WELCOME
Chickpea in Andhra Pradesh - Milestones in Adoption process of Short duration Varieties leading to Silent Revolution

By
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Chickpea Farmer in Guntur admiring his bountiful Chickpea Crop of ICC 37
Area, production and productivity of chickpea in Andhra Pradesh, 1985 to 2011
Importance of Food Legumes in Indian Diet

• **Rich in Protein** – Complements Predominant cereal diets
• **Healthy food** - rich in Minerals, Vitamins and fibre
• Adds taste, palatability and flavour to the food
• Improves sustainability to the Farming systems through
  - Biological Nitrogen fixation
  - Leaf fall
• **Provides nutritive feed to the animals**

Despite their importance, the per capita availability is falling (35g/capita/day), which is less than half the amount needed to prevent malnutrition. Hence, the need to increase the productivity and production.
Chickpea in Andhra Pradesh

- Chickpea was not even a minor crop in AP until 1985
- **Constraints**
  - Short winters
  - Terminal moisture stress and heat
  - Wilt and dry root rot diseases
  - Helicoverpa pod borer
- **Potentials**
  - Free from foliar fungal diseases
  - Less vegetative growth, responds to high input management
  - Farmers cultivate like a commercial crop
  - Easy to grow and less labour.
About Dr A Satyanarayana

- Gold Medalist in Genetics & Plant breeding
- All India first at ARS 1977
- Basically a Leguminous Vegetable Breeder at IIHR
- Joined ANGRAU, Lam, as Pulses Breeder in 1981 with a responsibility to improve all pulse crops grown in A.P
- Concentrated on Urdbean and Mungbean
- Collaborated with ICRISAT for Pigeonpea and Chickpea research
Areas of Collaboration

• Crop Improvement
  - Breeding Material
  - Varietal trials
  - Early Planting
• Integrated Pest Management
• On farm trials
• Conferences and Breeders meetings
• Literature Support
• As a Resource person on RBCS
Dr. Smithson, Principal Chickpea Breeder, ICRISAT visited Lam during 1984-85 to monitor chickpea trials.

On seeing vast stretches of Urd bean in Rice fallows, he remarked – “When are you going to show me chickpea like this in A.P.”

This triggered thinking, planning on chickpea development.
Before 1985

- Varieties tested under coordinated trials are:
  - Late Maturing
  - Sometimes did not flower

- Local land races and selections from land races such as ‘Jyothi’, ’Gulabi’? were under cultivation

- They are poor yielders & wilt susceptible

- Annegiri was just introduced, and it was found to have better adaptability
To avoid Terminal Moisture Stress and Heat

- Experiments were conducted by planting chickpea early in the season
  - CLL Gowda recommended to plant chickpea during late September and early October (1985-86)
- Breeding work initiated to develop early maturing varieties at ICRISAT.
- Released wilt resistant short duration varieties ICCC-37 (Kranti) Desi and ICCV-2 (Swetha) Kabuli during 1989 in Andhra Pradesh.
ICCC-37 (Kranti) Desi type

- Short duration 90-100 days
- Resistant to wilt
- Tolerant to dry root rot
- Medium bold seed
ICCV-2 (Swetha) Kabuli type

- Short duration 85 days
- Adopted to normal as well as late sowing
- Medium bold
- First Kabuli for tropical climate
Initial adoption and Impact

Since the release of ICCC-37 and ICCV-2, A.P witnessed dramatic increase in

• Area
• Production (16% Growth rate)
• Productivity 400-800 kg/ha and
• Kabuli chickpea has become a reality in A.P
Chickpea Replaced

- **Tobacco** on Black soils
- **Sorghum**
- **Korra**
- **Pearl millet**
- **Sunflower**
- **Cotton**

and also grown in rotation with other commercial crops.
Opportunity Grabbed

- **Crop holiday to Tobacco declared** by the Govt of A.P 1999-2000

- Most eventful as for as the chickpea spread is concerned in A.P, in general, Prakasam and Kurnool districts in particular
Tobacco crop holiday

• Chickpea was recommended as one of the alternative crop to Tobacco, based on Farming situations

• Based on the success of alternative crops to Tobacco, ANGRAU developed Farming situation based cropping plans for all the 1106 rural mandals in the state

• Chickpea started replacing commercial crops
To sustain the momentum

- Further high yielding varieties and technologies were needed
- **Dr H A van Rheenen**, Principal chickpea Breeder, ICRISAT initiated a network programme through exchange of breeding material aimed at identifying short duration, high yielding, disease resistant varieties

  South Zone (Lam, Coimbatore, Gulberga)

  Central Zone (Akola, Jabalpur, Sehore)

  and by testing superior genotypes identified at all the centres
Network Programme resulted in the identification and release of a number of varieties both by CVRC and State Release Committees, such as

**Desi**

- JG-11
- JAKI-9218
- SAKI
- Nandyal-1

**Kabuli**

- KAK 2
- VIHAR
- JKG-1

But popularization and spread was limited to areas of release only.
Take Off Point
On Farm Testing in AP during 2002-03

- 32 genotypes (18 Desi+14 Kabuli) were tested at three locations in AP
  - Kurnool
  - Prakasam
  - Guntur

- Conducted voluntarily by the farmers under the guidance of Dr. A. Satyanarayana, Director of Extension

- One Kg Seed of each genotype was supplied

- No financial assistance from any source
JG-11 among Desi types and KAK-2 among Kabuli types ranked first at all the three locations and other promising genotypes include

**Desi** : JAKI 9218, Vishal, Nandyal-1

**Kabuli** : Vihar, ICCV 95334, LBeG-7
JG-11

Maturity      : 95 - 100 days
Seed Size    : 20-22 g
Seed Yield   : 20 – 25 q/ ha
Semi Spreading
Early Maturing
Low Anthocyanin
Light brown
Bold seed

Irrigated and rain fed areas
KAK 2 (PKV Kabuli 2)

- Released in 2000 for Maharashtra
- Kabuli type
- Short-duration (95-100 days)
- Large seeded (37g/100 seed)
- Resistant to fusarium wilt
Souring Breeder Seed and Multiplication

• Chickpea requires higher seed rate but low in seed multiplication Ratio

• Large quantities of breeder seed
  ~200q JG 11 from JNKVV, Jabalpur and KAK 2 from PKV Akola were arranged

• No formal funding for Breeder seed

• Big farmers and seed producers were encouraged to multiply the seed
Further spread

• In 2 years, the spread of JG-11 and KAK-2 varieties was visible as ICRISAT simultaneously distributed small quantities of Breeder seed to large number of farmers, which helped Farmer to Farmer spread

• APSSDC also entered in Seed Multiplication

• Farmers started looking for more and more new varieties and started adopting
  
  JAKI-9218, Nandyal-1 among Desi Vihar and Bold (Dollar) among Kabuli
Popularization of Varieties and Technologies under ANGRAU Extension Programmes

- On **Farm Demonstrations**
- Seed Exchange (**Farmer to Farmer**)
- Farmers **Training Programmes**
- Publishing Success stories
- Popular articles in Telugu
- Organizing **Field days** and exposure visits
- **IPM Practices**, particularly use of NPV and Inter cropping with coriander as a whole village approach in Gottipadu, Guntur District
JG-11 played dominant role in Chickpea revolution in Andhra Pradesh

During 1998-2008

- 5 Fold increase in area (1.20-6.38 lakhs/ha)
- Productivity has doubled (750-1468 kg/ha)
- 10 fold increase in production 90,000MT to 9,37,000MT
- JG-11 alone occupied more than 75% area
Changes in Technology Adoption

- Use of higher seed rate – to achieve good plant stand
- High input use (especially fertilizers)
- Plant protection against insect pests - IPM
- Mechanisation in Chickpea cultivation
  - Tractors for land preparation
  - Seed cum Fertilizer drills
  - Tractor mounted sprayers
  - Threshers
- Cold storages
IPM on Chickpea
Awards Received for the Chickpea work

- King Baudovin Award 2002
- Dooren Margaret Mashler distinguished Achievement Award 2002
- Hooker Award 1997
- ISPRD Award 1994
Persons behind Chickpea Revolution in A.P

- Dr. Smithson
- Dr. H A van Rheenen
- Dr. Jagadish Kumar
- Dr. CLL Gowda
- Dr. PM Gaur
- Mr. B V Rao
- Dr. G V Ranga Rao
- Dr. A Satyanarayana
- Dr. S K Rao
- Dr. H S Yadav
Characters for an ideal genotype

- Early vigour or faster initial growth
- Short duration
- Tolerance to moisture stress
- Heat tolerance at poding stage
- Tall & erect canopy with long fruiting branches suitable for mechanical harvest
- Resistance to wilt and dry root rot diseases
- Bold seed and Good quality
- High yield

are required to stabilize and expand the area
To sustain the Growth

• 12th Five year Plan targets fixed by Govt. of A.P. by 2016-17
  Area - 10 lakhs ha, Production - 20 lakhs MT

• Area increase based on Farming situation

• Expand chickpea in Rice fallows

• To develop further high yielding varieties

• Popularizing heat tolerant varieties like JG 14 for late sowings.

• To develop varieties suitable for Mechanical harvest
• To overcome the constraint of dry root rot disease
• Continue On farm research
• Ensure quality seed supply
• Establish processing industries in chickpea growing mandals
• Educate on sustainable agricultural practices.
Potential spread of Chickpea in AP
THANK YOU