



## 1) POPULARISATION OF SPV-2217 VARIETY OF RABI SORGHUM

### Input and technology details:

- 1) Introduction of SPV-2217 variety through Front Line Demonstrations (24 ha., 60 farmers)
- 2) Seed production of SPV-2217 variety and supplied to farmers (63 quintals, 1360 farmers)
- 3) Training programmes (36 nos., 715 participants)



### Output details :

Technology	Area under FLD (Ha.)	No. of farmers	Yield (Qtl./ha.)	Increase in yield (%)	Net Returns (Rs./ha.)
			Demo		Demo
Introduction of SPV-2217 variety along with ICM practices under FLD	24	60	12.03	20.90	10276
Local check (M 35-1)	24	60	9.95	-	7232

Farmers obtained yield of 12.03 qtls./ha. from cultivation of SPV-2217 variety as against 9.95 qtls./ha. in local check, an increase of 20.90 per cent. Net additional returns for the farmers was Rs.3,044/- per hectare.

**Impact :** During 2019-20, SPV-2217 variety was spread in 10,000 hectares. Thus, it has contributed additional revenue of about Rs. 300 lakhs to the district economy.



DEMONSTRATION OF SPV-2217 VARIETY OF RABI SORGHUM

## 2) IMPACT OF INTERVENTIONS IN RABI SORGHUM (CSV-22 variety) IN GADAG DISTRICT DURING LAST DECADE

### Introduction :

Sorghum (*Sorghum bicolor*) is the most important food and fodder crop of dryland agriculture. Its cultivation is mainly concentrated in peninsular and central India. Jowar can be grown under a wide range of climate conditions although ideally it requires warm climate. The crop can tolerate high temperature and drought conditions very well. It is cultivated in both Kharif and Rabi season. Asia and Africa account for 86 per cent of the total area under sorghum. India is the largest producer of sorghum in the world with an area of 10.05 million hectares and rank second in production. Among cereals grown in India, Sorghum ranks third in area and production after rice and wheat. Karnataka stands second after Maharashtra with an area of 2.1 million hectares and 1.82 million tonnes of production.



In northern part of Karnataka state sorghum forms a staple food for human consumption and sorghum stover forms major available roughage for feeding livestock. In Gadag district, sorghum is predominantly cultivated in rabi season under rainfed situation.

It stands first in area among the cereals cultivated in Gadag district. The area, production and productivity of rabi sorghum in Gadag district is presented in Table – 1

**Table – 1 : Production Scenario of Rabi Sorghum in Gadag district**

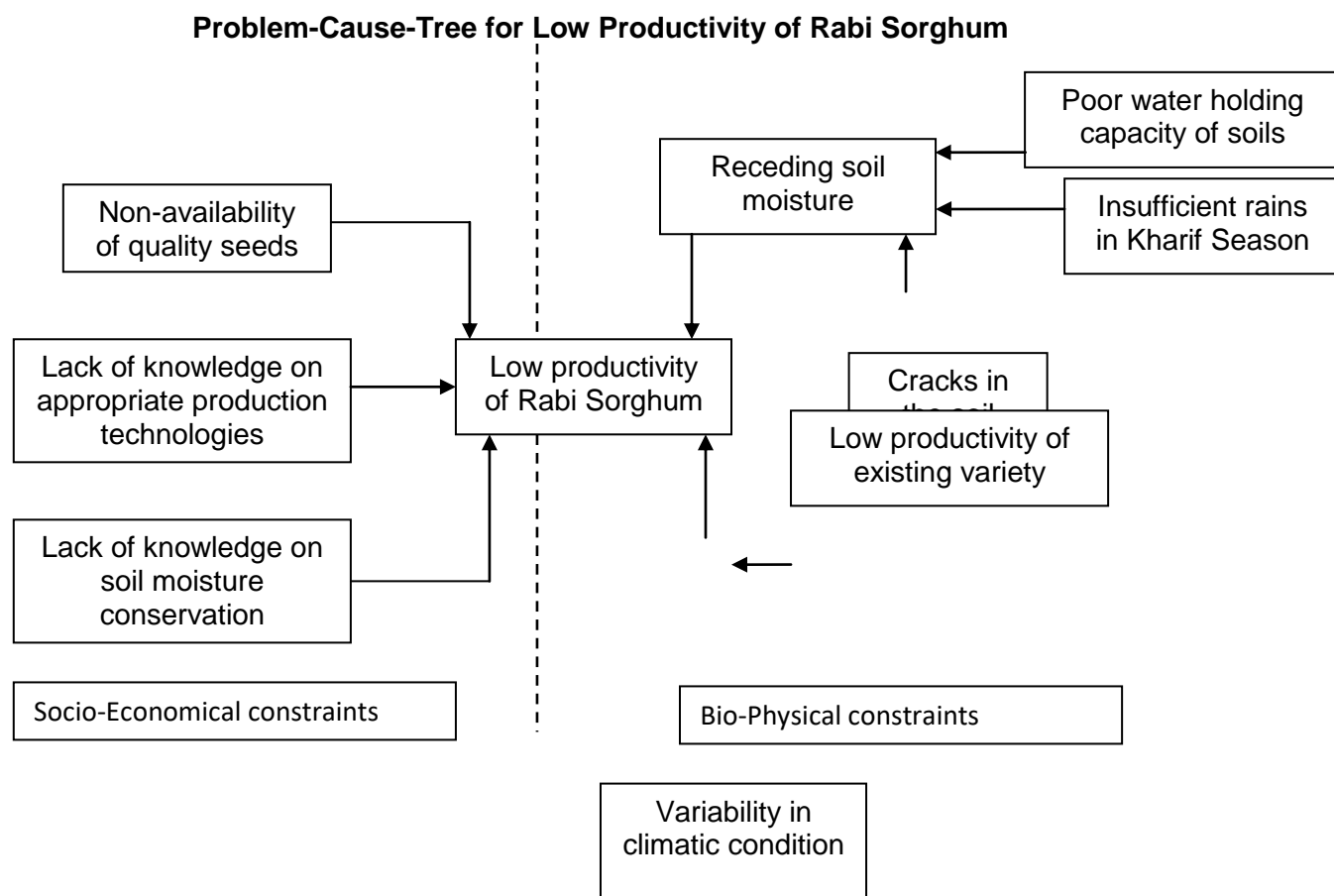
Year	Area (Ha)	Production (Tons)	Productivity (Kg/ha)
2012-13	101553	71087	700
2011-12	45752	43464	950
2010-11	56917	45534	800
2009-10	64120	60914	950
2008-09	63050	40983	650

### Production Constraints in Rabi Sorghum :

Rabi Sorghum is cultivated in deep black soil to medium shallow soils in the district. It is mainly grown as a sole crop. It is generally sown in the months of September to October. Good South West monsoon during the months of June to September usually brings better prospects for rabi sorghum production. However frequent occurrence of agricultural drought has severely affected the productivity of rabi sorghum.

Receding soil moisture during the crop growth period is another factor that contribute for low productivity. Majority of farmers use local variety of Maldandi (M 35-1), the genetic potentially of which has decreased over the period of time. The Problem-Cause Tree for low productivity of rabi sorghum in Gadag district is presented in Flow Chart – 1.

**Flow Chart - 1**



**Problem Analysis and Interventions:**

The above Problem-Cause Tree clearly reveals the primary and secondary causes for low productivity in rabi sorghum. KVK Gadag thoroughly examined the causes and analyzed the problems and technological gaps. Then suitable interventions were made to address the productivity constraints as mentioned below

<b>Problems</b>	<b>Technological Interventions</b>	<b>Tools used</b>
Uneven germination and poor crop stand	Seed priming with CaCl <sub>2</sub>	➤ Front line demonstrations ➤ Method demonstrations
Moisture stress during critical stages of crop growth	➤ Compartment bunding ➤ Wider row spacing	➤ Front line demonstrations ➤ Method demonstrations

<b>Problems</b>	<b>Technological Interventions</b>	<b>Tools used</b>
Decreasing genetic potentiality of M 35-1 variety	➤ Promotion of high yielding CSV-22 variety in deep black soil	➤ Front Line Demonstrations ➤ Training on ICM practices and Resource conservation technologies
Non availability of quality seeds	➤ Seed production and supply	➤ Training programmes on seed production
Lack of knowledge on appropriate production technologies	➤ Promotion of Integrated Crop Management practices	➤ Organization of On and Off campus training programmes

### **INTERVENTIONS BY KVK**

Based on the identified problems, KVK made various interventions during 2008-09 to 2012-13 with major focus on organization of Front line demonstration in farmers field along with training and extension activities.

The details of interventions are given below.

#### **1) Organization of Training Programmes :**

Knowledge and skill dissemination on rabi sorghum technologies was the major focus of KVK to address the technology gaps in the rabi sorghum production. Based on the identified thrust area, KVK designed the training module for farmers and accordingly conducted training programmes. The details of year wise training programmes organized by KVK is presented in Table-2

**Table – 2 : Training programmes organized**

<b>Year</b>	<b>Title of training</b>	<b>No. of programmes</b>	<b>No. of Participants</b>
2008-09	▪ Compartment bunding and seed priming with CaCl <sub>2</sub>	3	82
	▪ ICM in rabi jowar	2	48
	▪ Resource conservation technologies	5	123
2009-10	▪ Compartment bunding and seed priming with CaCl <sub>2</sub>	2	63
	▪ Resource conservation technologies in rabi sorghum	3	69
	▪ Production technology in rabi sorghum and seed production	5	112
2010-11	▪ Resource conservation technologies for sustainable production	2	52
	▪ ICM in rabi sorghum	2	55
	▪ Seed production	3	74

Year	Title of training	No. of programmes	No. of Participants
2011-12	▪ ICM in rabi sorghum	2	45
	▪ Value addition in sorghum	3	66
2012-13	▪ Soil moisture conservation practices in rabi sorghum	2	41
	▪ ICM in rabi sorghum	2	38
	<b>TOTAL</b>	<b>36</b>	<b>868</b>

During the period from 2007-08 to 2012-13, KVK organized 36 on-campus as well as off-campus training programmes for 868 farmers on various aspects of rabi sorghum production

## 2) Organization of Front Line Demonstrations :



KVK organized Front Line Demonstrations in farmers' fields to address the identified productivity constraints in rabi sorghum. Various technological components viz; compartment bunding for insitu soil moisture conservation, seed priming with calcium chloride for inducing drought tolerance, wider row spacing and introduction of high yielding CSV-22 variety were demonstrated along with recommended package of practices. Periodical farm advisory services were rendered by KVK experts during the various stages of crop growth. The details of Front Line Demonstrations organized by KVK during 2008-09 to 2012-13 is presented in Table-3

**Table -3 : Details of Front Line Demonstrations organized in Rabi Sorghum**

Year	Area (Ha)	No. of farmers	No. of villages covered
2008-09	25	42	03
2009-10	50	125	06
2010-11	10	25	05
2011-12	10	25	04
2012-13	05	12	03
<b>Total</b>	<b>105</b>	<b>229</b>	<b>21</b>

KVK has organized Front Line Demonstrations in 105 hectares and 229 farmers from 21 villages participated in the programme

## 3) Organization of extension programmes :



To strengthen and speed up the technology transfer process, KVK organized number of extension programmes. Field days on demonstrated technologies, farmers interactive

meetings and exposure visits, farm advisory services and mass media programmes were organized to popularize the technologies of rabi sorghum. The details of the extension programmes organized are presented in Table-4

**Table – 4 : Extension programmes organized**

Sl.No	Particulars	No. of programmes	No. of Participants
1	Field days	4	632
2	Farmers interaction	7	286
3	Exposure visits to KVK farm	13	360
4	Farm advisory services	142	142
5	Field visits	104	165
6	TV coverages	2	-
7	Radio talks by KVK experts	2	-
	<b>Total</b>	<b>274</b>	<b>1585</b>



About 274 extension programmes are organized for 1585 participants during the period from 2008-09 to 2012-13.

#### 4) Seed production activities of KVK and Farmers :



There has been a huge demand for CSV-22 variety of rabi sorghum as it performed very well under Front Line Demonstrations. KVK started seed production of CSV-22 variety on its farm and started supplying to farmers. KVK identified 11 progressive farmers and trained them in seed production of CSV-22 variety. The details of year wise seed produced and supplied by KVK as well as seed producing farmers is presented in Table-5

**Table -5 : Seed production activities**

Year	KVK		Seed producing farmers		Total (KVK + farmers)	
	Quantity (Q)	Supplied to no. of farmers	Quantity (Q)	Supplied to no. of farmers	Quantity (Q)	Supplied to no. of farmers
2008-09	0.75	13	0.8	25	1.55	38
2009-10	1.55	18	2.88	90	4.43	108
2010-11	2.25	31	18.00	125	20.25	156
2011-12	7.30	116	23.00	215	30.30	331
2012-13	1.24	20	17.00	183	18.24	203
<b>Total</b>	<b>13.09</b>	<b>198</b>	<b>61.68</b>	<b>638</b>	<b>74.77</b>	<b>836</b>

During last 5 years, KVK and seed producing farmers produced 74.77 quintals of seeds and supplied to 836 farmers.

## 5. Seed production through FLD farmers :

KVK facilitated FLD farmers as seed producers of CSV-22 variety and supplied it to the farmers. The details of yearwise seed retained and supplied by FLD farmers is given below in Table-6

**Table-6 : Seed produced & sold by FLD farmers**

Year	No. of farmers	Qty produced (Qt)	Seed Qty retained and sold as seed (Qt)
2008-09	42	375	68
2009-10	125	700	140
2010-11	25	105	17
2011-12	25	110	20
2012-13	12	60	12
<b>Total</b>	<b>229</b>	<b>1350</b>	<b>257</b>

About 229 FLD farmers have retained and sold 257 quintals as seeds during last five years in their villages and neighboring villages.

## **OUTCOME AND IMPACT**

KVK's efforts to address the productivity constraints in rabi sorghum through Front Line Demonstrations, training programmes, extension advisory services and seed production programmes have resulted in increased productivity of rabi sorghum besides horizontal spread of technologies. The details of outcome and impact of interventions is given below.

### **1) Economic performances of FLD programmes :**

The Front Line Demonstration programmes implemented based on the thrust area has resulted in increased productivity of rabi sorghum. Over the period of five years (2008-09 to 2012-13), there has been a consistent performance of rabi sorghum technologies as reflected in the yield levels. There has been an average increase yield of 22.56 per cent over farmers practice (Table-7). Average net returns of Rs. 10161 per hectare was achieved with a benefit cost ratio of 1.84 as compared against net returns of Rs. 6722 per hectare (BC ratio : 1.58) in farmers practice.

The perusal of Table-8 reveals that the performance of rabi sorghum under FLD programme is outstanding as compared to district productivity. About 70 per cent increase in yield under FLD programme is noticed as compared against district average.

**Table-7 : Economic performance of Rabi Sorghum under FLD**

Year	No. of demonstration	Area (ha)	Yield (Q/ha)		% increase in yield	Economics of demonstration (Rs./ha)				Economics of Local Check (Rs./ha)			
			Demo	Local check		Gross cost	Gross return	Net return	BCR	Gross cost	Gross return	Net return	BCR
2008-09	42	25	15.17	12.0	26.41	6463	10998	4535	1.70	5780	8700	2920	1.50
2009-10	125	50	15.31	13.12	16.69	8408	16279	7871	1.94	8033	13152	5119	1.64
2010-11	25	10	10.71	8.75	22.40	12968	29704	16736	2.29	12723	25000	12277	1.96
2011-12	25	10	11.77	9.62	22.35	17963	32217	14254	1.79	17362	27702	10340	1.59
2012-13	12	05	12.81	10.25	24.97	15648	23058	7410	1.47	15498	18650	2952	1.19
<b>Average</b>			<b>13.14</b>	<b>10.75</b>	<b>22.56</b>	<b>12290</b>	<b>22451</b>	<b>10161</b>	<b>1.84</b>	<b>9079</b>	<b>14041</b>	<b>6722</b>	<b>1.58</b>

**Table-8 : Comparison of Productivity level of Rabi Sorghum (kg/ha)**

Year	District yield (Kg/ha)	Demonstration yield (Kg/ha)	Farmers' yield (Kg/ha)	Percentage increase of demo yield over district yield
2008-09	700	1517	1200	176
2009-10	950	1531	1312	61
2010-11	800	1031	875	28
2011-12	750	1177	962	56.9
2012-13	650	1281	1025	92.4
<b>Average</b>	<b>770</b>	<b>1307.4</b>	<b>1074.8</b>	<b>69.79</b>

**2) Spread of CSV-22 variety in Gadag district :**

The impact of Front line demonstrations has created a lot of demand for CSV-22 variety. KVK has played a facilitator role through organizing seed production programme in it's farm as well as 11 identified seed producing farmers. Seed chain has been also developed through FLD participating farmers.

KVK's seed production programme as well as seed production by identified seed producers has considerably met the demand for CSV-22 variety. The data presented in Table-5 & Table-6 reveals that KVK as well as seed producers and farmers under FLD programme have produced and sold 331.77 quintals of seeds to farmers. In addition, seed producers and FLD farmers have retained CSV-22 variety assessed for self-use in their farms. Considering all these factors, CSV-22 variety has spread in to more than 6000 Hectares in last five years in Gadag district.