionnels par rapport au temps de loisirs ?
.....
.....

2.2.16 Quels sont les impacts de l'utilisation des foyers améliorés ?

2.2.16.1 Du point de vue social (temps de travail par rapport au temps de loisir par jour) ?
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.....
.....
.....

2.2.16.2 Du point de vue économique (économie de la dépense énergétique journalière par rapport au traditionnel) ?
.....
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2.2.16. 3 Du point de vue sanitaire (évolution des maladies respiratoires liées à la fumée par rapport à avant) ?

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2.2.16.4 Du point de vue sécuritaire (fréquence des feux dans les ménages avant et après introduction des foyers) ?

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2.2.16.5 Du point de vue hygiène dans le foyer surtout dans les cuisines avant et après introduction des foyers?

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2.2.16.6 Quelles sont les difficultés que vous rencontrez dans l'utilisation des foyers améliorés ?

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Guide d'entretien
Entreprises (restaurants, artisans locaux, etc.) et aux structures publics
(cantines scolaires ou cases des tout petits)

Quel est le nom de votre structure ?

Dans quelle zone se localise votre structure ?

Donner le nom du responsable ou de la personne interviewée ?

Quels types de foyers traditionnels que votre structure utilisait jadis (avant) pour ses besoins énergétiques ?

Pourquoi aviez-vous abandonné ces types de foyers ?
(Citer les principales raisons)

Quels combustibles utilisaient –ils ?

- Bois de chauffe
- Charbon de bois
- Autres (à préciser)

Quelle était la durée de cuisson de vos aliments ou vos services ?

Quelles étaient les quantités journalières de combustible utilisées par votre entreprise ?

A combien revenez l'unité de mesure de ces quantités de combustibles utilisés (le prix du kg à titre d'exemple) ?

Depuis combien de temps votre entreprise utilise t-elle les foyers améliorés ?

Quel(s) est (sont) le nombre et les types de foyers dont dispose l'entreprise ?

Combien ont coûté les foyers améliorés utilisés par votre entreprise ?

Quelle est la durée de vie de vos foyers améliorés ?

Quel est le montant actuel des dépenses énergétiques journalières de votre entreprise ?

Quelles sont les économies journalières réalisées par votre entreprise ?

Quelle est la durée actuelle de la cuisson des aliments ou des services ?

Quelle est la fréquence d'utilisation du foyer amélioré dans votre entreprise?

Quels sont les principaux usages du foyer amélioré dans votre entreprise?
Citer les avantages offerts à votre entreprise par les foyers améliorés ?

Quelles sont les difficultés rencontrées par votre entreprise dans
l'utilisation des foyers améliorés ?

Quelle est l'évolution des maladies respiratoires à la fumée avant et
actuellement ?

Quelles sont les dépenses jadis occasionnées pour votre entreprise pour
soigner les maladies respiratoires liées aux usages des foyers
traditionnels?

Qui sont les principaux fournisseurs de votre entreprise en foyers
améliorés ?

Quels sont les impacts de l'utilisation des foyers améliorés pour votre
entreprise ?

Existe-t-il des emplois créés dans votre entreprise par l'introduction des
foyers améliorés ? .

Guide d'entretien

Responsables des services de santé

Quel est le nom de la structure sanitaire ?

Dans quelle zone se situe structure sanitaire ?

Quel est le nom du responsable de la structure sanitaire ou de son représentant ?

Quelles sont les principales maladies respiratoires liées à l'exposition à la fumée ?

Quelles étaient celles qui étaient jadis fréquentes dans la zone?

Quelles sont celles qui existent encore?

Quelle est l'évolution des maladies liées à la fumée dans votre zone?

Quels sont les coûts moyens de traitement de chacune de ces maladies?

Peut-il exister de liens entre l'évènement des foyers améliorés et les maladies respiratoires ?

Quels peuvent être les impacts des foyers améliorés dans la santé des populations surtout des femmes et des enfants ?

Les foyers améliorés peuvent-ils au bien être de la famille ?

Guide d'entretien **GIE fabricants des foyers améliorés**

Quelle est le nom de votre structure ?

Quel type d'entreprise (GIE ; PMI ; etc.) est-elle ?

Dans quelle zone cette unité est-elle implantée ?

Quel est le nom du responsable ou de la personne mandatée par l'entreprise pour l'entretien ?

Depuis combien de temps votre entreprise s'est –elle lancée dans la fabrication des foyers améliorés ?

Quels types de foyers améliorés fabriquez-vous ?

Quels sont les prix de vente de chacun de ces type de foyers améliorés ?

Quelle peut être la durée de vie de chaque type ?

Combien de foyers améliorés fabriqués en moyenne votre unité par mois ?

Combien de foyers améliorés vendus en moyenne par mois par votre entreprise ?

Quelles sont les périodes pendant lesquelles vous vendez plus de foyers améliorés?

Quels sont vos principaux clients (entreprises ; groupements et particuliers) ?

Quelle est la part de chacun de vos clients ?

Quelles sont les principales zones d'écoulement de votre production ?

Quel est le nombre d'emplois directs créés dans votre entreprise par l'introduction de la fabrication des foyers améliorés ?

Quel est le salaire moyen par employé ?

Quel est le nombre d'emplois temporaires créés dans votre entreprise lors de la fabrication des foyers améliorés surtout pendant les périodes de forte production ?

Pendant combien de temps ces employés temporaires travaillent -ils?

Quel est le salaire moyen par employé temporaire?

Guide d'entretien

Revendeurs de foyers améliorés

Quel est le nom de votre structure revendeuse ?

Quel type de structure est-elle?

Quelles est son adresse ?

Donner le nom du responsable ou de la personne rencontrée ?

Depuis combien de temps exercez-vous ce travail?

Quel est votre principal fournisseur en foyers améliorés?

Donner le nombre de fours ou foyers améliorés vendus en moyenne par mois ?

Citer et donner les adresses des principaux clients ?

Parmi votre clientèle existe-t-il des entreprises (restaurants ou artisans locaux utilisant les foyers améliorés dans votre zone? Et donnez-nous quelques adresses?

Quelles sont les meilleures périodes de vente des foyers améliorés?

Existe-t-il des emplois directs créés par la vente de foyers améliorés et donner le nombre? :

Pouvez vous donner les revenus générés par les emplois directs?

Quel est le salaire moyen ?

Existe il des emplois indirects créés par la vente des foyers améliorés surtout pendant les périodes de fêtes?

Pouvez vous donner les revenus générés par les emplois indirects surtout pendant les périodes de fêtes..

Guide d'entretiens

Animation des focus groupe avec les groupements de femmes

Quel est le nom de votre groupement ?

Dans quelle zone est implanter votre groupement?

Quel est le nombre de femmes membres du groupement?

Depuis combien de temps le groupement s'active –elle dans la diffusion ou promotion des foyers améliorés ?

Quel est le partenaire de votre groupement dans la promotion des foyers améliorés ?

Combien de femmes de votre groupement utilisent les foyers améliorés ?

Pouvez nous citer quelques noms pour qu'on puisse les rencontrer?

Quels sont les types de foyers utilisés par les femmes ?

Existe-t-elle des entreprises qui utilisent les foyers améliorés dans votre zone ?

Les foyers améliorés offrent –ils des avantages pour les femmes ?

Quelle est la politique menée par votre groupement pour la promotion des foyers ?

Est – ce que l'utilisation des foyers améliorés permet aux femmes d'avoir plus de temps de loisirs ?

Ce temps de loisirs à combien d'heures correspond t-il par jour?

Quels sont les impacts des foyers améliorés dans la vie des femmes membres du groupement ?

Quels sont impacts des foyers dans la santé des femmes et des enfants ?

Quelle est l'évolution des maladies respiratoires avant et après l'introduction des foyers améliorés dans votre groupements ?

Quel est l'évolution de la pollution des cuisines avant et après l'introduction des foyers améliorés dans votre groupements ?

Existe-il des emplois directs créés par l'introduction des foyers améliorés dans votre groupements ?

Liste des personnes interrogées au niveau des ménages

N	Prénom et Nom	Adresse	Numéro de contact
1	Coumba NDIAYE	Médina Rue 3 x 6	452 99 19
2	Ndeye Ngoné NDIAYE	Médina Rue 6	821 24 82 / 583 6109
3	Mame Lémou KEITA	Médina Rue 27 x 24	-
4	Ndeye Marie BA	Médina Rue 29 x 22	848 30 54 698 79 81
5	Astou DIALLO	Médina Rue 6 x 23	-
6	Fanta DIOP	Médina Rue 6 x 23	-
7	Maïmouna SALL	Marché Thiaroye Gare	565 34 26
8	Maty KANE	Marché Thiaroye Gare	
9	Ndoya GUEYE	Marché Thiaroye	
10	Bène THIAW	Marché Thiaroye Gare	688 33 39
11	Aminata SARR	Diacksao	834 38 87
12	Aminata DIOUF	Diacksao	
13	Mame Ndoye DIAGNE	Médina Rue 6 x 27	538 68 09
14	Aby MBAYE	Médina Rue 6 x 27	821 42 82
15	Marie SOUGOU	Médina Rue 31x 6	821 19 67
16	Sokhna DIOP	Médina Rue 6 x 27	581 01 89
17	Astou Diagne NDOUR	Quartier Gnaga Thiaroye sur Mer	834 73 76
18	Rama DIENE	Quartier Gnaga Thiaroye sur Mer	834 73 76
19	Mame Arame NDIAYE	Quartier Gnaga Thiaroye sur Mer	-
20	Mame Diarra SOW	Quartier Gnaga Thiaroye sur Mer	-
21	Adama NDOYE	Quartier Gnaga Thiaroye sur Mer	491 58 06
22	Khardiatou SALL	Cité SOTIBA Pkine Ouest	
23	Ndonga DIOUF	Quartier Gnaga Thiaroye sur Mer	s/c 834 73 76
24	Arame DIOP	Quartier Gnaga Thiaroye sur Mer	
25	Baylo CAMARA	Cité SOTIBA Pkine Ouest	
26	Penda TOP	Cité SOTIBA Pkine Ouest	
27	Maïmouna SIMAKA	Cité SOTIBA Pkine Ouest	s/c 854 02 85
28	Arame DIOP	Cité SOTIBA Pkine Ouest	854 02 85
29	Aminata DIOP	Cité SOTIBA Pkine Ouest	
30	Djiguène THIAM	Sahm Notaire	877 09 03
31	Diarra DIAGNE	Sahm Notaire	894 63 93 514 60 17
32	Marième GNING	Quartier Cheikh KEBE Sahm Notaire	
33	Astou DIENG	Quartier Cheikh KEBE Sahm Notaire	
34	Mariama DIOUF	Quartier Cheikh KEBE Sahm Notaire	
35	Khardiatou BA	Marché Sahm Notaire	871 41 69
36	Coumba NDIAYE	Gandiaye	577 67 79
37	Bigué MBODJI	Gandiaye	658 45 88
38	Codou DIOUF	Gandiaye	526 58 71
39	Ndeye Béri DIOUF	Gandiaye	
40	Ami NDOUR	Gandiaye	552 04 35 549 49 20

41	Marième SENHOR	Gandiaye	540 76 56
42	Dabou DIOUF	Thiomby	
43	Seynabou SENE	Thiomby	344 27 64
44	Tening DIOUF	Thiomby	
45	Elisabeth Béty NIANE	Thiomby	
46	Daba THIAW	Thiomby	
47	Mame Diarra NDOUR	Thiomby	480 28 96
48	Saly NDONG	Thiomby	
49	Aïssatou NDIAYE	Thiomby	936 50 21
50	Fatou SARR	Thiomby	
51	Fatou SENHOR	Thiomby	
52	Diarra NGOM	Thiomby	960 22 40
53	Dibor DIOP	Thiomby	
54	Ndeye NGOM	Thiomby	
55	Seynabou NDIAYE	Thiomby	491 59 35
56	Aïda NDIAYE	Dya	
57	Aïssatou NDAO	Dya	
58	Khady WADE	Dya	698 57 85
59	Diodio MBODJI	Dya	681 04 07
60	Aïssatou NDOYE	Dya	
61	Amy DIOUF	Dya	
62	Boury MBODJI	Dya	699 18 26 506 49 21
63	Fatou MBODJI	Dya	460 40 54
64	Ngoné DIEYE	Dya	489 48 98
65	Fatou MBODJI	Dya	699 18 26
66	Amy TOURE	Dya	
67	Adama DIOP	Dya	463 47 44
68	Marie NDAO	Dya	
69	Mariama NDIAYE	Dya	679 43 87
70	Nguénar NDIAYE	Dya	
71	Dibor NDIAYE	Dya	
72	Astou MBODJI	Dya	692 15 06
73	Dibor DIOP	Dya	
74	Mbenda MBODJI	Dya	332 31 82
75	Adama MBODJI	Dya	
76	Khady MBODJI	Dya	
77	Seynabou NDIAYE	Dya	
78	Coumba SINE	Dya	332 34 26
79	Coumba MBODJI	Dya	
80	Modou NDIAYE MBODJI	Dya	

Personnes ressources rencontrées

Madame Ndew NIANE NDIAYE, consultante: 558 28 32
 Madame Rokhaya DIOP NDIAYE, PROGEDE: 513 92 81
 Madame Mireille AFOUNDJI, PERACOD : 832 64 71
 Monsieur Felip BARRY, FASEN: 832 80 17:

Liste des responsables des ateliers de fabrication de foyers améliorés rencontrés

1. Bara NIANG au Crédit foncier de Dakar Rebeuss;
2. Cheikh THIAM au Crédit foncier de Dakar Rebeuss;
3. Ousmane DIABY du GIE nommé «foyers Améliorés

Sakhanal» à Pikine ICOTAF: 854 27 21

4. Mamadou GNING du GIE GNING eet Frères à Yarakh Cafétariat: 594 35 07

5. Badara DIONGUE du Kaw Sara Fall à Thiaroye GARE: 685 5718

6. Sérigne THIAM à Thiaroye Gare: 698 14 56

Liste des responsables des restaurants rencontrés

1. Khady LOPEZ, restauratrice , Etoile à Tally Boubess à Pikine Est:

2. Ami Ciss, restauratrice à la Médina Rue 29 x 22;

3. Mame Lémou Keita: Restauratrice à la Médina Rue 27 x 22.

Liste de responsables des GIE où les focus groupe ont été tenus

1. Amy DIOUF: Présidente du GIE Bokh Diom de Dya: 690 52 10

2. Mantoulaye DIENE: Présidente de la fédération de GIE Dioko And Ligguey
S/C mutuelle d'épargne et de crédit ENDA/ GRAF

Liste des revendeurs de foyers améliorés rencontrés

1. Daba DIONE : Médina rue 3 x 6

2. Ndoya GAYE Marché Thiaroye Gare

3. Ndeye Ngoné NDIAYE: Médina rue 25 x 6: 583 61 09

4. Coumba NDIAYE: Médina rue 3 x 6

5. Cheikh Sadibou TRAORE: Traoré et Fils à Poste Thiaroye

6. Pape DIOP: marché Tilène Dakar

7. Abdou Lahad GAYE: marché Thiaroye Sur Mer

Liste des responsables de l'association communautaire de base Ngel Jam de Gandiaye

1. Mamadou NDIAYE: président de Ngel Jam: 943 12 23

2. Ousmane FAYE: Vice président de Ngel Jam

3. Ousmane NDOUR: 344 27 64

4. Mariama SQUARE: 598 58 47

5. Awa DIONE: 523 21 56 / 591 43 65

Responsable du Développement communautaire de Kaolack

Mouhammadou NDIAYE :941 13 32