groundnut (peanut)

Arachis hypogaea (L.)

Leguminosae family

Self-pollinating, 4X, 2n=40, 1C=2891Mbp

Groundnut is the 13th most important food crop of the world. It is the world's 4th most important source of edible oil and 3rd most important source of vegetable protein. Groundnut seeds contain high quality edible oil (~ 50%), easily digestible protein (~ 25%) and carbohydrates (~ 20%).

It is grown on 26.4 million ha worldwide with a total production of 36.1 million metric tons, and an average productivity of 1.4 metric tons ha⁻¹ (FAO, 2004).

Groundnut is grown in nearly 100 countries. Major groundnut producers in the world are: China, India, Nigeria, USA, Indonesia and Sudan. Developing countries account for 96% of the global groundnut area and 92% of the global production. Asia accounts for 58% of the global groundnut area and 67% of the groundnut production with an annual growth rate of 1.28% for area, 2.00% for production and 0.71% for productivity.

In India, groundnut is grown on 5.7 million ha with a production of 4.7 million metric tons, with an average productivity of 0.8 metric tons ha⁻¹ during the rainy season and in the post-rainy season it is grown on 0.9 million ha with a production of 1.5 million metric ton, and an average productivity of 1.6 metric tons ha⁻¹.

In Andhra Pradesh, it is grown on 1.6 million ha during the rainy season with a production of 1.6 million tons, and during the post-rainy season it is grown on 0.3 million ha with an production of 0.4 million tons. Anantapur district in the state is the largest producer of groundnut with 0.74 million ha of area under cultivation.

Globally, 50% of groundnut produce is used for oil extraction, 37% for confectionery use and 12% for seed purpose. In India, 80% of the total produce is used for oil extraction, 11% as seed, 8% for direct food uses and 1% is exported. Groundnut haulms (vegetative plant parts) provide excellent hay for feeding livestock. They are rich in protein and have better palatability and digestibility than other fodder.

Area, Production, Productivity

Developing countries account for over 96% of world groundnut area (26 m ha) and about 92% of total production (36 m t). Production is concentrated in Asia and Africa, where the crop is grown mostly by smallholder farmers under rain-fed conditions with limited inputs.

Asia accounts for:

- 58% of global groundnut area
- 67% of production

Africa accounts for:

- 38% of global groundnut area
25% of production

Groundnut is currently grown on nearly 26 m ha worldwide with a total production of 36 m t and average yield of 1348 kg ha-1. Between 1993 and 2003 annual growth rates worldwide (Figure 11) were:

- 2.17% for area (21 m ha to 26 m ha)
- 2.90% for production (26 m t to 36 m t)
- 0.74% for yield (1244 kg ha-1 to 1348 kg ha-1)

In Asia they were:

- 1.17% in area (13 m ha to 15 m ha)
- 2.35% in production (19 m t to 24 m t)
- 1.18% in yield (1390 kg ha-1 to 1600 kg ha-1)

The major gains in growth rates in Asia came from China, India, Indonesia and Vietnam.

In Africa

During the period 1993 to 2003, and unlike in the 1980's, the rates became positive with annual growth rates of:

- 4.35% for area (6.5 m ha to 10 m ha)
- 5.40% for production (5 m t to 9 m t)
- 1.05% for yield (800 kg ha-1 to 850 kg ha-1)
Nigeria, Sudan, Senegal, Chad, Congo, and Ghana contributed to positive growth rates in Africa.

**Cultivars Released**

Since 1986, our partners in National Agricultural Research Systems have released from ICRISAT-derived material:

- 34 improved cultivars in 11 countries in Asia, including 13 in India
- 25 improved cultivars in 14 countries in Africa

A large number of improved varieties are being tested on-farm in several countries.

ICRISAT initiates groundnut revolution in Anantapur

Groundnut grows where other crops fail. And when farmers in a tough terrain select a groundnut variety, they know what is best for their needs.

Improved groundnut variety ICGV 91114 from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has initiated a revolution in the dry, rocky Anantapur district of Andhra Pradesh in India. The choosy farmers of the district are multiplying ICGV 91114 seeds with alacrity, helped by an ICRISAT-initiated public-private seed partnership.

ICRISAT’s intervention has helped in designing an end-to-end solution to improve the groundnut variety in Anantapur district, according to Dr William D Dar, Director General of ICRISAT. “We have blended our scientific excellence with the strengths of our partners to improve the productivity of the farmers working in a difficult environment.”

Situated in the southern part of Andhra Pradesh, Anantapur district is known for groundnut cultivation. For the farmers from Anantapur, groundnut is a preferred crop since it survives the rough terrain and the uncertainty of rainfall. Though the average rainfall is around 550 mm per year, some parts of the district have recorded as low as 200 mm in bad years and as high as 900 mm in good years.

Every year, on an average, farmers grow groundnut over 800,000 hectares in the district, and in good years, this can go up to one million ha, accounting for nearly 70% of the cultivated area in the district, and making groundnut cultivation a pillar of strength for the rural economy. The crop can withstand up to 50 days of dry spell, and when the rain comes phoenix-like the crop rises from under the gravelly soil, yielding farmers nuts for the market and fodder for their animals.

Selecting the variety with farmers

According to Dr Shyam N Nigam, Principal Groundnut Breeder at ICRISAT, farmers of Anantapur have changed the cropping pattern over the decades due to poor rains, prolonged
dry spells and frequent crop failures. “About 45 years ago it used to be 80% cereals and 20% groundnut. Today it is 80% groundnut and 20% other crops,” explains Nigam.

It is not that only the choice of crop is limited, but also the choice of variety within the crop. Since the 1940s the farmers have been planting TMV 2, though improved varieties were available. The Anantapur farmers felt that the improved varieties selected for propagation in peninsular India through the formal system did not meet the very specific needs of the district.

ICRISAT started the process in the reverse. The groundnut breeding team from the Institute worked with the farmers to select the most suitable varieties. With financial support from the International Fund for Agricultural Development (IFAD), the project was launched in 2002 rainy season, in the fields of the ten farmers who volunteered to participate. Ten new varieties were grown along with the longstanding TMV 2 in Dhanduvaripalli and Rekulakunta villages. The other partners in the project were the Acharya NG Ranga Agricultural Research University and the Rural Development Trust, an NGO.

After the first harvest, the search for new improved varieties was narrowed down to two varieties – ICGV 91114 and ICGV 89104. During the next rainy season, in 2003, the selected varieties were grown in slightly larger plots in West Narsapuram and Rekulakunta villages. The severe drought that year put all the varieties to test and ICGV 91114 produced a significantly higher pod yield, haulm (stem or top part of the plant) and a higher shelling turnover (the percentage weight of the seeds against the total weight of seeds and the shell) than ICGV 89104 and TMV 2.

“Under such severe conditions any increase in productivity is of great benefit for the farmers,” comments Nigam. And since the farmers were involved in all stages of the varietal selection, they had a better acceptance of the improved variety. The trials and the seed multiplication program for ICGV 91114 picked up from the first year onwards.

The Anantapur trials show that ICGV 91114 yields on an average around 10% more pods than TMV 2, matures early (one week earlier than TMV 2), is tolerant of mid-season and end-of-season droughts, has an average shelling turnover of 75%, has an average oil content of 48%, and has better digestibility for livestock.

When the farmers got enthused about ICGV 91114 they started multiplying the seeds during the Rabi-summer season (the second crop season). From the initial plot of 2 ha in 2002 it has grown to 210 ha for seed multiplication. In the rainy season of 2006 it is expected that ICGV 91114 groundnut seeds will be sown over 5,000 ha in Anantapur. The silent revolution is gathering steam.

Partnering to strengthen the delivery mechanism

To strengthen the delivery mechanism for ICGV 91114, the Agri-Business Incubator (ABI) at ICRISAT, is partnering with the Aakruthi Agricultural Associates of India (AAI) – a group of entrepreneurs operating agri clinics – and the Andhra Pradesh State Seed Development Corporation (APSSDC), the state government institution mandated to reach seeds to farmers.

The ABI at ICRISAT headquarters at Patancheru, Andhra Pradesh, helps entrepreneurs to develop promising agricultural technologies into commercial business opportunities. The AAI
group of scientists and agricultural graduates with experience in research, production, marketing and banking approached the ICRISAT team for help to establish a delivery mechanism through a chain of agri clinics. ICRISAT saw this as an opportunity for supplying the seeds of improved varieties. ICGV 91114 was chosen as an ideal candidate for promotion in Anantapur district.

However, no effort at seed distribution can be successful without the involvement of the governmental machinery for seed supplies in Anantapur district. The APSSDC joined the partnership, and agreed to include ICGV 91114 in their groundnut seed supply in Andhra Pradesh (especially in Anantapur district).

According to Dr Kiran K Sharma, Chief Executive Officer of ABI and Principal Scientist at ICRISAT, the partnership is a win-win proposition for all stakeholders. While the groundnut farmers in Anantapur benefit from the supply of the improved variety, the APSSDC can increase its volume and also add improved seeds to its portfolio for supply. The agri clinics under the AAI can benefit through the activity of seed multiplication for supply through the APSSDC.

“For us at ICRISAT, we are happy that our improved groundnut variety can reach the poor and marginal farmers of Anantapur. We are also happy that through the ABI we are able to incubate an idea into an agri-business proposition,” observes Sharma.

As the monsoon showers hit peninsular India in June-July 2006, more and more farmers in Anantapur will be ready to plant the seeds of ICGV 91114 and mark the transition from the timeworn groundnut variety.

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