

# West Africa Seed and Planting Material

The Newsletter of the West Africa Seed Network (WASNET)



IITA

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This is the fourteenth issue of 'West Africa Seed and Planting Material', the newsletter of the West Africa Seed and Planting Material Network (WASNET). WASNET addresses the needs and problems in the seed and planting material sectors in West African countries and brings together private and public seed actors from West African countries in a structure, which will encourage them to work together to strengthen local, national and regional seed industry development.

The newsletter of WASNET is not only a tool through which the latest developments of the seed and planting materials sectors are communicated to seed and planting material staff in West Africa and beyond. It also aims at informing readers of what is going on in the seed and planting material sector in other networks or seed related associations in the world. Even more the newsletter can be seen as a forum of discussion whereby readers and contributors are allowed and encouraged to pose and answer questions.

The last issues of the Newsletter dealt with WASNET news mainly the minutes of the fourth Steering Committee Meeting, the proceedings of the second General Assembly Meeting held from 23 to 26 February 2004 in Dakar, Senegal and the launching of national seed associations of Mali and Niger.

Emphasis in the current issue is shifted to present the logo and the bylaws of WASNET, the list of seed actors and varieties in some member countries, the 23 top seed companies in the world in 2004, factors maintaining high seed quality during the storage; and the approval of four West Africa Presidents to the use of biotechnology to improve food security in the continent. It is also worthwhile to share with the readers of the newsletter of the West Africa Seed and Planting Material Network, what genetically modified (GM) crops are the first test of GM cotton in West Africa, and some seed events to come.

The screenshot shows the homepage of the WASNET website. At the top, there's a banner with the text "WEST AFRICA SEED AND PLANTING MATERIAL NETWORK". Below the banner, there's a sidebar with links to "News Stories", "Reports", and "Publications". The main content area contains several news items, each with a thumbnail image and a brief description. One item is about the Second General Assembly of WASNET, another about the National Seed Association of Mali (ASSEMA), and another about the Association of Private Seed Growers of Niger (APPSN). There are also sections for "Trade of Biotech Products in Africa: Requirements of Biosafety Protocols" and "Cost and Income Analysis Sheets". The footer of the website includes a copyright notice: "All Rights Reserved ©2004 WASNET".

**WASNET website**

[www.wasnet.org](http://www.wasnet.org)

Do not forget to send your comments on articles and contributions for the next issue of the newsletter

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- b. The Steering Committee is composed of four elected members, two from the public sector and two from the private sector.
- c. The four Steering Committee members must come from four different countries, two from Francophone and two from Anglophone countries.
- d. After a vote, a simple majority for a given candidate in his/her category will elect him or her as a Steering Committee member.
- e. A candidate is not allowed to participate to the vote counting
- f. A candidate cannot be elected if he or she is not attending the General Assembly.

## Chapter 2: Functioning of the Steering Committee

**Article 11:** The Steering Committee members are elected in a manner such that when a Francophone is elected as president, the vice President will be an Anglophone and vice versa and when a public sector member is elected as President, the vice President will be from the private sector and vice versa.

**Article 12:** The Steering Committee meets ordinary once a year. The Steering Committee comprises a President, a vice President, a Secretary and a member. The coordinator of WASNET shall be ex-officio member as will representatives of CORAF/WECARD, IITA, GTZ and CSIR.

### Article 13: The Steering Committee:

- a. Shall consider, amend as necessary and approve the agenda of its meetings;
- b. Shall review and evaluate the network activities
- c. Shall assist the Coordinator in the implementation, monitoring and evaluation of network activities
- d. Shall review the budget and evaluate the network work plan
- e. Shall advise the Coordinator on major decisions, such as entry and exit of member countries and policy issues
- f. Shall assist the Coordinator in promoting the formation of national networks and seed associations in each member country
- g. Shall be a link between the General Assembly and the policy bodies in the region (e.g. CORAF and ECOWAS) and the member countries for solutions to policy related problems
- h. Shall delegate the regional Coordinator to report on the progress and bottlenecks in implementing WASNET activities in member countries at the General Assembly meetings.
- i. Shall address all items on the adopted agenda

**Article 14:** The Steering Committee is convened every year. The venue should be the country hosting the Network Coordination Office. The Coordinator, in consultation with the President of the Steering Committee, shall prepare and organize the Steering Committee meetings.

**Article 15:** The term of office of the members of the Steering Committee shall be a two-year term and two terms maximum but continuity must be ensured.

**Article 16:** The Steering Committee shall assist the Coordinator in seeking funds from national, regional and international donors

### Article 17: The President of the Steering Committee

- a. ensures the chairmanship and the management of the Steering Committee and the General Assembly
- b. represents the Steering Committee with partners
- c. prepares the agenda of the Steering Committee and the General Assembly meetings in consultation with the other members of the Steering Committee and the Coordinator of WASNET
- d. monitors the implementation of the decisions of the Steering Committee and the resolutions of the General Assembly

### Article 18: The vice President of the Steering Committee

- a. assists the President in all his/her responsibilities
- b. represents the President in case of absence or incapacity to fulfil his/her responsibilities

### Article 19: The Secretary of the Steering Committee

- a. manages the secretariat during the Steering Committee meetings
- b. records, under the authority of the President, the minutes, proceedings and reports of the Steering Committee and General Assembly meetings
- c. reports to the General Assembly on the Steering Committee's activities
- d. sends copies of the reports and minutes to all Steering Committee members, to the Coordinator and the Country representatives
- e. writes, under the authority of the President of the Steering Committee, the administrative correspondence and archives the Secretary's documentation

### Article 20: The fourth elected member of the Steering Committee

- a. assists the Secretary to fulfil his/her responsibilities
- b. represents the Secretary in case of absence or incapacity to fulfil his/her responsibilities
- c. can be assigned special tasks by the President

**Article 21:** On request from the General Assembly or on its own initiative, the Steering Committee can establish ad hoc bodies, technical committees, working groups and permanent committees, subject to the following procedures:

- a. these bodies may be established whenever the Steering Committee considers that they will facilitate its work.
- b. before such a body is established, the Steering Committee shall define the mandate, the duration, and the composition and shall examine the administrative and financial implications of such decisions
- c. The ad hoc bodies report to the Steering Committee, which in turn may report to the General Assembly.

### **Chapter 3: Rights and obligations of members**

**Article 22:** Each country representative has the right:

- a. to express himself or herself in at least one of the two official languages of WASNET: English and French
- b. to fulfil regularly his/her national, regional, technical, scientific, and financial obligations to the network

- c. to take initiative for information on the network activities and to communicate the information to other actors of the seed sector within his/her country
- d. to obtain all the official documents of the network
- e. to have simultaneous interpretation between English and French during the General Assembly
- f. to request and obtain, where appropriate, the support of the network

### **Section III: Other matters**

**Article 23:** These bylaws shall be adopted by the General Assembly. It can be amended by the Steering Committee, but the amendments must be approved by the General Assembly before they become effective.

**Article 24:** The national networks may adopt bylaws that are appropriate to their own context however they should adhere to the network Code of Practice at a regional level.

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## National Seed Associations in WASNET Member Countries

### Professional Association of Agricultural Input Producers, Importers and Distributors of Guinea

M. Mamadou A. Kane

#### Background

- The government withdrew from production and marketing activities;
- 70% of the 8 million Guineans belong to the agricultural sector;
- Potential agricultural land is estimated at 6 million hectares;
- Ecological conditions are excellent;
- Food crops are predominant;
- Agricultural inputs are in short supply and expensive;
- Agricultural practices are still traditional;

- The buying power of farmers remains weak;
- Food security is uncertain.

#### Associated operators

- SPCIA SARL
- ENCIG SARL
- COMPTOIR AGRICOLE SA
- SAMAK SA
- SAREF INTERNATIONAL SA
- ETS TIDIANE AGRICULTURE
- PAPA SYLLA & FILS
- SAKO & FRERES

#### APIDIA's members profile

Name	Area of intervention	Activity	Address
SPCIA SARL	Production, distribution, import, export	Seeds fertilisers; equipment	BP 437 – Conakry spciagn@yahoo.com Tel/Fax +224 45 39 95 Mobile + 224 213776
COMPTOIR AGRICOLE SA	Distribution, import	Seeds; Fertilisers; pesticides	Tel +224 334095 act.gui@mirinet.net.gn
Ets TIDIANE AGRICULTURE	Distribution, import	Seeds fertilisers; pesticides	Tel +224 250973 & + 224 224713 agrdiallo@yahoo.fr
ENCIG SARL	Distribution, import	Seeds fertilisers	BP 3271 – Conakry Tel +224 422310
SAREF INT SARL	Distribution, import	Fertilisers; pesticides	BP 3915 – Conakry Tel + 224 451496 saref@usan-gn.net
Ets PAPA SYLLA & FILS	Distribution, import	Pesticides; equipment	Tel +224 330188 sylla_salim@yahoo.fr
Ets SAKO & FRERES	Distribution, import	fertilisers; pesticides	BP 1269 – Coankry Tel +224 464570
SAMAK SA	Distribution, import	fertilisers; pesticides	Tel +224 260005 malickkhadra@yahoo.fr

#### Seed related activities carried out by members

Name	Seed	Volume per year
SPCIA SARL	Rice /groundnut Vegetables	Up to 2 500 tonnes 0.3 tonnes
COMPTOIR AGRICOLE SA	Vegetables	1.5 tonnes
Ets TIDIANE AGRICULTURE	Vegetables	0.5 tonne
ENCIG SARL	Vegetables	0.3 tonne

### Mandate

- To develop the production and importation of seeds, fertilizers, pesticides, and agricultural implements;
- To stimulate the distribution and utilisation of production factors;
- To strengthen the technical and professional capacity of members;
- To carry out advocacy and uphold the interests of members (natural person and corporate body).

### Objectives

- *To take part in the organisation and regulation of the trade of inputs (legislation, supply, demand, fraud...)*
- *To professionalize associate companies through training ;*
- *To determine common marketing bases to the benefit of members (price, quality, markets, fares...)*
- *To boost product distribution by lowering producer sale prices*

### Membership

- ADIPIA is open to all natural persons or corporate bodies of Guinean or foreign nationality; members should :
  - Adhere to the Articles of Association
  - Pay membership dues
  - Pay for the membership card
  - Pay annual contributions

### Management bodies

- **Democratic General Assembly:** Decision making body—one man, one vote
- **Executive Bureau, a standing body** including:
  - a Chairman, member of the General Assembly
  - An Executive Director, employed by APIDIA
  - A Treasurer, member of the General Assembly
- **Auditors** in charge of the control, and support to technical and financial decision making

### APIDIA resources

- Membership fees
- Grants and subsidies by institutions, NGOs, and other development partners
- Interests and income on own properties and values
- Commercial returns on successful operations

### Current weaknesses

- Underperformance of members from professional viewpoint;
- Members are resource poor;

- Lack of bank security fund to cover the importation of inputs;
- Inadequate support from development partners;
- KR 2 truncated market;
- Insufficient promotional support and trust on the part of decision-makers;
- Exclusion of development projects from input supply operations.

### Partners

#### Public

- Ministry of Agriculture
- Agricultural Research Institute of Guinea
- National Extension Service
- National Department of Soils
- FAO/IFS

#### Private

- Chamber of Agriculture
- Farmer organizations
- Chamber of Commerce
- Local micro-enterprises
- Nongovernmental organizations
- WASNET
- WASDU
- IFDC
- AFSTA

### Expected outputs

- Volume of inputs used increased
- Turnover of associate members improved
- Professional capacity of associate members enhanced,
- Involvement in project implementation ensured and strengthened
- New agricultural jobs created
- Purchasing power of farmers improved
- Group marketing ensured and consolidated

### Future prospects

- Become a reliable partner of agricultural research and agricultural development projects ;
- Develop a regional security seed stock for the best varieties against climatic hazards ;
- Promote sustainable intraregional trade of food and vegetable seeds ;
- Develop planting material multiplication centers for perennial crops.

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# National and Interprofessional Seed Union of Senegal

M. Amadou M. Djigo

## Name

The 'Union Nationale Interprofessionnelle des Semences' (UNIS) was established in 1992 and authorized by the government in 1994.

## Mandate

Defend the interests of its members and build their capacity with a view to supplying sufficient good quality seeds to the farmers and users of improved seeds.

## Legal status

It is a national association whose Articles of Association and rules of procedure have been registered at the Ministry in charge of associations.

## Composition

It is composed of 194 members grouped as follows :

- Individual operators
- Economic interest Groups (GIE)
- Village sections
- Agricultural cooperatives
- Women's groupings
- Farmers' groups
- Seed companies
- Farmers' associations
- Traders
- Transporters

## Area of intervention

Seed production, collection, and marketing.

## Organs of UNIS

### ***The General Assembly***

It is the body of the members operating in four zones covering the various regions of Senegal. Each zone is led by a bureau composed of:

- chairman
- vice-chairman
- treasurer
- secretary-general
- councillor

### ***Board of directors***

The five delegates of each zone are ex-officio members of the board of directors. They elect the bureau of the

board and a chairman who is the moral authority of the association. Chairpersons are also elected to head the various produce boards:

- groundnuts
- cereals
- horticulture
- finance

### ***Groundnuts:***

- 1800 tonnes for 1999–2000 cropping season
- 7000 tonnes for 2000–2001
- 18 000 tonnes for 2001–2002
- 35 000 tonnes for 2002–2003

### **Goundnouts storage facility**

Those quantities of seeds are collected and marketed in 314 warehouses (Secco). The storage capacity of each warehouse varies between 200 and 500 tonnes. Some warehouses can store up to 1000 tonnes of groundnut. Each warehouse pools 20 to 35 villages.

### **Cereals**

The annual production of 2000 to 2500 tonnes seed rice evolve around the packaging chains at Richard Toll in the valley of River Senegal and at Bignona in the Southern zone. All the improved rice seeds are produced by UNIS. The bulk of the production is sold on the local market.

The rest is exported to Mauritania and Guinea Bissau. The exportation of good quality improved seeds towards those destinations led to the creation of the Subregional Interprofosionnal Association of Seeds and Planting Materials (ARIS). The production of millet, sorghum and maize is handled by the operators who use the packaging stations of UNIS at Diourbel, Keur Samba Gaye and Tambacounda.

### ***Horticultural species***

Vegetable seed production and marketing is handled by TROPICASEM, a company whose marketing network cuts accross all the regions in Senegal and almost all the other countries of the subregion. Its mandate includes research and improvement of tropical species.

### ***Finance***

The Association's resources are derived essentially from membership dues, annual and other contributions.

In order to implement their programmes, member operators are granted a line of credit at the Agricultural Bank of Senegal (CNCAS) which is fed by the European Union under the framework agreement involving the Senegalese government and the Comité National Interprofessionnel de l'Arachide-CNIA (the National Interprofessional Groundnut Board).

### Partners

- a. Public sector: Agricultural Research Institute of Senegal (ISRA), Seed Division (DISEM) of the Directorate of Agriculture, Agricultural Extension Department, Quarantine Service etc.
- b. National partners: CNIA, NOVASEN, SONACOS, FNOPS, SOSEM, SAPCA / EGAS, CCPA, SISMAR, SENCHIM, ICS, CNCAS, UNCAS, SODISCA.
- c. Regional and international partners: ARIS, AFSTA, WASNET, WASDU, APIA, RAS, CILSS, GNIS, FIS, SAFGRAD, USAID, European Union, IFDC, FAO, ECRISAT

### Constraints

- Difficulty in fund mobilization in some sectors
- Delay in funding
- Occasional state intervention in seed marketing activities
- Unlawful competition by the public sector
- Production is contingent upon climatic hazards (rainy season 2002–2003)

### Challenges

To be able to put in place a genuine seed industry in Senegal.

### Future prospects

To establish, through UNIS SA (with a capital of 100 000 000 CFA francs), small processing units that could relieve the association of support linkages and give it some autonomy vis-à-vis the donors.

### Conclusion and recommendation

In 1999, there were only 1800 tonnes of improved groundnut seeds but 3 years on 35 000 tonnes are available.

Over the same period, 22 operators were entitled to bank credit offering a fund mobilisation potential of 120 000 000 F CFA. Their number grew to 193 operators reaching a funding potential of 3 500 000 000 F CFA.

Such results could not have been obtained without the spirit of professionalism of members and the traditional collaboration ties between ISRA, DISEM, and CNCAS.

Such results could have been a common occurrence if it was not for the disaster experienced during the 2002–2003 growing season.

We recommend that existing cooperation linkages are strengthened between the various partners we've just cited. This will help towards the development of a genuine seed industry in Africa and free movement of seed thanks to harmonized regulations and mastery of information to the great advantage of farmers in Africa and in the world.

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# Seed Actors and Varieties Grown in Bénin, Burkina Faso, Mali, Niger, Senegal, and Sierra Leone

## Bénin

M. C. Hounpkonou

The Republic of Bénin is located in the Gulf of Guinea in West Africa. It covers a total area of 114 763 km<sup>2</sup> (11 476 300 hectares) 61.4% of which, i.e. 7 050 000 hectares, is agricultural land for a total population estimated at 6 187 173 inhabitants in 1999. 64% of the population live in rural areas in the south of the country on only 12% of the total land mass.

Bénin is bordered to the Northeast by Niger, Northwest by Burkina, East by Nigeria, West by Togo, and South by the Atlantic Ocean. Its natural environment is suitable for agriculture, livestock, and fisheries.

Relief in Bénin predominantly consists of flat lands. A few mountain ranges can be found in the northwestern region (Atacora). Soil types across the country vary from mineral soils including rocks, to hydromorphic vertisols lying in the South of Bénin but also along the banks of The Niger and Pendjari rivers in the North. Those soils are generally fertile. Vegetation is characterized by sparse forests, palm and coconut plantations in the South, and savanna vegetation edging from the North towards the center of the country.

From the North to the South and the East to the West, Bénin is endowed with a dense hydrographical network made up of rivers, lakes, lagoons, and other tributaries, supplemented by a rainfall pattern with four seasons in the South (two rainy and two dry seasons), and two in the North (one rainy and one dry season). Rainfall is often adequate and more or less evenly distributed over the year, generally rising above the mean of 800 mm each year.

Agriculture is the main activity in Bénin as it accounts for 40% of the Gross Domestic Product (GDP) and meets the needs of more than 70% of the population. Unlike food crops, cash crops heavily rely on seeds. The major seed users could be grouped as follows.

### Seed associations and operators

At the moment, Bénin does not have any seed association or seed operators but the establishment of seed banks in all the communes as a strategy will eventually bring about seed associations and operators.

#### Seed end users.

Number	Name of user	Main activities	Crops	Full address
01	ONG CAPID- 01639-83	Production	Cassava	Kandi/Borgou/Bénin
02	ONG OFDEDE	"	Cassava	Tél : 61 22 53 Parakou/Bénin
03	ONG ABICE	"	Cassava	Tél : 30 88 23 Cot/Bénin
04	ONG JAE	"	"	Tél : 92 09 32 Aplahoué/Bénin
05	ONG A.DEM	"	"	Tél : 61 08 94 Parakou/Bénin
06	ONG CVADES	"	"	Tél : 87 38 09 Djougou/Bénin
07	ONG APIC	"	"	Tél : 61 29 36/01 02 89
08	ONG AGIR	"	"	Tél : 33 82 80/95 15 40 Cotonou
09	ONG CRDB	"	"	Tél : 45 55 63 Djakotomey ou 35 02 25/91 11 70 ZE-TOFFO Abomey Calavi-Ouidah et Kpomassè-CARDER
10	Les semenciers de l'Atlantique (Mr ADJAGBE François	"		Atlantique
11	Les semenciers du Zou (Mr DIDOLANVI Christophe	"		CARDER Zou Bénin
12	Les semenciers du Borgou	"	Maize	CARDER Borgou
13	Les semenciers de l'ATACORA	"	Maize- Cowpea/ Groundnut	CARDER Atacora Bénin
			Maize-Groundnut	
			Rice-Sesame	

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### Varieties used by registered or unregistered farmers.

Crops	Species	Name	Type of variety	Cycle	Utilization
Cereals	Maize	DMR-ESR	Composite.	90 days	Food
		PIRSABACK 7930	Composite.	90 days	"
		SEKOU 85TZSR			"
		OBATAMPA	Composite.	110 days	"
		ADNY 11	Composite.	110 days	"
	Rice	ITA 212	Lowland and irrig.	110 days	"
		NIAPIS 8612	"	120days	"
		11365	"	110days	"
		TOX 3081	Lowland "	115 days	"
		ITA 222	Lowland and irrig.	115 days	"
Roots and tubers	Cassava	ITA 304	Lowland + Hydro.	115 days	"
		INRIS 88	Rainfed	100 days	"
		ITA 267	"	95 days	"
		ITA 333	"	110 days	"
		ITA 136		115 days	"
	Cowpea	BEN 86052		8-12 mth	"
		RB 89509	-	8-12mth	"
		TMS 30572		8-12mth	"
		IT 82E32		60 days	"
		NI 86-650-3	-	70 days	"
Legumes	Groundnut	IT 84 D1137		75 days	"
		TVX 3236		75 days	"
		TS 32-1		90 days	"
		KH 149A	-	90 days	"
		55-437		90 days	"
	Sesame	47-10		90 days	"
		-	-	-	"

### Seed production statistics for the main food crops from 1990 to 2002.

Year	Species	Variety	Production (kg)
1990	Maize	DMR-ESR	6 500
		SEKOU-85	2 712
		POSARICA	2 665
		PIRSABAK	1 425
		SUCRE	75
1994	Maize	DMR-ESR	9213
		IT 82D 326	330
		NI 86-650	432
		IT 81D 1137	106
		32-15	25
1995	Sesame	S-42	61
		S-42	14
		Gros-3	40
		38-1-7	28
		32-5	70
2002	Sesame	yender	76

Source: CRA Niaouli

Foundation and certified maize, groundnut and cowpea seeds are available by the growers. The Rural Development Action Centers (CARDER) in charge of data collection have run out of resources and are in the middle of the restructuring process.

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# Burkina Faso

M.A. Zongo

The Burkinabè economy relies heavily on agriculture and livestock which, on average, account for 35% of the Gross Domestic Product (GDP) and contribute 80% of export earnings.

The agricultural sector employs almost 86% of the active population. It is the main sector in terms of employment, income, and export opportunities.

Agriculture in Burkina Faso is essentially rainfed and consequently, highly subjected to erratic climatic conditions. Growth in the sector is highly contingent upon output which, in turn, depends on unforeseeable climatic changes.

Any agricultural production activity uses seeds as raw material. They play a vital role in agriculture and significantly account for almost 40% of yields in optimum farming conditions.

## The status of seed production groupings (GPS).

Regions	Name of grouping	Village	Membership
Est	- Groupement TORMA	Diapaga	15
	- Groupement Boussiébou		12
	- Groupement semencier de Pama	Pama	32
	- Groupement semencier de Bogandé	Bogandé	13
	- Groupement semencier de Logobou	Logobou	12
Sahel	- Groupement semencier de Partiaga	Partiaga	9
	- groupement Pabotonga	Bani périmètre	22
	- groupement Jaam Nati	Bani ferme	32
Sud-Ouest	- groupement Loromi	Pobé-Mengao	40
	- Association des multiplicateurs de semences du Poni -Noumbiel		20
Hauts- bassins	- Groupement Songoinsira	Koro	13
	- Groupement semencier	Séguéré	15
	- groupement Wouro - deni	Koro	19
Centre Est	- Groupement des producteurs de semences de riz	Bagré	31
Comoé	- Groupement semencier	Zabré	10
	- Groupement semencier	Diarabakoko	15
Plateau central	- Groupement semencier	Loumbila	142
	- Groupement GNAHINI	Bondo Rayoro	12
	- Groupement SIMA YAMASENE JENKULU		9
Boucle du Mouhoun	- Groupement Bodaba rayoro		11
	- Groupement semencier	Kié	24
Total			512

NB: These groupings and associations are specialised in seed production mainly of cereals, legumes and eggplants.

**Seed production statistics for selected crops in Burkina Faso (1994/95 to 2002/2003).**

Growing season	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/2003
<b>Crops</b>									
Sorghum	19.267	10.309	7.567	8.451	22.814	33.892	18.017	31.018	46.198
Millet	4.961	5.167	5.535	8.320	10.597	12.080	10.139	6.491	2.405
Maize	130.726	72.372	79.579	43.582	142.869	253.738	185.744	532.588	1540.433
Rice	42.102	61.648	146.512	244.174	258.150	8.455	2.790	18.562	241.460
Groundnut	23.436	27.854	12.791	0.916	5.410	25.418	7.311	9.696	3.640
Cowpea	10.577	19.892	19.443	29.438	15.651	39.189	21.066	41.092	21.770
Sesame	0.893	1.017	3.904	0.190	0.615	3.606	5.076	20.282	45.263
Soybean	3.449	0.515	4.350	0.050	3.531	7.769	1.797	-	19.570
Total	235.411	198.864	279.581	335.121	459.637	394.550	251.940	659.729	1920.73

## **Other activities carried out in the seed sector in 2003**

- Awareness and training programmes for seed growers and extension workers.
- Technical monitoring of seed production throughout the growing season 2003–2004.
- Farmer's National Day on 27 December 2004 in KAYA. It was an opportunity for farmers and public authorities to meet and exchange views on the strategies required for the promotion of farming organizations and for poverty alleviation.
- On-farm demonstrations were held on fertilizers and improved seeds.

Agricultural funding sources involving seeds are:

- Seed Sector Development Project
- National Budget
- HIPC programme

## **Conclusion**

Seed actors are not yet well organized. Existing groupings and associations are not dynamic. Their

poor organizational structure constitutes the major obstacle to their development. There is need to set up professional groupings should they operate as self-reliant entities.

However, the seed sector can claim a few assets:

- A seed grower's network with more than 800 declared farmers for the 2003–2004 growing season.
- Agricultural research stations employ scientists and breeders who are highly conversant with the production of breeder and foundation seeds.
- Experts are at hand for seed quality control and for the training of seed farmers and agents.

Thus, the General Directorate of Plant Protection (DGPV) wishes to benefit from the backstopping of WASNET in 2004 in order to strengthen the seed grower's organizational functional capacities.

Microfinance is also needed in order to provide the farmers with credit opportunities they dearly need for their production activities.

**Names and characteristics of varieties grown in Burkina Faso.**

Crop	Species	Name	Variety type	Cycle (days)	Utilization	Date release
Cereals	Sorghum	S 29	Improved	120–130	Food	Old
		Kanfiagui	Landrace	95–105	Food	Old
		Nongomsoba	Improved	120–130	Food	Old
		Gnofing	Improved	100–105	Food	Old
		Tjoadi	Landrace	105–110	Food	Old
		Ouédzouré	Improved	130–140	Food	Old
		ICSV 1049	Improved	90–100	Food	Old
		IRAT 204	Improved	80–85	Food	Old
		Kalsaka	Landrace	80–90	Food	Old
		Sariasso 01	Improved	105–110	Food	Old
Cereals	Sorghum	Sariasso 02	Improved	110–120	Food	Old
		Sariasso 03	Improved	80–85	Food	Old
		Sariasso 04	Improved	–95	Food	Old
		Sariasso 05	Improved	–100	Food	Old
		Sariasso 06	Improved	80–85	Food	Old
		Sariasso 07	Improved	90–95	Food	Old
		Sariasso 08	Improved	80–85	Food	Old
		Sariasso 09	Improved	–115	Food	Old
		Sariasso 10	Improved	110–115	Food	Old
		Sariasso 14	Improved	110–	Food	Old
Cereals	Millet	Kazoukwessé	Landrace	85–90	Food	Old
		Framida	Improved	100–105	Food	Old
		Maki		100–105	Food	Old
		IRAT P8	Improved	100–110	Food	Old
		CIVT	Improved	–70	Food	Old
		Local Doumiane	Landrace	65–75	Food	Old
		IKMV 8201	Improved	–90	Food	1986
		IKMP1	Improved	115–120	Food	1987
		IKMP2	Improved	–105	Food	1987
		IKMP3	Improved	115–120	Food	1987
Cereals	Maize	IKMP5	Improved	–110	Food	1987
		Zalla	Improved	110–120	Food	Very old
		SR 22	Composite	105–110	Food	
		SR 21	Composite	85–95	Food	
		FBC6	Composite	–91	Food	
		FBH33ST	Hybrid	–105	Food	
		FBH34SR	Hybrid	–105	Food	
		KPB	Composite	–88	Food	
		KPJ	Composite	–88	Food	1988–2001
		KEB	Composite	–76	Food	

**Names and characteristics of varieties grown in Burkina Faso [contd].**

Crop	Species	Name	Variety type (days)	Cycle release	Utilization	Date
Cereals	Rice	IRAT200	Composite	95–110	Food	
		Massayamba	OP	95–110	Food	
		IRAT80	Synthetic	95–110	Food	
		FBPC1	Composite	95–110	Food	
		FBMS1	Composite	–74	Food	
		FBH 33	Hybrid	95–110	Food	
		FBH 34 ST	Hybrid	95–110	Food	
		IRAT 81	Hybrid	110	Food	1988–2001
		Jaune FÔ	OP	85–95	Food	
		IRAT 83	Hybrid	105–110	Food	
		IRAT 98	Hybrid	95–110	Food	
		IRAT 100	Hybrid	100–105	Food	
		FKR27(1215-5-5)	Improved	100	Food	1982
		FKR37(WAB5650)	Improved	105	Food	1992
		FKR39(TOX10-11-4-A2)	Improved	98	Food	1992
		FKR41(WAB56-125)	Improved	103	Food	1992
		FKR2(Gambiaka)	Irrigated	145	Food	1970
		FKR4(Sintane Diofor)	Irrigated	120	Food	1960
		FKR6(IR20)	Irrigated	125	Food	1970
		FKR8(IR8)	Irrigated	130	Food	1970
		FKR10(IR1529-680-3)	Irrigated	130	Food	1973
		FKR12(VIJAYA)	Irrigated	145	Food	1973
		FKR14(4418)	Irrigated	125	Food	1976
		FKR16(4456)	Irrigated	120	Food	1976
		FKR18(SC27)	Irrigated	135	Food	1980
		FKR2(IET2885)	Irrigated	130	Food	1976
		FKR22(IET1996)	Irrigated	120	Food	1976
		FKR24(BR51-319-9)	Irrigated	126	Food	1977
		FKR26(C74)	Irrigated	135	Food	1970
		FKR28(ITA123)	Irrigated	125	Food	1983
		FKR30(IR21015-80-3-3)	Irrigated	125	Food	1983
		FKR32(ITA222)	Irrigated	127	Food	1984
		FKR34(RP1125-1926-2)	Irrigated	129	Food	1984
		FKR36(ITA304)	Irrigated	125	Food	1992
		FKR38(BW295-5-7)	Irrigated	115	Food	1992
	Rice	FKR42(IR64)	Irrigated	123	Food	1989
		FKR 43	Upland	100	Food	1992
		FKR 19	Lowland, irrigated	90–115	Food	1994
		FKR 33	Upland	80–100	Food	1982
		FKR5(IRAT144)	Upland	103	Food	1976
		FKR13(IRAT147)	Upland	96	Food	1976
		FKR 1	Upland	98	Food	1970
		FKR3(IRAT10)	Upland	100	Food	1973
		FKR7(IRAT112)	Upland	105	Food	1981
		FKR9(IRAT146-R)	Upland	97	Food	1981
		FKR11(IRAT146-B)	Upland	96	Food	1981
		FKR15(ROX16)	Upland	111	Food	1990

## Names and characteristics of varieties grown in Burkina Faso [contd].

Crop	Species	Name	Variety type	Cycle (days)	Utilization	Date release
		FKR17(ITA150)	Upland	100	Food	1981
		FKR21(ITA157)	Upland	98	Food	1987
		FKR29(1215-1-5)	Upland	100	Food	1982
		FKR31(1083-1-1)	Upland	98	Food	1982
		FKR35(WAB-5639)	Upland	105	Food	1992
		FKR44(IR1324-108-2-2-3)Irrigated	Irrigated	120	Food	1992
		FKR46(RP1125-156-1-1)	Irrigated	130	Food	1993
		FKR48(4418*IR6115-1-1)	Irrigated	120	Food	1990
		FKR50(4456*IR1529-680)Irrigated	Irrigated	120	Food	1990
		FKR52(BW348-1)	Irrigated	120	Food	1990
		FKR54(WABIR12979)	Irrigated	108	Food	1995
		CN94C	Improved	90	Food	1970
		TS32-1	Improved	90	Food	1960
		TE3	Improved	90	Food	1980
		QH243C	Improved	90	Food	1980
		QH194A	Improved	90	Food	1980
Legumes	Groundnut	KH241D	Improved	90	Food	1990
		E(104)	Improved	75-80	Food	1990
		SH470P	Improved	90	Food	1963/74
		RMP12	Improved	135-150	Food	1963/74
		RMP91	Improved	135-150	Food	1963/74
		69101	Improved	125	Food	1963/74
		59426	Improved	120	Food	1963/74
		38-1-7	Improved	90-100	Food	
Sesame		S 42	Improved	90-100	Food	1970
		32-15	Improved	90-100	Food	
Soybean		G.38	Improved	90	Food	
		G.121	Improved	100-105	Food	
		G.115	Improved	105-115	Food	1970
		G.196	Improved	105-115	Food	
		G.197	Improved	105-115	Food	
		KVX30-309-6G	Improved	70	Food	1986
		TVX3236	Improved	66	Food	1988
		Gorom Local	Landrace	70	Food	1979
		KVX414-22-72	Improved	70	Food	1988
		KVX414-22-2	Improved	70	Food	1990
Cowpea		KVX396-4-5-2D	Improved	70	Food	1988
		KVX396-4-4	Improved	70	Food	1988
		KVX61-1	Improved	70	Food	1988
		KVX404-8-1	Improved	70	Food	1988
		KN1	Improved	65-70	Food	1980
		CAR7/180-4-5-1	Improved	70	Food and fodder	1990
		IT81D-994	Improved	85	Food and fodder	1990
		Moussa Local	Landrace	70	Food and fodder	1990

# Mali

*M.S. Coulibaly*

Mali covers 1 241 298 km<sup>2</sup>, 40% of which lie in the 200 to 1200 mm rainfall area. The country is divided into various agricultural zones : the center, the south and the valleys of Niger and Senegal rivers and their tributaries.

Mali has a population of 10 million, 80% of which live in the rural area with 35% being under 20. The population growth rate is 2.5%. Agriculture is the backbone of the malian economy. It forms with extensive livestock the main activity found in rural areas. The agricultural sector which accounts for 45% of the GDP contributes close to 75% of export earnings and is a source of income for 80% of the population.

## Seed end users

In Mali, seed users are farmers who operate mainly under the supervision of public services and NGOs. The list of end users can change from one season to another.

The following list was drawn up based on the records of clients who purchased R1 seeds from the National Seed Service for the growing season 2003–2004. In addition to the content of the list, one should note that a high proportion of seeds is sold to various

clients who buy their seeds from branches of the National Seed Service.

## Seed associations

ASSEMA: The Seed Association of Mali is the only national seed association set up in February. The launching workshop was held in December 2003.

## Seed operators

### List of seed growers

- IER through agricultural research; Foundation seeds
- "TON" semencier de Molodo: R1 seedrice
- "TON" semencier de Babougou:
- "TON" semencier de Samanko:
- "TON" semencier de Dalabani
- Mopti Seed Grouping
- M'Pessoba Seed farmers' groups
- NIEGUE Seed Farm
- URDOC Seed farmers' groups at NIONO

## Seed processors

Seed farmers process (package and treat) their seeds and also take care of marketing aspects (primary collection).

## Seed traders

- Tropicasem
- Toguna
- La Cigogne
- La MPC (Syngenta branch) Mali Protection culture
- La Sikassoise
- Comptoir 2000
- USCOS

This list of economic operators is not exhaustive. Seed trading is more focused on imported seeds of vegetable crops. The seed stocks of staple food crops are not covered by private marketing channels.

Furthermore, it should be noted that most seed traders also deal in other inputs (fertilisers, pesticides, herbicides etc...)

A good number of unregistered retailers are also found in the informal sector.

End users	Crops
PAPIV –GAO	Rice
Cooperative Agricole de KLELA	Rice
PDR- SAN	Rice, cowpea, and dolichos
Commune Rurale de DIOUNA	Sorghum, millet, cowpea
GDPS - KALABOUGOU	Rice, maize, millet, sorghum, cowpea
DRAMR - SEGOU	Millet, sorghum, rice, cowpea, okra, dolichos, maize
Office Riz SEGOU	Rice, millet, sorghum
ONG –NEF DOUENTZA	Rice, cowpea
ONG – CARE MAL	Rice
OHVN	Maize, sorghum, millet, cowpea
ONG - SG 2000	Sorghum, millet, cowpea, groundnut
ONG – AFAR SEVARE	Rice
"TON" Villageois de N'GARA	Rice, sorghum, and millet
Communes Rurales de Tombouctou	Rice
ONG - KARED PACEDEL	Rice
NIORO	
Communes Rurales de SEGOU	Rice
PSSA (Programme Spécial de Sécurité Alimentaire)	Rice
Association Siginogonje Sofara	Maize , cowpea and okra

### List of cereal varieties used over the past growing seasons

Maize: 9 varieties	Rice: 19 varieties
Tiemantie de Zamblara	KHAO Gaewn
Sotubaka	DM 16
TZESR-W	BH 2
Dembaniuma (QPM blanc)	Gambiaka K.
E. 211	C 74
Zangurerini	BG 90.2
Kogoni B	Kogoni 91-1
TZEF-Y	Adny 11
Sorghum: 6 varieties	H 15-23 DA
CSM 388	Sébérange MR 77
Tiémarifing	Leizong
CSM 63	Nionoka
CSM 417	RPKN2
Wassa	Wassa
CSM 219	SIK 131
Millet: 9 varieties	Doussoumamalo
Toroniou C1	Kumabani
Benkadinio	Jiguifa
Djiguifa	Sikassoka

NB: All registered varieties (Official Species and Varieties Catalog) are not used by the farmers because the information or the material is not available. On the other hand, some unregistered varieties are used including landraces from given ecosystems.

### Varieties of roots and tuber crops

**Irish potato:** 7 varieties, all imported from France and Netherlands and distributed by traders.

- Sahel
- Lola
- Spounta
- Pamina
- Claustar
- Atlas
- Aïda

For cassava, sweet potatoe and yam: seeds are handled by the informal sector. The operation mainly consists in exchanges of local varieties among farmers. Those crops have not been seriously researched and the catalogue (2002 edition) does not include any variety recommended for release.

### Grain legumes varieties

**Cowpea:** 8 varieties registered

- Gorom – Gorom
- Yèrewolo
- Niban
- Korobalen
- Sangaranka
- TN 88-63
- Dounanfana
- KN2

**Groundnuts** 11 varieties some of which released only during the past three growing seasons.

47-10	GH- 119-20
JL- 24	CN 94 C
55-437	ICG 7878
Folofa	ICGVS (E) 34
28-206	ICG (FDRS) 10

**Soybean:** 1 variety : AGS 115

### Overall seed demand and production trends from 1990–2003 (tonnes).

		1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03
Rice	Demand	101.730	89.760	97.260	14.500	49.680	100.007	171.930	73.620	150.300	144.823	272.500	132.605
	Production	456787	265.139	260.236	31.827	119.885	177.639	313.211	286.502	306.023	258.150	302.911	371.427
Sorghum	Demand	4.390	1.700	7.100	2.000	0.826	1.355	1.629	1.485	6.750	9.649	15	25.660
	Production	10.307	7.369	12.298	7.582	5.892	5.274	6.429	10.847	12.224	15.498	17.189	27.642
Maize	Demand	3.250	3.400	5.790	9.160	3.838	5.600	4.963	5.810	4.500	5.498	0.400	2.800
	Production	22.475	5.997	11.061	10.815	7.601	8.032	13.198	15.919	13.730	15.144	11.848	8.002
Millet	Demand	11.440	1.400	3.550	3.455	0.379	2.450	1.115	0.140	6.250	7.960	1.200	3.450
	Production	18.458	10.273	8.961	5.086	9.952	7.665	6.244	9.503	10.560	12.266	11.322	10.051
Cowpea	Demand	2.935	1.400	4.110	0.746	0.871	0.845	1.912	7.590	5.800	5.595	11.100	3.235
	Production	6.310	5.692	6.425	2.091	1.679	3.201	5.039	1.834	3.217	3.962	3.305	3.204
Groundnuts	Demand	—	—	—	3.148	—	—	1.500	0.400	5.450	2.386	10.400	128.130
	Production	—	—	—	0.440	0.871	—	—	1.366	1.123	2.069	2.168	4.700
Fonio	Demand	—	—	—	—	—	—	0.500	—	—	—	—	—
	Production	—	—	—	—	—	—	0.596	0.240	—	—	—	—
Dolichos	Demand	—	—	—	—	—	—	0.050	0.360	—	—	—	—
	Production	—	—	—	—	—	—	0.556	0.335	—	—	—	—
Oseille de Guinee	Demand	—	—	—	—	—	—	—	—	—	—	—	—
	Production	—	—	—	—	—	—	—	0.075	—	—	—	—
Soybean	Demand	—	—	—	—	—	—	—	—	—	—	—	—
	Production	—	—	—	—	—	—	0.060	0.244	—	—	—	—

**Characteristics of varieties cropped in Mali.**

Rice: 16 varieties

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On-station yield (t/ha)
KHAO-GAEW	Thailand	165	Photosensitive	2.5–4.5
DM-16	Mali D52x37x Malobadian	140	Photosensitive	3–4
GAMBIAKA-KOKOUN	Mali (Landrace)	160	Photosensitive Susceptible to blast	3–5
C-74	Philippines	130	Photosensitive less susceptible to blast	5–5.5
BG.90.2	Sri-Lanka	135	Non photosensitive	5–8
H15.23-DA	Senegal	135	Photosensitive	5–8
GAMBIAKA SURUNI (Kogoni 91.1)	Mali IR36x Gambiaka K)	140	Non photosensitive 3-week dormancy	6
ADNY 11	Sierra Leone	120	Non photosensitive	5–6
SEBERANG –MR 77	Malaysia	145	Non photosensitive	6
RPKN2	China	115–125	Non photosensitive	4
WASSA	Philippines	110	Non photosensitive	4
IR32-307-107-3-2-				
JAMA JIGI (Leigzong)	IITA-IER/PRI	135	2-week dormancy planting period 1 June–15 July	6–8
NIONOKA AD 92	India	120	Non photosensitive, planting period 1 June–31 July	6–8
SIK 131	Sikasso (Mali) Gambiaka K x Bouaké 189	140	Tolerant to blast	4
DJIGIFA	WARDA	95	Resistant to blast	4.5–5
DOUSSOUSSOUMA MALO	WARDA Glaberrima x Sativa	95	Tolerant to blast	4.5–5

**Maize: 9 varieties.**

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On station- yield (t/ha)
Tiémanié de Z	Mali	110–115	Disease resistant	4–5
Sotubaka (Suwan)	IITA	115–120	Disease resistant	5
EV.84.22.SR	IITA CIMMYT	115–120	Disease resistant	5–6.5
Dembanionuman (maïs blanc)	Ghana	105–110	Very high lysin and tryptophane content	4
TZESR-W	IITA	95	Disease resistant	3.5–5
Zaguereni	Mali	80	Disease resistant	3
Kogoni B	Mali	80	Disease resistant	3
E.211	Mali	75–80	Disease resistant	1.8–2
TZEF-Y	IITA-SAFGRAD	65–75	Disease resistant	2–3

**Sorghum: 3 varieties.**

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On-station yield (t/ha)
Jigi Sèmè(CSM 388)	Improved local variety	125	Photosensitive	2.5
Tiémarifing	Mali	120–130	Photosensitive	2
Ja Kunbe (CSM 63 E).	Mali	100	Photosensitive	1.5

**Millet: 5 varieties.**

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On-station yield (t/ha)
M9D3	Mali/IRAT	125–130	Photosensitive	2.5–3
Djiguifa	Mali	110–120	Photosensitive	2–2.5
NKK	Mali	100–110	Photosensitive – résistant au charbon	2–2.5
Benkadinio	Mali	120	Photosensitive	2.5
Toroniou C1	IER/Mali	105–110	Photosensitive	1.5–2

**Cowpea: 5 varieties.**

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On-station yield (t/ha)
Niban	Mali (dogon land)	150	Highly photosensitive, fodder variety, resistant to bruchids and parasitic infections	0.8–1 of grain, 80 of fresh fodder, 8 of dry fodder
Yèrewolo ou (PRL 73)	Mali/IER	110–120	Susceptible to insect pests, yellow and golden mosaic, and Striga	1.5 of grain 4 of fodder
Sangaranka	Nigeria/IITA	75–85	Susceptible to golden mosaic, insect pests and striga	1.5 of grain 2 of fodder
Goro-Gorom ou (Suvita 2)	Burkina Faso	70–75	Grain variety, less photosensitive, susceptible to bruchids, resistant to drought	0.8–1
Dounanfana	Mali/IER	110–120	Susceptible to yellow and golden mosaic, susceptible to thrips, white flies and bruchids, Striga resistant	1.5 of grain 3.5–4 of fodder

**Groundnuts: 4 varieties.**

Varieties	Origin	Cycle (maturity in days)	Agronomic traits	On-station yield (t/ha)
47–10	Senegal	90	Non photosensitive, rosette resistant, drought susceptible	1.5–1.7
SAMEKE (JL 24)	Indies	90	Fairly resistant to drought, susceptible to diseases	1.7–2
MOSSI Tiga (CN 94 C)	Mali	90	Fairly resistant to drought, susceptible to neck rot	1.5–1.8
ICG (E) 34	Indies	90	Drought resistant, resistant to foliar diseases	1.5–2

**Okrah: 2 varieties.**

Varieties	Origin	Cycle (Planting-maturity in days)	Agronomic traits	On-station yield (t/ha)
Sabalibougou	Sabalibougou market	65–75	Drought resistant	10–15
Kéléya	Kéléya (Bougouni)	60–70	Drought resistant	10–15

**Soybean: 1 variety.**

Variety	Origin	Cycle (maturity in days)	Agronomic traits	On-station (t/ha)
AGS-115	Introduction from Burkina Faso	90	Drought tolerant	1.5–2

# Niger

M.A. Buckner

Niger covers 1 267 000 km<sup>2</sup>, barely 1/3 of which is suitable for agriculture. It is characterised by a tropical and dry climate marked by high temperatures and low rainfall data. The year is divided into two seasons namely a cool and dry season and a hot and wet season.

Niger supports a population estimated at 10 790 352 in 2001. It is unevenly distributed across the eight regions and ¾ of the population live on ¼ of the territory.

One of the characteristics of the social profile in Niger is poverty, the greatest threat to the country's social cohesion and ecological equilibrium. The Human Development Index (HDI) of Niger is one of the lowest in the world and, as a result, Niger was ranked one but last in 2002.

The main economic resources are derived from agriculture, livestock, handicraft, mines, and tourism.

Agriculture being the main activity in the rural area, is especially limited to southern regions. It is the main

occupation for more than 86% of the active population and remains the most important sector of the national economy. Over 80% of the total population live on agriculture. The major agricultural products are:

- *Food crops* (millet, sorghum, rice, maize) which account for 7/8 of the agricultural output;
- *Cash crops* (groundnut, sesame, nutgrass, cotton, cowpea, onion) offer potentially great opportunities for agro-industries, and exports;
- *Vegetable crops* (garlic, green pepper, cassava, sweetpotatoes, Irish potato, tomato, sugar cane, pepper, etc.) which are gaining importance are substantial sources of income.

## Collective seed users

A good number of organized structures (NGOs, Projects, Groups) use seeds in a scattered manner. They acquire seeds from private seed growers. The ones listed below buy their seeds from formal structures.

### Collective seed end-users.

N°	Nam of user	Main activities	Crops	Addresses
1	ONAHA	Office national des aménagements hydro-agricoles (production of rice and wheat)	Rice, wheat, soybean	BP.10697 Niamey Tel. 742058 ; 742993
3	PAFRIZ	Rice Sector Project: Activity	Rice	BP 10225 Tel.: 736779 pafriz@intnet.ne
4	PIDM	Dallo Maouri Irrigation Project	millet, groundnut,	Tel.: 722642
5	PSSA	Food Security Special Programme: Backstopping and extension	cowpea, sorghum	
6	PPEAP	Agropastoral Export Promotion Project (cash crops)	Onion, cowpea, sesame, groundnut, green pepper	BP.12131 Niamey Tel. 736256 738661 ppeap@intnet.ne
7	PDRT	Tahoua Rural Development Project: Backstopping	millet	BP: 139 Tel. 610550
8	PDLM	Local development Project of Maradi	millet, cowpea groundnut	BP 478 Tel. 411040
9	ASAPI:	Food Security small irrigation support program backstopping and extension	Millet, cowpea	411327 ugpasapi@intnet.ne
10	PDRAA	Aguié Arrondissement Rural development Project	groundnut	
11	Project Intrants/FAO:	Project on the promotion of agricultural input utilization by farmer organizations	millet	Tel.: 723236 pintrant@intnet.ne
12	Aquadev (Zinder)	Rural development, credit and demonstration		BP 496 Tel:510556 aquadev6@intnet.ne
13	INRAN	Agricultural Research Institute of Niger. Activity: research and seed production	millet, sorghum, cowpea, groundnut, maize, rice	BP: 429 Niamey Tel.: 725383 Inran@intnet.ne

**Collective seed end-users [contd].**

N°	Nam of user	Main activities	Crops	Addresses
14	ICRISAT	International Crops Research Institute for Semi Arid Tropics: Activity: research	millet, groundnut	Tel.: 722529 Fax: 738329 BP: 12404 incrissats6@c6iar.org
15	APPSN	Association of private seed growers of Niger: Activity Seed production and marketing	maize, millet, sorghum vegetable seeds	BP. 2253 Niamey Tel./fax :724733 also@intnet.ne
16	Care International	Technical support for development	millet, sorghum, cowpea, groundnut	BP : 10155 Tel.: 740213
17	Agrimex	Seed, pesticide and agricultural equipment marketing company	Lettuce, carrot, green pepper, tomato	BP. 10091 Niamey Tel.: 7404 Fax 740748
18	FCMN - Niya	Federation of vegetable growers cooperatives of Niger. Activity : vegetable production	Lettuce, Onion, green pepper, carot, cabbage	BP. Tel. 734249 fedmar96@caramail.com
19	FUMA	Federation of Farmers'Unions of Maradi: Activity: vegetable cultivation	Lettuce, onion green pepper, carrot	faomdi@intnet.ne
20	Mooriben	Federation of the Unions of farmers' groups of Niger	millet, cowpea	BP : 503 Tel : I724079 mooriben@intnet.ne
21	PADER	Rural Development Support Project of the Department of Dosso	millet, groundnut, cowpea	BP 143 Tel 650313 pader@intnet.ne niamey@sok.net
22	Cadelt	Local development support unit of Téra (Swiss Cooperation)		
23	PIP2	Private Irrigation Project (phase II). Activity: promotion of small scale irrigation	Vegetable seeds	BP 507 Tel 733807 anpip@intnet.ne
24	GTZ (PASP)	Agro-Sylvo-Pastoral Project	millet, cowpea, groundnut	BP:10814 Tel. 724548
25	World Vision	Backstopping and agricultural extension	millet, cowpea, groundnut	BP12713 Tel. 753427
26	CRS	Catholic Relief Service		
27	SAA (40)	Agricultural service of the Arrondissement: Activity : Monitoring and agricultural extension	All crops	
28	(DRDA): (8)	Regional Agricultural development Department: Activity: monitoring and agricultural extension	All crops	Tel. 650331
29	CA	Agricultural Input Supply Central Unit	Input	Tel. 733959 BP2259

Outside such organised structures, seeds are produced and marketed either through formal or informal channels by several individuals or farmers.

**Seed associations**

Several existing small-scale seed associations do not have any permanent address at regional and

subregional levels. APPSN (The Private Seed Growers Association of Niger) is the correspondent of most of those associations.

In vegetable farming the association concerned is the federation FCMN-Niya (Federation of vegetable farmers' cooperatives of Niger).

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### Seed related associations.

Order number	Name of association	Area of intervention	Crops	Full address
1	APPSN (Association of Private Seed Growers of Niger)	Seed production and marketing	millet, cowpea, maize, sesame, sorghum groundnut	Siège/ Stade GSK porte 1046; 1049 BP. 2253 Niamey Tel/fax:724733 also@intnet.ne faomdi@intnet.ne
2	FUMA (Federation of Farmers' Unions of Maradi)	Vegetable and Seed Production	lettuce, onion, green pepper, cabbage, carrot	
3	FCMN Niya (Federation of vegetable farmers' cooperatives of Niger.)	Vegetable and seed productions	lettuce, onion, green pepper, carrot, cabbage	BP. Tel. 734249 fedmar96@caramail.com

### Seed operators

Several operators trade occasionally in seeds as part of public contract or projects. The following table shows those who are engage in the trade on full time basis.

### Professional seed operators.

Order number	Association	Area of intervention	Crops	Address
1	Agrimex : Seed, pesticide and agricultural equipment trading company	Seed and agricultural equipment	Millet, cowpea, sorghum, Laite, carrot, green pepper, tomato, cabbage	BP 10091 Niamey Tel:7404
2	Etablissement Tout pour la femme et l'enfant	Vegetable seed trade	Tomato, pepper, carrot, etc.	Fax: 740748 Tel: BP
3	Société Aïnoma	Vegetable and agricultural seed trade	Seed, fertilisers, équipement	Petit Marché BP. 2253 Niamey Tel./Fax:724733 also@intnet.ne

### Traits of varieties grown in Niger

The varieties of cereal and leguminous crops presented here are the most commonly used and are listed in the national catalog. They originate either directly from the national genetic pool, or from introductions from neighboring or far-away countries. It should be noted that since 1996, the national variety catalog has not been updated in the light of new introductions.

### Cereals

#### Millet (*Penisetum typhoides*)

Name	Type of variety	Cycle	Utilization	Date of release
HKP HAINIKIRE	Landrace	75-85 d	Food	Very old
HKP3: HAINIKIRE	Landrace	75-85d	Food	Very old
HKBTIF: HAINIKIRE	Landrace	75-85d	Food	Very old
H-80-10-GR GUEREGUERA	Landrace	75-85 d	Food	
MORO	Landrace	75-85d	Food	
ANKOUTESS	Landrace	75-85d	Food	
CIVT COMPOSITE INTER - VARIETAL	Landrace	85-93d	Food	
SOUNA 3	Senegal	85-93d	Food	
P3 KOLO	Landrace	85-93d	Food	
% HK: HAINIKIRE	Landrace	85-93d	Food	
T 18 -L	Landrace	85-93d	Food	
IMV 8001	ICRISAT	85-93d	Food	
ZATIB: ZAFARWA - CHININ BAJINI	Landrace	85-93d	Food	
HKB-P-1: HAINIKIRE BENGOU	Landrace	85-93d	Food	
DG-P1: DAN GOMBE	Landrace	85-93d	Food	
GR-P1: GUERGUERA	Landrace	85-93d	Food	
BA: BA - ANGOURE	Landrace	85-93d	Food	
ZONGO KOLO	Landrace	85-93d	Food	
HKP - GMS	Landrace	95 d	Food	
SOSAT - C88	Landrace	80 d	Food	
GB - 8735	Landrace	80 d	Food	
CIVT - GMS	Landrace	95 d	Food	
ICMV IS 89305	Landrace	95-100d	Food	

**Sorghum (*Sorghum bicolor*)**

Name	Type of variety	Cycle	Utilization	Date of release
HYBRIDE NAD -1	Hybrid TX623 XMR - 732	75-85d	Food	
SEPON -82	India	85-95d	Food	
SRN 39	Nigeria	85-95d	Food	

**Mais (*Zea mays*)**

Name	Type of variety	Cycle	Utilization	Date of release
P3 KOLO	Landrace	90d	Food	
MAKA	Mauritanie	90d	Food	

**Rice (*Oryza sativa*)**

Name	Type of variety	Cycle	Utilization	Date of release
Sintane Diofor	Senegal	125-140 d		
IR 1529 - 680-3	Landrace	125-140 d	Food	
D 52 -37	Guayana	125-140 d	Food	
BG 90-2	Sri Lanka	125-140 d	Food	
IR 22	IR8 x Tadukan	125-140 d	Food	

**Legumes****Cowpea (*Vigna unguiculata*)**

Name	Type of variety	Cycle	Utilization	Date of release
KVX 30 - 309 - 6G	Landrace	70-75d	Food	
TN-27 - 80	Landrace	70-75d	Food	
TN-5-78	Landrace	70-75d	Food	
TN28-87	Landrace	70-75d	Food	
TN 3- 78	Landrace	70-75d	Food	
TN 88- 63	Landrace	70-75d	Food	
	Landrace	70-75d	Food	

**Groundnut (*Arachis hypogaea*)**

Name	Type of variety	Cycle	Utilization	Date of release
T.169-83	Landrace	85-95 d	Food	
T. 181 -83	Landrace	85-95d	Food	
55-437	BAMBEY	85-95d	Food	
TS 32-1	Burkina Faso	85-95d	Food	
796	Russia	85-95d	Food	

**Statistics of seed production in metric tons from 1990 to 2002**

Data on hand are quite scattered over the years. As a matter of fact, only productions from seed centers had been taken into account until 2001. A survey carried out during that year in six provinces has made it possible to estimate seed productions by private seed growers. Vegetable seeds are fully imported apart from onion seeds which are produced locally. However, data for the latter are not available.

**Table 10.**

Species	Factors	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Maize	Prod.									23	44	
Wheat										12	18	
Rice	Prod.								34	19		
Sorghum	Prod.				5	1,3	3	11			23	
Millet	Prod.				50	240	70				698	1081
Cowpea	Prod.				5	242	17				180	278
Sesame	Prod.				1					2	59	
Groundnut	Prod.				10	8	3			89	156	

### **Seed needs and availability for major crops in 2003-2004**

Pending the availability of the 2003-2004 cropping season data, seed needs and availability on the eve of the 2002-2003 season can be presented. They are needs in improved seeds expressed in terms of demands recorded by the regional directorates of agriculture. Actual needs could be ten times higher when the season is bad as farmers always consume their seed productions.

Crops	Quantity of seeds in tonnes					Observations
	Expected output	Seed in stock	Total on hand	National need	External demands	
Wheat		18	548	None		
Maize		44	340	None		Data on expected
Rice		3	642	None		productions and seed in
Sorghum		17	643	None		stock have never been
Millet		1 017	2 265	None		projected.
Cowpea		164	1 377	None		
Sesame		60	216	None		
Groundnut		155	1 276	None		

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## **Senegal**

M.A. Dieme

As part of its seed sector development policy, Senegal is endeavoring to promote private seed operators who can take over from the public sector and produce good quality seed to the benefit of the country's agriculture as well as to that of the other countries in the subregion. Thus, the most locally produced crops are groundnut, cowpea, maize, rice, millet, and sorghum for major crops and galmi onion for vegetable crops.

Due to their good quality, part of these seeds is exported within the subregion (Mauritania, Guinéa Bissau). Such quality label prompted the creation of the Association Sous Régionale des Interprofessionnelles des Semences et Plants du Sénégal et de la Mauritanie (ARIS) in 2000.

**Seed collective end-users.**

Seed end users	Headquarters	Crops
Communauté Mouride (Khalife Général)	Khelcom/Diourbel	Groundnut, millet
Communauté Tidiane (Khalife Général)	Tivaouane/Thiès	Groundnut
Union de Boundoun	Vallée et Delta du Fleuve Sénégal	Rice
CLCOP	ANCAR	Groundnut
AJAC/COLUFIFA	Sédhiou/Faon	Sesame
ASPRODEB	Kaolack	Groundnut/millet/sorghum
APROFES	Kaolack	Groundnut
SODEFITEX	Dakar	Cotton/maize/millet
SODAGRI	ANAMBE/Vélingara	Rice/Maize

**Seed operators.**

Operators/Producers	Headquarters	Crops
UNIS	Keur Khadim (Dakar)	All crops
NOVASEN	Dakar	Groundnut
WORL VISION	Point E (Dakar)	
PROGEDE	Tambacounda	
PALPICS	Thiès	
PAGERNA		
PAPER	Direction de l'Elev. (Dakar)	Fodder crops
UPSE	Bambey (ISRA/CNRA)	All crops
PROMONO (EWA)	Thiès	
UGPM	Makhé	
AQUADEV	Louga	
AFRICARE	Castor (Dakar)	
CARITAS	Thiaroye (Dakar)	
TROPICASEM	Rte du Centenaire de Dakar	Vegetable crops
CDH	Cambérène	Vegetable and fruits
Union de Debi-Tiguet	Valley and Delta of River Senegal	Rice
GIE Mame Oumar Niang	"	"
GIE Balel	"	"
UJAK/Podor	"	"
GIE Famille Mbaye Fall	"	"
GIE Amadou Niang	"	"
GIE E.H. Malick Sy	"	"
Ets Diallo et Frères	"	"
GIE Coumba et Frères	"	"
Ets Fall et Frères	"	"
Ets Natangué	"	"
GIE Soon Jerinu	"	"
GIE Diaw et Frères	"	"
GIE Dombé Jeunes	"	"
Union de Boundoum	"	"
GIE Darou Minam 5	"	"
CLCOP	ANCAR	Various species
AJAC/COLUFIFA	Sédhiou/Faon	Sesame
ASPRODEB	Kaolack	Groundnut/Millet/Sorghum
APROFES	Kaolack	Groundnut
SODEFITEX	Dakar	Cotton/Maize

**Seed operators (processors/traders).**

Processors/Traders	Address
TROPICASEN (Technisem)	Km 5,6 du Centenaire de la Commune de Dakar
SENCHIM (Tezier)	Km 12, Rte de Rufisque Zone Industrielle Dakar
NIAYES SARRAUT	16, Av. Sarraut BP2483 Dakar
PROSEM (Vilmorin)	10, Rue Rames BOURGI, Dakar
TRAORE et FILS	Km 12, Rte de Rufisque (Thiaroye)

**Cereal varieties grown by farmers; registered or unregistered.**

Maize	Sorghum	Rice	Millet
JDB	CE – 145 – 66	ITA 123	Souna 3
Synthetic C	F2 – 20	IR 15 – 21	IBV 8001
Maka	CE 180 – 33	DJ – 11	IBV 8004
Thiémentié	CE 151 – 202	DJ – 8 – 341	IBMV 8402
Early Thaï	CE 196	DJ- 12519	Sanio
Tévétré		DJ – 684 D	
Monumental		BR – 51	
Oba super I		WAR – 1	
Oba super II		WAR – 2	
Sewan I		SAHEL 108	
Tzeey		SAHEL 201	
Tzeew		SAHEL 202	
		JAYA	
		ROCK 5	
		TCS – 10	
		WAR – 77	
		IR 1529	
		BW – 248 – 1	

**Grain legumes varieties grown by the farmers; registered or unregistered.**

Groundnut	Cowpea	Sesame
69–101	IS 86–283 (mélakh)	32–15
28–206	Jongoma	38–15
73–33	Mougne	Jaalgan 128
55–437	Mougne Mouride	CROSS n° 3
Fleur 11	Bambey 21	Primoca
GC8–35	Mbaye Ngagne	
HS (Bourkouss)	Ndoute	
78–936	58–74	
H 75	66–35	
GH 119–20		
ICGV 97–065		

**Vegetable varieties grown in Senegal; registered or not.**

Eggplant	Courgette	Head cabbage	Cauliflower	Chinese cabbage
Barbantène	Aurore F1	Acre d'Or	Monperlé F1	Victory F1
Black Beauty	Darky F1	Marché de	Boule de Neige	
Kalandra F1	Précoce marai-	Copenhague		
Long purple	Chère	Alta		
	Blanc du Liban	Fabula		
	Black Beauty	Quick Start F1		
		Bonus F1		
		KK – Cross F1		
		Santa F1		
		Tropica Cross F1		
		Riana F1		
		Africa Cross		

Carrot	Jaxatu	Okrah	Beans	Lettuce
New Kuroda	Keur Mbir Ndao	Indiana	Rudy	Blonde de Paris
Chantenay	Ngalam	Volta		Briantine
Nantaise	Soxna	Lonny		Minetto
Touchon		Clemson Spineless		Pierre bénite
Amazonia		Puso		Trinity
		Pop 12		Madrilène
		Rouge de Thiès		Kagraner Summer

Melon	Turnip	Onion	Water melon	Pepper
Kaloro Cantaloup charantex Cantaloup charantais Biamex Galia F1 Omega F1 Bernita Jaune canarie Hales best jumbo	Marteau Chinois Chinois super longo 2000	Texas early grano Violet de galmi Blanc de galmi Rouge espagnol Rouge noflaye Red créole Red bombey Orient F1 Rouge d'amposta	Pastèque de kaolack Charleston grey Criston sweet Mémé mali Sugar baby Grey belle	Safi Antillaise 14-5 Antillaise karabean Big sun Salmon
Green pepper	Leek	Irish potato	Persil	Radish
Yellow wonder Piperade	Long d'été	Safrane Alaska Claustar	Frisé Commun	Long Talbot Rond carlate
Tomato	Beetroot	Cucumber	Kohlrabi	Others
Xina Heinz Heinz 2274 Mongal F1 Red cherry Large Roma VF Rossol RFN Rio Fieogo Slumac Tima Sumo Floradade Tropimech Calinago F1 Caracoli F1 Caraïbo Orbit Small Fry	Plate d'Egypte D3 - Shor -top Potagère grosby	Basma F1 Breso F1 Marketer Olimpic F1	Blanc halipote Vienne	Céleri Luzerne Petit pois provençal Poirée

### List of acronyms and abbreviations

C.L.C.O.P	Cadres Locaux de Concertation des Organisations Paysannes
AJAC/COLUFIFA	Association de Jeunes Agriculteurs de Casamance/Comité de Lutte pour la Fin de la Faim
ASPRODEB	Association pour la Promotion des Petits Projets de Développement à la Base
ASPROFES	Association pour la Promotion de la Femme et de l'Entreprenariat du Sénégal
SODEFITEX	Société de Développement de Fibres Textiles
SODAGRI	Société de Développement Agricole et Industriel du Sénégal
TROPICASEM	Semences Tropicales
SENCHIM	Société Sénégalaise des Produits Chimiques
PROSEM	Promotion de Semences
CDH	Centre pour le Développement de l'Horticulture
UPSE/ISRA	Unité de Production de Semences/Institut Sénégalais de Recherche Agricole
POGV	Projet d'Organisation et de Gestion Villageoise
UNIS	Union Nationale Interprofessionnelle des Semences
PROGEDE	Projet de Gestion Durable des Energies Renouvelables et de Substitution
PAGERNA	Projet de Gestion des Ressources Naturelles
UGPM	Union de Groupements de Producteurs de Mékhé
NOVASEN	Nouvelle Arachide du Sénégal.

## Sierra Leone

A. Kargbo

The ten-year civil war in Sierra Leone (1991–2000) led to a massive displacement of farmers from their original homes to safe heavens inside and outside the country. The agricultural research and extension institutions were destroyed and its activities were halted. During this period FAO and other international and nongovernmental organizations (NGOs) implemented agricultural emergencies programs that were geared towards alleviating the suffering of the destitute farmers. The distribution of seeds and tools under the framework of the emergency program enabled the resumption of cropping activities. However, the seeds were poor in quality and manifested in the low productivity of various crops.

Quality planting materials that are appropriate to the given agroecological condition is a prerequisite for cropping activities. Utilization of improved varieties of planting materials has traditionally been low in Sierra Leone. Replacement has been limited to the selection made directly by farmers, and the inter-neighboring farmers exchange systems. Experience has shown that farmers are naturally willing to adopt new varieties if they respond to their needs and proved suitable to their agroecological conditions.

In May 2002, the government of Sierra Leone pledged to achieve food security for people by 2007. It is believed that this objective be achieved mainly through the increase of domestic production. Rice is the main staple food and is widely grown by most farmers.

The West Africa Rice Development Association (WARDA/ADRAO) has developed a new rice variety named «New Rice for Africa (NERICA)». Many of the NERICA varieties produced by WARDA have been identified to be suitable to the country. Sierra Leone is a member of the African Rice initiative which was established to promote the transfer of NERICA to farmers. Groundnut is also gaining momentum as a cash crop particularly for women. Peace has been restored all over the country, but due to poverty the majority of farmers could not maintain their seed stock, hence the importance for the introduction wide of a community seed program. This will increase the availability of high quality seed rice and enhance productivity and improve food security.

### **Seed certification defaulters**

After two years following the inauguration of the National Seed Board on 10 January 2000 both agents and seed dealers became familiar with the official formalities of the NSB regulations on renewal of their registration certifications.

An observed quantum of 1 157.9 Mt of seed rice and 248.3 Mt of groundnuts being side stepped for official certification by the Seed Testing Laboratory. This has resulted to a seeming loss of US\$ 57 900 for seed rice and US\$2485 for groundnuts the leone equivalent of Le129 827 750. Consequently there was reduced cash income of approximately Le 40M as against Le 80M in the year 2001. There have been several warning notices to both NGO and seed dealers and an obvious penalty of any defaulter discovered to side step his produce for certification to be accordingly charged to pay the prerequisite sum for quantitites so smuggled.

At the next agricultural Committee of Thursday 28 December 2002, the Chairman of the NSB is requested, in the company of the secretary NSB to officially make these revelations and request affected NGOs or agencies to substantiate the findings of NSB Secretariat without which they will be charged for payment of these deficits accordingly.

### **WASNET activities**

Between 23–24 January 2002 the National Seed Board Secretary participated in a General Assembly of the West Africa Seed Network (WASNET) in Banjul the Gambia. A report on the deliberations of the assembly in which Sierra Leone became the 12-member is in your personal file.

Then from 30 September to 5 October 2002 the Secretary was also invited to deliver a country paper on the Seed Sector Strategy. Both presentations and papers on the proceedings of the workshop are also in the personal file.

Generally, the workshop formulated policies of development objectives as:

«The issues of improved seeds and planting materials by farmers in West Africa are increased».

And an action objective of:

«A regional network for the promotion of improved seeds and planting materials is sustainably operational».

The one-week workshop was very intensive but the 12 participants representing their respective ECOWAS members countries worked consciously to produce an Action Planning Matrix (APM) on:

- a. Communication network
- b. Promotion of seed associations at national and regional level
- c. Identification of partner activities directly or indirectly concerned in the network

- d. Complete report assigned to lead countries among the network's member countries
  - e. Improvement of the network governance system
- These results are interesting and useful. The West Africa Seed Network (WASNET) is confident that the West Africa Seed Development Unit (WASDU) will sufficiently involve the private sector, in seed and planting materials promotion within the West Africa Sub Region.

#### **List of collective seed end-users.**

N°	User's name	Main activities	Crops concerned	Complete address
1	FAO Sierra Leone	Distribution to vulnerable farmers	Rice, groundnuts, vegetable seeds	15 Sir Samuel Lewis Road, Freetown
2	EU Sierra Leone	"	"	George Street, Freetown
3	World Vision	"	"	39, Freetown Road, Lumley
4	Action Aid	"	"	PMB 59, Sierra Leone C/o Minister of Agriculture Sierra Leone
5	Africare	"	"	"
6	CRS	"	"	"
7	Caritas	"	"	"
8	GTZ/CRS	"	"	"
9	ICRC	"	"	"
10	MCSL	"	"	"
11	WVSL	"	"	"
12	EFSL	"	"	"
13	CCSL	"	"	"
14	Ministry of Agriculture			

Source NGO Desk Officer – National Committee Meetings

#### **Seed Associations existing in the country.**

N°	Name of association	Domain of intervention	Crops concerned	Complete address
1	PASACOFAAS	Production and marketing	Rice and groundnuts	5A City Road, Damson Bridge, Wellington
2	Murray Agro. Ent.	Production, processing and marketing	Rice, coffee, and cocoa	Njagbahun, Tongo Fields
3	Roda SServices	Rice and groundnut production	Rice cultivation	Rofutha, Masimra Chiefdom Port Loko District
4	Marampa Base Farmers Association	Production and marketing	"	5 Kamara Lane, Lunsar
5	Munafa Women's Dev Proj	"	"	Makandu, Makari Gbanti, Bombali
6	Buya Romende Women's Assoc.	"	"	Feredugu, Port Loko District
7	Mathenneh Foday Farmers association	"	"	Mathenneh Via Makeni
8	Mabanta Rural Dev. Project	Rice, fruit, trees production	"	Mabanta Village, Makeni, Bombali District
9	Koyai Women's Agric. Comm.	Production and marketing	Seed rice and groundnuts	
10	Masungbo Women Farmers Cooperative	"	"	Masungbu Makari Gbanti Chiefdom, Bombali District
11	Sogboneh Women's Farmers Cooperative	"	"	Masineh Via Makeni
12	Gollu Town Dev. Association	Production, processing and marketing	Rice, coffee, cocoa and tubers	Gollu, Kenema District
13	Associate Agric. Dev. Project	Production and marketing	Rice and groundnuts	Kontah Wallah, Port Loko District
14	Kolisoko Farmers Association	Production and marketing	Rice and groundnuts	Kolisoko Magabanti Chiefdom, Bombali District
15	Kama Agric. Farmers Association	Production and marketing	Rice and groundnuts	Petifu, Tonko Limba, Kambia District

Source: National association of Farmers Sierra Leone (NAFSL)

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### List of Seed Operators.

N°	Name of association	Domain of intervention	Crops concerned	Complete address
1	Seed The Limited	Production, importation and commercialization of seeds	Rice, G/nuts, Vegetables, Oil Palm	41 Station Road, Makeni, Sierra Leone
2	Marika Enterprises	Production and marketing	Rice and groundnuts	2 Garrison Street, Freetown
3	Strand enterprises	Vegetable seeds importation and sales	Wide range of vegetable seeds	20 Waterloo Street Freetown
4	Kailahun District Farmers Ass.	Production	Rice, coffee/cocoa, roots and tubers	Kailahun Town, Eastern Province
5	Moawoma Rural Women Farmers association	Rice production	Rice and other staples	Kanema
6	Reset Limited	Importation and marketing	Vegetables seeds	11, Bowling Street, Kingtom, Freetown
7	FARMCO Limited	Seed purchase	Rice, g/nuts, beans, and tubers	36 Race Course Road, Freetown
8	PASACOFAAS	Production, processing and sales	Rice	5A City Road, Wellington, F/Town
9	Maremila Farmers Association	Production – community-based organization	Rice, roots and tubers	Bureh / Kasseh Maconteh, Port Loko District
10	Gbonolenken Women Farmers Dev. Association	Production	Rice and groundnuts	Yele, Tonkolili District, Sierra Leone
11	Community Action For Progress (Local NGO)	Production and distribution	Rice, g/nuts, fertilizers and vegetables	Rokupr, Kambia District
12	Kissy Kpayama Agricultural Development Association	Production and Marketing	Rice	2 Yoke Street, Kenema
13	Buya Farmers Association	Production and marketing	Rice	1 Ladies Mile, Makeni, Sierra Leone
14	Sierra Seeds Limited	Production, processing and marketing	Quality seed rice	11 Old Railway Line, Freetown PMB 231

### Statistics data of seed production (mt) from 1990 to 2002.

Species	Factors	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Maize	Prod.											
Rice	Prod.	1390	1002	2013	2381	2000	2000	2500	—	—	5	62
Sorghum	Prod.											
Millet	Prod.											
Fonio	Prod.											
Cowpea	Prod.											
Sesame	Prod.											
Peanut	Prod.											
Soyabean	Prod.											
Yam	Prod.											
Potatoes	Prod.											

Source: Seed Multiplication Project (SMP) & IAR Njala

### Needs and availability of seed of main crops for 2003–2004.

Seed quantity estimated (t)						
Crops	Expected production	Carryover seed	Total seed available	National need	Estimated demand	Remark
Hybrid Maize						
Maize (OPV)						
Rice	600	62	662	15 000	12 000	Quality Rice
Sorghum						
Millet						

Source: Seed Multiplication Unit Evaluation, Ministry of Agriculture

## Other seeds sector activities realized in 2003

- National events during year 2003 in the seed sector involved
  - a. the Bombali District Agricultural show which provoked participation of farmers from the other four districts in Northern Province in February 2003 and
  - b. the World Food Day celebrations on 16 October in Bo to which a fairly representative attendance from the seed sector all over the country participated in four days
- The following are the National Seed Sector meetings in which I participated during 2003
  - 19/04/2003: National Seed Board Meeting
  - 15/05/2003: Emergency Seed Board Meeting on Seed Trade within Sierra Leone

There are 12 scheduled meetings of the Agriculture Committee on the ast Thursday of each month and 10 National Seed Board meetings in the year to discuss and plan progress in the agriculture sector.

- Information on source of funding:
  - a. National. WASDU team leader to sensitize various involved governments in WASNET to create a budget for the program up to 2006.
  - b. Bilateral. GTZ bilateral Seed Multiplication Project to be reactivated to again fulfil its role in the production of quality seed rice and other improved planting materials in Sierra Leone.
  - c. Multilateral. To strengthen the already multilateral activities within Sierra Leone

to embrace a more truly seed sector impasse to the farming population.

## Conclusion

The private actors or the seed sector have not yet been fully sensitized about the organization transportation consultants being the greatest. Their impression concerning the current organisation would be premature to determine. By way of extension education their action concerning the organization will be strengthen to its good ideals.

For the fact that over 50% of the farming population is just recovering from the turmoils of a 10 year war their weakness is centered in a viable recovery program to strengthen their awareness towards development in their farming activities e.g. no credit facilities either in cash or kind. The threats are that any program geared towards sustainability must bear in mind the foregoing constraints.

Government and donors are fully aware of the need for subsidy to the seed sector. Those fleeing the country due to the war will face an uphill task to get their once viable programs on the right track.

Generally, the majority of farmers or seed growers in the seed sector are expecting WASNET to provide them with quality seed on a revolving account basis. This input will strengthen their efforts towards production and self sustenance.

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# Maintaining High Seed Quality in Storage

## Factors Maintaining High Seed Quality During Storage

Mammohan Attavar

*(This article was first published in Asian Seed and Planting Material volume 11 N°3 of May–June 2004)*

The establishment of an adequate, uniform plant population is a prerequisite to achieving maximum crop yield. Seed quality, planting rate, seedbed conditions and seeding emergence combine to determine the final plant population and yield potential. Seed quality encompasses several important attributes of each seed lot that represent the collective planting performance potential. Although all seed quality components are important, the single most recognized and accepted index of seed quality is germination. The test procedure for this has been standardized and is referred to as the standard germination test.

The seeds are at their highest quality level at the time of physiological maturity. Beyond this stage, deterioration processes gain ascendancy and seed quality can only decrease. Among the seed quality factors affected during seed deterioration are seed viability and seed is adequately evaluation under present seed testing procedures. This situation would be of little importance if the relation between the two factors was constant. Unfortunately, the seeds usually decline in vigour much more rapidly than their decline in viability.

Thus, a seed lot may have a relatively high germination percentage but be almost worthless for planting. Seed vigour, when properly evaluated, is not only a measure of the capacity of seed to survive and emerge under adverse field conditions, but is also a measure of the storability of seed. Seeds that are low in vigour are as susceptible to adverse storage conditions as they are to adverse field conditions.

### Pre-storage phase

Seed storage actually begins in the field. It starts when the seeds have reached physiological maturity, and depend on the external environment in terms of moisture, temperature and even biotic pressures.

Therefore, the environmental conditions during seed maturation, harvesting and threshing have a high impact on seed viability and seed storage potential. This is why the location where seed are produced has a

high impact not only on yield, but also on seed moisture management and overall quality in terms of viability, germinative ability, seed health, vigour and even plant performance.

Those regions where the weather is rain-free with low relative humidity, and cool enough during seed maturation and harvesting, are more suitable for seed production.

Most studies indicate that storage starts in the field. This is why any seed production and marketing plants needs to understand the effect of the pre-storage factors that influence seed quality, and to plan accordingly. All the management practices provided during the storage phase will only be able to build on this initial factor.

For example if the seed starts with high quality due to optimum pre-harvest factors, it is possible to follow up successfully during the storage phase. On the other hand, if the seed starts with bad quality (field weathering, high moisture at harvesting, heating problems, low germination, low vigour, seed health problems etc) it is difficult to compensate even with the best storage practices.

### Critical factors in seed storage

#### Type of seed

First, understand your seed. Some species store better than others do. For example, tomato seeds store better than cabbage seeds, while the latter store better than onion seeds. It is good to develop records of moisture and germination or tetrazolium readings for different species over time.

#### Seed moisture content

The moisture content in the seed influences many factors through increasing metabolic activities, higher respiration, fungal problems, heating, weakening and finally the death of the seed. The ease or difficulty in moisture management after harvesting depends largely on the climatic conditions that exist during seed maturation and harvest.

### **Initial viability of seed**

Seeds that have high initial viability maintain their quality for longer periods than seeds with low viability. The dry and cool conditions that prevail during seed maturation and harvesting makes it possible to start with high viability.

### **Storage temperature and relative humidity**

Relative humidity and temperature influences the storage life of the seeds. Harrington's rule of thumb suggests that the sum of the percentage of relative humidity (RH) plus the temperature in Fahrenheit should not exceed 100°F for safe storage (for example, 40 per cent RH and 60°F). In general, a temperature below 40°F and a RH below 60 per cent is still safe for the storage of most seeds. The longer the storage time needed, the lower these two factors should be.

### **Length of storage**

Prolonged storage can lead to a gradual loss of vigour and, finally, a loss of viability. Obviously, the storage period depends on all the above factors as well as on the levels of viability that are desired at the end of the storage period. It has been reported that the actual age of seed is of less importance than the environment in which seed has been stored. With current technology and moisture management principles, it is possible to have older seeds that germinate at high levels. The longevity also varies among species, varieties, seed lots and even among individual seed inside the same.

### **Protection from storage fungi and insects**

The best method for preventing these problems is by storing seeds with low moisture, and maintaining it at a low enough level for the duration of the storage period, cleaning the warehouse and avoiding any source of infestation from old infested seeds.

### **Maintenance of seed quality**

Maintenance of seed quality in storage from the time of production until the seed is sown is imperative to assure its planting value. Storing seeds, just like storing any other live organism, has its risks. Those risks can be high or low depending on the species, the prevailing weather, market requirements and management during storage. The best alternative for avoiding the risks associated with storing seeds is to avoid storage; in many regions around the world, the seed industry has figured out how to do just that.

One such example is the cottonseed in India where most of the seed is packed in just a few months after harvest; this is also the case with rice that can be produced

twice a year, thus decreasing the storage period. These strategies are becoming highly desirable not only because they reduce storage but especially because they make it possible to market and meet financial obligations in a shorter period.

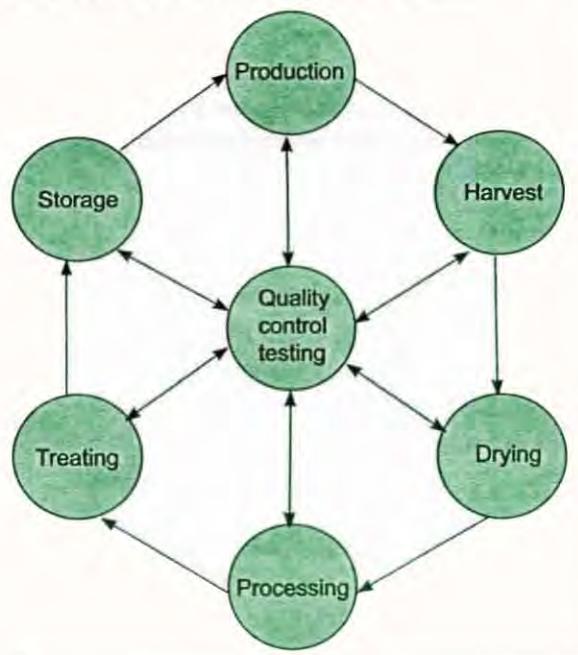
However, despite the best strategies, there are times when seed growers and dealers carry over seed lots from one year to the next due to a weak market, in order to insure an adequate supply the following year, among other reasons; this is because the production system does not provide choices.

Under such circumstances, the question is how to manage seeds to maintain a high viability. Seed quality comprises many attributes or characteristics of seeds. In terms of individual seeds, the characteristics include trueness to variety, viability, vigour, the amount of mechanical damage, disease treatment coverage, size and appearance.

When extended to seed lots, quality characteristics include moisture contents, storage potential, contaminants such as weeds, other crop seeds and inert matter, uniformity of the lot and performance potential.

Prevention of poor seed quality is the central theme of quality control. The quality control laboratory is the centre of the seed quality programme and it is here that quality control tests are made on which management decisions are based (see figure).

### **The quality control laboratory is the hub of a seed quality control programme**



For each new seed lot being processed and stored, quality tests such as those for physical purity, viability, germination, seed health, moisture and genetic purity as well as the tetrazolium test if required, are conducted, recorded on quality control charts and checked against the established minimum seed certification standards.

All the tests except the one for genetic purity should be conducted periodically until the end of the lot is reached. An accelerated ageing test may be employed to predict the relative storability of seed lots (Hampton and TeKrony, 1955). If the characteristics of the seed lot exceed the control limits, corrective action can be taken to prevent a loss in quality from recurring.

Quality control is just a matter of paying attention to the important operations and procedures in a seed business as well as periodically checking to determine that standards are achieved and maintained.

### **Significance of seed vigour**

Seed vigour differences exist in seed lots of agricultural, horticultural and silvicultural species. The significance of seed vigour for sowing depends mostly on seedbed and environmental conditions as detailed below:

- a. When conditions are benign, the field emergence percentage will often be close to the germination percentage of the seed lot, and seed vigour may not be a factor in seedling performance;
- b. Environmental stress (e.g., low temperature, wet soils) may result in varying field performance depending on the vigour status of the seed lot;
- c. High-vigour seed will perform better (emergence and seedling growth) under environmentally stressed seed bed conditions than low vigour seed lots, even though the laboratory germination of the lots may not differ.

The significance of seed vigour for storage is that the storage potential of high germinating seed lots is related to their vigour status before entering storage:

- a. for both controlled and uncontrolled storage, high-vigour seed lots will perform better (germination) after storage than low-vigour seed lots;
- b. Similarly for seed lots being transported within a country or exported to other countries, high-vigour seed lots are better able to withstand environmental hazards (e.g., fluctuating

temperatures, high humidity) than low-vigour seed lots.

### **Major causes of seed storage problems**

- Low-quality seed lots are placed in storage. (The seed may have deteriorated in the field before harvest and/or improperly dried in the case of rice and beans, mechanically damaged in the case of cotton, and contain a high incidence of seed-born inoculum in the case of gourds and cole crops).
- Inadequately dried seeds are placed in bulk storage without proper aeration or packed with a high moisture content.
- Seed lots are "carried over" for too long due to various reasons.
- Certain types of seed stored are naturally "short-lived" such as onion, soybeans and peanuts.
- Seed lots are stored in poorly ventilated, damp, warm warehouses.
- Ambient conditions that are very unfavourable for the storage of the seed lots.
- Proper care not taken during: a) bulk storage (that is, the period from harvest through packing including aeration, drying and "holding" operations); b) packaged storage (the period between packaging and distribution); c) distribution storage (that is, the period from distribution through sale to the growers, including the time in transit at assembly points (dealers) and at retail outlets); and d) storage of unsold packets or stock transfer. Seed, being a viable and propagating material, has to be protected from high temperatures and humidity until it is sown.
- Fungicides registered as seed dressings may also affect germination of seeds due to improper use. In general, seed dressings can be applied when seed is loaded into a storage bin. Some fungicides, however, contain active ingredients that are reported to be toxic to seeds and must only be applied immediately prior to sowing. Storage of seed treated with such phytotoxic chemicals can greatly reduce viability. It is important to read the label of any chemical treatment before applying it to seeds and to adhere carefully to the recommended application times, rates and withholding periods.

## **Seed storage principles**

- Seed longevity is the characteristic of a species or variety. The relative rating regarding seed longevity has been given for most of the agricultural, vegetable and flower crops (Justice and Bass, 1978).
- High-quality seed stores better than low quality seed.
- Seed quality is not improved by storage, regardless of how favourable the conditions. The best storage conditions can only maintain quality.
- Good seed production, harvesting, aeration/drying and processing practices contribute to successful seed storage operations. Thus, planning for seed storage begins in the field.
- Carry over only high-quality seeds.
- Place the desired amount (best seed lots) in the most favourable conditions as soon after bagging as possible. Do not wait until the end of the sales season to start thinking about carry-over.
- Seed moisture content and temperature are the most important factor influencing seed storability. Moisture of seed is a function of relative humidity and, to a lesser extent, temperature.
- A 1 per cent decrease in moisture content or a 10-degree decrease in temperature (Fahrenheit) almost doubles the storage life of seed.
- Cool and dry conditions are best for seed storage. Effectively sealed storage requires that the moisture content be substantially lower than that for non-sealed storage,
- Sanitation is essential.

## **Care to be taken in storing seeds**

- Before storage, seed should be treated with recommended protectants after processing.
- Use new seed bags for all fresh seeds and treat them with insecticide before use.
- Properly dry seed to a safe moisture content before storage.
- Permit better ventilation of bags in storage, and ensure that storage conditions are dry and cool.
- Do not pack seed in moisture-proof bags at high moisture levels of more than 6–8 per cent.
- Use wooden pallets for stacking.
- A regular schedule for fumigation of seed storage and dusting or spraying of seed bags with insecticides should be followed.
- Each seed lot should be stacked separately with complete information on identity, quantity, germination and test data given on the stock card.
- A regular schedule for sampling seed lots and testing for moisture, germination and vigour as per ISTA rules should be followed.

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# The top 23 seed companies in the world in 2004

(This information was published by Cultivar SEED Special issue of May 2004)

	Company	Nationality	Seed turnover in 2003	Owner group	Presence in the world
1	Pioneer Hi-Bred International	USA	2000 M US \$	DuPont de Nemours (100%)	Subsidiaries in 53 countries
2	Monsanto	USA	1971 M US \$	Stock market (100%)	Subsidiaries in 52 countries
3	Syngenta Seeds	Switzerland	1071 M US\$	Stock exchange in Switzerland and New York	Subsidiaries in 90 countries
4	Group Limagrain Semins	France USA	822 M € 477 M US \$	Cooperative Limagrain Public company traded on the NASDAQ stock exchange under the symbol SMNS	Subsidiaries in 26 countries Distribution in 120 countries production in 30 countries 59 research stations in 19 countries
6	Kaneko	Japan	430 M US\$		
7	KWS Saat AG	Germany	424 M €	Family shareholder group (>50%), Bayer CropScience (15%), Bayrische Hypo-und Vereinsbank AG (15%), individual shareholders (10%), Südzucker AG (<10%)	Subsidiaries in 16 countries
8	Advanta	Netherlands	400 M €	Astra-Zeneca (Suède-UK, 50%), Cosun (NL, 50%)	Subsidiaries in 24 countries
9	Delta & Pine Land Company	USA	281 M US \$	New York stock exchange	Subsidiaries in USA +11 countries
10	DLF-Trifolium	Denmark	270 M €	DLF COOP (95%)	Subsidiaries in 10 countries
11	Dow Agrosciences	USA	200 M US \$	The Dow chemical company	
12	Aventis CropScience	Germany	200 M US \$	Bayer	
13	BayWa AG	Germany	165 M €	Cooperative BayWa	Subsidiaries in 5 countries
14	Barenbrug	Netherlands	142 M €	Barenbrug (85%), banques (15%)	Subsidiaries in 11 countries
15	Saaten-Union GmbH	Germany	121 M €	7 companies with equal parts: Ackermann, Borries Eckendorf, Norddeutsche Pflanzenzucht, Nordsaat, Petersen, Südwestdeutsche, Saatzucht, Strube, Saatzucht	Subsidiaries and representatives in 12 countries
16	Svalöf Weibull	Sweden	121 M €	Swedish farmers' supply and crop association (Suède, 60%) BASF (d, 40%)	Subsidiaries in 9 countries
17	RAGT génétique	France	112 M €	Groupe RAGT (Actions privées)	Subsidiaries in 5 European countries
18	Emergent Genetics	USA	110 M US \$ (estimation)	Holding company: Hicks, Muse Tate & Furst as investment partners	Subsidiaries in USA, Denmark, India, Argentina
19	Mikado Group	Japan	100 M US \$	Mikado seed growers Co.Ltd	
20	Euralis semences	France	97 M €	Groupe cooperatif Euralis (100%)	Commercialization in 30 countries
21	Union In Vivo (hors Semillas)	France	86 M €	Union de coopératives, fusion de Sigma et UNcca. Socéétés Semences de France, Semences verts.	
22	Nidera Semillas	Argentina	80 M US \$	Nidera SA	
23	Maïsadour semences	France	73 M €	Groupe coopératif Maïsadour (60%), Syngenta (40%)	Subsidiaries in 7 countries

## Biotechnology News

### The use of tissue culture techniques to improve private sector commercial farming: the challenges

M.D. Quain, E. Acheampong, and B. Asante

An article by Quain published in the issue No. 9 (June 2002), indicated how much the technique of tissue culture could contribute to commercial production of vegetatively, propagated planting materials. The article referred to the great potentials and benefits the tool of tissue culture can offer the Ghanaian community especially the private sector in the production of non-traditional export crops such as pineapples, banana and yam. Since the article was published, there have been several developments in the private commercial farming sector, which have caused the anticipated use of tissue culture techniques to be realised.

The urgent need for farmers to produce large quantities of pineapples, a non-traditional export crop led to the realisation that tissue culture is the only available tool to meet the required targets. Since December 2002, the tissue culture laboratory of the Department of Botany, University of Ghana, Legon, has helped a private farmer to establish a commercial tissue culture laboratory. The department provided expertise for the establishment of the commercial laboratory for pineapple production. The current turnover is 200 000 suckers per month. This number is expected to increase in the near future to meet growing demands for pineapple suckers.

#### Challenges arising

The use of tissue culture for the commercial production of planting material for farmers came with several challenges:

- Availability of funds to start the project; assistance was sought from banks. However, the pressure to pay back bank loans is in the short term but the realization of the full benefits of the investment is in the long term.
- The availability of laboratory ware and consumables locally was limited and assistance was sought from Europe and South Africa.
- Collaboration was sought from countries where the technology is already in use for commercial production.

- It was originally envisaged that few local commercial farmers going into the investment would automatically monopolize the market and hence easily recoup their investment. However, competition came into play immediately. Other farmers collaborating with international institutions imported already multiplied *in vitro* plantlets into the country and only had to harden and sell or multiply to produce more planting material in their nursery.
- The university as a research institution offered training and technical support for the commercial venture to start. This did not come without sacrifices made on the part of the farmer, scientists, and the personnel trained to work in the laboratory. It is hoped that the sacrifices made will pay off and all involved will enjoy the fruits of their labor. We are, however, coming to the point where the investor should be ready to pay for the services offered by those who transfer technology (both local and foreign)
- It was a difficult task training labor to adapt to *in vitro* techniques. Attitude to work which enables set targets to be met and availability of back ups in case of eventualities as technology is adapted to the system was quite challenging.

#### Guiding principles to be considered

Since the start of the commercial private sector activities, the benefits envisaged in the previous article (issue No. 9) are being realized. These benefits are coming to the whole community:

- Policies should be put in place to protect the local commercial producer working from the field through the laboratory to the nursery and back to the field. (Benefits will depend on which stage of the production line the investor is involved in)
- It should be possible to seek financial support from the government, banks, NGOs and the international community. It is hoped that the terms of reference and interest rates where

applicable will take into consideration the time needed to realise profits.

- Another policy issue to be addressed is for the maintenance of standards in the use of the technique in order to experience its full potentials.
- All the necessary measures have to be taken to keep disease pressure down by using *in vitro* cleaned planting material, hence increase yield, lower the use of pesticides and other chemicals as well as increase employment.

### Maximizing Potentials

To fully realise the potentials of biotechnological tools, investors, government, banks, NGOs and the international community will be continually called upon to finance scientists. There is also the need for government to invest in research and development (in the universities and research institutions) to optimise existing techniques to meet the ever-changing market demands.

As the technology of tissue culture for mass production becomes popular, it becomes more urgent to characterise and conserve existing germplasm. There is the likelihood that neglected varieties, which are not utilised, will be

eroded from the system. However, these are the materials that are needed for crop improvement and breeding programmes. It is hoped that funds will be available to utilise the various germplasm conservation techniques for the preservation of endangered germplasm. All these are necessary for the protection of consumer preference and to meet changing market demands.

As we appreciate the potentials of the tissue culture tool and deal with the arising challenges (which would keep changing), one would wonder who is on board: this involves virtually everyone; the tissue culture specialist, molecular biologist, virologist, breeder, agronomist, technical staff, farmers, policy makers, investors, donors, international collaborators, input suppliers, publishers. Thus, all are involved.

We shall see what other challenges arise in the near future. It is expected that all involved will be ready to face the challenges and keep the tissue culture technology providing its optimum for the whole society.

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### Four Presidents in West Africa approve the use of biotechnology for food

(This information is published in CropBiotech Update a weekly summary of world developments in agri-biotech for developing countries, issue of July 2<sup>nd</sup>, 2004 produced by the Global Knowledge Center on Crop Biotechnology)

Four West Africa Presidents, Amadou Toumani Touré of Mali, Mamadou Tandja of Niger, John Kufuor of Ghana, and Blaise Compaore of Burkina Faso, have given their approval to the use of biotechnology to improve food security in the continent.

Speaking at the "Ministerial Conference on Harnessing Science and Technology to Increase Agricultural Productivity in Africa" held in Ougadougou, Burkina Faso, the four Presidents called on the participants to come up with clear recommendations on how West Africa can quickly gain from the technology.

President Blaise Campaore of Burkina Faso said "The continent should increase food production 12 fold in order to satisfy needs of its population. To meet this

challenge, Africa must acquire and adapt biotechnology to the agricultural sectors."

The three-day conference, which attracted over 400 participants, focused on four main themes of critical importance to West Africa, and the entire continent. They included biotechnology and biosafety; regulatory policies and frameworks that will support efforts to increase agricultural productivity; technology transfer and marketing of African crops; and water management and conservation./ Kenya Biotechnology Information Center.

In related developments, USDA reported that the West African ministers adopted a resolution calling for greater research and investment in agricultural biotechnology and recommended the creation of a West African center for biotechnology. They also agreed to meet again in Bamako, Mali to discuss the development of a regional action plan to strengthen research, testing, technology transfer and scientific training.

*The USDA release is available online at <http://www.usda.gov/Newsroom/0271.04.html>. Presentations and other materials from the conference are being posted on the Web at <http://www.fas.usda.gov/icd/stconf/event6.html>.*

## First Testing of Genetically Modified Crop in West Africa

(This information was published in *PLANT BREEDING NEWS EDITION 140* of 4 August 2003. An Electronic Newsletter of Applied Plant Breeding Sponsored by FAO and Cornell University Clair H. Hershey, Editor)

### Burkina Faso to Test Genetically Modified Cotton

The US Company Monsanto has started field trials of GM crops in Burkina Faso the first time that such trials have been conducted in West Africa.

The tests involve Bollgard II, Monsantos second generation of insect-resistant (Bt) cotton. Monsanto says that the new variety will reduce farmers' use of pesticides.

At present, when planting non-GM cottonseeds, farmers need to spray pesticides eight to ten times per season, but they still lose half of their crops. "If we are able to increase the yield per hectare by only 50 per cent, that would be a way to reduce poverty," says Celestin Tiendrebeogo, manager of Burkina Faso's state cotton firm, Sofitex.

The trials are part of a research agreement signed between Monsanto and the government of Burkina Faso.

### What are "genetically modified crops"?

Genetically modified (GM) crops are those that have been genetically enhanced using modern biotechnology to carry one or more beneficial new traits. Modern biotechnology as defined by the Cartagena Protocol on Biosafety means the application of:

- In vitro nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and direct injection of nucleic acid into cells or organelles, or
- Fusion of cells beyond the taxonomic family, that overcome natural physiological reproductive or recombination barriers and that are not techniques used in traditional breeding and selection.

The first GM crop developed through the use of transgenic methods and approved for cultivation was the 'Flavr Savr' tomato in 1994 in the US. Since then the development of transgenic crops has been rapid, from less than 5 million ha cultivated globally in 1996 to around 59 million ha in 2002 (See the annual publication by Clive James for the global status of commercialized transgenic crops for the latest figures).

The main commercially released crops so far have traits of agronomic interest, the so-called 'input' traits, such as herbicide and insect resistance. In the short to medium term, transgenesis will be used to transfer the so-called 'output' traits in crops such as:

- nutritional content e.g., higher vitamin content in soybean, oilseed rape and rice; and higher iron content in rice
- nutritional profile e.g., improved amino acid composition of maize, improved fatty acid composition of maize, soybean and oilseed rape
- improved processing e.g., through modified starch in maize and potato, higher solid content in potato and improved fiber quality of cotton
- reduction of postharvest losses e.g., through delayed ripening in papaya and improved storage capacity of potato.

The benefits and risks of GM crops are assessed by comparing the new crop and/or associated technologies (pest management or food processing) to its 'conventional' counterpart. Input traits in general lower the use of pesticides and as a consequence, benefit the environment and improve farmer revenues. More specifically, insect resistant varieties limit post-harvest losses (insect damage cause up to 50% loss of the harvested product in developing countries) and production of mycotoxins (the source of serious health problems), and herbicide tolerant varieties reduce soil erosion. Output traits will be of considerable benefit to consumers through access to healthier food.

The development of GM crops has benefited farmers, consumers and the environment. In a recent analysis of the total benefits to US society from Bt maize, when 6.5 million ha of a total of 32 million ha was planted by Bt maize, Wu (2003) showed that the major beneficiaries are consumers (63% of the total gains equaling USD 848 million). Maize growers are the second largest beneficiaries (22%) followed by the seed industry (15%). Non-Bt maize farmers made a net loss of USD 416 million.

Today, data shows that GM crops and foods are as safe as their conventional counterparts: millions of hectares worldwide have been cultivated with GM crops and billions of people have eaten GM foods without any documented harmful effect on human health or the environment.

Nevertheless, ISF is aware that as with any new product GM crops may be associated with some risks. These risks must be evaluated on a case-by-case basis. For instance the use of herbicide tolerance genes could result in the evolution of 'super weeds' resistant to herbicides\*, or the introduction of allergens in the

novel food through the transfer of genes from a species known to be allergenic. Some aspects are not specific to GM crops such as insects developing resistances to Bt genes. All these risks are taken seriously into consideration during the pre-release risk analysis and, where needed, specific risk management procedures may be established to prevent hazardous products being put on the market.

\* The situation, if it were to occur, is not as dire as it seems. It is not dissimilar to the circumstances prevailing before the development of the herbicide tolerant variety.

**Reference:** Wu, F. 2003. Explaining consumer resistance to genetically modified corn: An analysis of the distribution of benefits and risks. *Risk Analysis*.

## International Meetings and Seed Events

### Meetings/seminars/congresses

105<sup>th</sup> Annual Conference of the Indiana Crop Improvement Association to be held from 3<sup>rd</sup> to 4<sup>th</sup> February 2005 in Keystone at the Crossing, Indianapolis, United States

5<sup>th</sup> Annual Native Seed Quality Conference to be held from 23<sup>rd</sup> to 24<sup>th</sup> February 2005 at the downtown Doubletree in Omaha, United States

Meeting of the Breeders Committee of the International Seed Federation to be held on 10 March 2005 in Bonn in Germany

Annual Congress of the African Seed Trade Association (AFSTA) to be held from 15 to 18 March 2005 in Yaoundé, Cameroon.

Annual Soybean Seed Quality Conference to be held on 23<sup>rd</sup> March 2005 in Marina Inn, S. Sioux City, US.

Seventh Session of the Food and Agriculture Organization Interim Commission on Phytosanitary Measures to be organized from 4<sup>th</sup> to 8<sup>th</sup> April 2004 in Rome, Italy.

Fifth Seed Health Symposium of the Seed Health Committee (SHC) of the International Seed Testing Association (ISTA) to be held from 10<sup>th</sup> to 13<sup>th</sup> May 2005 in Angers, France.

Seed Analyst Training Workshop to be organized from 16<sup>th</sup> to 20<sup>th</sup> May 2005 by Mid-West Seed services, Brookings, United States

Annual congress of the International Seed Federation to be held from 30<sup>th</sup> May to 1<sup>st</sup> June 2005 in Santiago, Chile.

Seed Sampling Workshop to be organized by Mid-West Seed services, Brookings, from 1<sup>st</sup> to 2<sup>nd</sup> June 2005.



122<sup>nd</sup> Annual Convention of the American Seed Trade Association (ASTA) to be held from 16<sup>th</sup> to 25<sup>th</sup> June 2005 in Seattle, United States.

04–09 May 2005. 11th International Lupin Conference, Guadalajara, Jalisco, Mexico. 1st Circular is available at: <<http://www.cuba.udg.mx/eventos/lupinus/lupinus.html>> <<http://www.cuba.udg.mx/eventos/lupinus/lupinus.html>>. Contact: mailto:pgarcia@cuba.udg.mx> pgarcia@cuba.udg.mx. Submitted by George D. Hill, Secretary/Treasurer International Lupin Association (hill@inia.es)

13–17 June 2005, Murcia (Spain): XIII International Symposium on Apricot Breeding and Culture. Info: Dr. Felix Romojaro and Dr. Federico Dicenta, CEBAS-CSIC, PO Box 164, 30100 Espinardo (Murcia), Spain. Phone: (34)968396328 or (34)968396309, Fax: (34)968396213, email: <mailto:apricot@cebas.csic.es> apricot@cebas.csic.es Symposium Secretariat: Viajes CajaMurcia, Gran Via Escultor Salzillo 5, Entlo. Dcha., 30004 Murcia, Spain. Phone: (34)968225476, Fax: (34)968223101, email: <mailto:congresos@viajescajamurcia.com> congresos@viajescajamurcia.com

### Training Course

A training course will be held from June 20 to July 1, 2005 on Plant Variety Protection by the cluster Plant Variety Research of the Centre for Genetic Resources, the Netherlands, in close co-operation with the International Agricultural Centre (IAC Wageningen) and in collaboration with UPOV, the European Community Plant Variety Office, the Dutch Board for Plant Breeder's Rights, and various industry organizations. There will be presentations, discussions and practical training, and visits to key organizations in the operation of a plant variety protection system.