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## **8. WOODFUEL IN NIGER: CRISIS OR ADAPTATION IN THE LAST TEN YEARS?**

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### **1. INTRODUCTION**

Niger is twice the size of France, and is West Africa's second largest country. Two thirds of the country is desert, and the other third, to the south, falls within the Sahelian zone. Ninety percent of Niger's population lives in this southern area.

Niger's boom years took place between 1974 and 1979, when world uranium prices quintupled. Niger became the world's fifth largest producer of uranium outside the socialist block, and by 1980 revenues had risen to \$200 million. But uranium prices collapsed thereafter, and by 1985, Niger's revenues from this source had fallen to \$20 million per annum. In the last ten years the economic and political circumstances of Niger have had a profound effect on the quantity and quality of data available to permit a thorough analysis of the woodfuel situation over the period. For much of the last decade the State has effectively been bankrupt, and any work on their part has been severely constrained unless supported by external aid. Initially this was available, but since the coup in 1996 much of it dried up and has only recently started to return.

#### **1.1 Population**

The last official census took place in 1988 at which the population was calculated to be about 7.4 million, of whom about 15% (1.16 million) were classified as urban. The largest urban centre is the capital Niamey, which in 1988 had a population of just under 400,000. Today the population estimates in use by the various agencies vary

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from 10.6 to 11.3 million of whom about 20% (c.2.2 million) are considered urban. Niamey remains the most important urban centre, followed by Maradi, Zinder and Tahoua. Classifying, let alone estimating the urban population is complicated by the widespread practice of seasonal migration, principally of unaccompanied young men, who are absent from their villages typically between September/October to the following April/May. The volume and principal directions of this movement vary annually, one of the principal factors being the state of the preceding harvest. In 2001, given the poor harvest in 2000 and the problems migrants have experienced in surrounding countries, (Libya, Nigeria and Côte d'Ivoire) the principal Nigerien urban centres are probably particularly populous.

## 2. THE URBAN SITUATION

### 2.1 Policy

The national policy for urban woodfuel<sup>3</sup> from January 1990 was effectively the same strategy as that of the *Projet Énergie II - Énergie Domestique* (DANIDA, 1997, pp 7). This project, financed by DANIDA and managed by the World Bank, ran from 1989 until 1996 and had two principal objectives: (a) to restructure the woodfuel sector around the principal urban centres towards more rational management, in order to protect the environment and (b) to promote the conservation of woodfuel through improved cook-stoves and support for alternative energy sources.

The second phase of the project started in March 2000 and is concerned only with supply side operations, the principal objective being to ensure the rational and sustainable management of woody resources for the benefit of the rural populations who have usufruct rights. Though urban populations are included as beneficiaries in the objective, they are only indirectly affected, presumably by an improved/guaranteed supply. The project is principally concerned with the creation of further 'marchés ruraux de bois'<sup>4</sup>. These are commercial organisations recognised under Law N° 92-0307 of 21<sup>st</sup> August 1992, which are modelled on experience from the forest of Guesselbodi, in which populations surrounding important forest resources manage them in such a way that they benefit from the sustainable sale of the wood to urban centres. Such an approach is in line with wider environmental policy as outlined in the *Plan d'Action National de Lutte contre la Desertification et des Gestion des*

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<sup>3</sup> In Niger, urban woodfuel consists almost entirely of fuelwood. Charcoal is not made in rural areas for sale in towns.

<sup>4</sup> The theory behind 'marchés ruraux' is that rural people get a better price for the woodfuel they cut and sell from the forests they manage, if the fuelwood market is near them and the resource, rather than in town. There is also the hope that forests will be more sustainably managed as a result. There are principally two types of rural wood markets; 'marchés orientés' where in a certain delimited area a specific quantity of deadwood as calculated by agents of the BTPN is permitted to be extracted, and 'marchés contrôlés' where a system of rotations are put in place to allow cutting of live wood. It is clearly envisaged that 'marchés orientés' will become in time 'marchés contrôlés' and this evolution is encouraged by the slightly higher taxes that the 'marchés orientés' attract (375 CFA per 'fagot' (250kg) as opposed to 350 CFA).

Ressources Naturelles (PAN-LCD/GRN, Nov. 2000) and the Plan National de l'Environnement pour un Développement Durable (PNEDD, July, 1998)

During the first phase of *Projet Énergie II*, woodfuel supply plans (*Schéma Directeur d'Approvisionnement – SDA*) were prepared for the main urban centres. These were Niamey (1990), Maradi and Zinder – Tahoua's SDA was abandoned because of the Tuareg rebellion. However, there is still no national plan in place which will meet urban fuelwood demand from rural markets by any particular date. The second phase of the project plans to establish 172 new rural markets nationally in the next three years (122 were established in the first phase, though how many of these are still functioning is not clear). A few have also apparently been established by NGOs.

In April 2000 the *Projet d'Aménagement de Forêts Nationales (PAFN)*, which comes under the wing of the Ministry of Environment, began work - its principal goal being to establish 260 rural wood markets in five years. This project is funded by the African Development Bank, so if the State reneges on its debt, the money will dry up – the project is already late in starting for this reason. However, Ibrahim Maman, Director of the *Brigade Territoriale de Protection de la Nature (BTPN)* estimates that even with all these markets in place (554+) 40-50% of woodfuel would still need to come from elsewhere.

Whilst rural markets are very much considered the way forward in government policy, it should be noted that despite the rhetoric there are problems with those in place today. Giraud, (1998) studied the management strategy put in place around the village of Say, and noted that quotas are not respected, and that some cutting strategies are causing problems with regeneration. (M. Maman, BTPN, had similar reservations.)

Woodfuel from 'zones non-contrôlées' - areas of forest outside those managed for 'marchés ruraux' - requires a special red permit before it may be collected. One 'fagot' of wood (about 250 kg) collected on such a permit costs 975 CFA (600 CFA in 1996). With Law N° 92-0307 of 1992, these permits were made valid only in the arrondissement in which they were issued (earlier, it was possible to buy a permit in Niamey and collect wood in Maradi). Theoretically, these permits are valid only for 48 hours for trucks and 24 for all other means of transport, but in reality - given the distances to be covered - this time limit is not strictly enforced. In principle, permits are only meant for the collection of deadwood, but in reality this aspect of the permit is difficult to enforce. Deadwood is quite easy to distinguish from cut live wood left to dry, and from personal observation and from discussion with M. Maman, it would seem that much wood being sold is clearly of the latter type. The price of these permits relative to those issued for the 'marchés ruraux' (350 or 375 CFA depending on type) is meant to act as a disincentive to purchase from non-controlled areas. But since controlled area markets cannot meet demand, traders have to buy some fuel at the higher price, and no disincentive can operate. M. Maman thought that even if raised to 1500 CFA there would still be demand for these permits: it is not difficult to raise a labour force of 10-15 young men in Niamey and take them out to fell profitable quantities.

In 1999 only 11.1% of receipts from wood permits were from 'marchés ruraux', rising to 14.1% in 2000 (see Annex 2 for department breakdown). There is also the question of how efficient the BTPN are in collecting/enforcing permits. In 1995 it was estimated that they only collected 52% of potential receipts in Niamey (L'Indicateur, N° 9, 1996, pp 14-17), and at the national level receipt collection peaked in 1996 and is only just starting to recover (see graph in appendix). Furthermore, some managers of rural markets put their signature to the cheaper permits, even though they know that the wood has been collected from the uncontrolled zone.

As outlined in PNEDD, the promotion of alternative energy sources is given high priority. However the history of government policy in the last decade was particularly affected by the devaluation of the CFA franc in January 1994.

According to Mr. Abdoul Karim Saydou, Directeur de l'Energie, state subsidies of gas (which originally stood at 50%) ended in 1994, and gas is now consequently unaffordable for much of the population. Kerosene stoves were originally promoted by the Projet Énergie II, but by the mid-term evaluation (1992) focus was shifted towards improved woodfuel cook-stoves.

According to Mr. Saydou there has never been any formal government subsidy of kerosene, though no tax has been levied upon it either<sup>5</sup>. In any case, as with gas, few can afford to cook on it.

The government policy regarding alternative energy is now focussed on capitalising on the nation's coal supplies. In 1991-3 an early effort was made with Canadian support to exploit the reserves of Anou-Ararem in the north of the country, which are estimated to be about 9 million tonnes. A carbonisation furnace was built, but the Tuareg rebellion forced suspension of activities (L'Indicateur, N° 3, 1992, pp 9-10). The programme was re-started in 2000 and is currently in a demonstration phase producing about 5,000 tonnes a year of processed coal, which is used at the semi-industrial level in hospitals, prisons and barracks<sup>6</sup>.

The Japanese aid agency is now involved in negotiations for funding a new processing factory. Though these reserves are distant from the majority of the urban population they are accessible for the nearby desert 'city' of Agadez, where woodfuel supplies are very limited. There is also a more accessible seam stretching across from Felingué to Tahoua, which is due to be prospected with funding from the European Union. As part of this policy, come stoves specially designed to use coal at the household level<sup>7</sup>.

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<sup>5</sup> This is probably incorrect. The official in charge at the Statistics Office of the Ministry of Finance and Planning thought otherwise. Certainly his price data showed little fluctuation.

<sup>6</sup> Processing (partial burning using millet stalks) is necessary to improve the lighting properties of the coal and reduce the smoke..

<sup>7</sup> As the adjoint of the Projet Énergie II, wryly pointed out, how is such a policy to be regarded in the light of global concern over greenhouse gas emissions. Which is worse – a deforested landscape or emissions from coal?

## 2.2 Urban Supply - Niamey

Assessing the amount of woodfuel brought into Niamey annually is difficult, but the following estimations have been made .

Volumes of woodfuel brought to Niamey by lorry		
Year	Volume	% transported by lorry to Niamey
1984	110,000 tonnes	40%
1990	130,000 tonnes	64%
1996	153,000 tonnes	73%

Source: L'Indicateur, N° 9, 1996, pp. 4

Firewood enters the city from seven directions, the western Torodi route (a bitumen road from the main frontier crossing with Burkina Faso), accounting in 1996 for 53% of the supply. Today this remains the dominant route, yet despite the recommendation of the final evaluation of the first phase of Énergie II, a forest guard post is still not in place on the Pont de Kennedy, the only route into the city from this direction.

It is interesting to note that during March 2001, the issue of red permits in the arrondissement of Say to the west of Niamey (for the exploitation of resources in 'zones non-contrôlées') has been stopped. This is an area where about 50% of the countries 'rural fuelwood markets' are located, and the change is intended to encourage their use – some have been having problems selling wood. The heads of Énergie II and the BTPN estimate that only about 20% of Niamey's demand is currently met from rural markets, in fact.

Though the official policy for Niamey's supply is meant to be as outlined in its woodfuel supply plan (SDA- Niamey), it only covers a radius of 150 km, though several people remarked that the main sources of Niamey's wood may now be as far away as 200 km. It is not clear whether this reflects a failure adequately to identify the correct woodfuel catchment area in Niamey's 1990 SDA; whether the originally demarcated area has now been outgrown or whether, rather, there are strong incentives to seek fuelwood in remoter areas where there are fewer controls.

The researcher Dr Yamba Boubacar mentioned that there have been problems in the past with illegal supplies from Burkina Faso, which have now been all but suppressed<sup>8</sup>. A survey in 1995 of the origin of wood from 'exploitation incontrôlé' (i.e. not from rural markets), for instance, indicated some sites just over the border in Burkina and some just within the boundaries of Park 'W' (L'Indicateur, N° 7, 1995, pp. 5). According to the BTPN, both may have occurred but are now controlled or very limited. Some of Niamey's charcoal may be imported from Burkina, however.

<sup>8</sup> There is also some illegal supply from over the border in Nigeria, to supply towns and cities such as Maradi and Zinder.

One of the principal recommendations of the final evaluation of the first phase of the Projet Énergie II was that:

'In light of the fact that the immediate prospect of a severe shortage of firewood in town seems to have diminished or been over-estimated, it is recommended that project objectives be oriented towards a more optimal ecological and economic wood exploitation and a strengthening of society and economy in rural areas' (1997, p 11, translated from French).

While it proved impossible to meet the President of the Association Nationale des Exploitants de Bois (ANEB), informal discussions with two wood sellers in Niamey suggested the following. There have been some changes in the quality of wood available (these changes date back for some years). They noted a higher proportion, in the fuel brought in, of less popular species such as *Sclerocarya birrea* (dagna) and *Prosopis africana* (kiryyia), of lighter termite-eaten or diseased bits of wood, and of shorter lengths and smaller diameters.

However, in the interviews with urban women only half had noted any decline in quality and two in fact noted an increase. There exists some clandestine trade, which is probably all brought in by animals. Much of this is unlikely to penetrate the more central *quartiers* where the interviews were carried out, but some women had heard of it, one remarking that they sold inferior species such as *Acacia albida* (gao). Dr Yamba who, lives in one of the newer more suburban *quartiers* mentioned some trade of this kind by night, and the sale not only of *gao* but even of tree roots. The provenance of the animal-transported wood is presumably much closer to Niamey but it is difficult to conclude anything from the inferior quality observed in this supply. It suggests limited available supplies, but also an attempt to generate a modest income either by those living not too far from Niamey, or even by migrants who have failed to find city work.

One little-documented aspect of urban supply is the seasonal shortage during the rains (May/June to September). Shortages come about because of the impassability of many of the main fuelwood routes during the rains, and the reduced availability of labour due to agricultural demands. During this period one of the wood sellers says she may only get a delivery every three or four days (which she tries to 'book') and this is all sold in one day as everybody is looking for wood. The other seller likewise reports shifting his supply very quickly in the rains. Some suppliers stock up in advance, and there is certainly an increased profit to be made from such practices: both sellers reported having to pay up to around 30% more to their suppliers.

It is perhaps only during the rains that one can talk of a real woodfuel *shortage*, but whether this is a new phenomenon or one that has got worse it is very difficult to say. The city population is reduced at this time as migrants go home, other staples are also expensive, and the rains make the physical act of cooking difficult if not, at times, impossible.

### 2.3 Urban Demand – Niamey

In the one and only survey of urban household expenditure conducted in 1988-89, wood was found to be the fuel source for cooking in 96.31% of households and expenditure on it was calculated to be 4.1% of the annual total spent per person (pp. 11 and 26, Ministère des Finances et du Plan, 1994). For the households categorised as the poorest, the annual percentage spent on wood was calculated at 7.2% (ibid, pp 52).

Despite the efforts of the first phase of *Projet Énergie II* to promote alternatives, the percentage of households using wood as their prime fuel source remains about the same – and may even have increased given the increased prices of alternative fuels after currency devaluation. Whether firewood has become economically scarce in the last decade is very difficult to calculate. There is in use a consumption index for Niamey (*Indice Harmonisé des Prix à la Consommation, IHPC*) but this was reconstituted in 1997, so that a comparable continuous record for the decade is difficult to obtain.

The graph overleaf shows the relation of woodfuel price to the principal urban foods, rice and maize over the last decade for Niamey (millet is included as it may still be important for some households). However the woodfuel price data sources and representativeness should be considered carefully. The data from January 1993 to December 2000 is from the IHPC, and for the first five years of this period was calculated on the basis of price per 10 kg. (each month, 24 sample bundles were purchased, and weighed). The data before 1993 are from various surveys reported in *L'Indicateur* where the sample size is not known. However, wood is not sold by weight, but rather by bundles of 50, 75, or 100 CFA or larger units. Clients rarely have any choice over the composition of a bundle – but two women reported that if you bought over 300 CFA's worth you got a choice. The graph masks much of the seasonal price variation reported by every user. But as described by two users and one seller, 50 CFA buys 4 bits of wood in the dry season and 3 in the rains – which could be expressed as an approximate 33% price-hike.

Over the decade woodfuel has nearly doubled in price according to one user, and the graph suggests that there is some validity in this statement. According to *L'Indicateur* (1994, N° 6 pp12-16) much of the price increase (especially noticeable from May 1994) can be explained by the restructuring of the various taxes in the market, and increases in transport costs due to the currency devaluation.

What has been the effect of a near doubling of the woodfuel price in the last 10 years? This is a very difficult question to answer given the scarcity of recent data. However, it should be stated that alternate fuels hardly exist, and thus people are obliged either to economise on their use of wood by changing fire use and/or eating habits or else to make compensations for the increase elsewhere in their budgets.

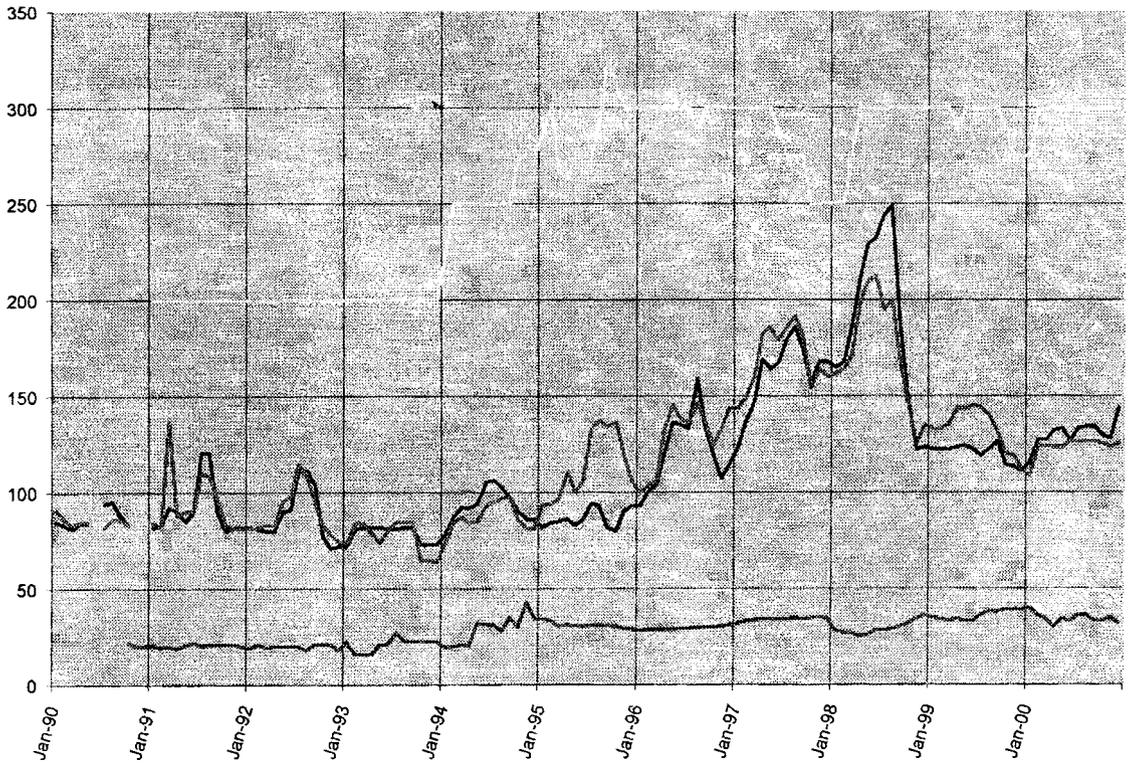
There are a few additional ways of accessing wood. The clandestine informal market does allegedly supply some cheaper (though inferior) wood. This market may be more significant than could be ascertained in the time available. Another strategy is to buy a basin of kindling gathered up at the fuelwood-selling area. According to both wood sellers and one user, this is a relatively new option. Before, such oddments used to be free. One seller started selling wood chip kindling seven and the other three-four years ago, apparently as a means of compensating for falling profits. Finally, three young girls were encountered one evening with basins full of bits of wood they had gleaned at the market at the end of the day after all transactions were over, which may be an option for those with time to search for the small quantities left by this stage.

#### **2.4 Adaptations at household level**

From the eleven interviews conducted with women in Niamey, there was very little indication of fundamental changes in cooking habits or fire use over the last decade. However, it should be noted that whereas, in a study of urban diets in Niamey in 1989 Gamatchié (cited in Oumarou et al. 1993) notes that millet was the preferred staple for the evening meal, this was never once reported to me twelve years later. This may reflect a continuation of the trend noted in Niamey towards more rice and maize in the diet, both of which take less time to prepare, and less overall cooking time. (CILSS, 1989)

All women interviewed universally used the 'malgache' steel drum cook-stove. A few 3-stone fires were also seen, and one woman used a small camping gas stove to heat water. Virtually all claimed to extinguish bits of wood unused at the end of cooking, and none claimed that this was a new habit. One difference that *has* occurred is that the coals left over when the fire has burned down can now be sold. These coals have usually been saved to heat water on a brazier or are given to the husband or children for making tea, but it is now also possible to sell them to young men and to 'blanchisseurs' (men who wash and iron clothes).

**The Price of Woodfuel compared to staples in Niamey, January 1990- December 2000**



(data sources: see text for woodfuel, staples from SIM)

This is a very small-scale transaction (though for food sellers who have to buy a lot of wood it can add up) but it does represent the monetisation of what used to be given for nothing. A large study of woodfuel use in Niamey in 1984 notes that while the use of charcoal by households is not particularly important it exists, but often goes unnoticed because it is not bought (Matly & Laurent, 1985). Whilst most admitted that this monetisation was new, the only timeframe I got was that it had occurred within the last 10 years. What it reflects it is difficult to say, but as far as I am aware and was told, charcoal is not a major fuel outside specialised trades such as blacksmiths and ironing. It may simply reflect an attempt to gain extra money, perhaps motivated by the higher cost of wood.

Non-cooking uses of wood mentioned were space heating in the cold season (December/February) and heating water for washing, most often in the cold season or rains. Space heating was not found to be particularly common - only 12% in Matly & Laurent's study (1985). It is however probably more important for the elderly and also depends on the type of housing. *Banco* houses retain heat quite well, but one elderly widower interviewed who lived in a grass hut seemed to have a made considerable outlay on wood despite only eating one cooked meal a day.

One cultural practice requiring water heating is the mother's 'quarantine' (40 day 'quarantine' period after a moslem woman gives birth) when she is meant to rest, and bathe herself and her child morning and evening in water that has been brought to boiling point (to purify it) then allowed to cool<sup>9</sup>. According to the president of CONIPRAT<sup>10</sup>, Madame Maiga Amsou, this is a practice that is disappearing with urbanisation: it has been reduced to just 7 days or is limited to just the first birth. What effect woodfuel prices have had on this trend it is difficult to say, but the interviewee from whom I first learnt of the practice said that her husband was covering the extra 200 CFA outlay on wood. In the rains the outlay would be more and the wood difficult to find.

One possible impact of the woodfuel price increase over the last decade has been to put bulk buying beyond the reach of more households. Two of the women interviewed reported they were now unable to afford to do this. On the whole though, it can probably be concluded that the price rise has been carried by adjustments elsewhere in the daily budget. Men are theoretically obliged under Islamic norms to provide for the family's needs, which in the urban environment include the woodfuel cost, so the adjustment may ultimately have been their responsibility. But how successful women have been in invoking this it is hard to say: one woman said she paid for extra wood out of her own budget, and another said she would have to do the same if the price of wood doubled. Unravelling where the adjustments have been made would require a very detailed survey.

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<sup>9</sup> A certain pap is eaten during this period which is not particularly nutritional

<sup>10</sup> Comité Nigérien sur les Pratiques Traditionnelles ayant Effet sur la Santé des Femmes et des Enfants

The seasonal price increases in the rainy season may precipitate more innovative wood use at this time. But since cereal and condiment prices are all high in this season as well, the precise effects are hard to unravel. All women reported increasing their expenditure on wood during this period except one, who actually reduced it: she was conscientious in preparing for the rainy season beforehand. Her strategy was to save as much charcoal as possible in advance, and use this during the rains, with wood, to boil water and eat pasta.

Pasta eating is new, and even though it is expensive, its use makes for considerable fuel-saving economies. Otherwise most women seemed to increase expenditure by anything up to double the dry season amount. Several women said that eating food bought ready prepared, such as bread, cassava, *zogala* (*Moringa oleifera* leaves) or cooked beans was more frequent in the rains. Another reported sometimes making just a quick light sauce to eat with bread. This was because of the difficulties in finding wood for sale, which involved travelling to a distant *quartier*, or spending more, and also because it was very difficult to cook outside when it was raining.

## 2.5 Food sellers

Five of the women interviewed also sold fried snacks such as '*galettes*' and '*dumbu*'. It was difficult to disassociate the effects of raw product price increase in the rains from wood increases but at least two thought it had an important effect on their profits and they said that they had to compensate by doling out smaller quantities for the same price.

The two women rice sellers talked to said that most of their clients were migrants, and that by late March they begin to diminish the quantity cooked, as the migrants are starting to leave, and people do not eat so much in the hot season. Both said the number of customers had declined in last 10 years because 'more migrants now come with wives' and because 'people can't afford to eat rice anymore', they think some of their clients may be the result of transport increases forcing people to stay in town at midday. Though both diminish the quantities cooked in the rains, their wood expenditures both increase, a rise they have to carry. Both wood and rice prices have doubled in the last decade and they have adapted by reducing the size of portions dispensed, though not by half.

Probably all omelette makers in town use kerosene stoves to fry on, which are apparently economical for this use. Most use wood to heat tea water. One said that he used to use kerosene as well, but that, with price increases, it is no longer economical.

### 3. THE RURAL SITUATION

#### 3.1 Introduction

It is very difficult to give any picture of the national rural fuelwood situation, especially given the country's size and heterogeneity. Good maps which related tree cover to population density were not to be found, for instance. A national inventory carried out between 1982 and 1989 estimated that national forest resources covered 16 million hectares, of which 11.6 are considered marginal and 4.4 million capable of management.

The following table of productivity and consumption of woodfuel, dated 1997, is in the PNEDD (pp33):

Department	PRODUCTION (T)	CONSUMPTION (T)	DIFFERENCE (T)
Agadez	1800	91980	-90180
Diffa	21517	55003	-33486
Dosso	409770	306600	103170
Maradi	90000	398815	-308815
Tahoua	27672	485000	-457328
Tillaberi	300000	600000	-300000
Zinder	60000	200000	-140000
CU Niamey	0	156000	-156000
<b>Total</b>	<b>910,759</b>	<b>2,293,398</b>	<b>-1,382,639</b>

Any better quality data that exists tends to be piecemeal, focussing on an arrondissement here or there. According to Dr. Yamba, the best information exists on Maradi department. It is in southern Maradi and southern Zinder department, close to the Nigerian border, that population pressure is greatest in the country.

An important change in the legal status of woody cover occurred in the last decade with the passing of Ordonnance N° 93-015 in March 1993 which outlined the principal orientation of the Rural Code. Article 16 states:

‘Sous réserve des droits des tiers, tout ce qui s'unit au sol, naturellement ou artificiellement, qu'il s'agisse du couvert végétal ou d'aménagement divers réalisé par l'homme, appartient au propriétaire du sol’ (Republique du Niger, 1993, pp 4)<sup>11</sup>.

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<sup>11</sup> This may be translated as: ‘Under Third Party rights, everything pertaining to the land, either natural or the result of human investment, be vegetative cover, or its improvement through management, belongs to the owner of that land’.

These provisions diverge from the Forest law (Loi 74-7 of 4<sup>th</sup> March 1974) which lists fifteen species of protected trees that may not be cut without permission obtained at the departmental level. The situation was further confused by a government statement (not a law), issued after the 'Debat National sur la Lutte Contre la Desertification' held in Maradi in 1984, which prohibited the cutting of *any* tree for the purposes of crop field expansion or preparation (Elbow, 1994). Today, under the 1993 Rural Code, farmers have an incentive to protect and plant trees on their own fields as they now have ownership rights. However, theoretically the 1974 law is still in place, since the specific rules concerning forests which incorporate the implications of the Rural Code, have yet to be elaborated (despite having been expected several years ago).

Reputedly, the delay may have something to do with an internal governmental dispute: the Ministry for the Environment is trying to reclaim state control over trees. It is interesting to note that, according to Yamba Boubacar, (2000) *Projet Energie II* had an important role in influencing a national reorientation of forest policy away from repressive state control (pp 40-41).

The national policy for the environment is outlined in PAN-LCD/GRN and PNEDD and its principal relevant elements include:

- support for local resource management
- tenure reform slowly going through (the Rural Code)
- encouragement of natural regeneration

### **3.2 Introduction to Maradi district<sup>12</sup>**

During the period since the 1970s, Maradi Department has faced declining rainfall; increasing competition for land resources because of population growth; growing shortages of animal manure and crop residues needed to maintain soil fertility; and labour shortages attributed to the rapid extension of cultivated areas.

Total rainfall has not only diminished overall, but also the season has become shorter, with diminished reliability of early (May and June) and late (October) rainfall.

Over the last 12 years, populations densities in the drier northern part of Maradi have gone from 23 to 44 people to the km<sup>2</sup>, while in the southern slightly less dry *arrondissements*, densities have risen from 49 to 68/km<sup>2</sup>. In Maradi, too, farmers have moved north and transgressed the line that is intended to demarcate the exclusively pastoral zone. The proportion of village lands under cultivation has risen steadily. In the 1980s there were still some uncultivated areas, but most of these are now gone and land in the Department is now at saturation point. Between 1975 and 1996, in addition to an increase of 13 percent in cultivation, at the expense of woodland and steppe, 6 percent of the total area suffered a decline from one woodland type to an inferior one,

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<sup>12</sup> This section is drawn from work in progress by Mary Tiffen and Michael Mortimore, 'Livelihood transformations in semi-arid Africa 1960-2000: policy lessons from farmers' investment choices in Kenya, Senegal, Niger and northern Nigeria' first presented at an ODI seminar in January 2001.

and wooded grassland declined from 25 to only 8 percent. Livestock numbers have been maintained or slightly increased, but these animals are managed more and more on the farm.

The loss of common property resources has led, not surprisingly, to increased focus on the household as the decision-making unit at the expense of the power of local rulers and the extended family. Labour migration is increasingly long-term and long-distance and, whereas in the past it was mainly confined to villages in the northern and drier parts of the Department, is becoming much more widespread. Women have had to take on more responsibility for managing the family farms while also maintaining household consumption through alternative income generating activities.

However, data collected during the 1990s shows that farmers in Maradi Department have adapted to long term rainfall decline, drought and high demographic growth while maintaining production and yields, increasing on-farm tree densities, and making other investments in land resources, transport and other off-farm income generating activities. Farming households have adapted to climatic and demographic changes by introducing new seeding and cultivation methods, new crop varieties, and a wide range of soil fertility conservation measures. They have responded to an uncertain economic environment by identifying new markets and new crops. Trade forms an important part of income strategies, and there is an intense exchange of goods and labour between Maradi Department and Nigeria.

In the southern part of Maradi Department, where population densities are highest, intensification of agriculture is well under way, and there are strong economic linkages between rural farming areas and urban market economies, through the trade of a widening range of crops, livestock and labour. In the northern part of the study area, intensification of agriculture is less well advanced, as adequate land resources exist and farmers can still increase production through the extension of cropped areas, a strategy that is not possible in the south. (As elsewhere in the Sahel, low-lying soils have been brought from neglect into intensive use. The dry valleys of Maradi Department which supported much woodland fifty years ago, are now entirely under cultivation).

Decreases in farm size have led to more available labour. Some is directed to labour migration, but some may be available for more intensive activities on farm. Where this is the case, labour has been invested in the maintenance of soil fertility (the management of manure and crop residues) in tree management on farms - a little planting, but mainly the management and protection of natural regrowth - and to changed methods of livestock feeding. Animals may be fed on crop residues for nine months of the year, or may be sent south to Nigeria for part of the year. Fallowed land (once a communal resource) is now being privatised by its owners for animal feed.

### 3.3 Supply and Demand in two Contrasting Villages: Howaltchi & Guidan Bakoyé

#### 3.3.1 Howaltchi ~ poor woody cover and wide use of fuel alternatives

Howaltchi has a population of about 500 and is situated in the drier 'agro-pastoral zone' in Dakoro arrondissement in the northern part of Maradi District. The woody cover is limited to a few odd trees and much shrubby regrowth principally of *Guiera senegalensis* (sabara) which is cut back when the fields are prepared every year. Fallowing is less common nowadays, and larger areas are under permanent cultivation using the 'iler' or Dutch hoe.

Every women interviewed in Howaltchi reported using wood, dung and millet stalks. With only one exception all women said they were limited to their household fields to collect wood, even dead wood. Some women claimed that they might also search in the communal grazing area but I have the impression that this was not really worthwhile. When exactly they became more limited to their household fields is unclear, and it was clearly something that has evolved over some considerable time. Estimates ranged from the famines of 1973/4 to more recently than 1984. The driving factors are probably a combination of the expansion of the cultivated area, and a reduction in woody cover - the droughts perhaps being partly responsible. Most of the wood seen in use was very small diameter regrowth cuttings.

A household's woodfuel supply is thus a function of their woody resource endowment and management strategies. And some management of the regrowth along traditional lines, or in a '*défrichement amélioré*'<sup>13</sup> style would seem to be occurring. Women may only gather fuel from their own fields, but it would seem that greater latitude is given to children. It was evident that this freedom was being used to advantage in one of the poorest households interviewed. The children of the woman interviewed would leave about 4pm, and come back late at night with wood that she admitted had been taken from other people's fields.

*Guiera senegalensis* (Sabara) was the preferred species, as well as most common, the reasons being that it dries quickly when cut and burns well. One women reported having had to use *Maerua crassifolia* (jiga), which gives off a bad smell. But with various alternatives available, recourse to unsuitable species is probably infrequent -- and it is of course strongly conditioned by the species endowment in household fields which can presumably be modified in the chosen direction over time.

With only one exception among those interviewed, dung tends to be used only during the dry season. It seems to have been in use for pretty much the same length of time that people have been restricted to their fields. Cattle dung is preferred for its

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<sup>13</sup> '*Défrichement amélioré*': literally, 'improved field clearance'. A way of managing woody regeneration in fields, which leaves a few sprouts to grow from the rootstock (akin to coppicing) and protects naturally regenerating seedlings.

consistency but donkey dung can be used. Four out of ten women interviewed complained about the smoke that dung gave off, two stated that it brought bad health and one complained that it took longer to cook with than wood. However four other women found no disadvantages with using dung.

Compared with agricultural residues (millet stalks) dung has one key advantage: it requires far less supervision. ('You can leave the fire and go to the well' was one response.) Stalks are light by contrast and, if a wind gets up, they may be blown onto a house or fence and start a fire. For rules about dung collection, the general consensus was that it could be collected anywhere outside the village. The village animal compound appears to be off-bounds to non-animal owners unless permission is sought, but there are no sanctions against the well area. Six women were asked whether collecting in fields where there was a manure contract<sup>14</sup> in place between the landowner and a visiting herder with his herd was acceptable. Two gave an outright 'no' answer, two said 'yes', and two more truthfully perhaps, clearly collected such manure but thought it was wrong to do so.

Stalks have probably always been used to start fires with – one woman said she used to stock them for this purpose in the rains<sup>15</sup>. As to where women can gather the stalks the consensus was fairly evenly split between those who said anywhere and those who said the household fields (or who at least preferred to look there). Stalks require a lot of attention because of the danger that they might cause a fire – many huts and all fencing are made of straw or grass stalks. This precaution probably explains why fires are always put out when finished with.

It was very difficult to identify any changes women had made in adaptation to a worsening fuel situation, perhaps because such changes had been going on for a long time and were not particularly recent. One woman complained that she sometimes had to skip pulling water or even meals to look for wood, but on the whole women seemed to accept that the search for fuel was time-consuming and its availability modest.

Nine out of the ten women interviewed made food for sale, - *beignets*, *galettes*, peanut oil, millet pâte and beer, all of which require some degree of fire use. High levels of food sales are well known in Hausa culture (Raynaud, 1977).

Estimating cooking times was difficult especially given the various fuels, so changes there could not be elaborated. Space heating is mainly done with wood and so is water- heating. Several women reported that for the '*quarantaine*' they would use millet stalks.

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<sup>14</sup> A manure contract enables a transhumant herder to park his animals on the private fields of a sedentary farmer, and allow his animals to graze on stubble. The advantage for the farmer is that the tethered animals drop all their manure on his fields.

<sup>15</sup> Unfortunately the author did not find out until later that there is no distinction in Hausa between millet stalk and millet cob. The local millet is the bulrush variety with a head – in good years – of 18-24 inches. It is stored in the granary on the cob, and can be used for fuel once the grain has been removed.

Some wood has been sold in the village in the last three to four years, predominantly by men with carts who go well beyond the range at which they might compete with local women. Women seem prepared to buy wood if they can get it, especially for the production of food for sale, but it is not always available. Another source of wood is when men replace their concession fences: some may even sell the wood to their own wives.

### ***3.3.2 Guidan Bakoyé ~ good woody cover, but almost all in privatised resources***

Guidan Bakoyé is a large village (2000 people) in the northern part of the agricultural zone in Aguié arrondissement, in the southern part of Maradi District. There appears to be very good woody cover (especially compared with Howaltchi) but this is reportedly a recent phenomenon, and is the result of farmers' independent, or 'Projet Aguié'<sup>16</sup> encouraged, *défrichement amélioré* in the last 10 years.

#### **Supply-side changes**

It is approximately within the period that natural regeneration has been encouraged by farmers, that women have been mainly limited to the collection of fuelwood in their own fields. This has had to be actively enforced by a surveillance committee recently established by the project, since before this there were problems of 'abuse'. Several women reported that wood collecting had become much more difficult since collection had been limited to farm fields, pointing out that it was now no longer possible to stock up for the rainy season, for instance. Women – especially poorer women, presumably, whose husbands' fields are smaller – are clearly objecting to the privatisation of hitherto communally available woodfuel resources<sup>17</sup>. How big a problem this is was impossible to gauge in the time available.

The woodfuel used by women is principally the small twiggy material cleared from their fields. One woman whose husband had extensive lands, and who had been protecting woody regrowth for the past twenty years, has ample woodfuel resources of up to 5cm diameter, and never has to use crop residues. Because she realises that she is in an exceptionally fortunate position, she allows her neighbours access to her woodfuel resources as a gift. Some, but not all women were successful in persuading their husbands to cut extra wood when the stock from the previous field clearance was finished<sup>18</sup>.

For many women the collection of millet stalks for fuel has become more important, as woody resources have been privatised. Interestingly, older rules (of public access to all land areas once crops have been harvested) still seem to hold good in the case of

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<sup>16</sup> The Project donor is IFAD (Fonds International de Développement d'Agriculture).

<sup>17</sup> The finding of interim solutions is not made easier by the fact that there is only one woman on the project's surveillance committee.

<sup>18</sup> Cutting live wood in the Hausa world is a male activity and one woman reported then when she cut trees herself when her husband was away as a migrant, he objected, not because of the trees, but because tree-cutting was not women's work.

millet stalks. These may be gathered anywhere, not just in household fields (though some prefer to gather them in their own fields), and they are hotly competed for, especially after years of low rainfall, when stalks are scarce. There is no reported competition between the use of stalks as a fuel alternative and animal feed - animals eat the leaves around the stalks, which can then still be used as fuel.

Dung is mainly important in this region as a fertiliser, and would seem to have been rarely used for fuel so far. One woman who had tried using dung had been told by other women that it would give her children skin diseases if she did - so she gave up the experiment.

The time spent collecting wood in Guidan Bakoyé seemed to be longer than in Howaltchi (4-6 hrs 3 or 4 times a week), but it is a much larger village, which dictates greater distances to fields and other resources for many women.

#### **Evidence for demand side changes at the household level**

There is some evidence of forced change at household level, owing to the scarcity of cooking fuels. A couple of women reported using wood for space-heating and/or heating water less often.

One woman reported that she sometimes was forced to prepare a type of millet porridge (*fura*) called '*lalamé*' which takes about half as much time as normal to prepare. She also sometimes made a quicker sauce called *tabaché*. These quick foods had been made previously only when time was especially short (e.g. right before big household social events such as baptisms), but are now beginning to be made as a response to cooking fuel shortages. Others confirmed that fuel supplies are beginning to dictate such food preparation changes.

Several women reported having been obliged to cook with tree species that were disliked for one reason or another. Examples included *Annona senegalensis* (whose acrid smoke 'gives the user a sore throat') and *Euphorbia balsamifera* (*aguwa*) which burns too quickly like millet stalks. Women felt that *Acacia albida* (*gao*) also burnt too quickly.

Many women also reported buying wood and this was not exclusively for food trade, though several reported having to pay for it themselves nevertheless. The trade appears to be recent. The sellers are mainly children, who roam widely and gather twigs and millet stalks, which they sell relatively cheaply, or young men who cut from their own or their family's fields, and sell to others.

#### **4. URBAN/RURAL COMPETITION**

As is the case in many parts of Africa, urban/rural competition can translate itself readily into competition for resources between men and women. As is seen in miniature in the example above, young men may have an incentive to cut fuel resources for sale at a local market (even if that market is no more than a large village) which their wives or mothers had been relying on for domestic purposes.

Similarly, the gender advisor for SNV (Dutch volunteers) reported that, in a village 120 km from Niamey, the women had told her that it was becoming much harder to find firewood, because the men of the village were collecting it to sell to the Niamey-bound market. The second phase of the *Projet Énergie II* specifically talks about the need to include women in the *marchés ruraux*. The project is currently writing up its first gender impact survey. Not only are there every few women represented on rural market management committees, but the impact on local need, rather than on the need for sales seems hardly to have been considered.

## 5. CONCLUSIONS - ADAPTATION OR CRISIS?

### Urban supply

The urban supply to Niamey has probably not diminished over the last decade, and the fuelwood shortage hypothesised by the *Energie* and *Energie II* projects have not come about. This is the result of mixture of factors.

(i) The Niamey population has not grown with the rapidity originally projected at the height of the uranium boom.

(ii) The seasonal ebb and flow of population is highly variable - depending on the state of the preceding harvest, and the flux of migrant opportunities in neighbouring countries. Pressure on urban resources is not the same all through the year, or even from year to year.

(iii) Above all, probably, there are far more diverse sources of fuel coming in to Niamey than project model allowed for. The projects' goals were to restructure the woodfuel sector around the principal urban centres to allow more rational management, and to protect the environment. But unfortunately, controlled-area markets cannot meet demand, so permits must be given for collection in uncontrolled areas. These permits are clearly open to various kinds of abuse, and are in hot demand. A largely unregulated woodfuel supply comes in mainly from the west and south west, where resources are more ample, and some women reported better, rather than worse fuel quality than in the past, which suggests the tapping of new and possibly illegal supplies (such as Parc National W?). In addition to fuelwood transported by lorry, a more clandestine small-scale trade of fuelwood brought in by individuals would seem to be flourishing.

## **Adaptation to higher urban prices**

Nevertheless, fuelwood prices *have* doubled over the last decade because of transport increases and forest permit price restructuring, and temporarily increase further by a factor of about a third each rainy season.

Fuel-switching to kerosene or gas remains unaffordable for all but a few. Coal use may be a medium-term option, but 96% per cent of users still use fuelwood.

Adaptations to shortage have been made as follows:

- Urban dwellers have adapted to rising costs by economising on food and fuel simultaneously, and do not seem to be able to distinguish fuel savings.
- All use metal >Malgache= stoves.
- Some modest dietary changes have been made - away from slow-cooking millet towards faster cooking rice, maize, and pasta.
- Bulk buying of fuelwood is now beyond the reach of most individuals
- Cooked food is bought more often in the rainy season.
- Food-sellers adjust to woodfuel cost fluctuations by adjusting portion size.

## **Rural supply and demand**

The picture in the rural areas is of the slow and steady privatisation of fuelwood resources as the district fills with farms and common property resource areas disappear. The inter-relationship of agriculture, livestock, trees and fuel grows ever more complex. The widespread and encouraged practice of *défrichement amélioré* in regions of high population density and/or wood scarcity speeds the process of individualisation of woody resources.

- In both the northern and the southern Maradi arrondissement examined, women are now almost exclusively confined to gathering woodfuel from regrowth protected in their own fields.
- For some poorer women, supplies from this source are inadequate and, sometimes with the assistance of their children, there is a certain amount of theft from the fields of the better endowed. One woman interviewed, aware of this disparity, made gifts to her neighbours from her fields.
- Millet stalks are important fall-back fuels in both areas and they seem still to be gathered on an open access basis, as fuelwood was in the past, even though they are all found on private fields
- So far, dung would seem to be a more familiar fuel in the north than in the south.
- Both areas reported the use of less satisfactory species
- In areas of individualised woodfuel access and/or *défrichement amélioré*, local woodfuel sales may increase. Whether men are prepared to pay for this household expense like their counterparts in town is unknown, but they gain from such sales as they assume control of the resource Both areas reported increased sales of fuelwood - by men with transport who go right away from the villages in the north, and by young men and children in the south who seemingly cut and gather locally from private lands.

In the north, almost all the women interviewed sell food within the village. More investigation is needed to know what economies of scale may be being practised here. In the south, household economies were mentioned including cooking quickly prepared foods, and undertaking less space heating and water heating.

Anecdotal evidence suggests that urban v. rural competition for woodfuel translates into a potential gender crisis as well. The policy of support rural wood markets may have similar effects to *défrichement amélioré*, in monetising woody resources to the benefit of men.

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## Annex 1

### Tree & shrub names used in the text

<i>Latin Name</i>	<b>Hausa name</b>
<i>Acacia albida</i>	Gao
<i>Anona senegalensis</i>	Gwanda
<i>Euphorbia balsamifera</i>	Aguwa
<i>Guiera senegalensis</i>	Sabara
<i>Maerua crassifolia</i>	Jiga
<i>Moringa oleifera</i>	Zogala
<i>Prosopis africana</i>	Kiryia
<i>Sclerocarya birrea</i>	Dagna

## Annex 2 : Niger National Forestry Receipts (CFA)

	1999			2000		
	Exploitation Zone Incontrôlée	Exploitation Zone Orientée	Exploitation Zone Contrôlée	Exploitation Zone Incontrôlée	Exploitation Zone Orientée	Exploitation Zone Contrôlée
Agadez	5770445	0	0	5600285	0	0
Diffa	3685950	0	0	3899637	0	0
Dosso	16912700	2724824	0	21887934	3182160	0
Maradi	8180824	0	1761157	10514510	0	3002785
Tahoua	10704582	0	0	13303943	0	0
Tillabéri	49320545	6973336	1599778	67085351	11590778	4063800
Zinder	9307981	0	41368	17714300	1026929	90133
<b>Total</b>	<b>103883027</b>	<b>9698160</b>	<b>3402303</b>	<b>140005960</b>	<b>15799867</b>	<b>7156718</b>

	1999	2000
Uncontrolled	<b>1999</b>	<b>2000</b>
Rural markets	<b>3998</b>	<b>4000</b>
	<b>7996</b>	<b>8000</b>
RM Total	13000463	22956585
Total receipts	13016455	22972585
<b>% Total from RM</b>	<b>11.1%</b>	<b>14.1%</b>

## Glossary of terms & acronyms

ANEB	<i>Association Nationale des Exploitants de Bois</i> – national wood sellers association
Arrondissement	Territorial organisational unit – a district
Banco	A type of house made of mud
<i>Beignets</i>	A fritter type snack
<i>Blanchisseurs</i>	Men who wash and iron clothes
BTPN	<i>Brigade Territoriale de Protection de la Nature</i> – national environmental enforcement agency
CFA	Local currency, linked to the French Franc at 100 CFA = 1FF and used throughout francophone West Africa – <i>Communauté Financière Africaine</i>
CILSS	<i>Comité permanent Inter-États de Lutte contre la Sécheresse au Sahel</i>
CONIPRAT	<i>Comité Nigérien sur les Pratiques Traditionnelles ayant Effet sur la Santé des Femmes et des Enfants.</i>
<i>Défrichement amélioré</i>	Literally improved field clearance. A way of managing woody regeneration in fields, which leaves a few sprouts to grow from the rootstock (akin to coppicing) or naturally regenerating seedlings protected. Also known as <i>régénération naturelle</i> in some projects.
<i>Dumbu</i>	A type of snack
<i>Exode</i>	Seasonal migration
<i>Fagot</i>	A bundle of firewood that weighs about 250 kg
<i>Fura</i>	Millet porridge
<i>Galettes</i>	Literally pancakes
IHPC	<i>Indice Harmonisé des Prix à la Consommation</i> – Inflation Index
<i>Lalamé</i>	A type of quickly prepared <i>fura</i> (millet porridge)
<i>Malgache</i>	Name used for a simple steel wood stove
<i>Marchés ruraux de bois</i>	Rural wood markets
PAFN	<b>Projet d'Aménagement de Forêts Nationales</b>
PAN-LCD/GRN	<i>Plan d'Action National de Lutte contre la Désertification et des Gestion des Ressources Naturelles.</i> National anti-desertification and natural resource management plan
<i>Pâte</i>	Called ‘ <i>tuwo</i> ’ in Hausa, it is the standard evening meal that resembles a well set pudding over which a sauce is poured.
PNEDD	<i>Plan National de l'Environnement pour un Développement Durable</i> – National Sustainable Development Plan
Quarantaine	Literally 40 days – referring to the period after a woman gives birth when she is meant to rest and bathe herself and child morning and evening in warm water.
SDA	<i>Schéma Directeur d'Approvisionnement</i> – Supply Plan
SNV	Dutch Aid Organisation
<i>Tabaché</i>	A type of sauce that is quickly prepared

## The Price of Woodfuel compared to staples in Niamey, January 1990- December 2000

(data sources: see text for woodfuel, staples from SIM)

