

# The Fuel Wood Crisis in Burkina Faso

## Solar Cookers As An Alternative

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*But most people still fail to realize that, in some areas, solar cooking may soon constitute one of the few remaining options for preparing a hot meal [Kuhnke et al. 1990]*

### **Summary.**

More than 90 % of the wood cut in Burkina Faso is used as fuel. Consumption is higher in urban than in rural households. Under these conditions, rapid urbanization will lead to accelerated deforestation, the more so as the wood reserves have been overexploited for a considerable time. Imported forms of energy are not an alternative for economic reasons. Because of high and still rising costs of wood and other forms of household fuel the link with the problem of poverty is obvious. In the context of globalization and urbanization the relationship of modern sector growth and increasing poverty, the relationship of acceptance of solar cookers and socio-economic standing is discussed, as is the possibility of hybrid solutions at the local level.

### **Zusammenfassung.**

Über 90 % des eingeschlagenen Holzes dienen in Burkina Faso als Feuerholz für Kochzwecke. Der Verbrauch ist in städtischen bzw. halbstädtischen Haushalten höher als in ländlichen. Unter diesen Umständen lässt die rasche Verstädterung für die Zukunft eine weiter beschleunigte Entwaldung erwarten, da die Holzvorräte bereits seit längerer Zeit übernutzt sind. Importierte Energieformen können aus wirtschaftlichen Gründen keine breitenwirksame Alternative sein. Angesichts der hohen und steigenden Kosten für Holz – und andere Energieformen – ist der Zusammenhang mit dem Problem der Verarmung breiter Bevölkerungskreise offensichtlich. Im Kontext von Globalisierung und Verstädterung, Wachstum des modernen Sektors und Verarmung wird die Beziehung zwischen der Akzeptanz von Solarkochern und dem sozial-ökonomischen Milieu angesprochen. Die Möglichkeiten von hybriden Lösungen auf lokaler Ebene werden erörtert.

### **Résumé.**

Plus de 90% du bois utilisé au Burkina Faso servent de bois de chauffe. La consommation dans les ménages est plus importante en milieu urbain qu'en milieu rural. Dans ces conditions, l'urbanisation rapide conduira à une déforestation accélérée, étant donné que les réserves de bois sont surexploitées depuis longtemps. Les formes importées d'énergie ne sont pas une alternative envisageable pour des raisons économiques. Vu les coûts importants et encore croissants du bois et d'autres formes d'énergie le lien du problème de l'énergie avec le problème de la pauvreté est évident. Les liens entre la mondialisation et l'urbanisation, entre la croissance du secteur moderne et l'appauvrissement de la population, entre l'acceptation des cuiseurs solaires et le milieu socio-économique sont discutés, ainsi que la possibilité de solutions hybrides à l'échelle locale.

### **Introduction.**

Burkina Faso is confronted – like other African countries[1] of the Sahel- and Sudan-Savannah zones – to a lack of woodfuel for cooking. Over 90 % of the energy used for this purpose is based on wood. Consumption is higher than production; this means that there is no ecological sustainability. At the same time – because of the low economic productivity – import of the necessary amounts of energy cannot be envisaged, neither on the macro-economic level (because of the permanent budget deficit) nor on the family budget level. Thus, economic sustainability is also lacking.

A 20-kg bottle of liquefied gas costs 20.000 FCFA in Ouagadougou, and every new filling 4.000 FCFA. One filling is sufficient for about three weeks. This means 72.000 FCFA per year for gas refills alone. The poverty line is of the same order of magnitude (the official figure is 72.690 FCFA/year), and 45 % of the population are defined as poor. It is obvious that there is no economic sustainability of commercial alternatives to wood as fuel.

In his book on the energy question in the Sahel J.P. Minvielle [1999: 127] asks: “Will we – in a not too distant future – have to organize a system of energy aid just as we did with regard to food aid? Will there be an energy famine in the Sahelian countries?” In 1985 Jean Gorse, then head of a working group of the World Bank on desertification in Africa, stressed that “in all zones, the carrying capacity of the natural forest cover is lower than that of crops and livestock with traditional production techniques. The natural forest cover is therefore the most vulnerable part of the ecosystem. ... The natural forest cover is not only vulnerable, it is severely overexploited”. According to A Compaoré and J. Kaboré [1999] 46 % of the soil surface in Burkina Faso are ecologically degraded by human intervention as well as by the process of desertification[2].

An example showing how far production and consumption may differ from each other is the republic of Niger: consumption amounts to 2.293.398 tons, whereas production is only 910.759 tons. This means a deficit of 60%, which is most certainly covered by predatory and illegal felling.

This paper is intended to show that, in Burkina Faso, the use of solar cookers can reduce the demand of wood for fuel and can thus contribute to narrowing the gap between production and a sustainable use of wood.

### **How was the balance disturbed?**

Those who travel in the Sahel countries cannot overlook the heaps of wood at the roadside and the wood-laden trucks transporting their loads to town. The observation that wood is collected or felled in the countryside should not make us oblivious of the fact that this wood is mainly consumed in towns with a growing tendency. Even in pre-colonial and colonial times, cities, if there were any, have been important consumers of wood. Today the ruins of Wara, the ancient capital of the kingdom of Wadaï in Tchad are surrounded by desert. But the city was partially built with baked bricks, and the baking was done using wood removed from the thick bush which surrounded the city at the time of its foundation some 300 years ago [see Gustav Nachtigal 1879-81, 1989, reprint 1967, III tome, p.77-78]. When Nachtigal visited the town there were only few inhabitants left as the capital had been transferred to Abéché around 1850. The reason officially given

was that evil spirits had rendered the palace uninhabitable. A dwindling of wood resources on this site – a backlash of nature partially attributable to the overexploitation of trees – may be a more scientific explanation. Nowadays, something similar happens in the surroundings of large cities – like N'Djamena[3] – in the Sahel and Sudan Savannah zones.

### **Urbanization and fuel wood consumption.**

With modernization, there has been a steep increase in urbanization. According to the new report of the UN organization for Human Settlements [UNCHS 2001][4], there is a link between urbanization and globalization: „The Report argues that globalization and urbanization have a symbiotic relationship: the characteristics of cities help shape – and promote – globalization”.

The annual loss of wooded surfaces in Burkina Faso between 1980 and 1990 was, according to the World Bank, 80.000 to 100.000 ha. In Mali, which has about the same population figure (11.9 million), living and ecological conditions, the consumption of wood in 2000 is given as 6.5 million tons, or 1.5 kg/person/day, corresponding to 464.285 ha of wooded surfaces[5]. For Burkina Faso, the FAO assumes an annual loss of 15.266 ha, equivalent to 0.2% of the wooded surface[6]. Another source states a loss of 0.7 % annually[7]. These figures, however, do not include losses due to felling for fuel and bush fires, but only those surfaces cleared to make way for other uses, for instance agriculture. Comparison of statistics is difficult, as different types of forest are concerned.

The degree of urbanization of Burkina Faso is given by the World Bank (Burkina Faso Country Profile) as 18 %, the American Population Reference Bureau assumes it to be 15 %, while the percentage given for 1990 by J.M. Cour und S. Snrech in their ‘West African Long Term Prospective Study’ [WALTPS, OECD 1998, 133] is 25 %. These differences are due to divergent definitions of what should be regarded as a city or town. The document „La Politique des Villes au Burkina Faso“ [February 1995] considers settlements with more than 10.000 inhabitants as urban, if they dispose of defined infra-structural facilities. Cour and Snrech [1998] define all settlements with more than 5.000 inhabitants as urban, irrespective of the existence or non-existence of these facilities. For the period from 1990 to 2020 they calculate an annual population increase of 1.14 % in the rural areas, 2.13 % as a national mean , but 4.28 % in the urban areas.

Under this assumption, the degree of urbanization of Burkina Faso in 2020 is expected to be 42 % (corresponding to 6.872.000 town-dwellers within a general population of 16.337.000), while for the West African region as a whole the figure given is approximately 60 %.

Can the household energy needs of this rapidly growing urban population still be covered by wood and wood products? Samir Amous (FAO)[8] writes: “Fuelwood consumption is a major contributor to total wood removal, accounting for around 92 % of total African wood consumption and contributing to greenhouse gas emissions”.

Generally speaking, the rural population may be regarded as self-reliant with regard to fuel wood, but the urban population is a net consumer and depends on the market. The

critical size of a local population which results in dependency on the market does not correspond to any official definition of town or city, and may be assumed to be far below 5.000 people. When predicting the demand for fuel on the market, it is therefore advisable to put town, cities and bigger places on the same footing. The population figures for Burkina Faso given by the „World Gazetteer 2001“ („cities and places“, see table 1) are useful in this respect.

Tab. 1: **Bigger places with or without urban infrastructure in which fuelwood supply is supposedly delivered through the market, as opposed to gathering.** Population in Thousands. Source: „Cities and places in Burkina Faso“, The World Gazetteer, 2001 (modified, the last two columns were calculated by the author)

place	province	population in 1985	population in 2001	increase in %	mean annual increase in %
Banfora	Comoé	35.0	95.0	271	6.4
Bobo-Diou-lasso	Houet	231.2	474.3	205	4.6
Bogandé	Gnagna	12.4	29.3	236	5.5
Boulsa	Namatenga	7.1	9.1	128	1.6
Dédougou	Mou Houn	21.0	35.7	170	3.4
Diapaga	Tapoa	20.0	43.2	216	4.9
Diébougou	Bougouriba	3.7	5.1	138	2.0
Djibo	Sanmatenga	4.8	7.0	146	2.4
Dori	Séno	7.1	13.6	192	4.1
Fada N'Gourma	Gourma	20.3	54.6	269	6.4
Gaoua	Poni	7.3	10.7	147	2.4
Gorom-Gorom	Oudalan	4.2	7.0	167	3.2
Kantschari	Tapoa		20.2		
Kaya	Sanmatenga	25.8	50.8	197	4.3
Kombissiri	Bazéga	25.8	42.3	164	3.1
Kongoussi	Bam	3.2	3.8	118	1.1
Koudougou	Boulkiemdé	51.9	124.4	240	5.6
Koupéla	Kouritenga	6.6	15.4	233	5.4
Léo	Sissili	8.1	21.0	259	6.1
Manga	Zoundweogo	1.9	4.0	211	4.8
Nouna	Kossi	6.0	12.1	202	4.5
Orodara	KénéDougou	7.1	11.9	168	3.3
Ouagadougou	Kadiogo	442.2	1236.9	280	6.7
Ouahigouya	Yatenga	38.9	74.0	190	4.1
Pô	Naouri	3.6	6.0	167	3.2
Réo	Sanguie	2.9	4.4	152	2.6
Tenkodogo	Boulgou	22.8	55.8	245	5.8
Tougan	Sourou	14.1	18.2	129	1.6
Yako	Passoré	12.8	13.7	107	0.4
Ziniaré	Oubritenga	8.4	11.6	138	2.0
Zorgo	Ganzourgou	4.2	8.0	190	4.1

Differences in population increases are above all conditioned by internal migration from rural areas to towns: Fofack, Monga and Tuluy [2001] explain the reasons for this phenomenon: “This is especially because, to a large extent, rural-to-urban migration which fuelled the convergence of the traditionally rural population, largely poor to urban centres may be driven by quest for greater economic opportunities in most urban centres, likely to materialize either with time lag or in the medium to long run”.

With urbanization in West Africa, the role of charcoal is growing. Samir Amous (FAO) writes in his paper cited above: „While fuelwood traditionally accounted for a major part of total woodfuel consumption, the social and economic changes associated with urbanization will lead to a significant shift from fuelwood to charcoal, increasing its energy, environmental, economic and social role in the future“. The government of Burkina Faso, in a document submitted in the context of the Agenda 21 to the Commission on Sustainable Development (CSD) gave the increases of consumption of different forms of energy as follows[9] (table 2):

**Tab.2, yearly increases in consumption by form of energy**

source: <http://www.org/esaagenda21/natlinfo/countr/burkfaso/natur.htm>

Formes d'énergie	Taux d'accroissement moyen annuel sur 36 ans
Électricité	4,36
Super / Essence	3,60
Jet / Pétrole	3,78
Diesel / Gasoil	3,57
Fuel oil	3,3
Butane	4,39
Bois de feu (fuel wood)	2,76
Charbon de bois (charcoal)	5,5
Déchets végétaux (vegetable waste)	2,72

The table shows that the biggest increase regards charcoal. The consequences for the tree cover become even more apparent if we put charcoal and wood together to give a single figure representing wood-based fuel (8.26 %), and if we further consider the energy losses in the production of charcoal. “The rate of deforestation is around 8.5 to 10 times the rate of planting”, according to a document of the Convention to Combat Desertification (CCD)[10]. It is evident, that, despite the rhetoric of the aid system, there is no such thing as sustainable forest management. Reforestation and fuel-saving cook-stoves alone will not solve the problem. In the above mentioned document to the CSD the government of Burkina Faso stated, that for decades to come, woodfuel would remain the basis of household fuel supply for cooking purposes[11]. In view of the dynamics of change, this statement, however, is not suited to be taken as a precept for energy policy.

## The link between wood consumption and poverty.

In the countryside in Burkina Faso, wood is collected mainly by women, who carry it to their village, pile it next to their houses or at the roadside, and carry it to the markets, from where it is transported by truck to the urban areas. Women depend on these meagre resources to be able to buy matches, kerosene for lighting, salt, dried fish and other items. They have to buy a licence from the local bureau of the Ministry of the Environment, which costs 600 CFA/month, nearly one Euro. This may be well-intended under ecological aspects, but it is a social catastrophe and probably counterproductive. A woman who used to earn 1.200 FCFA/month collecting two bundles worth each 600, has now to collect three instead of two to get the same net amount of money.

Moreover, the population gets the impression that the licence requirement for the collection of wood and the prohibition to cut green wood is intended to deprive them of their traditional rights to the benefit of government bureaucracy. Participation by the population in officially organized tree planting activities and active protection of newly planted surfaces become improbable under these circumstances. Mobilization of the population might be easier with regard to tree planting on agriculturally used land in private or communal ownership, for instance windbreaks, shelterbelts and hedgerows on the edge of fields[12]. Sometimes this is called social or communal forestry [e.g. Chazine 1985, CFAN 2001[13]]; the concept of forest farming (agroforestry) belongs to the same order of ideas. The International Centre of Research on Agroforestry (ICRAF) in Nairobi, Kenia, promotes research on the issue. However, agroforestry should not be seen as a substitute for an equitable forestry policy.

In Burkina Faso, the rural population consumes relatively small amounts of wood. In contrast to urban women, rural women cook only once a day. Often they use corn of millet stalks instead of wood. Wood consumption by townspeople is much more important. The reasons for this are as follows:

- bigger dimensions of the wood used (especially diameter)
- The percentage of charcoal, which is preferred because of easier transport and less fume output. The finished product, however, contains only about 40 % of the original wood energy, and this only if the best available technique is used. In Burkina Faso, according to the World Bank [1999][14] the degree of effectiveness of charcoal production is much less, namely 11 %, while the figure given for Senegal and other Sahel countries is 18 %. This is due, according to the World Bank, to the fact that charcoal production in Burkina Faso is forbidden and done in secrecy.
- The fact that the urban population has partly accepted European food habits. This means lighting a fire three times a day for cooking or warming food. Wood consumption per family is accordingly more important than in the countryside.
- The far more than proportional increase of the urban population, compared to the general population.

But, apart from these negative aspects, there are also increased chances of a new drive in

household energy supply[15]:

- The rate of illiteracy of the urban or semi-urban population is less than in the rural areas. In 1998 the degree of literacy in towns was 50.6 % (59.9 in men, 42.0 in women), in the countryside it was only 10.8 % (15.6 % in men, 6.8 % in women).
- The urban and semi-urban population depends on the increasingly expensive wood and charcoal market supply and is therefore hardest hit by price increases and more disposed to consider energy alternatives. In Gaoua for instance a bundle of 20 kg costs 600 FCFA. “In any case, wood represents a heavy share of the family budget. A wage-earner supporting a large family at Ouagadougou spends one third of his monthly salary on fuel wood alone” [Jacqueline Ki-Zerbo, “Women and the energy crisis in the Sahel”, Unasylva, 1985, 133]. This situation is still very much the same[16].
- More frequently in urban or semi-urban than in rural areas the population has an income that allows some investment. Only 16.5 % of city-dwellers are considered poor[17] by official standards, compared to 51 % in the countryside and 45,3 % in general. Poverty is rural to 94 % [18], even if – according to Fofack, Monga und Tuluy [2001] it is on the increase in urban areas.
- The necessary sales promotion and after-sale service are easier in urban areas because of the spatial concentration of the habitat.
- Often urban families employ female relatives of rural origin for household duties and cooking, while the housewife or landlady is doing her job outside the house to earn money. Cooking is thus possible when the sun is high.

### **Solar cookers as an alternative:**

In 1998, a workshop on renewable energies was organized by ENDA[19] in Tunis. In a preparatory document the advantages and limitations of thermal uses of solar energy – including solar cookers – were summed up. The document came to the following conclusion:

“Solar thermal appliances in the form of solar cooking or water warming have an enormous potential in the fight against desertification, but due to technical difficulties, their massive dissemination will only be possible if the energy delivered can be increased and local adaptations be effected to make them more useful and accessible. The cookers hitherto constructed are not exempt from criticism: slow cooking and lack of adaptation to eating habits in certain areas.” This – generally speaking – certainly true statement should not induce us to draw conclusions with regard to individual types of cookers. More differentiation is needed. Nobody would venture to make general statements about the merits of trucks or aircraft without distinguishing between the profile of demand, the type and producer of the engines in question.

Despite the fact, that solar cooking – under certain conditions – opens a way out of the ecological and socio-economic dilemma, it is often proclaimed worthless; examples (in Germany) are Hankins [1996] and Sauer [2000]. The argument is as follows: solar

cookers are not useful, and if they are, they are not accepted by the population, and if they are accepted, that is a special case which must not be generalized.

Generally the rural population is seen as the target group. The lack of acceptance among this group is explained along the lines of the hypothesis of traditionalism and sought “not so much in the technical, but in the socio-cultural, socio-economic and psychosocial fields [Kruhnke et al. 1990, 116], Sauer [2000, 3, 25]. But, according to the Berlin Anthropologist Elwert [1983, 29], “the hypothesis of traditionalism is no more than a lamp illuminating an impasse”. We have seen that it is the needs of the ‘modern’ urban sector and not of the traditional part of the population which lead to the overexploitation of wood resources.

There is one more important aspect of the use – or absence of use – of solar cookers. „Women are hit hardest by shortage of fuel, since the onus is on them to find a solution. Household coping strategies can affect nutritional status since fuel availability affects cooking habits and food availability” [WHO/INT, Environmental Health Information][20]. Qaim [1996, 21] remarks: “Women are the prime target group for solar cooker dissemination. ... The advantages for women are often overlooked. If they could decide solar cookers would certainly have a better chance”.

I cannot but stress this remark by Qaim. In December 1999 I accompanied the solar cooking team, founded in 1999, of the „Association for the Promotion of Women of Gaoua” (Association pour la Promotion des Femmes de Gaoua, APFG) on a number of days to public demonstrations of solar cooking at markets in the Poni province, an area where I had been working earlier (1972-75) as a physician. All the seven participants use a solar cooker at home, adapted to the needs of a family – the cooking pot holds 8 litres. Members of the APFG have access to acquiring a cooker through the use of credit facilities. When counselling others they use their own household experience.

During these trips I made interesting observations. ‘Cooking without a fire’ was unexplainable to some people who had not been influenced by school or television and was thus assimilated to the supernatural. Some elderly women spoke of witchcraft, others assumed that they were being deceived and that in reality there must be a hidden fire. But they could not detect any. This did not hinder them from tasting the meal, and they liked it. Positively noted was especially the absence of the taste of fumes; my fear had been that this might be seen as negative.

Active interest about purchasing possibilities, prices etc. was expressed mainly by people belonging to the modern sector – teachers, administration officials, police agents and so on.

This is comprehensible if we consider that women in this population segment often have an outside job to contribute to family income and they do not have time to collect wood, which in this area is traditionally the task of women. This group suffers most from the increase in wood prices. What is under the pot – fuel – may cost as much or even more than what is inside. Here are – financially spoken – the greatest possibilities for savings by the use of solar cookers. There is preparedness to consider alternatives and there is also potential for investment at the same time. Some people had already seen solar cookers on television.

Sure, solar cookers are not yet a runner. They are still too expensive. A cooker of the 'Bamako'-type[21] costs 92.000 FCFA, the butterfly-type (with 50 % more thermal output) 115.000 FCFA. The producer is APEES[22] in Ouagadougou, Burkina Faso. Additional expenses may be necessary to buy a thermal basket and a gas bottle and gas cooker for cloudy days.

It is interesting to note how this partial success came about. In 1999 the chairlady of APFG was invited to Germany and became acquainted with solar cookers and photovoltaic appliances like portable lamps. In 1998, when the first two parabolic cookers arrived in Gaoua, the terrain was psychologically prepared. It was decided that these cookers could be hired on a day-to-day basis for a small sum. This possibility was first made use of by women running their own roadside restaurants. In this way they were able to test the technique by using it and to calculating the potential savings in wood and money. The presence of a solar cooker in a restaurant court-yard is a good publicity opportunity, as visitors can see it and inquire about its usefulness and cost. Guests are mainly public service officials, that is to say people who have partly accepted a European way of life, and are therefore called "tubulamogow", which in the Jula-language means people living along European lines. This implies that they take their main meal in the middle of the day, and not after sunset like the rural population. This coincides with the best hours for solar cooking. The proceeds from the restaurant can be used to hire a solar cooker or to repay the credit taken out for the purchase.

In the meantime an inquiry by a member of APFG, Mrs. Youl Ini, revealed that the owners of the restaurants prefer a larger capacity of pots, holding 40-50 litres. But the Bamako-type cooker is not – neither from the thermal output nor from the stability point of view – suited for this purpose. A solution will need a different cooker technology, perhaps a collector or a Scheffler-type cooker. This sort of appliance is still too expensive for the solidarity groups in Germany financing the project. The main field of activity, however, remains unchanged, that is the promotion of solar cooking in families. The high price is the main problem.

Favourable for solar cooking is the custom of open-air cooking. The traditional one-storey architecture and wide courtyards are equally favourable. Only in case of rain or strong wind is the cooking done inside the house, which is annoying due to the fume of the open fire. Advances in solar cooking presuppose local promotion campaigns to familiarize people with the technique, handling, advantages, limitations and safety measures. This needs financial resources. The back-up groups in Germany understand this. Grass-root organizations – especially of women – have a decisive role to play. The importance of these campaigns is underlined by the fact that ten solar cookers, which had been donated earlier to the National School of Social Services (ENSS) did not lead to effective use. Only after the successful use of solar cookers by members of APFG and public demonstrations of solar cooking were these appliances put into use.

The technology has to be further adapted to needs. This implies a continuing process of discussions between users and developers. A difficulty with the cooker type used is that there is only one focus, but a typical meal comprises two components (tô or rice and sauce), which cannot be prepared at the same time. For some components – as with rice for instance – it may be sufficient to finish the cooking process by preserving the heat of

food by using a thermal basket. It remains to be seen whether the new butterfly (papillon) cooker allows the simultaneous use of two or three pots of different size at the same time.

### **The effect of reflections by parabolic cookers on the eyes.**

The butterfly-type cooker, which has not yet been used in Gaoua, has another advantage: it diminishes the danger of dazzling because there is no reflecting surface vis-à-vis the cooker's eyes. In Gaoua, users of solar cookers have begun to wear sun-glasses. Important for the avoidance of dazzling is also the selection of a cooker with a deep focal point and good handicraft keeping very closely to the geometry of a parabolic mirror. Deviations increase the danger of dazzling and diminish performance. Quality management is therefore important.

Acute effects on the eyes may be compared to what is known in occupational medicine as eye injuries due to beams of light during welding, a painful irritation of the eyes. It is further known that long-term heat radiation can lead to heat cataract. Therefore preventive measures are needed. In Gaoua, women have begun to wear sunglasses when cooking. When comparing the relative risks of solar cooking with traditional cooking on an open fire, we must not forget the frequent burns suffered by children and epileptics when they come close to the fire.

### **The social and economic environment.**

Production and marketing of solar cookers should not be seen as part of development defined in terms of the market economy or in the sense of globalization and economic growth. If we follow the argumentation contained in the Memorandum of German scientists [Engel et. al., 2000] recommending a new basic concept for German policy with regard to Africa, most African countries have no or nearly no chance of development in the sense of an export-oriented economy. Burkina Faso is seen by the authors as "remaining a low-income country with little development perspectives". Under political perspectives, they recognize "a growing need of prevention". For such countries the authors ask for efforts to obtain "structural stability". They define this as "a state of stability, which does not impede dynamic transformation processes, but favours and influences them positively".

The concept of structural stability remains rather abstract. As far as household energy supply, conservation of resources and poverty reduction is concerned, solar cookers promotion may allow the passage from concept to action, and contribute to obtain some „structural stability“. The more so, as solar cookers are not consumed like gas, kerosene or ethanol-gel, and therefore have the potential to be seen as an the equivalent of a bank account or as an asset like a bicycle, radio, fuel saving cook-stove, sewing machine, hunting rifle or the like. In their study on poverty in Burkina Faso Fofack, Monga und Tuluy [2001] stress the inverse relationship of poverty and the ownership of ‚assets‘.

The solar cooker technology is best suited to production in the framework of handicraft or small industry[23], compatible with the widespread informal sector of the economy. Even in China production on the basis of craftsmanship or small industries is preferred[24].

Kuhnke and his co-authors [Kuhnke et al. 1990] wrote in 1990: “But most people still fail to realize that, in some areas, solar cooking may soon constitute one of the few remaining options for preparing a hot meal”. This statement becomes more and more reality. On the other hand solar cookers will not entirely replace wood as fuel. That is not even necessary. But to re-establish a balance between growth and felling of trees the use of alternative energies – especially solar cookers – is indispensable. Imported forms of energy cannot fulfil this role because of fluctuating and generally rising prices, frequent cuts of supply, heavy burdens on the balance of payments and a variety of other reasons. With regard to acceptability, the problem is not limited to solar cooking, on the contrary; as the “Programme Gas” of the European Union has shown, acceptance of gas cookers is very poor [Minvielle 1999, 64, 71 ff].

“Poverty Reduction Strategies”, a much used buzz word, would in theory – if successful – lead to more liquidity in the family budgets. Any shift to imported forms of energy risks to offset this effect, as any gains may be absorbed by rising gas prices. The same is true for wood and charcoal. According to a World Bank document cited by Minvielle the ideal would be that reforms in the economy should be accompanied by compensatory payments to the poor[25].

The Poverty Reduction Strategy Paper (PRSP) of Burkina Faso gambles exclusively on growth of the modern sector. Such growth of around 5 % has been present since the devaluation of the FCFA in 1994, but, at the same time, poverty of large segments of the population has increased. Fofack, Monga und Tuluy [2001] in their “Policy Research Working Paper” for the World Bank put it like this: “In a context of continued coexistence of high economic growth rates and widespread poverty, the benefits of growth and their welfare implications across economic regions and for the different socio-economic groups over time becomes a key question of policy relevance”.

This is probably the reason why the authors of the PRSP in the Burkina Faso Ministry of the Economy and Finance refer to their own paper as “rather voluntaristic”, i.e. based on will, not reason. They do not even mention the problem of household energy, except as a formula concealing its hollowness (sustainable management of natural resources[26]).

As far as wood resources are concerned, this sustainable management simply does not exist. And without a decisive lessening of wood consumption it cannot be brought about. But such a decisive change has not been conceived of by the numerous national, intergovernmental and international official organizations and even most NGOs involved in the fight against desertification, deforestation or energy management, and has certainly not been initiated. Things are similar for other tropical and especially African countries. The “Forestry Advisers Network” of the Canadian International Development Agency (CIDA/ACDI, 2001) states: “Globally, woodfuels (firewood and charcoal) account for over 55 percent of all wood harvested”[27]. This resource becomes more and more scarce, as numerous communications during the World Conference to Combat Desertification (Bonn 2000) have shown see e.g. Mgendi, Catherine, [2000][28], and Mulenga, Mildred, [2000].

## **The necessary change of mind.**

That those excluded from the world market or ‚development‘ should not again be referred to the world market to cover their energy needs – i.e. imported forms of energy like gas, kerosene[29] or ethanol-gel, which they cannot pay for – should be obvious to everybody. But this is exactly the conclusion that must be drawn from the PRSP in Burkina Faso, insofar a change for the better is exclusively sought through foreign investment and increasing exports[30].

Maybe some change of mind is imminent. According to Paul Lachance[31] (in an internet-discussion-forum of the OECD/Club du Sahel) the “model of development through growth of the modern sector“ is too restricted. The informal sector, called by Lachance the “real economy” has also to be considered. He talks about two types of growth, which should co-exist. Even the World Trade organization (WTO) recognizes the importance of the informal sector. In a press release named “Burkina Faso, Novembre 1998“, the WTO states that 25 % of GdP and 80 % of non-agricultural occupation can be attributed to the informal sector. Thus the relative merit of the latter is the creation and maintenance of jobs, while that of the modern sector concerns the accumulation of capital.

Being excluded from the world market or preferring local/regional commercial exchange does not mean turning one’s back to technology, at least as far as alternative energy techniques are concerned. Arturo Escobar [1995, 96], who severely criticizes the ‘development industry’ writes: „One thing is certain in this regard: local models exist not in a pure state but in complex hybridizations[32] with dominant models“, but he warns at the same time [1995, 97]: “The house model persists at the margins, where the model of the corporation (which epitomizes the market economy) has not become dominant. House and corporation are in a contrapunctal relation, the latter always trying to incorporate the contents of the former”.

In this hybrid relation donors have to refrain from being too prominent. J.D. Naudet [2000] in his book on the evaluation of twenty years of aid to the Sahel countries puts it like this: „Good practice requires less donor intrusiveness“, and he recommends starting without detailed programming, but proceeding by trial and error, ‚tâtonnement‘, or feeling your way as you go along. It seems to be doubtful, however, if the ‘development industry’ can be convinced to do this, and if it is at all able to do so. This would imply acting against their own interests. This is improbable. Naudet himself (p.118) adds a note of scepticism: “The aid system does not seem to learn from lessons of the past”, and he states (p.265): “The lack of wisdom is a key for understanding the problems of technical assistance” .

But nevertheless, the idea of cultural hybridization is attractive, especially when it comes to utilization of alternative techniques. The difficulty is to subordinate the economic and technical aspects to the conditions of the local social tissue [Latouche 1998][33]. Escobar [1995, 19] holds a similar view: “I argue that instead of searching for grand alternative models or strategies, what is needed is the investigation of alternative representations and practices in concrete local settings, particularly as they exist in contexts of hybridization, collective action, and political mobilization”.

In July 2001 a workshop was organized[34] in Ouagadougou by CILSS[35], an

intergovernmental organization to combat drought in the Sahel. The objective was to establish a management plan to be able to solve the fuel wood crisis ("plan d'énergie domestique de sortir de la crise de bois - énergie", acr. 'PLED'). It remains to be seen, whether the German GTZ, which was invited and which supports a solar cooker project in South Africa, has been able to put the subject of solar cooking on the agenda. Has CILSS learnt from the past? Still in 1998, an evaluation of the different National Action Plans (NAPs) by the Sahel Club (Club du Sahel) – the partner of CILSS on the donor-side – arrived at the following conclusion: "In no case has the development of the NAP[36] been based on a thorough, rational assessment of the existing situation taking account of lessons from experience in such fields as research, funding, innovative approaches and ways of building effective partnership"[37].

In the Agenda-21-Report cited above the government of Burkina Faso talks about a re-awakening of interest in solar cookers for ecological reasons („il existe un regain d'intérêt pour les cuiseurs solaires“, communication at the 9. session of the UN Commission on Sustainable Development). This has still to be translated into concrete actions and conventions with partners. The government program 'mastering energy' (Maîtrise de l'Énergie) which is supported by Denmark, may provide a starting point.

New thinking is also required on the part of non-governmental organizations of the North who otherwise follow very useful concepts e.g. the "Intermediate Technology Development Group" (London), which in a comment on the Human Development Report 2001 of UNDP argued somewhat hastily: „Even 'appropriate technology', where it has not been actively developed in partnership with the users, will fail. Solar cookers, for example, are simple, efficient and low cost alternatives to traditional biomass fuels. But they have not been adopted by local people – whose labour patterns in their fields and markets do not fit in with spending the main part of the daylight hours cooking". The words "labour patterns in their fields and markets" shows that the authors still think of the rural population as the prime target group, and do not realize that the urban population has a far higher and growing wood consumption, and is more liable to look for alternatives to wood and charcoal for economic reasons. The error was already present in the selection of the target group done from outside, based on undue generalization of earlier experiences and without a fresh new look at local realities.

The production and use of solar cookers by Africans aided by Northern NGOs might be a situation like the one imagined by Arturo Escobar, when he wrote about hybridization of cultures, and it may contribute to overcome the marginalization of the South.

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[1] See e.g. „Fuel Crisis Aggravates Desertification“ by Catherine Mgendi, Daily Nation, Nairobi/Kenia, presented at the workshop of the Global Cooperation Council in Bonn, 11-12. Dezember 2000.

[2] Here is not space enough to refer to regional climate changes, for instance the southward displacement of lines of equal amount of rain (isohyets), see the atlas „Burkina Faso“ edited by Jeune Afrique [Paris 1998].

The changes correspond to a diminution of the total amount of rainfall in the country.

[3] „concentrated demand around urban centres (particularly N'Djamena) is leading to localized desertification and a decline in soil fertility” [ World Bank 1999, Chad –Household Energy Project, 1996, Project ID: TDPA532; [www.worldbank.org/pics/pid/td532.txt](http://www.worldbank.org/pics/pid/td532.txt)]

[4] „United Nations Centre for Human Settlements“ (Habitat), [www.unhcr.org/Istanbul+globalreport.htm](http://www.unhcr.org/Istanbul+globalreport.htm)

[5] Source: Panafrican News Agency (Dakar) vom 02. Oktober 2000, based on a communication by the „Direction Nationale de la Conservation de la Nature (DNCN), source: <http://allafrica.com/stories/200010020005.html>

[6]« Situation et changements du couvert forestier 2000, Système d'information des forêts - profil des pays ». source: <http://www.fao.org/forestry/fo/country>

[7]Global Statistics Annual Deforestation, source: <http://www.planetgeog.com/upload/stats/for.htm>

[8] Samir Amous, “The Role of Wood Energy in Africa”, Wood Energy for Tomorrow (WETT), Executive Summary, Forestry Department, FAO, source: <http://www.fao.org/docrep/x2740e/x2740e00.htm>

[9] Agenda 21, « Aspects Du Développement Durable Référents Aux Ressources Naturelles Au Burkina Faso », communication at the 8. session of the Commission on Sustainable Development, source: <http://www.un.org/esa/agenda21/natinfo/countr/burkfaso/natur.htm>.

[10] Information Sharing Segment, First Substantive Session, Intergovernmental Negotiating Committee for a Convention to Combat Desertification, Part II, (Causes of Woodland Degradation).

[11]« ... le bois restant pour de nombreuses décennies, l'énergie primaire de base des ménages pour la cuisson » (« Énergie », report of the government of Burkina Faso at the 9. Session of the UN-Commission for Sustainable Development)

[12] in Burkina Faso – and other countries of the area – we often meet a curious reservation against the planting of trees, namely the belief, that this entails the death of the person who planted the tree. Astonishingly, this belief does not seem to be dealt with nor be mentioned even in adult education and awareness campaigns in regional languages.

[13] Canadian Forestry Advisers Network, “Community Participation in Forest Conservation”, Forestry Issues, source: <http://www.refa-cfan.org/english/issues.7.html>

[14] Burkina Faso Sustainable Energy Management Project/ AIJ Component, ID BF-PE-52442, 1999 ([www.worldbank.org/pics/pid/bf52442.txt](http://www.worldbank.org/pics/pid/bf52442.txt))

[15] « la consommation des ménages urbains est à la fois la plus préoccupante et celle sur laquelle il apparaît le plus facile d'intervenir » [J.-P. Minvielle 1999, 144]

[16] The report of the World Bank „Energy by Region: A Brighter Future? Energy in Africa's Development“ states that people in developing countries spend around 12 % of their income on energy, compared to only 2 % in OECD-countries. According to Douglas Barnes („energy issues“, The World Bank Group, Nov. 1995) families in developing countries spend even 15-22 %.

[17] The poverty line in 1994 was established at 41.099 FCFA und in 1998 at 72.690 FCFA (around 98.- USD oder 217.- DM).

[18] Figures are taken from : « Synthèse du Cadre Stratégique de Lutte contre la Pauvreté » (CSLP), December 2000.

[19] « Atelier sur les énergies renouvelables, 26-29 octobre 1998, Programme d'Action Régional .de lutte contre la désertification, Afrique. ENDA is an NGO based at Dakar, Senegal.

[20] An Anthology on Women, Health and Environment: Domestic Fuel Shortage and Indoor Air Pollution, Summary of the work of: Cecelski E., "Energy and rural women's work: Crisis, response and policy alternatives", International Labour Review, 1987.

[21] This type is very similar to the SK 14 developed by Dr. Seifert, EG Solar, Altötting, Germany.

[22] According to the government of Burkina Faso solar cookers are sold by three companies: ISOMET, APEES und SOLTECH.

[23] The solar cookers used are produced by APÉES (Association pour la Promotion et l'Exploitation de l'Énergie Solaire) in Burkina Faso. Women's organisations promoting solar cookers and APÉES are supported by solidarity groups in Germany: „Solar Global e.V.“ (Jülich) und „Sonnenenergie für Westafrika e.V.“ (Ettlingen) und „BSW Alternative Energie Bio-Sonne-Wasser-Wind e.V.“ (Burg Layen bei Bingen).

[24] "Sun Seek" Concentrating Solar Cooker, Beijing Newline Co. LTD, zit. nach Integration GmbH, Frankfurt 1997.

[25] World Bank: „Rapport Mondial sur le Développement dans le Monde 1980-1996“, 1996, S. 29, cited according to Minvielle 1999. I could not trace the original document.

[26] „gestion durable des ressources naturelles“

[27] "Tropical Forests and the Climate Change", Forestry Issues, last modified 02/14/ 2001. Source: <http://www.refa-cfan.org/english/issues.8html>

[28] see website of the „Deutsche Stiftung für Internationale Entwicklung“, (German Foundation for International Cooperation).

[29] The World Bank finances a project of promotion of kerosene cookers in Burkina Faso.

[30] «Synthèse du Cadre Stratégique de Lutte contre la Pauvreté (CSLP) », DGEP Septembre 2000.

[31] OECD/Club du Sahel, Points of View: "Africa's real economy and its Development Prospects" – the Case for Local Development", <http://www.oecd.org/sah/viewpoint.htm>

[32] Hybrid means hereditarily mixed“, the term is here used metaphorically.

[33] Latouche [1998, 21 ff] talks of « enchâssement (ré-enchâssement) dans le social », which means to replace something into its real social context.

[34] 19. juillet 2001, Verlainne Kaboré «Quelles sources pour substituer au bois de chauffe?» allAfrica.com,

[35] Comité Inter-État de Lutte contre la Sécheresse au Sahel

[36] National Action Plan

[37] Patrick Freudiger und Oussouby Touré, "Implementation Of The United Nations Convention to Combat Desertification, Points For Discussion On The Process in Seven Countries In The Sahel", Club du Sahel, November 1998.