



Increasing area and productivity of paddy in tribal belt of South Gujarat through effective TOT efforts : A success story

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Abstract : Krishi Vigyan Kendra Vyara is located in the Tapi district – the southeastern part and the tribal belt of Gujarat. The main crops of the district are – paddy, sorghum, groundnut, pulses, sugarcane, gram and vegetables like brinjal, okra and chilly. Paddy is the staple food of the tribal communities of the district. Among vegetable crops okra is main crop for export quality. KVK Vyara is working under the auspices of Navsari Agricultural University. It has started its activities since September, 2000. Kendra has undertaken seed multiplication programme of paddy since 2000-01. Considering the above the whole story KVK has initiated the programme of multiplication of seeds of high yielding varieties of paddy under both rain fed and irrigated condition since 2000-01 on instructional farm. The objective was to popularize high yielding varieties by supplying pure seeds to the farmers on regular basis and thereby increase the area and productivity of paddy. It was planned to cover at least 20-25 per cent of the area under the paddy in the surrounding 45 villages with increasing the productivity and profitability per unit area. As a result of successful introduction of high yielding varieties of the paddy, the whole district has twisted an interest to espouse HYVs in paddy as a replacement for conventional varieties. This efforts has cemented the way to introduce seed village concept in the paddy itself. Four adopted villages of this KVK had been decorated fully self-sufficient paddy seed villages and also supplied paddy seed to the adjacent villages. The apparent impact of this programme can be seen in the form of raising the standard of living of the tribal people. Tribal people are able to discriminate the high yielding varieties of the paddy compared with conventional age old varieties in the form of economics. This study is a boon for tribal upliftment in the other region of tribal in the country. This study can be eye opener for the extension workers in the field of TOT at grass root level. The seed production programme had also increased the revolving funds of this KVK up to the remarkable level. This seed production programme has also created the affection with KVK to tribal farmers and KVK become a popular among tribal community.

Key Words : Productivity, TOT efforts, High yielding varieties, KVK

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Krishi Vigyan Kendra Vyara is located in the Tapi district – the southeastern part and the tribal belt of Gujarat. The district shares its borders with Surat, Navsari and Dang district in North-west, South and East, respectively with Maharashtra state in East. The geographical area of the district is 7.79 lacks ha. The conspicuous features of the district are undulating topography with steep slopes and heavy rainfall. The average rainfall of the district is about 80–100 inches per annum. The distribution is erratic and thus, causing damage to the crops like pulses, paddy and other cereals. The district is composed

largely of tribal communities. These communities depend primarily on agriculture for their livelihood supplemented by income from seasonal employment in nearest industrial town. Soils of the district in general can be classified as medium black to heavy black, red murrum and rocky with low innate fertility. Agriculturally, about 60 per cent of the cultivated area is undersigned crop during monsoon. The main crops of the district are – paddy, sorghum, groundnut, pulses, sugarcane, gram and vegetables like brinjal, okra and chilly. Paddy is the staple food of the tribal communities of the district. Among

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Krishi Vigyan Kendra:

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Genesis of programme:

To ascertain the constraints encountered by paddy growers of this area, a Benchmark survey was carried out by multidisciplinary team of scientist of KVK during the year 2000-01. The results of the survey revealed following ...

- Large majority of the tribal farmers are cultivating conventional varieties (Tichun native-1, Sathi and Kada) of paddy.

- Conventional varieties are early maturing, having coarse grain with dull husk colour, and highly susceptible to water logging as the rain coincides with maturity of paddy in later stage.

- Paddy growers are using higher seed rate *i.e.* 30 – 40

Kg for transplanting 1 acre of land as they produce seed of their own.

- They were planting 10-12 seedlings/hill resulting in to over plant population and lower yield. It also increases the cost of cultivation because harvesting takes much time.

- Farmers were using impure seed, as they produce it on their farm without taking much care.

- Av. yield of paddy (conventional varieties) is about 2500 kgs/ha under good management practices.

- Market value of the conventional varieties is less, ranges between Rs. 5 –6 /kg, because of coarse grain and unlikable colour of husk.

- Tribal farmers are not satisfied with yield status of conventional varieties of paddy.

- The farmers having assured irrigation facilities or low land kyari expressed their desire to have high yielding variety with late maturity to avoid damage by rains to crop at the maturity time.

- On the contrary, farmers growing paddy under rain fed condition expressed their desire to have high yielding early mature variety.

Table 1 : Year wise area, production and productivity of paddy of the Tapi district

Sr. No.	Years	Seasons	Area(ha)	Production (MT)	Productivity (kg/ha)
1.	1997-98	<i>Kharif</i>	53,276	1,55,198	2913
		Summer	15,007	6,00,93	4004
2.	1998-99	<i>Kharif</i>	59,552	1,22,266	2053
		Summer	1,037	31,480	3035
3.	1999-00	<i>Kharif</i>	59,980	1,86,480	3109
		Summer	1,454	5,905	4061
4.	2000-01	<i>Kharif</i>	58,010	1,69,302	2918
		Summer	1,553	6,379	4108
5.	2001-02	<i>Kharif</i>	85167	16777	1970
		Summer	1311	3833	2924
6.	2002-03	<i>Kharif</i>	79627	236378	2969
		Summer	4831	14009	2900
7.	2003-04	<i>Kharif</i>	80000	154800	1935
		Summer	5300	17000	3226
8.	2004-05	<i>Kharif</i>	79535	201130	2529
		Summer	1205	18600	3100
9.	2005-06	<i>Kharif</i>	77817	198393	2550
		Summer	3839	6086	3500
10.	2006-07	<i>Kharif</i>	77817	198393	2550
		Summer	3839	6086	3500
11.	2007-08	<i>Kharif</i>	94306	252660	2679
12.	2008-09	<i>Kharif</i>	257	381	1482
13.	2009-10	<i>Kharif</i>	257	381	1482

Table 2 : Year wise details of the area covered under HYVs of paddy

Sr. No.	Year	Name of village	Area (ha)
1.	2000-01	Dhamodi	07
		Chikhalda	04
		Saraiya	02
		Chhindiya	13
		Tichakiya	08
		Total	34
2.	2001-02	Chhirma	14
		Khanpur	08
		Ambach	06
		Velda	09
		Total	37
3.	2002-03	Madav	29
		Vedachhi	36
		Vanskui	10
		Olpad	15
		Choryasi	19
		Unchamala	20
		Total	129
4.	2003-04	Khurdi	09
		Nani chikhali	08
		Paniyari	07
		Lotarva	05
		Total	29
5.	2004-05	Unchamala	16
		Gunkhadi	25
		Amalgundi	10
Total	51		
6.	2005-06	Bandharpada	19
		Dolara	20
		Agasvan	14
		Dhajamba	38
		Total	91
7.	2006-07	Gadat	38
		Pati	25
		Champawadi	67
		Total	130
8.	2007-08	Bedi	41
		Gatadi	36
		Ambach	24
		Kapura	38
		Vadkui	54
		Total	193
9.	2008-09	Dolvan	20
		Panchol	15
		Rupwada	18
		Allu-Boriya	25
		Shiker	10
		Total	88

Table 2 contd.....

Contd.... Table 2

10.	2009-10	Godchit	12
		Mirpur	10
		Bhadbhunja	13
		Selud	08
		Gadat	24
		Pati	32
		Mandal	45
		Nishana-Amji	15
		Jamkhadi	11
		Vanskui	25
Total		Degama	24
		Limdada	10
		Total	229

– It was also noticed that most of the tribal farmers possess small piece of land. Whatever they produced from the land during monsoon, they have to depend on it for their livelihood. They are striving hard for their food especially during August and September.

Intervention of KVK:

Considering the above the whole story, KVK has initiated the programme of multiplication of seeds of high yielding varieties of paddy under both rain fed and irrigated condition since 2000-01 on instructional farm. The objective was to popularize high yielding varieties by supplying pure seeds to the farmers on regular basis and thereby increase the area and productivity of paddy. It has been planned to cover at least 20-25 per cent of the area under the paddy in the surrounding 45 villages with increasing the productivity and profitability per unit area.

Approach:

As many as 92 training programmes especially on production technologies of HYVs of paddy were organized covering 2636 farmers (Table 3). Front line demonstrations of HYVs of paddy were also conducted on farmer's field to show them the production potentialities. The details of the demonstrations conducted are given in Table 4. Field trials of the HYVs were conducted on instructional farm of Kendra to screen the best varieties amongst the seeds of different varieties supplied by Navsari Agricultural University. Total 41 field days and 18 farmers days were also organized on KVK farm as well as on demonstration plots on farmer's field, benefiting 17593 paddy growers. Details are given in Table 5. This has created awareness amongst tribal farmers about use of HYVs of paddy.

Efforts were made to produce and supply the improved seeds of the paddy to the paddy growers of this area. The details of seed production programme is given in below Table.

Table 3 : Training programmes on production technologies of HYVs of paddy

Years	No's of training programme			Participants		
	On	Off	Total	Male	Female	Total
1997-98	2	8	10	167	24	191
1998-99	1	6	7	127	17	144
1999-00	3	4	7	133	20	153
2000-01	2	4	6	78	45	123
2001-02	2	5	7	134	--	134
2002-03	4	7	11	232	37	269
2003-04	3	6	9	179	56	235
2004-05	1	10	11	298	84	382
2005-06	2	11	13	344	141	485
2006-07	2	5	7	120	67	187
2007-08	2	7	9	125	54	179
2008-09	2	5	7	130	55	185
2009-10	4	8	12	272	185	457
Total	24	68	92	1912	724	2636

Achievement of the programme:

As a results of intensive efforts to introduce, successfully introduced HYVs of paddy cultivars such as IR-28, GR-3, GR-4, GR-5, GR-7, GR-11, Gurjari and Jaya in this area. About 545 ha of land had been covered under HYVs of paddy replacing conventional varieties. More than 1200 farmers of 45 villages were directly benefited by this programme. Average yield of paddy per unit area is almost doubled. Reduction in cost of cultivation as a means of reduction in seed rate and maintenance of optimum plant population. Earlier farmers were using 30-40 kg seed rate for transplanting of one acre of land now with adoption of HYVs they are using only 10-12 kg of seeds for the transplanting of same area. Farmers getting higher yields and more profit from the unit area as improved varieties fetch little higher prices as compared to local varieties because of slender grains. More than 55 farmers have started multiplication of seeds in their own farm under the supervision and guidance of KVK scientist. This will increase the area under HYVs at a faster rate in coming years. This in turn will helps in changing socio-economic status of the tribal farmers of this area. Four seed villages were decorated by KVK to mitigate the high demand of paddy seed in the area.

Comparison of economics- Indigenous V/S HYVs:**Conventional varieties:**

- Av. yield 3000 kg/ha.
- Av. market price Rs. 5-7 /kg
- Total cost of cultivation Rs.9170 / ha
- Av. income Rs. 21000 / ha
- Net profit Rs. 11838 / ha

High yielding varieties:

- Av. yield 4500 kg/ha.
- Av. market price Rs. 6-8 /kg
- Total cost of cultivation Rs.8120/ha
- Av. income Rs.36000/ ha
- Net profit Rs. 27880 / ha

Thus, by adopting HYVs and recommended improved technologies (Table 4) such as seed rate, fertilizer doses, crop geometry, timely hand weeding and plant protection measures for the control of stem borer, tribal farmers of the targeted area are getting higher production and income from paddy cultivation.

Conclusion:

As a result of successful introduction of high yielding varieties of the paddy, the whole district had twisted an interest to espouse HYVs in paddy as a replacement for conventional varieties. This efforts had cemented the way to introduced seed village concept in the paddy itself. Four adopted villages of this KVK had been decorated fully self-sufficient paddy seed villages and also supplied paddy seed to the adjacent villages. The apparent impact of this programme can be seen in the form of raising the standard of living of the tribal people. Tribal people were able to discriminate the high yielding varieties of the paddy compared with conventional age old varieties in the form of economics. This study is a boon for tribal upliftment in the other region of tribal in the country. This study can be eye opener for the extension workers in the field of TOT at grass root level. The seed production programme had also increased the revolving funds of this KVK up to the remarkable level. This seed production

Table 4 : Front line demonstration on HYVs of paddy organized by KVK

Years	Seasons	Area	No. of farmers	Variety	Village	Average yield (Q/ha)		Incr. in yield (%)
						Demo	Local	
2001	<i>Kharif</i>	4	10	Jaya	4	59.15	52.00	13.75
				GR-5		24.99	18.00	38.80
2002	<i>Kharif</i>	3.80	9	Gurjari	6	55.75	52.00	7.21
				GR-7		62.50	55.00	13.64
				GR-5		20.40	17.00	20.00
				GR-8		15.27	17.00	9.82
2002	Summer	12.5	24	Gurjari	4	69.29	62.00	11.75
				GR-3		64.97	--	--
				GR-7		79.66	65.29	22.00
2003	<i>Kharif</i>	14	31	Gurjari	7	65.08	53.92	21
				GR-7		68.24	61.50	11
				GR-5		26.96	19.50	38
				GR-8		17.48	14.00	25
2003	Summer	2	4	Gurjari	4	68.38	60.00	14
2004	-	-	-	-	-	-	-	-
2004	Summer	-	-	-	-	-	-	-
2005	<i>Kharif</i>	10	26	Gurjari	8	52.90	41.41	28
				GR-7		54.66	41.84	31
				GR-8		15.60	11.92	31
				GR-12		45.58	40.74	12
2005	Summer	8	16	Gurjari	3	61.38	49.04	25
2006	-	-	-	-	-	-	-	-
2007	<i>Kharif</i>	10	42	GR-5	8	22.23	13.75	60
				GR-7		52.05	40.65	28
				GR-8		16.74	13.28	26
				GR-9		20.66	16.00	29
				GR-12		51.09	40.93	25
2008	<i>Kharif</i>	17	42	GR-5	6	18.63	11.13	62
				GR-8		14.19	9.14	27
				GR-9		10.53	9.14	15
				Jaya		52.59	43.77	20
2009	<i>Kharif</i>	15	54	GR-9	8	11.13	9.30	19.67
				GR-7		51.50	41.50	24.09
				Jaya		58.75	47.25	24.34
2010	<i>Kharif</i>	22	81	Jaya	8	59.50	47.75	24.61
				GR-5		15.50	12.25	28.75
				NAUR-1		60.50	47.75	26.70
				GAR-13		55.75	46.50	18.89

Table 5 : Extension activities on production technologies of paddy

Year	Name of activity	No	Participants		
			Male	Female	Total
2000-01	Field day	3	50	75	125
	Farmers day	2	412	88	500
2001-02	Field day	1	55	45	100
	Farmers day	1	750	430	1180
2002-03	Field day	4	431	107	538
	Farmers day	1	370	430	800
2003-04	Field day	4	102	37	139
	Farmers day	1	670	145	815
2004-05	Field day	5	121	55	176
	Farmers day	2	700	250	950
2005-06	Field day	2	73	0	73
	Farmers day	1	400	210	610
2006-07	Field day	2	95	65	160
	Farmers day	1	375	125	500
2007-08	Field day	4	85	55	140
2007-08	Farmers day	1	475	145	620
2008-09	Field day	7			301
	Farmers day	2	1209	1942	3151
2009-10	Field day	6	125	170	295
	Farmers day	4	2749	2130	4879
2010-11	Field day	3	123	6	129
	Farmers day	2	398	1014	1412

Table 6 : Adoption of paddy production technologies by tribal farmers (n= 120)

Sr. No.	Reco. practices	Before		After	
		No.	%	No.	%
1.	High yielding varieties	41	35.65	91	71.00
2.	Reco. seed rate	35	24.53	94	73.45
3.	No. of seedlings /hill	32	20.45	82	67.43
4.	Cutting of tips of young seedlings	28	21.23	73	60.53
5.	Spraying of insecticide for stem borer	25	17.28	64	54.38
6.	Soil application of carbofuran for stem borer	32	23.55	78	67.78
7.	Reco. dose of fertilisers	25	20.83	66	55.00
8.	Hand weeding	38	32.43	89	74.55

programme has also created the affection with KVK to tribal farmers and KVK become a popular among tribal community.

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