Production and Productivity Trends of ICRISAT Mandate Crops

ICRISAT
Science with a human face
International Crops Research Institute for the Semi-Arid Tropics

Contents

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Sorghum [*Sorghum bicolor* (L.) Moench]

Sorghum is a self-pollinated diploid (2n=2x=20) C_4 grass with a high photosynthetic efficiency. Its small genome size (730 Mbp, about 25% the size of maize or sugarcane) is fully sequenced and makes sorghum an attractive model for functional genomics of C_4 grasses. Sorghum is one among the few resilient crops that can adapt well to future climate change conditions, particularly the increasing drought, soil salinity and high temperatures.

Sorghum is the fifth most important cereal crop and is the dietary staple of more than 500 million people in 30 countries. It is grown on 40 million ha in 105 countries of Africa, Asia, Oceania and the Americas. The USA, India, México, Nigeria, Sudan and Ethiopia are the major producers. Other sorghum producing countries include Australia, Brazil, Argentina, China, Burkina Faso, Mali, Egypt, Niger, Tanzania, Chad and Cameroon. Grain is

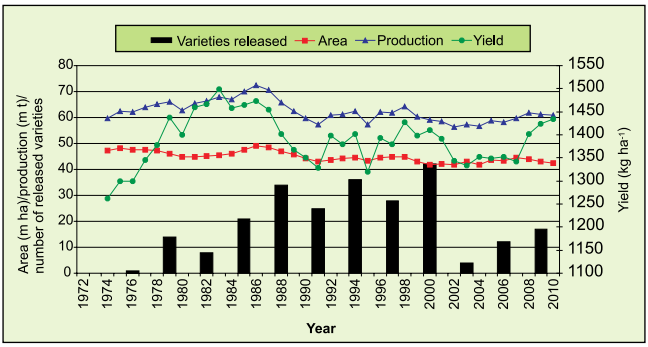

Figure 1. Three-year moving average for sorghum area, production, yield; and number of released varieties (3-year total) based on ICRISAT-bred material globally.

mostly used as food (55%), in the form of flat breads and porridges (thick or thin) in Asia and Africa, and as feed (33%) in the Americas. Its stover is an increasingly important source of dry season fodder for livestock, especially in Asia.

Global sorghum area trends indicate that area increased from 45 million ha in the 1970s to 51 million ha in the 1980s. Later, there was fluctuation in area by 4 to 10 million ha and it declined to 40 million ha by 2009. Grain yields have increased from 1200 kg/ha in the 1970s to 1400 kg/ha in 2009 (Figure 1).

Asia

The sorghum area in Asia declined continuously from 23 million ha in the early 1970s to 9 million ha in 2009 (Figure 2). Production declined from 19 million tons in

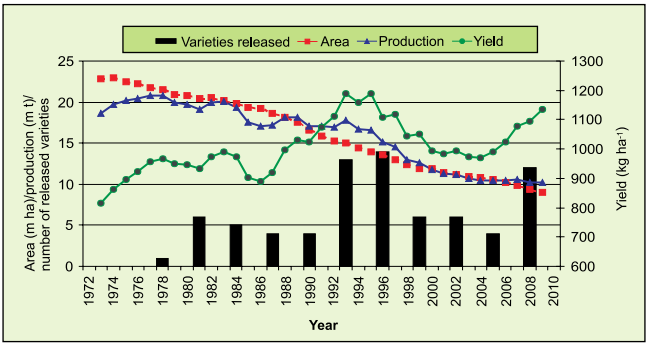

Figure 2. Three-year moving average for sorghum area, production, yield; and number of released varieties (3-year total) based on ICRISAT-bred material in Asia.

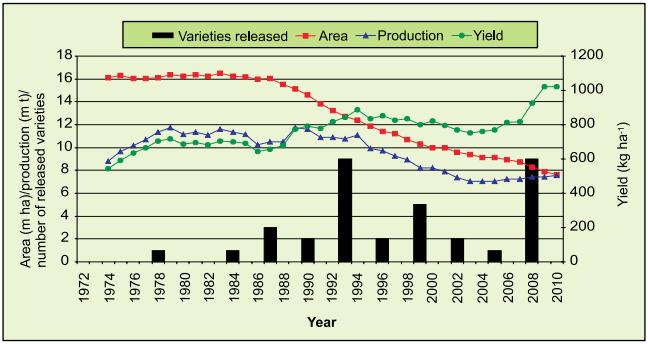

Figure 3. Three-year moving average for sorghum area, production, yield; and number of released varieties (3-year total) based on ICRISAT-bred material in India.

the early 1970s to 10 million tons in 2009. However, grain yield increased from 800 kg/ha to 1130 kg/ha during the same period.

India

The sorghum area in India was more than 16 million ha in 1981, but has gradually decreased to 7.8 million ha in 2007-08 (still 20% of the world's sorghum area). Of this, 3.5 million ha was grown in the rainy (*kharif*) season and 4.3 million ha in the postrainy (*rabi*) season. Production increased from 9 million tons in the early 1970s to 12 million tons in the early 1980s and maintained this level for over a decade until the early 1990s, followed by a steep decline to 7.3 million tons (Figure 3). Despite the decrease in area over the years, production has been sustained at 7.3 million tons (2009) due mainly to adoption of improved varieties and hybrids. Sorghum

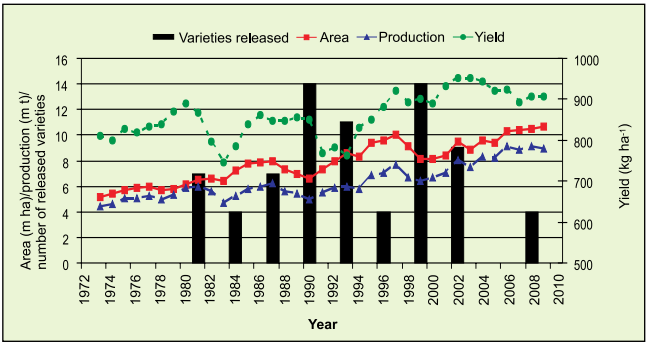

Figure 4. Three-year moving average for sorghum area, production, yield; and number of released varieties(3-year total) based on ICRISAT-bred material in ESA.

grain yields in India have averaged 1170 kg/ha in the rainy season and 880 kg/ha in the postrainy season in recent years.

Eastern and Southern Africa (ESA)

Area and production in ESA has increased significantly from the early 1970s to 2009, while there has been a marginal (18%) increase in productivity from 800 kg/ha to over 940 kg/ha during the same period (Figure 4).

West and Central Africa (WCA)

In West and Central Africa, the increase in sorghum area was more than two-fold from 1972 to 2008 (7.39 to 16.59 million ha), while production increased by almost four times during the same period (4.24 to 16.08 million tons). However, there was 22% reduction in area (12.92

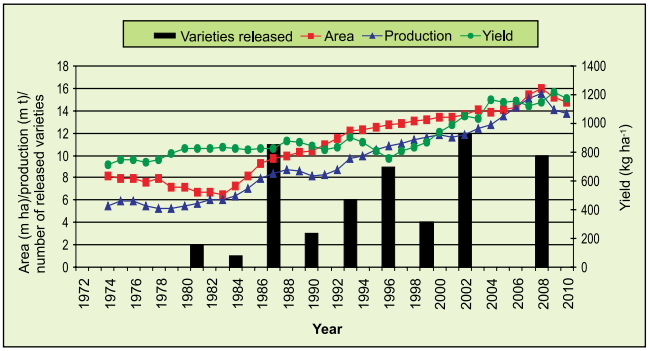

Figure 5. Three-year moving average for sorghum area, production, yield; and number of released varieties (3-year total) based on ICRISAT-bred material in WCA.

million ha) and 28% reduction in production (11.52 million tons/ha) in 2009. Grain yield increased by 17% over 2008 levels (Figure 5). Overall in WCA, an 80% improvement in productivity was seen from the early 1970s (700 kg/ha) to 2009 (1260 kg/ha).

Latin America (LA)

Sorghum area in Latin America increased from 4 million ha in the early 1970s to 5 million ha in the early 1980s followed by a decrease to the 4 million ha level of the early 1970s (Figure 6). Production increased by 67% from the early 1970s to the early 1980s (9 to 15 million tons), followed by a decrease to 9 million tons in the early 1990s. However, in 2009 production increased to 11 million tons. Productivity increased by 55%, from 2000 kg/ha in the early 1970s to 3100 kg/ha in 2009.

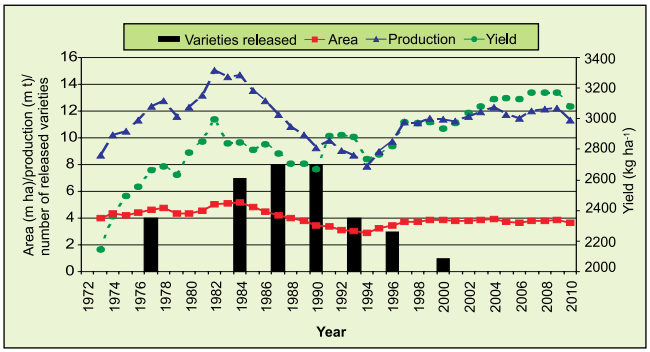

Figure 6. Three-year moving average for sorghum area, production, yield; and number of released varieties (3-year total) based on ICRISAT-bred material in Latin America.

Cultivars released

A total of 242 cultivars have been released using germplasm and ICRISAT-bred lines and hybrid parents, over the years in all regions (Asia, ESA, WCA and LA) (Figures 1-5). The number of cultivar releases was highest in Asia (75) including 35 in India, closely followed by ESA (74), WCA (58) and Latin America (35). While released cultivars include both hybrids and varieties in Asia, releases were mostly varieties in WCA and ESA (the exception being a hybrid released in Sudan).

Energy and nutrition

Sweet sorghum is a multipurpose crop that gives food, feed, fodder and fuel without significant trade-offs in grain production. ICRISAT is researching the use of sweet sorghum for ethanol production technology. Sorghum has the potential for high levels of iron (more than 70 ppm) and zinc (more than 50 ppm) in the grain, and hence sorghum biofortification (genetic enhancement) of grain iron (Fe) and zinc (Zn) contents is targeted to complement other methods to reduce micronutrient malnutrition globally.

Sorghum core and mini-core collections and references sets representing the diversity of the global collection have been developed by ICRISAT and partners for enhanced utilization of genetic resources in crop improvement programs globally.

Pearl Millet [*Pennisetum glaucum* (L.) R. Br.]

Pearl millet is a highly cross-pollinated (more than 85% outcrossing) diploid annual (2n=2x=14) with a large genome size (2450 Mbp). It is grown annually on more than 29 million ha in the arid and semi-arid tropical regions of Asia, Africa and Latin America.

India

India is the largest producer of pearl millet in Asia, both in terms of area (about 9 million ha) and production (8.3 million tons) with an average productivity of 930 kg/ha during the past three years (Figure 1). From the early 1980s, the pearl millet area in India declined by 22%, but production increased by 36%, due to a 75% increase in productivity (from 530 kg/ha during 1981-1983 to 930 kg/ha during 2008-2010).

Since 1986, the year when WC-C75, the first ICRISAT-bred open-pollinated variety (OPV), was released for cultivation, 67 cultivars based on ICRISAT-bred germplasm (14 OPVs and 53 hybrids) have been released and notified in India. Among the OPVs, five were developed by ICRISAT and nine by NARS. Of the hybrids, five were developed by ICRISAT, and 31 by NARS based on ICRISAT-bred male-sterile lines. Seventeen hybrids developed by the private sector were also based on ICRISAT-bred male-sterile lines, or on selections made within these lines. Many other

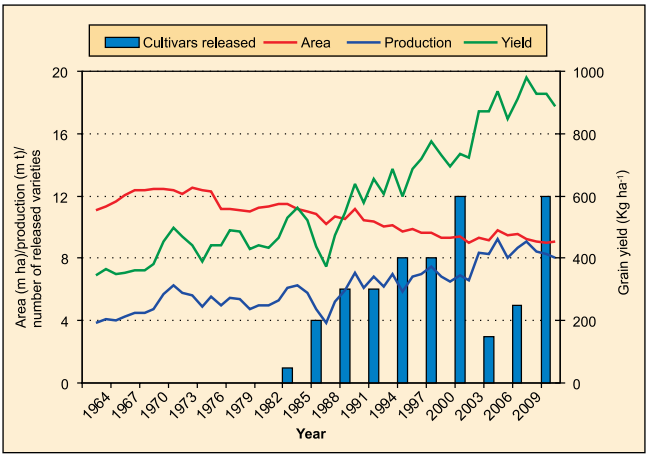

Figure 1. Three-year moving average for pearl millet area, production and grain yield; and number of varieties/hybrids released (3-year total) based on ICRISAT-bred material in India.

released and notified hybrids from the private sector, and several others marketed as truthfully labeled seeds, also involve some degree of ICRISAT-bred materials. The improved cultivars are grown on more than 4.5 million ha (of about 9 million ha), of which the OPVs cover only 0.6-0.8 million ha, with the remaining area cultivated with hybrids. This enormous hybrid cultivar diversity with improved productivity has not only contributed to increased productivity, but has also halted recurrence of downy mildew epidemics that were observed quite often during the 1970s and 80s.

Besides the main rainy season crop, there is now increasing interest in pearl millet cultivation as an irrigated summer season crop in parts of India (Gujarat, Rajasthan and Uttar Pradesh) where a few hybrids that

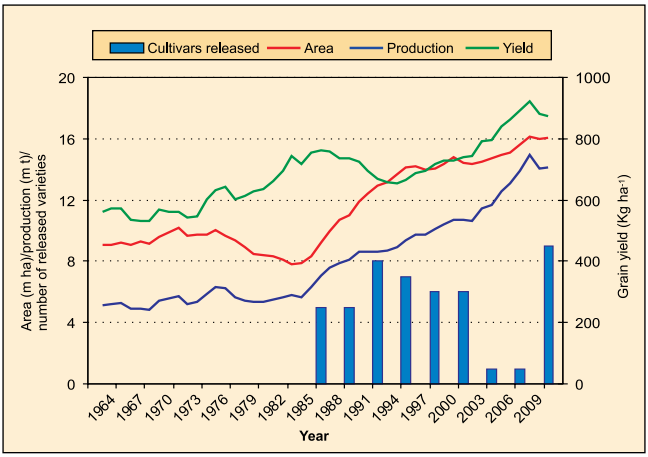

Figure 2. Three-year moving average for pearl millet area, production and grain yield; and number of varieties released (3-year total) based on ICRISAT-bred material in West and Central Africa (WCA).

tolerate temperatures of 42°C and above during flowering, have given very high grain yields (4000-5000 kg/ha) in farmers' fields. Germplasm and breeding lines with high temperature tolerance are now being identified to diversify the genetic base of parental lines to develop high-yielding hybrids adapted to such environments.

Western and Central Africa (WCA)

The West and Central African (WCA) region has the largest area under millets in Africa (16.8 million ha), of which more than 95% is pearl millet. Since 1982, the area of pearl millet in this region has doubled (from 7.8 to 16.0 million ha), and grain yield increased by 19% (from 740 to 880 kg/ha), contributing to the 143% increase in grain production (from 5.8 to 14.1 million tons) (Figure 2). Thus, most of the increase in pearl millet production in the region during this period has come from increases in cultivated area (4% per year), although there has been a small increase in productivity (0.7% per year). Across the six major pearl millet producing countries in WCA (Niger, Nigeria, Mali, Chad, Burkina Faso and Senegal), the productivity increases during this period have varied from 0.2% per year in Chad and Niger to 1.6% per year in Burkina Faso, except for Nigeria where yields actually decreased from 1570 kg/ha in 1982 to 960 kg/ha in 1992, and then increased sharply to 1610 kg/ha by 2008.

Pearl millet breeding in WCA has concentrated on the development of open-pollinated varieties (OPVs). Hybrids in WCA are likely to have at least 25-30% grain yield advantages over OPVs (similar to those reported in India), and hence a new initiative is underway to develop hybrids adapted to this region. The initial focus will be for more favorable areas with less risk of the need for re-sowing (after failure of seedling establishment) and where basal micro-dose applications of compost and/or phosphorus fertilizers are being adopted more widely.

Twenty-five OPVs, developed by ICRISAT in partnership with NARS from this region, have been released and adopted by farmers in nine countries in the WCA region. A total of 48 varieties were released in WCA, with some of these OPVs being released in more than one country. For example, the most popular varieties, SOSAT-C88 and GB 8735, have both been released in seven countries across this region, and ICMV-IS 89305 has been released in four countries. Limited seed production and distribution has been a major bottleneck and has slowed the spread of improved cultivars in the region.

Eastern and Southern Africa (ESA)

In Eastern and Southern Africa, pearl millet is cultivated on about 2 million ha. Twenty-eight OPVs developed by ICRISAT in partnership with NARS have been released in ten countries in the region. Of these, ICMV 88908, renamed as Okashana 1, has been released in more than one country. Okashana 1 and Okashana 2 have been

adopted on a large scale, covering more than 50% of the total pearl millet area in Namibia prior to 2008. Similar to the situation in WCA, lack of seed production and distribution continues to be the major bottleneck in varietal spread and productivity increase in the ESA region also. For instance, during 1970-2006, there was only 15% productivity increase (from 800 kg/ha to 920 kg/ha) in the region.

A pearl millet mini-core collection of 238 accessions and representing diversity of the global collection has been developed and is available for crop improvement programs globally. Inbred panels derived from representative samples of the global collection are under development.

Chickpea (*Cicer arietinum* L.)

Chickpea, a self-pollinating diploid (2n=2x=16) with a genome size of 740 Mbp, is the world's third most important food legume. It is currently grown on about 11.5 million ha, with 96% of the area in developing countries. Chickpea production has increased during the past 30 years from 6.5 million tons (1978-1980 average) to 9.6 million tons (2007-09) because of increase in grain yields from 630 to 850 kg/ha during this period.

South and Southeast Asia

This region contributes about 81% to the global chickpea production, with India as the principal chickpea producing country (84% share in the region). The chickpea area marginally increased from 9.1 million ha to 9.5 million ha during the period 1978-80 to 2007-09 (Figure 1). However, the production increased by 27% (from 5.6 to 7.7 million tons) during this period due to the increase in grain yields from 610 to 800 kg/ha. Severe drought in several parts of India during 2000-03 led to sudden decline in chickpea area during that period.

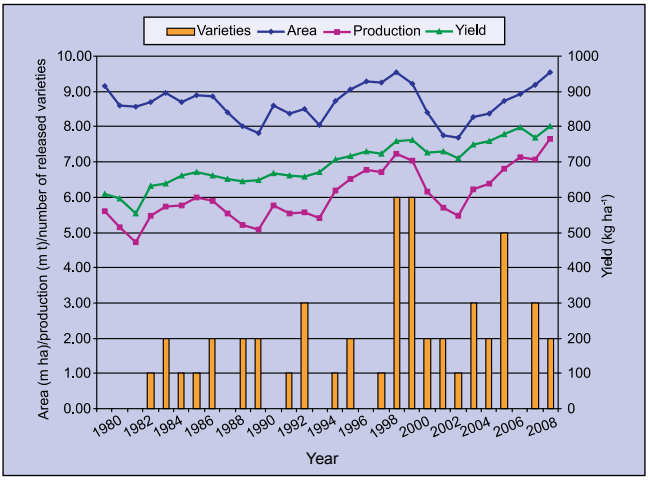

Figure 1. Three-year moving average for chickpea area, production and grain yield; and number of varieties released based on ICRISAT-bred material in South and South-East Asia.

Most significant has been the major shift in chickpea area from northern India (cooler, long-season environments) to southern India (warmer, short-season environments) during the past four decades (Figure 2). The short-duration cultivars developed through ICRISAT-NARS partnerships have played a key role in expanding area and productivity of chickpea in central and southern India.

An example is the phenomenal increase in area and productivity of chickpea in Andhra Pradesh state of

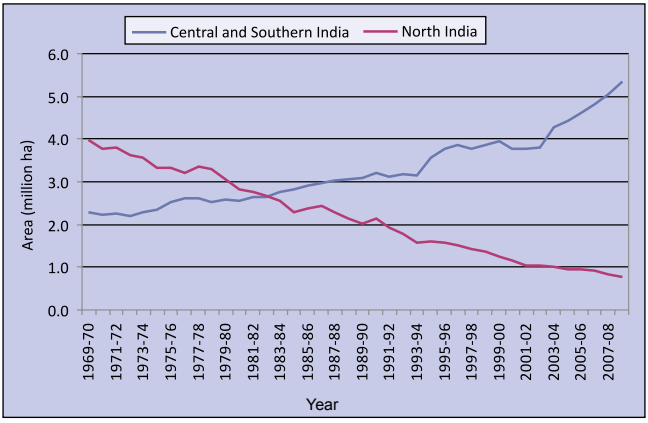

Figure 2. Regional shift in chickpea area from northern India to central and southern India (3-year moving average).

southern India, largely because of the adoption of fusarium wilt resistant, short-duration varieties. During the past 10 years (1999/00 to 2008/09), chickpea production has increased 9.3 fold (95,000 to 884,000 tons) due to the 3.8 fold increase in area (from 163,000 ha to 628,000 ha) and 2.4 fold increase in productivity (850 to 1410 kg/ha).

ICRISAT-bred chickpea cultivars covered over 80% of the chickpea area in Myanmar during 2008-09, with the adoption of improved cultivars leading to an increase in area and productivity. During the past decade (1999/00 to 2008/09), chickpea production in Myanmar has increased 4.7 fold (from 84,000 to 398,000 tons) due to an increase in area (from 129,000 to 282,000 ha) and yield (from 650 to 1415 kg/ha). Myanmar has emerged as an important exporter of chickpea in the region.

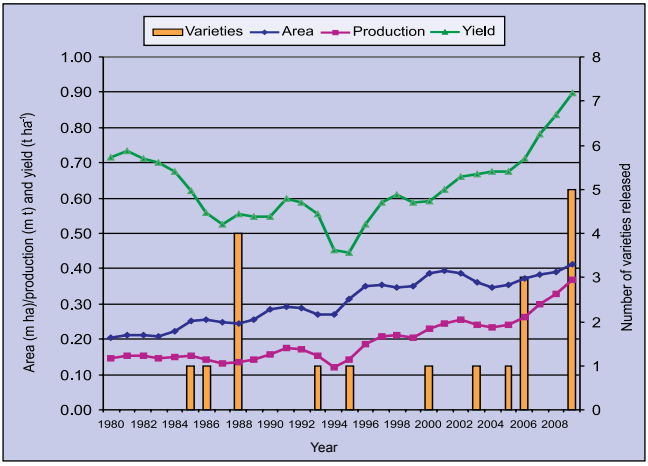

Figure 3. Three-year moving average for chickpea area, production and grain yield; and number of varieties released (3-year total) based on ICRISAT-bred material in eastern Africa.

Eastern Africa

New cultivars that combine early maturity and resistance to fusarium wilt have been rapidly adopted in Ethiopia, Tanzania, Sudan and Kenya. This led to an increase in area from 0.21 to 0.41 million ha, production from 0.15 to 0.37 million tons and productivity from 0.71 to 0.90 tons/ha during the period 1978-80 to 2007-09 (Figure 3).

Chickpea export from eastern Africa has substantially increased after 2001 and ranged between 11,000 to

122,000 tons per year. The introduction of new large-seeded kabuli cultivars in eastern Africa opened new opportunities for farmers to earn extra income through export of these high-valued chickpeas.

Cultivars released

Seventy-seven cultivars based on ICRISAT-bred germplasm have been released in different countries - India (34), Ethiopia (10), Bangladesh (6), Myanmar (6), Kenya (5), Tanzania (4), Sudan (4), Nepal (4), Australia (2) Pakistan (1) and USA (1).

Chickpea core and mini-core collections and a reference set representing diversity of the global collection have been developed and are available for crop improvement programs globally.

Pigeonpea [*Cajanus cajan* (L.) Millspaugh]

Pigeonpea is a cross-pollinated (20–70%) species with a diploid number of 2n=2x=22 and genome size of 858 Mbp. Since 1976, the area under pigeonpea has increased by 7%. Pigeonpea is currently being grown on 5.2 million ha in the rainfed areas of Asia, eastern and southern Africa, Latin American and Caribbean countries.

Asia

In Asia, pigeonpea is grown in an area of 4.33 million ha with a production of 3.8 million tons (Figure 1). India has the largest area (3.38 million ha) followed by Myanmar (580,000 ha), China (150,000 ha) and Nepal (21,360 ha). Maturity duration of pigeonpea varies from about 90 days for extra-early varieties to more than 260 days for late maturing varieties that fit well in various niches and cropping systems. Between 1976 and 2009, pigeonpea recorded a 57% increase in area (2.76 to 4.33 million ha) and 78% increase in production (2.14 to 3.8 million tons).

During 1995-2009, the pigeonpea area in Myanmar increased from 240,000 to 580,000 ha and production increased to 719,000 tons (in 2009). Five pigeonpea varieties, based on ICRISAT-bred material, have been released in Myanmar.

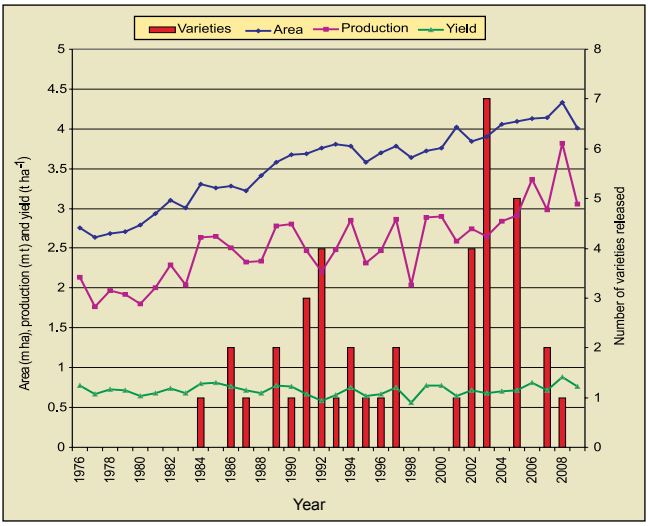

Figure 1. Three-year moving average for pigeonpea area, production and yield; and number of varieties released (3-year total) based on ICRISAT-bred material in Asia.

Pigeonpea in southern China is primarily grown for the purposes of soil conservation, food (vegetable), feed and fodder. Cultivar ICP 7035 has shown high adaptation in different provinces of China. Currently, pigeonpea is grown on 150,000 ha in Guangxi and Yunnan provinces.

Eastern and Southern Africa

In Eastern and Southern Africa, pigeonpea is grown on 0.82 million ha (Figure 2). It is an important crop in Mozambique, Malawi, Tanzania, Kenya and Uganda. Between 1976 and 2009, pigeonpea area increased 2.5

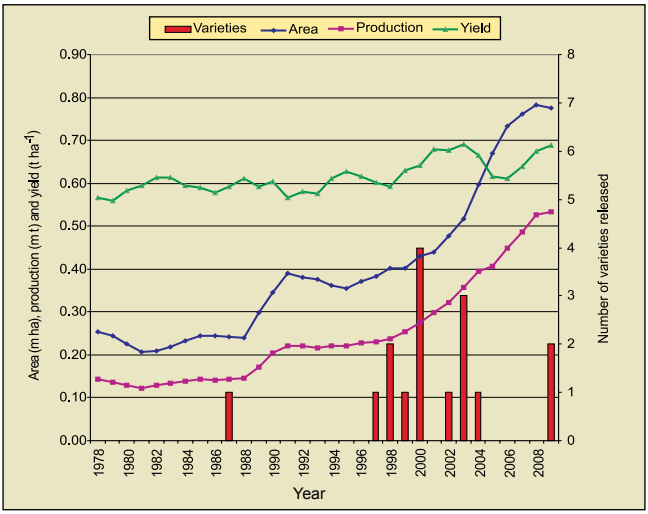

Figure 2. Three-year moving average for pigeonpea area, production and yield; and number of varieties released based on ICRISAT-bred material in eastern and southern Africa.

fold (0.23 to 0.82 million ha) and production by 3 fold (0.13 to 0.53 million tons). The crop is grown for home consumption and export.

In eastern Kenya, about 20 percent of the farmers have adopted new varieties. Farmers have also started adopting the medium duration pigeonpea varieties, ICEAPs 00554 and 00557, in addition to the long duration variety ICEAP 00040 for both dry grain as well as green vegetable. In Tanzania, over 50 percent of the farmers in Babati

District adopted new varieties, ICEAP 00040 and ICEAP 00053, and production area expanded to the neighboring districts of Karatu, Kondoa and Mbulu. Release of new medium duration varieties, ICEAPs 00557 and 01514/15, has opened avenues for area expansion in southern, central and northern regions of Malawi. The use of long duration, fusarium wilt resistant and consumer/market preferred variety ICEAP 00040 in northern and central Tanzania, Kenya and Malawi resulted in increased grain yields and lowered production costs in comparison to local genotypes.

Hybrid Pigeonpea Technology: To break the yield barrier in pigeonpea, ICRISAT and partners have developed a cytoplasmic male-sterility (CMS) based hybrid breeding technology in pigeonpea. CMS-based medium maturity hybrids, ICPH 2671 and ICPH 2740, produced 30-40%

greater grain yields than the popular varieties across farmers' fields in India. This technology is also being transferred to China, Myanmar and to the ESA region.

Cultivars released

Sixty-six cultivars based on germplasm and improved breeding lines developed by ICRISAT have been released in several countries of Asia (38), Africa (22), Australia (3) and USA (3). Short and medium duration cultivars have made a significant impimpact in Asian countries. However, long and medium duration varieties with fusarium wilt resistance and consumer preferred large, cream colored seeds have created impacts in eastern and southern Africa.

A pigeonpea mini-core collection of 146 accessions and representing diversity of the global collection has been developed and is available for crop improvement programs globally.

Groundnut (*Arachis hypogaea* L.)

Groundnut is a self pollinated, allotetraploid (2n=4x=40) with a genome size of 2891 Mbp.

Groundnut is grown on nearly 23.95 million ha worldwide with the total production of 36.45 million tons and an average yield of 1520 kg/ha in 2009 (FAOSTAT 2011). China, India, Nigeria, USA and Myanmar are the major groundnut growing countries. Developing countries in Asia, Africa and South America account for over 97% of world groundnut area and 95% of total production. Production is concentrated in Asia (50% of global area and 64% of global production) and Africa (46% of global area and 28% of global production), where the crop is grown mostly by smallholder farmers under rainfed conditions with limited inputs. Between 2000 and 2009, the annual global production increased marginally by 0.4%, the area by 0.3% and yield by 0.1% (Figure 1).

During the same period in Asia, groundnut area declined by 1.36 million ha, an annual decline of 1.1%. However, the annual decline in production was only 0.1% due mainly to a 0.9% annual increase in productivity (1970 kg/ha in 2009) (Figure 2).

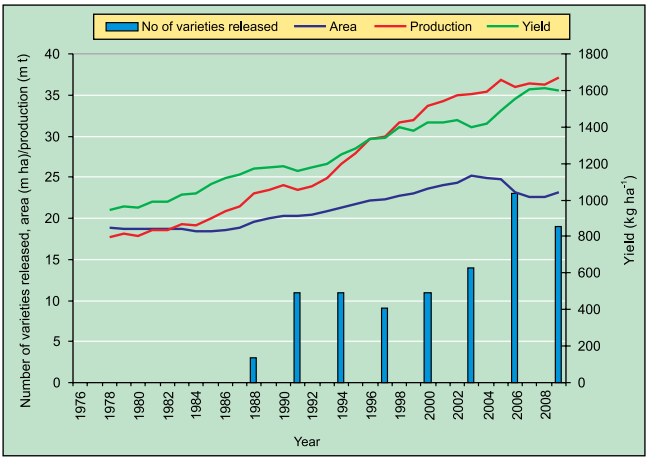

Figure 1. Three-year moving average for groundnut area, production and pod yield; and number of varieties released (3-year total) globally.

In Africa both groundnut area and production grew during the 2000-2009 period. The groundnut area grew by 2.17 million ha, an annual increase of 1.9%. The annual increase in production was 1.5%, crossing the 10 million ton level in the year 2009. However, grain yields declined by 0.4% annually and remained below 1000 kg/ha during the entire decade with the exception of 2006 (Figure 3).

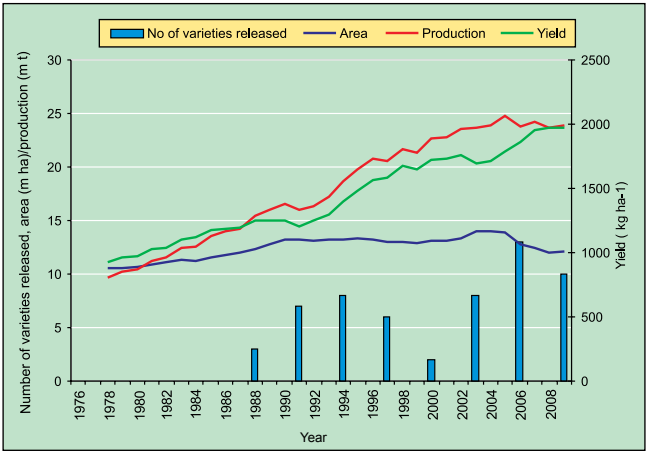

Figure 2. Three-year moving average for groundnut area, production and pod yield; and number of varieties released (3-year total) in Asia.

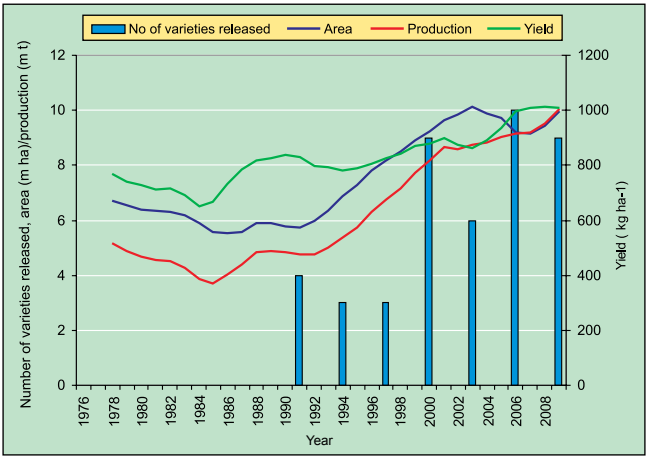

Figure 3. Three-year moving average for groundnut area, production and pod yield; and number of varieties released (3-year total) in Africa.

In Asia, the major gains in production came from China, India, Myanmar, Indonesia and Vietnam. In the 2000-2009 decade, the annual growth of groundnut area and yield in Myanmar was over 3.0% resulting in a 5.3% annual increase in production to reach 1.36 million tons in 2009. The groundnut area remained the same during 2000-2009 in India (6.5 million ha) and Vietnam (0.24 million ha), but both groundnut production and yield in Vietnam showed an annual growth of 3%, while in India, the increase in annual groundnut production and yield was negligible. In China, area declined by 1.1%, but pod yield increased by 1.1% annually, thus not affecting the total groundnut production in the country, which remained at 14.7 million tons in 2009.

In Africa, unlike in the 1980s, groundnut production showed a good recovery during 2000-2009. Yields increased from 600-800 kg/ha in the 1980s to 900-1050 kg/ha during 2000-2009 (Figure 3). In Nigeria and Ghana, groundnut yields were above 1000 kg/ha in 2009. Groundnut production in WCA averaged 7.3 million tons (78% of Africa) from 72% of groundnut area in Africa. Nigeria and Senegal are the largest producers in WCA accounting together for about 45% of total African production. Mali, Niger and Burkina Faso are also important groundnut producers. During 2000-2009, the groundnut area grew annually by 2.6% in Nigeria, but the yield declined by 3.3% annually resulting in

stagnation of groundnut production at 2.9 million tons. In the same period, in Senegal, there was no apparent change in groundnut area (1 million ha), production (1 million tons) and yield (around 960 kg/ha). An annual increase in yield of 3.3% in Ghana and 2.0% in Niger was recorded. In ESA, Tanzania (3.8% annual) and Malawi (2.4% annual) showed substantial increase in yields between 2000 and 2009. In Sudan, yields increased by 3.5% annually but the groundnut area declined by 5.5% annually.

Cultivars released

Since 1986, our NARS partners have released 138 improved cultivars using ICRISAT-developed breeding materials – 70 improved cultivars in 14 countries in Asia, including 23 in India, and 68 improved cultivars in 22 countries in Africa.

Impacts in Asia

A drought tolerant groundnut variety, ICGV 91114, introduced through farmer-participatory varietal selection has spread to 25,000 ha of the 0.8 million ha groundnut area in the Anantapur district of Andhra Pradesh, India. It has been released for cultivation in three states of India - Andhra Pradesh, Orissa and Karnataka. Another drought tolerant variety, ICGV 00350, is gaining popularity in the states of Karnataka and Andhra Pradesh.

Spring season cultivation of groundnut is expanding in North India. In Uttar Pradesh, India, spring season groundnut cultivation reached 261,950 ha in 2010.

In Vietnam, with the introduction of the new autumn-winter cropping season and improved varieties, yields increased from 1620 kg/ha in 2002 to 2110 kg/ha in 2009. Consequently, the groundnut production has increased from 0.40 to 0.52 million tons.

Improved bacterial wilt resistant farmer-preferred varieties, Zhonghua 6, Yuanza 9102 and Yueyou 200 (developed from ICRISAT's advanced breeding lines) are slowly replacing the local varieties in Hubei province in China. A high yielding variety, Huayn 23 (ICGV 87187) was recently released for cultivation.

Impacts in Africa

Farmer-participatory varietal selection trials speed variety release and benefits to farmers, especially women farmers. Farmer-preferred varietal selections carried out in Mali, Niger and Nigeria using a mother-baby trial approach during 2007-10 has resulted in the release of four varieties in Niger; and two are recommended for release in Mali.

To facilitate the availability of improved groundnut seeds, community based seed production and marketing is being promoted. Seed producers were linked to farm-input shops to market the seeds; they could also sell seed

through village markets. This has enhanced availability of improved variety seeds.

In Tanzania, for the first time, six new rosette resistant groundnut varieties were released during 2010. A survey conducted in Uganda three years ago confirmed that more than 50% of the groundnut area was occupied by improved varieties. The release of new red-seeded rosette resistant farmer/market preferred variety ICGV-SM 93535 in 2010 will stimulate increased adoption of improved cultivars in Uganda.

It is estimated that improved groundnut varieties currently occupy more than 60% of the total area under groundnuts in Malawi. We are currently conducting a countrywide survey in Malawi to confirm the extent of adoption.

Groundnut core and mini-core collections and a reference set representing diversity of the global collection have been developed and are available for crop improvement programs globally.

IMOD

Inclusive Market Oriented Development

Innovate ● Grow ● Prosper ●

About ICRISAT

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger, malnutrition and a degraded environment through better and more resilient agriculture.

ICRISAT is headquartered in Hyderabad, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. It belongs to the Consortium of Centers supported by the Consultative Group on International Agricultural Research (CGIAR).

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