

## BURKINA FASO

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### General introduction to the country and the S&T system

Burkina Faso is the only African country to have maintained a small but permanent growth during the past decade. From 1986 to 1991, it was 3.5% (mean per year) and inflation stayed below 3%. However, economic results entirely depend on external factors: mostly climatic ones but also foreign investments. Conscious of this dependence, Burkina Faso has tried with its limited possibilities to use scientific research as a means to strengthen and ensure a continuous growth. This policy depends on competent people constituting the political elite and recognized as experts in their domain.



Burkina Faso remains an agricultural country. The agricultural sector has been led by a few major companies: the Office National des Céréales (OFNACER), the Société des Fibres Textiles (SOFITEX, cotton) and SOSUCO (sugar). The Société de Recherche et d'Exploitation Minière du Burkina Faso (SOREMIB) performs the irregular mining activities (gold, manganese) with the Canadian company Interstar Mining Group (COMITAM). Four companies dominate the sector of services: SONABEL distributing electricity, ONEA distributing water, ONP and ONATEL specialized in telecommunications technology. Burkina Faso is listed amongst the the ten poorest countries in the world. Paradoxically, it has become a reference for all African countries on the way to organize and manage scientific research. As in many countries, research is highly depending on political will but here it did not lead to mismanagement.

**Table 1: Demographic indicators**

Indicators 1985-2004	Total population (2003) <sup>(1)</sup>	Population under age 15 (2003) <sup>(1)</sup>	Urban population (1975) <sup>(1)</sup>	Urban population (2003) <sup>(1)</sup>	Migration stock (2000) <sup>(2)</sup>	Annual population growth rate (1975-2003) <sup>(1)</sup>
Measure	Million Inhabitants	(% of total)	(% of total)	(% of total)	(% of population)	%
	7.9	44.8	21.9	44.6	1.6	3.2

(1): UNDP Human development indicators

(2): world development indicators

**Table 2: Social indicators**

Indicators 2003	Life expectancy at birth (2003) <sup>(1)</sup>	Infant mortality rate (2003) <sup>(1)</sup>	Adult literacy rate (2003) <sup>(1)</sup>	Net secondary enrolment ratio (2002/2003) <sup>(1)1 2 3</sup>	Combined gross enrolment ratio for primary, secondary and tertiary schools (2002/2003) <sup>(1)</sup>	Public expenditure on education (1990) <sup>(1)</sup>	Public health expenditure (2002) <sup>(1)</sup>	Tertiary Gross enrolment ratio (2002-2003) <sup>(2)</sup>
Measure	Years	(per 1,000 live births)	(% ages 15 and above)	(%)	(%)	(% of GDP)	(% of GDP)	Number
	47.5	107	12.8 <sup>4</sup>	9	24 <sup>4</sup>	2.4	2	1

(1): UNDP Human development indicators

(2): World development indicators

1 - The net enrolment ratio is the ratio of enrolled children of the official age for the education level indicated to the total population of that age. Net enrolment ratios exceeding 100% reflect discrepancies between these two data sets.

2 - Enrolment ratios are based on the new International Standard Classification of Education, adopted in 1997 (UNESCO, 1997. International Standard Classification of Education 1997. [http://portal.unesco.org/uis/TEMPLATE/pdf/isced/ISCED\\_A.pdf](http://portal.unesco.org/uis/TEMPLATE/pdf/isced/ISCED_A.pdf). Accessed March 2005.), and so may not be strictly comparable with those for earlier years.

3 - Data on net enrolment ratios refer to the 2002/03 school year, and data on children reaching grade 5 to the 2001/02 school year, unless otherwise specified. Data for some countries may refer to national or UNESCO Institute for Statistics estimates. For details, see <http://www.uis.unesco.org/>. Because data are from different sources, comparisons across countries should be made with caution.

4 - Preliminary UNESCO Institute for Statistics estimate, subject to further revision.

**Table 3: Economic indicators**

Indicators 1975-1999	GDP per capita annual growth rate (1975-2003) <sup>(1)</sup>	GDP per capita (2003) <sup>(1)</sup>	GDP (2003) <sup>(1)</sup>	Structure of output (2003) <sup>(2)</sup>		
Measure	%	(PPP US\$)	PPP US\$ billions	%	%	%
	1.2	1,174 <sup>1</sup>	14.2 <sup>1</sup>	31	19	50

(1): UNDP Human development indicators

(2): world development indicators

1 - Estimate based on regression.

Sources: World Bank. World development indicators 2005

The unemployment data are from the ILO database *Key Indicators of the Labour Market*, third edition.

## 1. History of science

Even though the research system is not very developed, there are some basic structures and human resources. Medical and agricultural sciences has a long history of scientific research whereas it has only recently appeared in applied science and technology.

Modern science in Burkina Faso appeared in 1923 with the creation of the experimental station for agronomic research in Saria. It was mostly implemented in the fields of agriculture, medical and social sciences, colonial research contributed to assert a scientific tradition. Thus, the idea that research can play a major role in the development of the country arose earlier than in other African countries.

**Table 4: Colonial science**

Year founded	Name	Fields	Status	Administrative supervision
1923	Experimental station for agronomic research, Saria	Agriculture	Public	France
1939	Muraz Centre, Bobo-Dioulasso	Medical sciences	Public	France
1949	Institut Français de l'Afrique Noire, Ouagadougou	Natural and social sciences	Public	France
1954	Laboratoire Vétérinaire	Medical sciences	Public	France
before 1960	Experimental stations for agronomic research, Niangoloko, Farako-Ba, Kamboinse	Agriculture	Public	France

**Table 5: National science**

Year founded	Name	Fields	Status	Administrative supervision	Notes
1960	Laboratoire de Diagnostic et de Recherche Vétérinaire	Medical sciences	Public		ex Laboratoire Vétérinaire
1960	Organisation de Coordination et de Coopération pour la lutte contre les Grandes Epidémies	Medical sciences		International cooperation	
1963	Centre des Techniques Forestières Tropicales	Forestry	Public		
1965	Centre Voltaïque de la Recherche Scientifique	Natural and social sciences	Public		ex IFAN

Table 5 Continued

Year founded	Name	Fields	Status	Administrative supervision	Notes
1968	Centre Africain et Malgache d'Enseignement Supérieur	Evaluation of scientific activity and performers		African cooperation	
1969	Ecole Inter-états d'ingénieurs de l'Équipement Rural	Planning		International cooperation	
1973	Institut Supérieur Polytechnique		Public		
1977	Institut de Recherche sur les Fruits et Agrumes	Agriculture	Public		
1977	Semi-Arid Food Grain Research Development	Agriculture	International agency	International cooperation	
1978	Ministère de l'Enseignement Supérieur et de la Recherche Scientifique	Coordination			
1978	Centre National de Recherche Scientifique et Technologique	Coordination	Etablissement Public à Caractère Administratif		ex CVRS
1978	Institut de Recherche sur les Substances Naturelles	Medical sciences	Public	Dgrst	
1981	Institut Voltaïque de la Recherche Agronomique et Zootechnique	Agriculture	Public		ICRISAT + SAFGRAD
1981	Institut de Recherche en Biologie et Ecologie Tropicales	Natural sciences	Public	Dgrst	CTFT + 1 dept of the CVRS
1981	Institut de Recherche en Sciences Sociales et Humaines	Social sciences	Public	Dgrst	
1982	Institut Burkinabé de l'Énergie	Energy	Public	Dgrst	
1987	Institut National d'Études et de Recherche Agricoles	Agriculture	Public	Dgrst	
1991	Laboratoire de Biologie et de Technologie Alimentaires	Food	Public	Dgrst	
after 1995	Forum de la Recherche Scientifique et de l'Innovation Technologique	Coordination			
after 1995	Agence Nationale de Valorisation des résultats de la Recherche	Coordination			

At the independence in 1960, the country inherited several experimental stations and research centres. Thanks to cooperation agreements, these structures remained under French management. Quickly, the science performed in these establishments became very isolated because of the scientific and institutional desert. The absence of a national research system is due to a will to enter a regional network comprising western African countries. Thus, funding and energy were devoted to foreign universities as the one of Abidjan or Dakar. They were considered as national universities. That policy lasted from the independence until the 1980s and explains why in this very state, research activities long preceded a national higher education system. Half a century separated the creation of the first research structure in 1923 and the first university, that of Ouagadougou in 1974. Even if the first generation of executives had been trained thanks to this regional cooperation, quarrels rapidly became an obstacle and Burkina Faso decided to work with France while developing its own system.

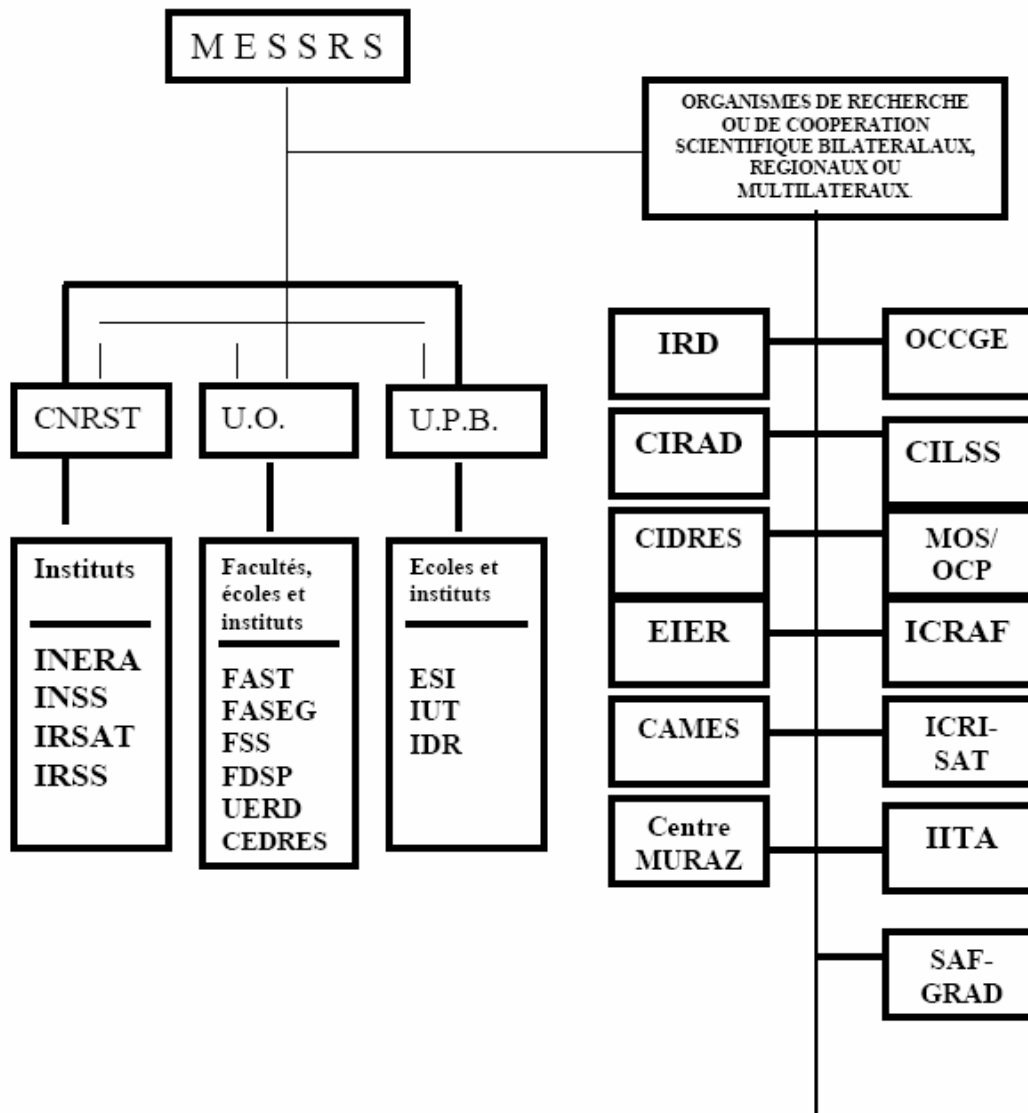
The national research system is the result of the realization of two goals: the creation of an institutional framework for research activities and the creation of a higher education system. It was revised and reformed permanently to adapt to the national context. Three phases can be defined:

- In the 1960s and 1970s, inherited structures were reformed and new ones created with the goal of asserting a national science and using at best available resources. However, the dispersion of these structures depending on various administrative supervisions let research split without coordination.
- Institutionalization began with the creation in 1978 of both the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique and the Centre National de Recherche Scientifique et Technologique. The latter was then divided in departments and then research institutes. It also had the mission to perform, evaluate and coordinate research programmes. Since the symposium of Farako-Ba initiated by the new government - at power since 1983 - in 1987, a new line was defined with two main goals: to reduce the gap between fundamental and applied science in order to link research and development more systematically and to gain total independence in the leading of strategic research which is a means to get national science to be a motor of development. Actually, that period is that of the organisation and appropriation of national research resources.
- In the 1990s, the national research system was entirely reformed. That reform is the result of a vast reflexion in scientific community that gave birth to the strategic plan of 1995. Every actor of the research system (financial backers, performers, users, politicians...) took part in the reflexion. Research system has evolved in two poles: the CNRST and the university, each one dealing with a specific domain: R&D for the CNRST and fundamental research for the academic world. However, the dichotomy is not so clearly marked; young teacher-researchers especially prefer performing R&D.

## **2. Governance of science**

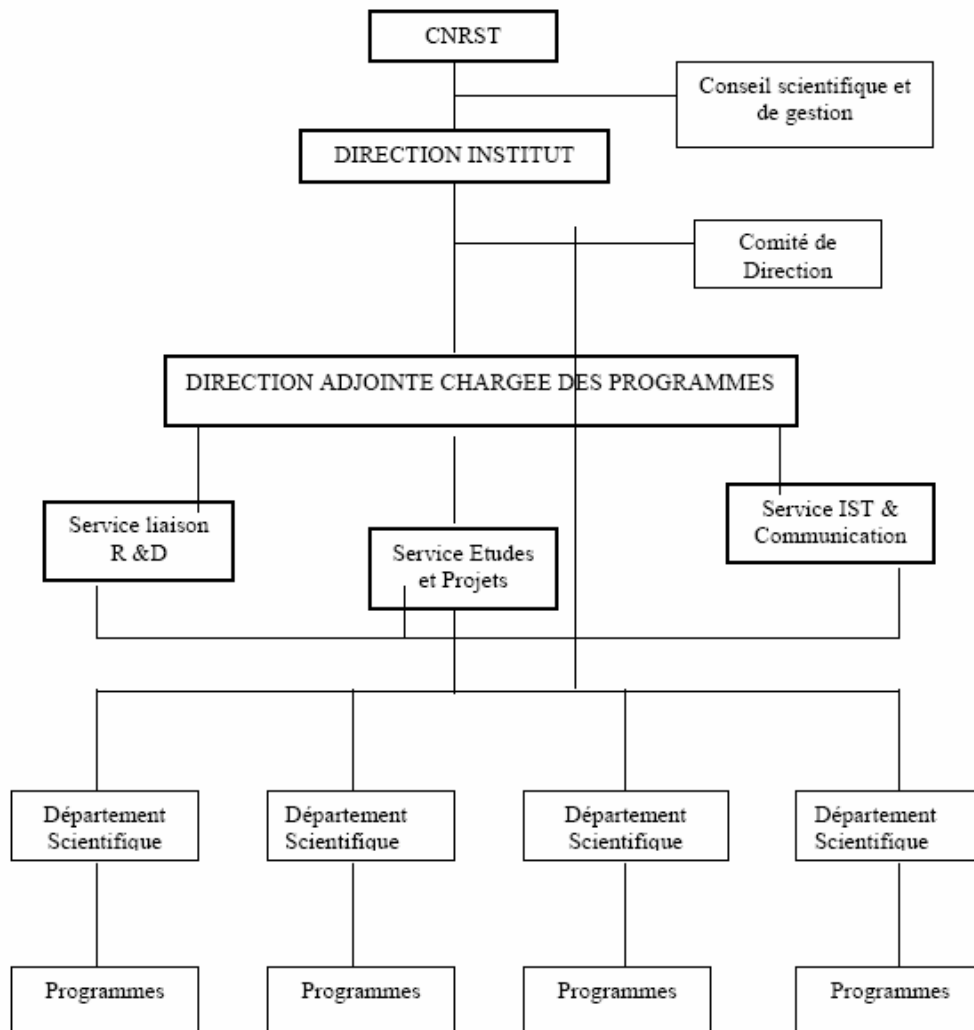
The national research system is currently relatively stable. It is composed of two poles: the CNRST and the university, both of them under the supervision of the Ministry for Higher Education and Scientific Research, plus international research establishments. Except for the Centre Africain et Malgache d'Enseignement Supérieur, all these institutions are supervised by the director of the CNRST who bears the title of Délégué National à la Recherche Scientifique et Technique.

## Researchers in Burkina Faso



The CNRST is organized at three levels: evaluation and management organs (board of directors, scientific council, national and regional technical committees, operational structures (research institutes) and support structures designed to facilitate communication between the different research performers and them and the public. The Forum de la Recherche Scientifique et de l'Innovation Technologique created in 1996 and the Agence Nationale de Valorisation des résultats de la Recherche are two of these. The aim of research institutes is to link research and development, to adapt research to local demand and needs and to concentrate research force in a few programmes while supporting multidisciplinary projects to face the lack of human resources. To realize these goals, research institutes are organised in departments provided with several programmes themselves regrouping several projects. The department is a national structure supported at regional level by some specific organisations. The national territory is divided into 5 regions.

## Research institutes in the CNRST



The two universities of the country have very different policies and are thus managed differently. Ouagadougou University is supervised by a board of directors and headed by a rector. Bobo-Dioulasso Polytechnic University is composed of institutes headed by directors.

### 2.1 Available policies

Agricultural research is the most developed sector in Burkina Faso. It constitutes almost 80 percent of national research activities. This domain is also a model of current research development policies: direct relationships with users are established and the relatively simple application of research results ensures the effective utilisation of agricultural research for national development. The majority of the national research system takes part in agricultural research.

**Table 6: Human resources of agricultural research in Burkina Faso in 2001**

Category	Supervising agency	Executing agency	Research focus	Researchers		
				Head count	FTEs	
<b>Government</b>	Ministère de l'Enseignement Supérieur et de la Recherche Scientifique: Centre National de la Recherche Scientifique et Technique (CNRST)	Institut National de l'Environnement et de la Recherche Agricole (INERA)	Crops, livestock, soils, irrigation, socio-economics, farming systems	154.0	154.0	
		Institut de Recherche en Sciences Appliquées et de Technologie (IRSAT)	Postharvest, biotechnology, food technology, renewable energy	39.0	39.0	
		Institut des Recherches en Sciences de la Santé (IRSS)	Livestock, natural resources	34.0	6.8	
		Institut des Sciences des Sociétés (INSS)	History, sociology, anthropology, geography	32.0	3.2	
	Ministère des Ressources Animales	Laboratoire National d'Élevage (LNE)	Animal health	29.0	4.4	
	Ministère de l'Agriculture, de l'Hydraulique et des Ressources Halieutiques	Direction des Pêches	Fisheries	11.0	11.0	
		Bureau National des Sols (BUNASOL)	Soil	26.0	7.8	
	Ministère de l'Environnement et du Cadre de Vie	Centre National de Semences Forestières (CNSF)	Forestry, natural resources	24.0	18.0	
	<b>Higher Education</b>	Université d'Ouagadougou	UFR - Sciences Économiques et Gestion : Centre d'Études, de Documentation, de Recherches Economique et Sociale (CEDRES)	Sociology, economics	30.0	4.5
			UFR - Sciences de la Vie	Animal production, natural resources, postharvest	37.0	5.6
Université Polytechnique de Bobo-Dioulasso		Institut du Développement Rural (IDR)	Livestock, crops, fisheries, socio-economics	25.0	6.3	

Source: Agricultural Science and Technology Indicators (ASTI), <http://www.asti.cgiar.org/>

Agronomic research perfectly embodies the two current goals of research management: the linking of research and development, and the coordination of R&D performers even those under different administrative supervisions.

Academic research and higher education are mainly financed by the state. Below are some figures about human resources and funding resources for the agricultural sector, which is by far the most developed one.

**Table 7: Human and financial resources of agricultural research in Burkina Faso in 1993**

STRUCTURES	HUMAN RESOURCES			FINANCIAL RESOURCES millions FCFA	
	Researchers				
	National	Expatriate	Others	National	External
Government structures					
INERA	92	19	408	523	747
IRBET	11	6	54	24	50
IRSS	7	-	13	4,5	33,5
LBTA	4	-	6	2,5	15,2
IDR (UPB)	8	-	3	-	-
CEDRES	19	-	-	-50	
UFR-Sciences Exactes et Appliquées	20	-	-	-	126
CNSF	18	3	18	60	20
Direction des Pêches	3	1	10	-	-
LNE (Ministry of agriculture)	4	-	-	51,2	-
BUNASOLS (Ministry of agriculture)	16	-	-	150	-
Regional and international structures					
International Water Management Institute	5	2	19	26	211
IRD	-	11	50	-	-
CIRDES	-	7	-	-	-
CIEH	2	10	25	-	-
EIER_ETSHER	2	-	-	-	-
Wageningen/Sahel	-	5	-	-	-
CRTO	-	-	-	-	-

### 3. R&D performers

**Table 8: Universities**

Year founded	Name	Fields	Student numbers	Number of researchers
1974	University of Ouagadougou (figures of 2003/2004) <a href="http://www.univ-ouaga.bf/">http://www.univ-ouaga.bf/</a>			
1974	UFR Langues, Arts et Communication	languages, arts and communication	2,441	57 permanent + 32 short-term teachers
1974	UFR Sciences Humaines	humanities	4,004	82
1975	UFR Sciences Economiques et Gestion	economy and management	4,075	21 permanent + short-term teachers
1975	UFR Sciences Exactes et Appliquées	exact and applied sciences	1,018	54
1975	UFR Sciences de la Santé	health	2,092	87
1975	UFR Sciences de la Vie et de la Terre	biology, geology	2,004	48
1978	UFR Sciences Juridiques et Politiques	law, politics	3,189	45
none available	Institut Burkinabè des Arts et des Métiers	management	422	5 permanent + short-term teachers
1995	Polytechnic University of Bobo-Dioulasso (figures of 2000/2001) (university composed of structures previously belonging to Ouagadougou University)			
1970	<b>Institut Universitaire de Technologie</b>	engineering sciences and management	253	?
1975	<b>Institut du développement Rural</b>	agricultural sciences	106	?
1992	<b>Ecole Supérieure d'Informatique</b>	informatics	139	?

**Table 9: Research institutes**

Year founded	Name	Location	Fields	Number of researchers	Number of publications (1991-1997)	Website
1978	Centre National de Recherche Scientifique et Technologique			208	3	<a href="http://www.cnrst.bf">www.cnrst.bf</a>
1978	Institut de l'Environnement et de la Recherche Agronomique	Ouagadougou	Crops, livestock, soils, irrigation, socio-economics, farming systems	154	33	<a href="http://www.inera.bf">www.inera.bf</a>
	Institut National des Sciences Sociales	Ouagadougou	History, sociology, anthropology, geography	32		<a href="http://www.cnrst.bf/inss.htm">www.cnrst.bf/inss.htm</a>
	Institut de Recherche en Sciences Appliquées et Technologie	Ouagadougou	Postharvest, biotechnology, food technology, renewable energy	39		<a href="http://www.cnrst.bf/irsat.htm">www.cnrst.bf/irsat.htm</a>
	Institut de Recherche en Sciences de la Santé	Ouagadougou	Livestock, natural resources	34		<a href="http://www.cnrst.bf/irss.htm">www.cnrst.bf/irss.htm</a>
Foreign organisations						
	IRD	Ouagadougou, Bobo-Dioulasso		22 research units (2006)	28	<a href="http://www.ird.bf">www.ird.bf</a>
	Organisation de Coordination et de Coopération pour la lutte contre les Grandes Endémies		medical sciences			

Year founded	Name	Location	Fields	Number of researchers	Number of publications (1991-1997)	Website
1984	Centre de coopération Internationale en Recherche Agronomique pour le Développement		agricultural sciences	15 + 10 technical staff		<a href="http://www.cirad.fr/fr/le_cirad/">www.cirad.fr/fr/le_cirad/</a>
1973	Comité permanent Inter-états de Lutte contre la Sécheresse dans le Sahel		environment			<a href="http://www.cilss.bf">www.cilss.bf</a>
	Ecole Inter-états d'Ingénieurs de l'Équipement Rural		planning		9	<a href="http://www.eieretsher.org">www.eieretsher.org</a>
1978	International Centre for Research in Agroforestry		agroforestry			<a href="http://www.worldagroforestry.org">www.worldagroforestry.org</a>
1939	Centre MURAZ	Bobo-Dioulasso	medical sciences	25	28	<a href="http://www.membres.lycos.fr/centremuraz">www.membres.lycos.fr/centremuraz</a>
1967	International Institute of Tropical Agriculture		agricultural sciences		2	<a href="http://www.iita.org">www.iita.org</a>
1977	Semi Arid Food Grain Research And Development		agricultural sciences			<a href="http://www.ua-safgrad.org">www.ua-safgrad.org</a>

### 3.1 S&T Human Resources

The Centre National de Recherche Scientifique et Technique lists 780 people devoted to scientific research of which about 200 are researchers at least having a doctorate degree. The original status of the CNRST, which is a public establishment funded by public funds but that can and has to realize receipts, attracts more and more researchers previously working as engineers in companies thanks to the autonomy of the CNRST. This trend reduced the perverse effects of the halt in recruitment that occurred after budget restrictions. Another great problem is the evident lack of technician staff that causes a loss of productivity due to mechanical failures and induces engineers and researchers to use their spare time completing these tasks. The number of CNRST researchers has been stagnating for the last decade. Furthermore, the number of INERA researchers and engineers decreased slightly from 1996 to 1999.

**Table 10: Evolution of CNRST staff**

	Staff numbers	INERA	IRSS	INSS	IRSAT
1993	Researchers	211	6		28
	Others	258	3		4
	Total	469	9		19
1996	Researchers	289	22	19	21
	Others	411	8	12	40
	Total	545	30	31	61
1999	Researchers	261	23		21
	Others	439	26		85
	Total	700	49		106

The University of Burkina Faso is one of the smallest of the continent: out of 731 staff members, 342 are teachers.

**Table 11: University staff**

Establishments	Permanent teachers	non teaching staff	Personnel devoted to projects	Total
Ouagadougou University	272	255	53	584
Bobo-Dioulasso Polytechnic University	59	72	1	131
<i>Ecole Normale Supérieure</i> Koudougou	11	11		22
<b>Total</b>	<b>342</b>	<b>338</b>	<b>54</b>	<b>731</b>

**Table 12: University staff per faculty at Ouagadougou University and the Polytechnic University of Bobo-Dioulasso**

Ouagadougou University								
Faculties	Professors	Senior lecturers	Junior lecturers	Assistants	FTE	National	Expatriate	Total
FAST	11	14	35	11	6	76	4	80
FSS	4	7	16	28	0	57	3	60
FLASHS	1	5	49	25	6	86	3	89
FDSP	1	1	9	6	2	19	2	21
FASEG	0	2	11	3	3	19	3	22
Total	17	29	120	73	17	257	8	272
Polytechnic University of Bobo-Dioulasso								
ESI	0	1	1	2	0	4	2	6
IDR	0	2	8	10	1	21	6	27
IUT	0	0	1	5	15	21	5	26
Total	0	3	10	17	16	46	13	59
UO+UPB	17	32	133	94	37	301	30	331

Non-teaching staff includes the personnel at the disposal of the university (76 people), the personnel paid by university (262 people) and temporary staff working on specific projects.

Except the Faculté des Sciences et Techniques and the Faculté des Sciences de la Santé, academic structures run with very few or even no post-graduate staff.

**Table 13: Lecturing staff and student numbers at the University of Ouagadougou (1997-1998)**

Faculties*	Permanent teachers	Short-term teachers	Students	Average annual growth (1991-1995)	Students in 2010 (previsions)	Students in 2020 (previsions)
FASEG	22	63	1,522	13.68	7,555	27,232
FAST	82	108	1,453	8.3	3,98	8,835
FDSP	26	21	843	8.71	2,386	5,500
FLASHS	91	49	2,796	13.68	5,490	9,378
FSS	57	41	909	10.29	2,998	7,984
TOTAL	276	282	7,523	9.3	22,409	58,929

\* Since this date, faculties have been reformed : the five former faculties gave birth to 7 Unités de Formation et de Recherche (training and research units)

### 3.2 Sources of research funding

The CNRST receives different sources of funding:

- the state pays salaries and expenditures
- stocks especially devoted to parastatal structures (cotton companies, rural development)
- funds generated by medicine fabrication unity, which is the property of the CNRST and produces aspirin, quinine and faca
- produce commercialisation of a 10,000 hectares (24,700 acres) experimental zone.

Stocks are only devoted to programmes funding except 10 per cent for support services and 5 per cent for the exploration of new research fields. Thus, progressively, the CNRST has been evolving from an organisation financed by public funds to a self-financing structure.

The CNRST principally works with public funds but it has to secure funds in order to become progressively autonomous. It can thus manage research programmes on its own.

**Table 14: Financial resources of the CNRST (FCFA)**

Sources	State funding	Stocks	Agreements and projects (International funding)	Others	Total
amount	1,269,406,000	109,079,378	1,451,036,599	384,525,000	3,214,046,000
%	39.5	3.4	45.14	11.96	100

The high amount of international funding signifies a recognition of research in Burkina Faso but induces an important dependence towards international cooperation that compromises the autonomy of the country for leading research.

Research funding has been hotly debated at various conferences. The obstacles have been identified: insufficient involvement of the elite and of politicians for research support, insufficient funding, political instability and international competition. Furthermore, the university will certainly have to face a decrease in public funding, the state being currently the main financial backer, and also the withdrawal of other financial backers as the World Bank, which claim that investing in primary education is more socially profitable and fairer than in higher education seeing that the latter only concerns “a minority of privileged people”. The state is currently reducing scholarships.

Thus, the academic world wants to diversify sources of funding and mentions the following groups as potential financial backers:

- the state
- private companies
- local administration
- NGOs
- individuals
- development partners
- stocks
- fees

#### **4. Research output**

The pre-eminence of medical sciences is characteristic of French speaking sub-Saharan Africa. The high rate of co-authored in this domain underlines a strong cooperation and an established scientific community.

**Table 15: Research output per field (1991-1997) (PASCAL and SCI databases)**

Agriculture				
Institutions	More than 10 articles	7 to 9 articles	4 to 6 articles	2 or 3 articles
AGRI Canada		Ouedraogo A.	Boivin G., Bouchard D.	
INERA			Thiombiano L., Konate G.,	Dakouo D.
CIRDES		Duvallet G.	Bengaly Z.	Amsler S, Filledier J
Laboratory of vegetal protection		Vincent C., Stewart RK	Zongo JO	
CIRAD				Cattan P, Faure G.
IITA				Drabo I., Muleba N., Mwanke M.
IRBET				Ouedraogo SJ
Other sciences				
EIER			Jannot Y.	
Univ Ouagadougou			Ouattar T.	Sawadogo L., Tapsoba T. Ouedraogo-Traore R.
ORSTOM				Yameogo L. (OCP)

Table 15 Continued

Medicine and Health				
Institutions	More than 10 articles	7 to 9 articles	4 to 6 articles	2 or 3 articles
Centre Muraz	Meda N., Guiguemde T.	Ouedraogo JB, Chiron JP, Cartoux M.	Soula G., Dabis F., Diallo I., Gbary AR, Kanki B., Lamizana L.,	
HN Bobo	Tall F., Traore A., Cousens F., Curtis V.	Bazie AJ, Dao B.	Mertens T., Nacro B., Tall FR, Traore E., Ouiminga RM, Prazuck T., Rouamba A.	
HN Y Ouaga	Traore O., Ilboudo D., Kabore J.	Drabo YJ, Lengani A., Serme D.	Ouandaogo BJ, Sangare L., Sanou J., Bougouma A., Kone B., Ouedraogo C.	
Univ Ouaga		Sanou A.,	Ouoba K., Sakande B, Dao M	
Department of Health			Catraye J.	
Fight against trypanosomiasis			Bauer B., Kabore I.	Clausen PH, Quilleveré D, Guillet P, Seketeli A.
ORSTOM			Gazin P.,	Molez JF, Carnevale P.,
OCP			De Sole G., Remme J.	Agoua H., Alley ES, Boatou BA
Fight against malaria				Esposito F.

**Table 16: Research output per field and institution**

<b>Fields / Institutions</b>	<b>Agricultural sciences</b>	<b>Medical biology</b>	<b>Clinical sciences</b>	<b>Biology (others)</b>	<b>Geosciences</b>	<b>Physics</b>	<b>Chemistry</b>	<b>Mathematics</b>	<b>Engineering sciences</b>
<i>Hospital NY Ouaga (56)</i>		74	29						
<i>Hospital Nat Bobo (42)</i>		55	45						
<i>Univ Ouaga (36)</i>	25	10	2	7	10	2	1	5	1
<i>INERA (33)</i>	33			7	24				
<i>Muraz Centre (28)</i>		44	4	1					
<i>ORSTOM (28)</i>	4	16	2	6	19				
<i>OCP-OCCGE (22)</i>		31	1	8					
<i>CIRDES + Trypanosomiasis (13)</i>	2	16		2					
<i>Health Department (12)</i>		17	4						
<i>IRBET (9)</i>	9			2	4				1
<i>EIER (9)</i>	2	2			2				13
									Energy

Table 16 Continued

<b>Fields / Institutions</b>	<b>Agricultural sciences</b>	<b>Medical biology</b>	<b>Clinical sciences</b>	<b>Biology (others)</b>	<b>Geosciences</b>	<b>Physics</b>	<b>Chemistry</b>	<b>Mathematics</b>	<b>Engineering sciences</b>
<i>CIRAD (8)</i>	11			1					
<i>Lab Prot Végétaux (6)</i>	6			5					
<i>Lutte/palu (4)</i>		7	1						
<i>CNRST (3)</i>		4							
<i>Agric Canada (3)</i>	3			3					
<i>IITA (2)</i>	4								
Divers (1 à 2 chaque)	7	18	2	2	32				
					Ministries, Antea, BRGM...				

These data emphasize the output of regularly publishing authors or teams. Exceptional or recent publications so that different types of output are less or utterly not highlighted.

There is no information about research output in humanities and social sciences.

## 5. The profession of Researcher

Three major changes have affected the profession of researcher over the recent past:

- the linking of research and development principally initiated by the pressure of financial backers and the orientation of new generations of researchers,
- the emergence of expertise activities bringing more money but reducing the time devoted to research, and
- access to the New Technologies of Information and Communication, essential for the knowledge of international research activity and for the share in international scientific community.

In this domain, Burkina Faso makes great efforts; it has been supported by international organisations located in the country such as the IRD that for the first time in the country implemented a web mail service in 1992. The state also created a network: the Réseau National d'Education et de Recherche, which aims at developing access structures to the NTIC, train people to optimally use the limited resources.

The creation of the Centre Africain et Malgache pour l'Enseignement Supérieur et la recherche scientifique constituted a great step for African research. Since 1988, it has been the unique organisation entitled to recruit researchers in Burkina Faso; they all have passed a third level doctorate, what is not the case in Congo, the Ivory Coast, Mali, Niger or Senegal. Criteria of evaluation of the CAMES are the three following:

- degrees: researchers are demanded a third level doctorate, they necessarily have to pass a Ph D to become research leader.
- research output: researchers have to publish as much as teachers and even more in several subjects.
- specific criteria: the share in national development programmes, the planning and framing of research activities, training.

These criteria changed in 1998. Researchers have for this time been evaluated like teacher-researchers at university. Researchers now ask for another revision: they want the evaluation to take into account research results for their promotion (salaries).

**Table 17: Current salaries of academic staff**

Status	Echelon	Index	Gross annual salary	Gross monthly salary
	1	820	1,748,240	145,685
Junior lecturer				
	11	1,635	3,485,820	290,485
	1	1,320	2,814,240	234,52
Senior lecturer				
	6	1,755	3,741,660	311,805
	1	1,570	3,345,240	278,937
Teacher				
	6	2,005	4,274,660	356,222
1 FCFA = 0,0015 euro				

Even if teachers' salaries are some of the highest of those of the civil servants, they ask for a substantial increase in wages from sometimes almost 100 per cent.

**Table 18: Requested salaries**

Echelon	Junior lecturer	Senior lecturer	Teacher
First echelon	398,684	489,294	534,284
Last echelon	546,378	568,125	613,430

Surprisingly enough, some former ministers currently manage scientific structures. It is rather rare that these people accept subaltern jobs but it underlines the relatively good situation of researchers. Research is still a major subject of concern for the government but also for the national elite: permanent reforms seem to be aimed at a better adaptation of research to the development of the country and to international research progress. Papers from all political tendencies mention research problems and success. Research in Burkina Faso, thanks to the international organisations located in the country, benefits from their presence.

## 6. Informal S&T structures

Researchers in Burkina Faso have at their disposal several journals that they try to maintain even if funding is very low.

#### 6.1 Publications depending on the CNRST

- "Revue Sciences et Technologies";
- "EUREKA!", journal of popularisation;
- "Série Colloques et Séminaires".
- **Publications depending on the University**
- "CEDRES-Etudes", half-yearly journal of the Centre d'Etudes, de Documentation et de Recherche Economiques et Sociales of the FASEG;
- "Résultats de la Recherche", series, FASEG
- "Documents de Travail", series, FASEG
- "Revue Burkinabè de Droit", half-yearly journal of the FDSP
- "Le Burkina Médical", journal of the Société Médicale of the BFA (3 first issues financed by Presidential and Prime Minister Offices)
- "Annales de l'Université: séries "Sciences et Techniques"
- "Annales de l'Université: séries "Lettres et Sciences Humaines"
- **Regional publications (Western Africa) in Burkina Faso**
- "Journal de la Société Ouest Africaine de Chimie", bulletin de la SOACHIM.
- "Bulletin de l'OCCGE", bulletin de l'Organisation pour la Coordination et la Coopération pour la lutte contre les Grandes Endémies.
- "Revue du CAMES: séries Sciences et Médecine", scientific journal of the Conseil Africain et Malgache pour l'Enseignement Supérieur.
- "Revue du CAMES: séries Sciences Sociales et Humaines", scientific journal of the Conseil Africain et Malgache pour l'Enseignement Supérieur.
- "Revue et Perspectives, Document de Travail ILRI/CIRDES", journal of both the International Livestock Research Institute (ILRI) and the Centre International de Recherche-développement sur l'Elevage en zones Subhumides (CIRDES).
- "SUD Sciences et Technologies", Journal of the Ecole Inter-état d'Ingénieurs de l'Equipement Rural (EIER)

The pre-eminence of regional publications can be explained by the important activity of international institutions settled in the country. These journals are very much in demand because of their international scope.

The following professional societies are in Burkina Faso:

- Professional societies
- SOACHIM, Société Ouest Africaine de Chimie, created in 1997.
- ABAO, Association des Botanistes d'Afrique de l'Ouest, created in 1997
- Société Ouest Africaine de Gynécologie et d'Obstétrique.
- Société Africaine de Mathématiques.
- Académie des Sciences du Burkina Faso (to be).
- The Académie des Sciences du Burkina will be devoted to encourage the use of research for development, to define research and training orientations and to coordinate applied research activities in the whole country. Indeed, this role is currently that of the CNRST and the risk of duality or competition exists.

- The FRSIT is also an opportunity for every research actors to meet the scientific community as a whole, and the population every two years.

## 7. Scientific cooperation and agreements

Contrary to the majority of other African countries, Burkina Faso has elaborated a clear strategy for leading research but has at its disposal no funds to realize it. Scientific activity is mostly financed by foreign aid and cooperation. External funding represents 95 per cent and sometimes 100 per cent of global funding according to fields. This aid affects direct support to research programmes, running costs and salaries being part of state's duty. Since 1990, annual external budget has been estimated to 600 million dollars US provided by about twenty different organisations. Seventy-four percent of this amount emanates of bilateral cooperation with in the first place the USAID, French cooperation, the ACDI and the CRDI as organisations and the World Bank and the UNDP as financial backers. Multilateral organisations provide the country of 20 per cent of external subsidies and private institutions of 6 per cent. According to an evaluation of scientific managers, academic research funding depends in descending order on French cooperation, Dutch cooperation, Canadian cooperation (ACDI and CRDI), Swedish cooperation, Danish cooperation and the USAID.

Different types of cooperation exist: scientific cooperation between the CNRST and foreign institutions, harbouring of foreign teams working with their own means on their own projects: they have to ask the permission to the CNRST that generally allows the settlement but demands a copy of research results.

**Table 19: Demands for research authorizations from 1998 to June 1999**

Research fields		Germany	France	Austria	Denmark	Japan	TOTAL
Humanities and social sciences	Socio-anthropology	14	5	0	0	0	19
	Linguistics	4	0	11	0	0	15
	History	7	3		1		11
	Culture	1	5	1	0	1	8
<b>Total</b>		<b>26</b>	<b>13</b>	<b>12</b>	<b>1</b>	<b>1</b>	<b>53</b>
Botanic and environment	Botanic	5	0	2	0	0	7
	Environment	0	0	0	2	0	2
<b>Total</b>		<b>5</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>9</b>
Geography and pedology	Geography	7	0	0	0	0	7
	Pedology	1	0	0	0	0	1
<b>Total</b>		<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>

Table 19 Continued

Research fields	Germany	France	Austria	Denmark	Japan	TOTAL
Economy	0	6	0	1	0	7
Technology	1	0	0	8	0	9
Health	0	4	1	0	0	5
<b>GLOBAL TOTAL</b>	<b>40</b>	<b>23</b>	<b>15</b>	<b>12</b>	<b>1</b>	<b>91</b>

This kind of cooperation mainly concerns countries with little local presence. The third style of cooperation consists of a request of foreign financial backers that directly deal with research teams. Cooperation with other African countries is very limited whereas it could help to perform research activities more adapted to a development strategy. Indeed, it could reduce the dependence towards Northern financial backers and thus the gap between national policy and international demand. However, it is the stability of the research system and the existence of a research policy that attracts so many international institutions.

**Table 20: Research cooperation**

Partners	Object	Dates	Amount
INERA-CDC, Free university of Amsterdam	Soils and water preservation	1997-2000	200,000 florins
Consortium Bas-fonds/ADRAO	Improve women's income	1994-1999	\$ 9,290
INERA-IITA/PHMD	Productivity of agriculture, forestry and breeding	1995-1999	231,035 \$ US
INERA-Netherlands	Fertilizing of river rice	1995-1998	florins 1,864,500
INERA-ICRISAT	Management of natural resources	1996-2000	florins 2,400,000
INERA-AID	Evolution of soils and populations	second phase at stage	\$ US 423,050
INERA-Netherlands	Agricultural mechanization	1997-2000	\$ 9,290
INERA-CORAF (EU)	Planning	1995-1999	ecus 674,800
INERA-UCP	Agricultural productivity	1995-2002	fcfa 1,946,154,000
Scholarships FIS			SEK 72,720

Table 20 Continued

Partners	Object	Dates	Amount
INERA-CORAF (EU)	Hydro-agricultural structures	Project studied	
INERA-CIRAD Forest	Forestry	1998-2000	Annual budget
IRBET-UNDP	Natural forests	None available	fcfa 48,702,000
IRBET-MARA	Management of natural plants	None available	\$ US 141,718
Agreement CNRST-CIRAD	Research and institutional support actions	1996-	fcfa 283,000,000
CNRST-French cooperation	Valorisation of biomass energies	None available	fcfa 7,760,000 (annual)
INERA/IRBET/MAE-AID	Evolution of soils and populations	1992-97	\$ US 423,050
CNRST-Swedish university	Nature management	1995-1998	SEK 2.3 millions
CNRST/IRBET-FIDA	Agroforestry	1996-2003	Annual budget
CNRST-CAS/UIUC	Economic and social ecology	ended	\$US 131,396
IRBET-ICRAF	Forestry	1995-undefined end	None available
CNRST-CEE	Migration in the Sahel	None available	None available
IRBET-RABEDE (French coop)	Production of composite material with grass	1996-1997	fcfa 3,500,000
INERA-CIRAD	Improvement of the Sorghum	1996-2000	ecus 96,000
INERA-CEE	Genetic diversity	1995-1999	ecus 104,136
CNRST-IPGRI	Biodiversity of genetic resources	1996-1999	ecus 264,381
CNRST-Belgique	Improvement of agricultural production	1997-2000	fcfa 3,369,000
INERA-ICRISAT	Productivity of peanuts	1998-2001	\$US 40,000
CNRST-Foundation Jean Paul II	Vulgarisation of improved varieties of niébé	1995-1998	fcfa 5,243,700
CNRST-ADRAO	Damage of soils in the Sourou	1995-1998	fcfa 7,184,625

Table 20 Continued

Partners	Object	Dates	Amount
CNRST-Netherlands	Internal mechanisms of adaptation and innovation	1997-1998	fcfa 7,500,000
CNRST-Netherlands	Sustainable animal production and ecological risks	1994-1999	fcfa 2,263,200,000
CNRST-Ghana- Danemark	Traditional fermentation processes	1997-1999	fcfa 2,033,000
University Ouaga-ICRISAT	Food innovation	1997-1999	ecus 67,000
CNRST-RABEDE (French cooperation)	Energetic valorisation of the biomass	1997-1999	fcfa 31,800,000
CNRST-RABEDE (French cooperation)	Cleaning of waste water	1997-1999	fcfa 8,500,000
CNRST-CRDI Canada	Shea tree derived products	1998-2000	\$ CAN 300,400
CNRST-AUPELF UREF	Epidemiologic supervision	1985- 1999	fcfa 6,500,000 per year

## 8. Conclusion

Burkina Faso inherited and developed efficient research structures and provided them with well-founded institutions that evolved progressively. There are few research performers principally working on agricultural themes with few human and material resources. However, the stability and the efficiency of the system attracted financial backers and foreign institutions that settle in the country. Furthermore, Burkina Faso is very orientated towards international cooperation. Researchers enjoy a reasonably comfortable position relatively to other professions in the country even if they are still not satisfied by it. A great reform was initiated with the Plan Stratégique de la Recherche adopted in 1995 that has not entirely been achieved yet. The trend at that stage consists of an increase in research public funding (public funds devoted to research were planned for reaching 1 % of the GNP in conformity with the declaration of Lagos but also of an evolution towards self-financing of the CNRST. A policy of decentralization and regionalization has also been initiated. It will demand a greater communication between the different services and organisations, which is necessary to the best use of weak resources and a tight linking of research, development and application.

## 9. Annotated Bibliography

La Science au Burkina Faso par Hocine Khelfaoui in La Science en Afrique à l'aube du 21ème siècle, IRD, Paris, 2002

Websites :

<http://www.asti.cgiar.org/> - a very well documented site on agricultural research in many countries of the world.

