**All India Coordinated Small Millets Improvement Project**

1. **Name :** All India Coordinated Small Millets Improvement Project
2. **Date of start :** 2001
3. **PI and staff position:** i. Dr. Adikant Pradhan- Scientist (Agro.) – PI

 ii. Dr. Abhinav Sao – Scientist (GPB)

 iii. Sh D. P. Patel - Scientist (Plant Pathology) -

 iv. Shri G.P. Parmanik, FEO

 v. FEO (Vacant)

1. **Major Achievements:**
2. **Crop Improvement**
3. One variety released in Finger millet- **Indira Ragi-1**

One variety released in Kodo millet – **Indira Kodo-1**

1. Pipeline varieties in Small millet

**Finger millet -** BR-36, BR-2, BR-30, BR-4, BR-1

**Kodo millet -** BK-5,BK-6**,** BK-3,BK-2,BK-1

**Little millet -** BL-4, BL-6,BL-2**,** BL-5, BL-3,BL-1

1. Breeding lines - 200 breeding lines developed in Finger millet
2. lines in Little millet

 125 mutant lines in Kodo Millet

1. **Agronomy**
2. Improved varieties.
3. Line sowing R X R 22.5cm to 25 cm, P X P 10 cm in FM and Kodo millet and 7 cm in Little millet
4. Timely sowing last week of June to first week of July
5. Mechanization of small millets
6. Recommended nutrition

**Finger Millet**

* Long duration 60:40:20 kg NPK /ha
* Medium duration 50:30:20 kg NPK /ha
* Short duration 40:20:10 kg NPK /ha

Kodo Millet 40:20:10 kg NPK/ha

Little millet 20:10:10 kg NPK/ha

1. **Recommended Intercropping for small millets**

Finger millet + Arhar (4:1)

Kodo millet + Horse gram (4:1)

Little millet cropping sequence with niger

* Little millet – Niger under rainfed condition
1. **Plant Pathology:**
* Finger blast management in Finger millet
* Edienphos (0.1%) 2 spray / *Pseudomonas flurescens* ( pf ) 1 spray + Saaf (0.25) spray.
* Pf (0.6%) + 2 spray of 0.2 % (Mancozeb 6.3 % + Carbendazim 12 %
* 2spray of Carbendazim (0.1 %)/Hinosan 0.1 % spray
* 2spray of 0.2 % ( Mancozeb 63%)+Carbendazim 12 %)
* Seed treatment with PF (0.6%) + 2 spray of PF 0.6 %
* Finger blast resistant variety FM –GPU-28 ,GPU-45 ,RAU-8, GPU-48
* Neck blast resistant variety – GPU-28 ,GPU-45 ,PES 110 ,GPU-48
* Kodo millet varieties for Head smut resistance - RBK-155, GPUK-3,
* JK-439, JK-41
* Little millet varieties for grain smut- OLM-203, CO2, JK-8
1. **Impact:**
2. **Entry of new cultivars:** The change was seen with 200% percent yield enhancement when improved cultivars introduced covering 200 to 300 acres every year.
3. **Refined technologies:**
* The traditional plough was modified with bamboo stick as seed drill behind the share of plough in remote areas where tractor is not easily accessed for improving yield.
* Time of sowing (last week of June to 1st fortnight of july) is recommended time of sowing as per the monsoon early or late onset.
* Line sowing opened the way of weed management by running the desi plough in between rows which suppressed the weed drastically in critical period of competition. The technology adopted for line sowing is mainly due to line sowing implements made the difficulties earlier.
* The seed cum fertilizer drill by bullock drawn as well as tractor drown were used for sowing of seeds took 2½ hours including field preparation and sowing with tractor (9 tines) whereas bullock drown drill took nearly 4 hours for sowing and ploughing for small millets required 2 ploughing for land preparation and one passed of seed drill sowing.
1. **Mechanization:**
2. **Productivity enhancement:** The best management techniques were accounted for line sowing quality seed production, balance fertilizer found effective in higher level of productivity (20-25 q/ha) in case of ragi and kodo millet.
3. **Area expansion**: Cultivation of small millets on uplands expanded areas from homestead cultivation to large uplands. Small millets are being consumed because all crops become failed under scarcity of rain and can be kept for many years without insects and diseases under normal control condition.
4. **Seed bank**: Continuous replacing of local land races with improved varieties created the demand among the tribal farmers which was supplied by either All India Coordinated Small Millets Project or their own seed got from last year demonstrations. Ultimately this ran the channel of popularization in untouched areas quite often. The village seed bank was itself generated because introduction of technologies and motivation among the tribal farmers
5. **Income enhancement**: Now a days, the finger millets & Kodo millets are in prime focus of consumer due to medicinal as well as easier way of cultivation; and fitted well in farming situation of tribal farmers. Certainly income enhanced when production of small millets were larger triggers market demands. Quality seeds like foundation, certified and truth labled seed on farmers field was undergone it sold at Rs 30-40 per kg of produce buy back system under registration by national seed certification corporation led the farmers to increase income profusely and earned ` 1.00 lakh per 1.5 acre over certified seed production on own land where earlier it was no value of lands due to such as barren lands converted in productive lands through quality seed production.
6. **Nutritional improvement:** Now incorporation of intercropping as pulses (horse gram, moong bean, urd bean etc.) gave that positive yield enhancement along with attitude of farmers in response to farming system improved the nutritional security making them independent on market for pulses in routine meals. Off farm activities were also targeted on Research Station involving farm ladies with processing of small millets in new innovation like multigrain flour and ragi malt preparation for nutritional security through small millets and self income generation by selling these healthy foods for diabetic as well as non-diabetic person under great demand to use in daily life and now became popular products among people due to nutritional properties. The chain which has run the system of production to consumption of small millets is the intervention of new agro-technologies and value addition.
7. **Problems:**
8. Lack of machinery used for cultivation of small millets
9. Lack of drought tolerant varieties for this region
10. Short duration varieties fitted under vagaries of monsoon
11. **Future plan:**
12. To explore the possibilities of recombination breeding in Kodo and little millet
13. To utilize the molecular breeding tools for allele mining and crop improvement in millets
14. To utilize the molecular approaches for improvement of nutritional traits in small millets
15. Development of early maturing, high yielding and disease resistant varieties in Small millets crops like, Finger millet, kodo millet and little millet crops.
16. Formulation of cost effective package & practices for resource conservation under dwindling rainfall pattern
17. Recommendation of low cost weed management practices
18. Agronomical manipulation for conserving waterRecommendation of control measures for major insects & diseases.

**List of extendable technologies through KVKs**

**Table 1. Varieties performed well under farmers’ field with improved technologies**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Crop** | **Varieties** | **Liking feature** | **Area coverage (acre)** | **Yield potential (q/ha)** | **Increased % over local** |
|  | Finger millet | GPU 28  | High yielding, rainfed cultivar, long open finger | 600 | 20-30 | 200 |
|  |  | VR 708, | High yielding, suited for stress condition | 300 | 20-25 | 175 |
|  |  | Rantagiri | High yielding, Short stature, medium finger | 200 | 18-20 | 150 |
|  |  | VL 149 | High yielding, Pigmented finger | 120 | 15-20 | 140 |
|  |  | PR 202 | High yielding, tolerant to blast | 100 | 15-18 | 135 |
|  | Kodo millet | RBK 155 | Regular raceme, compact grains, more productive | 400 | 18-25 | 150 |
|  |  | JK 48 | More tillers, lodging tolerant, high yielding | 250 | 15-20 | 140 |
|  | Little millet | JK 8 | High yielding, lax panicle | 200 | 5-8 | 200 |
|  |  | BG 1 | Medium height, synchronized maturity  | 120 | 4-6 | 180 |

1. **Seed bank**: A targeted village can be seed bank if it is managed through technological back up initial 3 years afterward it will be converted one seed bank.
2. **Mechanization:** Involvement of implements from sowing to harvesting over existing implements
3. **Nutritional enrichment:** Now incorporation of intercropping as pulses (horse gram, moong bean, urdbean etc.) will give yield enhancement and also improved the nutritional security making them independent on market for pulses in routine meals. Off farm activities can be targeted on KVKs involving farm ladies with processing of the small millets in multigrain flour and ragi malt and homemade preparation for nutritional security and self income generation by selling these as healthy foods for diabetic as well as non-diabetic person under great demand to use in daily life due to nutritional properties.