

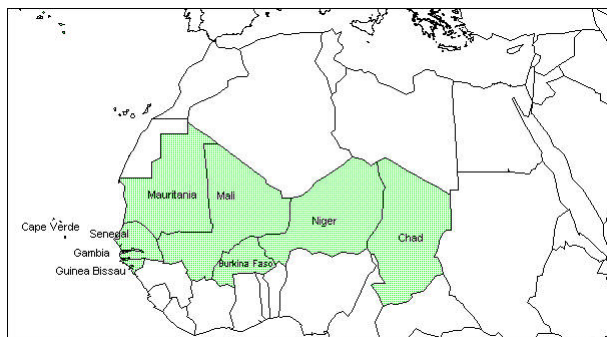
Traditional household energy sector in sahelian countries of West Africa

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Date: 20/8/2002

Location: Durban

0. Sahelian countries



- **Inshore countries:** Cap Verde; Gambia; Guinea Bissau; Mauritania and Senegal
- **Landlocked countries:** Chad; Burkina Faso; Mali and Niger

1. Physical contexts

- **Two complementary groups of countries**
 - landlocked countries: with a regional market
 - and inshores states: market more developed
- **The desert in a clear progression with a potential woody biomass hopeless: 50% of the region surface,**
 - countries more touched by the desert: Mauritanie (80%), Niger (56%), Mali (46%), Chad (39%)
- **Important quantity of biomass not yet exploited in permanent and temporary rivers**

2. Demographic context

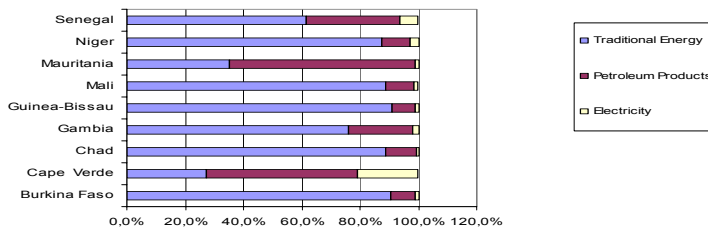
- **54,530,000 people in 1998**
 - **growth rate: 2.7% during 1975-1997**
 - **Urban average annual growth rate more important : 30.4 to 57.7%**
 - **Predominance of juvenile stratum**
 - **Rural people account 77%**
 - **Female population over the half and more in rural areas**
- augmentation of the need and supplementary pressures on the forest...**

3. Economic context

- **Two blocks on monetary plan:**
 - - countries of F CFA zone
 - - states out of the F CFA zone
- **level of industrialisation is weak** (less 20% of GDP)
- **agriculture and service remain the key sectors**
- **agriculture is principal occupation** (over 70 % of active population)
- **agriculture is affected by drought and desertification**
- **with GDP per capita between 211\$ and 856, sahelian States are among countries to weak incomes**

4. Energy consumption by type of products in Sahel

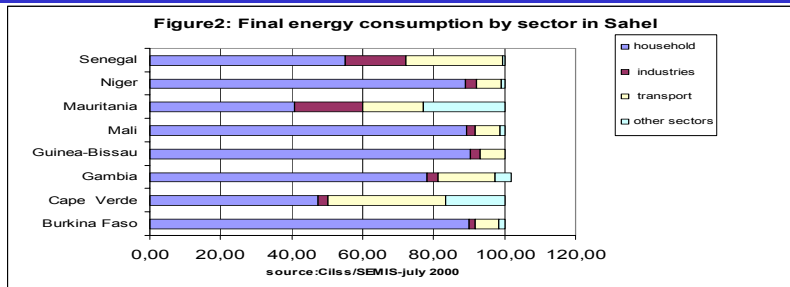
Figure 1: Simplified energy balance by types of products in Sahel



source: Cils / Semis - July 2000

- The main energy consumed are traditional energy which is constituted by woody biomass and agro-forest residues
- petroleum product and electricity consumption is weak
- oil products generally occupy the second level of importance
- the inshore countries get percentage of petroleum products more elevated than those of landlocked States

5. Final Energy consumption by sectors in Sahel



- Household sector predominate all sector
- transport sector occupies generally the second level of importance. Its percentage is more elevated in inshore countries
- industry consumption is very weak owing to the low level of industrialization
- other sectors get energy consumption nearly negligible

6. Energy demande evolution and investment in Sahel

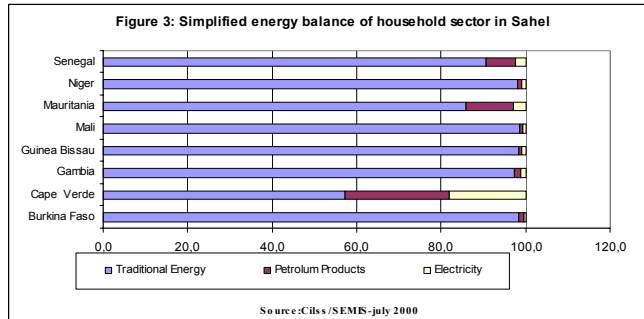
Table N°...: Evolution of final energy consumption by type of products in Sahelian countries

Sahelian countries	Traditional Energy (%)			Electricity capita_kwh ⁽¹⁾ (per		Petroleum Products ⁽³⁾ (10 ³ toe)		
	1977 ⁽²⁾	1980 ⁽¹⁾	1996 ⁽¹⁾	1980	1996	1980/1983	1986	1990/1992
Burkina Faso	94	91	87	16	21	112	135	155
Cape Verde	77	Nd	Nd	55	104	Nd	36	47
Chad	99	98	87	10	14	Nd	Nd	Nd
Gambia	87	80	79	67	70	Nd	Nd	Nd
Guinea Bissau		76	57	18	39	23	24	Nd
Mali	93	90	85	15	30	159	170	174
Mauritania	69	Nd	Nd	60	66	144	250	266
Niger	88	78	78	39	39	165	102	97
Senegal	60	55	49	115	136	510	533	558
Ensemble				44	57			

Sources : (1) PNUD - 1999 - Rapport mondial sur le développement humain 1999 (2) CISS - 1978 - L'énergie dans la stratégie de développement au Sahel (3) Girod J. - 1994 - L'énergie en Afrique ENDA / IEPF / ADEME - Karthala

- Traditional energy weight remained even elevated in spite of the increase of oil and electricity consumption. This positive evolution of modern energy seems to follow the evolution of demographic growth.
- the part of budget devoted to modern energy is below extensively superior to the one of traditional energy.

7. Simplified energy balance of sahelian household sector



- Traditional energy consumption is most major, it accounts generally over 85% in the household energy demand
- petroleum products with their very weak part, come in 2nd position
- the use of electricity in sahelian households remains negligible, however electricity domestic consumption is more important than other sector

8. Traditional energy of sahelian household sub-sector

- Household sector stays the almost exclusive traditional energy consumer
- the use of wood fuel remained extensively predominant
- in this range crude wood gets the most important part
- charcoal occupies the 2nd position after crude wood among traditional energy
- agro-forest residues get the very weak percentage

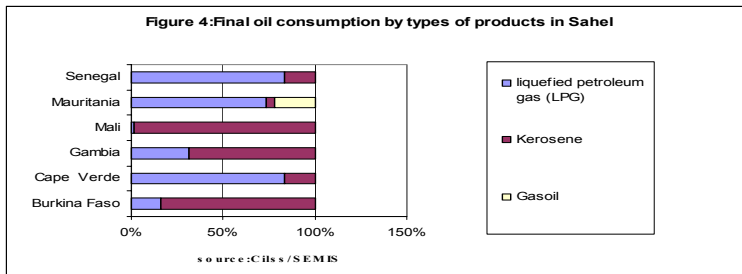
Table N°2: Final traditional energies consumption by types of products in the household sector of the sahelian countries

Sahelian countries	Repartition by type of traditional energies (%)			%	TOTAL 10 ³ Toe
	wood	Charcoal	Agro-forest residues		
Burkina Faso	94,2	0,7	5	100	1512
Guinea Bissau	92,3	6,1	0,5	100	158
Mali	97	3	Nd	100	1617
Mauritania	72	27	1	100	167
Senegal	75,4	24	0,6	100	796

source: CLSS/SEMS-July 2002-Energies domestiques au Sahel: situation et perspectives

Traditional energy is mainly constituted by woody biomass (crude wood and charcoal) and agro-forest residues

9. The sub-sector of petroleum products



- Oil used in the household sector is essentially constituted by kerosene and LPG (Liquefied petroleum gas)
- expected Gambia, inshore countries are the greatest LPG consumer where it accounts over 70 %
- Kerosene consumption is more important in Mali (98.7%), in Burkina Faso (83.9%) and Gambia with 68.8%

10. Household energy in sahelian urban area

- Charcoal is solely used
- Charcoal demand is inequally distributed between the main cities and the secondary urban agglomeration
- Urban dwellers are the greatest modern energy consumer
- Urban people buy wood and charcoal
- Distance provision passed from about 10 Km to more than 400 Km in some countries
- Woodfuel trade requires important motorized means of transportation

11. Household energy in sahelian rural area

- **Crude wood demand is more important than the one of charcoal and the oil products both united**
- **Agro-forest residues are strongly solicited**
- **Modern energy consumption more negligible**
- **Beginning of oil products penetration in inshore States**
- **Auto-provision in wood is a current practice**
- **Wood collection is a task allotted to women and children representing the most important fringe**
- **Wood fuel trade begin to take place,so it is sold by heap, by faggot or by unit of portage(cart)**
- **It is reported that woodfuel used by rural dewellers for their own need is little predator of the forest environment**

12. Household energy consumption by types of uses

- **Cooking absorbs the largest part of total household energy**
- **Woody biomass is the major fuel used for cooking**
- **LPG and kerosene occupy the second level of importance for preparing meal**
- **Electricity consumption for cooking is very negligible**
- **Electricity and Kerosene are the main source for lighting**
- **Sahelian rely also woodfuel to meet their needs of ironing, heating**
- **Electricity consumption of domestic devices is more important than the one of lighting**

13. Cooking in Sahel

- **Cooking with traditional woodfuel stoves cost more expensive and weigh more heavily on the household budget**
- **Improved stove presents the costs acquisition relatively elevated in relation to traditional stoves, however their use provide some substantial savings and permit to recover the investment**
- **Cooking with improved woody biomass stove is less expensive than LPG burner and than kerosene stove**
- **The price of petroleum products cookstove is more expensive than improved woody biomass stove**
- **The cost of meal preparing with LPG is most elevated and its device price is most expensive**
- **Cooking with kerosene is more advantageous than LPG**

14. Primary energy in sahelian area

- **Primary energy production is constituted mainly by woody resource**
- **in spite of oil and natural gas signalled in some countries, all sahelian States import oil(LPG and Kerosene for households)**
- **the important quantities of agro-industrial residues used directly for electricity production, are not yet consumed for domestic needs**
- **the use of harvests residues for domestic fuel with modern technology(briquetting) have no significant experience**
- **action aimed to introduce coal and peat for household fuel has no success**