Bulletin of Tropical Legumes

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A MONTHLY BULLETIN OF THE TROPICAL LEGUMES II PROJECT

About the Bulletin

The Bulletin of Tropical Legumes is a monthly publication of the Tropical Legumes II (TL II) project, funded by the Bill & Melinda Gates Foundation, and jointly implemented by the International Crops Research Institute in the Semi-Arid Tropics (ICRISAT), the International Center for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA) in close collaboration with partners in the National Agricultural Research Systems of target countries in Sub-Saharan Africa and South Asia. TL II aims to improve the livelihoods of smallholder farmers in drought-prone areas of the two regions through enhanced grain legumes productivity and production.

Cowpea farming in Mali

Cowpea is one of the major legumes grown in Mali. It is the most consumed and most cultivated food legume in Mali after groundnut. The demand of cowpea in Mali is estimated at 23,000 MT / year. Mali produces 75,000 MT annually on about 261,000 ha (Figure 1). The ROG for the period from 1985-87 to 2005-07in area, yield and production was estimated at 3.2%, 3.3%, and 8.8%, respectively. It has been projected that production of cowpea would grow at the rate of 5.9% between 2010 and 2020. Producer prices for Mali were relatively stable throughout the period between 1991 to 2008 (Abate et al., 2012).

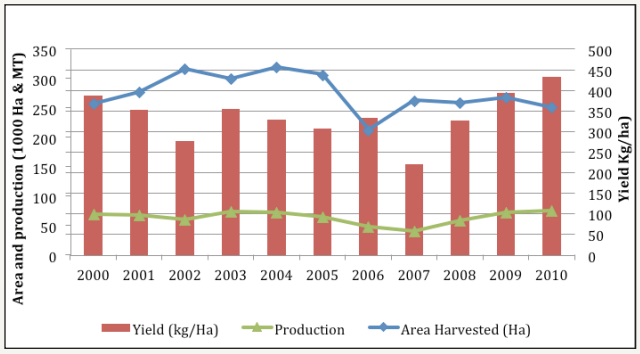

Figure 1: Cowpea Area, Production and Yield in Mali 2000-2010 (FAOSTAT, 2012)

Cowpea is an important source of protein in the diet and cash income. Crop residues of this crop are important sources of animal feed, especially for ruminants. Cowpea cropping systems are moving toward mono-cropping as its economic importance is increasing. It plays an important role in food security of rural and urban populations. Cowpea is consumed throughout the year. The Consumption per capita per year is about 1.6 Kg. The proportion of production sold is 50%. Cowpea breeding is conducted mainly by the Institute of Rural Development (Institut d'Economie Rurale (IER)), which was created in 1960. IER's cowpea program has the responsibility to conduct research activities including breeding, agronomy, and crop protection. The main objective of the cowpea breeding program is to develop high yielding varieties with drought tolerance and Striga resistance. Several varieties were released (Table 1) by the cowpea breeding unit, which has a harmonious collaborative relationship with IITA's cowpea breeding unit

The opportunities for cowpea production include; New law that enhances innovative seed system, high demand for cowpea as part of the daily staple, good market access for cowpea, availability of suitable varieties at major cowpea growing areas, and favourable ecology (dry lands) for cowpea production.

The constraints include: low yield because of biotic and abiotic stresses, lack of insecticides to protect the cowpea crop, limited seed production and marketing opportunities, low capacity of national seed certification laboratory, Insect pests from field to the store and poor seed distribution systems (lack of seed dealers in communities)

Cowpea production in Mali is concentrated in the Sudan Savanna and Sahel Savanna agro-zones. Data from 2006 to 2008 were used to map area under cowpea and cowpea productivity in these areas as shown in Figure 2 and Figure 3 respectively. There are regions with more than 75,000 ha and there are some with average productivity level up to 1.0 t/ha.

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Table 1: Characteristic features of common varieties developed by the Malian research system

Official name of release	Year of release	Source of the materials	Genetic back-ground (parent-age, pedigree, ancestry)	Area of potential coverage (ha.)	Area of actual adoption estimate (ha.)	Spillover national boundaries	Average yield poten tial kg/ ha (on-farm)	Varietal traits (selected characteristics)
Korobalen	1998	IITA	IT89KD-374	29,444	43,264	Yes	1-1.5 t	Medium maturing/ Resistant to Striga
Suvita2	1994	INERA	Local from Burkina	21,031	21,632	Yes	1.5 t	Medium maturing/ Resistant to Striga
Cinzana Telimani	2003	IER	Suvita2/Tvu 79/ Suvita 2	21,031	21,632	Yes	1.5 t	Early maturing/ Resistant to Striga
Djèmani	1993	IER	IAR 1696/NIBAN	29,444	28,843	Yes	1.5 t	Late maturing/ susceptible to Striga Resistant to yellow mosaic virus
Dounanfana	1993	IER	IAR 1696/NIBAN	29,444	28,843	Yes	2 t	Late maturing/ susceptible to Striga Resistant to yellow mosaic virus
IT90K-372-1-2	2002	IITA	IT90K-372-1-2	29,444	14,421	Yes	1-1.5 t	Medium maturing/ Resistant to Striga
Jiguiya	2011	IITA	IT97K-499-35	33,650	28,843	Yes	1.5 t	Early maturing/ Resistant to Striga
Sangaraka	1998	IITA	IT89KD-245	29,444	36,053	Yes	2 t	Medium maturing/ Resistant to Striga
Yèrè Wolo	1993	IER	IAR 1696/NIBAN	29,444	28,843	Yes	2 t	Late maturing/ susceptible to Striga Resistant to yellow mosaic virus

Figure 2: Cowpea production regions in Mali

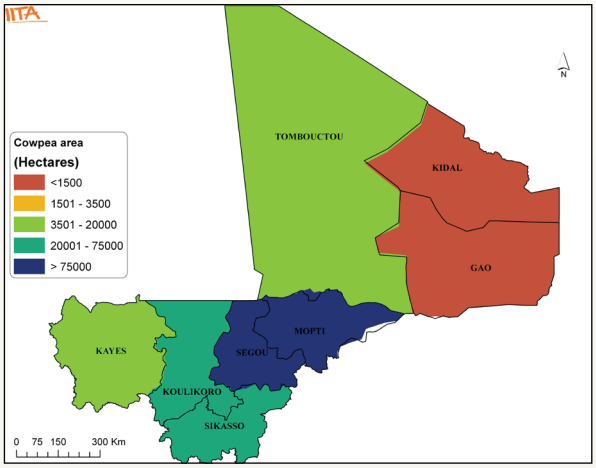
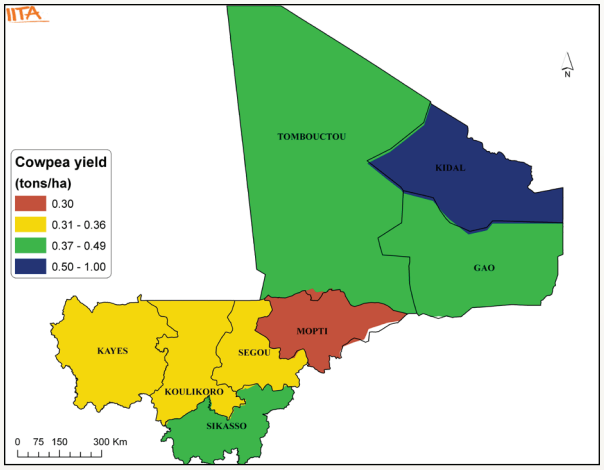


Figure 3: Cowpea yield in Mali



Seed systems for a legume green revolution in Mali (uniqueness of legumes in seed systems and Cowpeas in particular)

Over the years, scientists at IER have developed a number cowpea varieties that are resistant to Striga and tolerant to drought. These varieties require a minimum number of sprays with insecticides to protect them against insect attack. These varieties are however, not widely adopted because of lack of high quality seeds. At planting, there is a shortage of quality seeds and farmers plant whatever grain they get, which leads to poor stands and low yields. Private seed companies that produce and market cowpea seed are not many. Only one seed company (FASO Kaba) is producing and marketing improved cowpea seed in Mali as shown in Table 2.

Farmers mostly rely on NGOs to source and distribute improved cowpea seeds in the main producing areas. However, recently other companies are getting involved in seed production. These include: Comptoir 2000, Nako Shi and Coop Semence. With the increased adoption of improved (and market preferred) varieties, seed system need to be established to increase the production of cowpea in Mali. Seed supply arrangements should emphasize schemes with low transaction investment costs targeting village seed system to maintain and distribute seed. The certified seed production plan over three years is shown in Table 3. The quantity of seed will be produced mainly by FASO KABA Co, other small scale seed companies and community seed producers supported by the NGOs. IER will work with NGOS to produce foundation seed. The NGOS will support seed dissemination and marketing activities.

Table 2: Seed Production (tons) in Mali

Seed Production								
			Breeder seed in 2012		Foundation seed in 2013		Certified seed for use in 2014	
Regional demand	Variety demand	Yield (kg/ha)	Area m²	Production (kg)	Area (ha)	Production (t)	Area (ha)	Production (t)
Mopti 83150	Korobalen	1000	1299.22	129.92	5.20	5.20	207.88	207.88
	Suvita2	1000	1299.22	129.92	5.20	5.20	207.88	207.88
Ségou 67288	Korobalen	1000	700.92	70.09	2.80	2.80	112.15	112.15
	Sangaraka	1000	700.92	70.09	2.80	2.80	112.15	112.15
	Cinzana Telimani	1000	700.92	70.09	2.80	2.80	112.15	112.15
Koulikoro 67233	Djèmani	1000	525.27	52.53	2.10	2.10	84.04	84.04
	Dounanfana	1000	525.27	52.53	2.10	2.10	84.04	84.04
	Yèrè Wolo	1000	525.27	52.53	2.10	2.10	84.04	84.04
	Korobalen	1000	525.27	52.53	2.10	2.10	84.04	84.04
Sikasso 20790	Djèmani	1000	162.42	16.24	0.65	0.65	25.99	25.99
	Dounanfana	1000	162.42	16.24	0.65	0.65	25.99	25.99
	Yèrè Wolo	1000	162.42	16.24	0.65	0.65	25.99	25.99
	Korobalen	1000	162.42	16.24	0.65	0.65	25.99	25.99
Kayes 12248	Korobalen	1000	191.38	19.14	0.77	0.77	30.62	30.62
	Cinzana Telimani	1000	191.38	19.14	0.77	0.77	30.62	30.62
Tombouctou 1583	Korobalen	1000	49.50	4.95	0.20	0.20	7.92	7.92
Gao 82	Korobalen	1000	0.85	0.09	0.00	0.00	0.14	0.14
	Jiguiya	1000	0.85	0.09	0.00	0.00	0.14	0.14
	IT90K-372-1-2	1000	0.85	0.09	0.00	0.00	0.14	0.14
			7886.8	**788.68**	**31.55**	**31.55**	**1261.9**	**1261.9**

Table 3: Certified seed production plan over the three years (in tons)

Variety	2012	2013	2014
Korobalen	200	340	468.73
Suvita2	70	140	207.88
Sangaraka	30	70	112.15
Cinzana Telimani	45	80	142.77
Djèmani	0 3	70	110.03
Dounanfana	30	70	110.03
Yèrè Wolo	30	70	110.03
Jiguiya	0.08	0,10	0.14
IT90K-372-1-2	0.08	0.10	0.14
	435.16	840.2	1261.9

Groundnut farming in Mali

In Mali, the national production was estimated at 271, 057 tons in 2004-2008 average. The area cultivated for groundnut production was 294967 ha in 2004-08 average and yield was 0.919 ton/ha. The approximate annual growth rate in production since 1984 has been 4.46%, the national demand for ground nut is 286,390 tons while the expected growth in demand is estimated at 3%. The major production areas in Mali are shown in table 4. The country targets yield of 1000kg/ha by 2014.

The major constraints to groundnut production in Mali include lack of access to new groundnut varieties, lack of availability of seed of new varieties, poor access to agricultural equipment to expand hecterage, difficulties in accessing fertilizers, variable rainfall conditions, labor constraints for weeding and harvesting, poorly developed market and volatile prices, poor access to credit, poor road infrastructure to transport produce to markets, poorly developed processing industry and also lack of coordination of actors along the groundnut value chain.

Table 4: Agro ecologies (for each major production system within the country)

Region/ecology/district	Total production (tons)	Yield (tons/ha)	% area	% production	Proportion sold (%)	Dominant varieties
Kayes/Sudan Sahel/Kita	130,096	1249	33	35	72	47-10, 28-206
Segou/Sudan –Sahel/San	99,858	534	21	18	71	47-10, JL 24
Koulikoro/Sudan Savannah/Kolokani	81,320	760	21	24	59	Fleur 11, 47-10
Sikasso/Guinea Savannah/Bougouni	129,988	661	22	21	72	47-10, 28-206

Farmers are not well equipped with agricultural implements. About 16% of households own a cultivator, 45% own a seeder, 46% own a sprayer, and 2% own a tractor. Most (about 80%) own hand tools and less than 20% own a complete set of animal traction equipment (i.e. a pair of bullocks, a plough and multipurpose equipment and a seeder) for production. Harvesting is done manually and processing is done with rudimentary tools not amenable to large scale processing at the local level. The low level of equipment has significant implications on the potential for expanding groundnut cultivation in the country. In this case the returns to investment in small mechanization in the form of simple animal traction may be high. Access to production and processing equipment is essential to increase productivity and profitability.

In the capacity building component, scientists have been trained as breeders, seed technologists and crop protection specialist who will help reinforce the current staff in Mali. Efforts have been explored in building adequate infrastructure for routine phenotyping such as screen houses, meteorological station and irrigation facilities.

In the environmental sustainability issues, the drought prone environments are fragile environments. They must be carefully managed to generate benefits for the local population without overexploiting the resources and undermining the future sustainability. Groundnut tends to be grown in intercrops or as a component of crop rotation. This is because the small scale farmers recognize the value of these legumes in improving soil fertility. Crop rotation can reduce the incidence of pest and diseases in the cereals that commonly follow groundnut. In either case the farmers obtain a net gain in the sustainability of their cropping system. Most groundnut farmers do not use pesticides and little or no chemical fertilizers, because these chemical are prohibitively expensive. Yet without alternative measures to maintain soil fertility and control of plant pest, even the low yields currently obtained are under threat. As land pressure builds and fallow periods decline, the sustainability of the production system is threatened. Increase in groundnut productivity offers an important contribution toward resolving this threat.

A range of improved varieties and exploitation of environmentally friendly and sustained technologies (resistant varieties) will contribute to the preservation of biodiversity. Availability of resistant varieties with high productivity will eliminate the need for pesticides, thus contribution to a safe and healthy environment. Higher groundnut yields and creation of commercialization opportunities will lead to environmental benefits in other ways as well. Growth in income and employment (e.g. labor for farming, crop processing and trade) will reduce the pressure on marginal lands using sustainable agricultural practices. Poverty is major contributor of environmental degradation, and by contributing to poverty alleviation, cultivation of groundnut will ease the pressure on natural resources in the fragile, drought prone areas.

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New highlights

TL-II holds a Project Management Team Meeting – Nairobi Kenya

The Tropical legume II (TL-II) Project Management Team (PMT) meeting was held on the 24th and 25th January 2013 at the **Laico Regency Hotel**, in Nairobi, Kenya. The main aim of the PMT was to take stock of the project standing with respect to meeting the TL-II goal of enhancing production and productivity of six grain legumes (chickpea, common bean, cowpea, groundnut, pigeonpea and soybean) in the drought-prone areas of Sub-Saharan Africa and South Asia. The project is pursuing this through increasing availability and adoption of improved crop varieties and associated crop management practices.

The specific objectives of the PMT were to review TL-II progress by objective and propose alignment to the CGIAR Research Program (CRP) on grain legumes; review the complementarities with TL-I and propose the best way to maximize synergies to deliver the grain legume CRP outcomes. The PMT also reviewed progress of the TL-II Data Management Platform being implemented by aWhere consultancy; refined and finalized the Legume Country x Crop Strategies and Seed Road Maps.

The meeting was a great success. Each objective presented an update of their respective progress report. The country strategies were finalized and a project report on Legumes country strategies and seed road maps for all 15 countries will be developed. TL-II scientists agreed to develop and implement common Reporting and Review meetings with TL-1 in-order to more directly incorporate the products of TL-1 research into TL-II workplans. The first such meeting is planned for 20 – 24th May, 2013 in Kampala Uganda. Agreements were also reached on reporting frequencies, formats and templates for data collection. Finally the team agreed to complete a Monitoring, Learning and Evaluation Plan to be shared among team members and the foundation.

The PMT comprised 37 participants which included the Program officer from the BMGF, ICRISAT Deputy Director General – Research, ICRISAT Grain Legume Program Director, TL-II Project coordinator, Project objective leaders and Regional Objective Research Leaders.

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