

## Original Research Article

### Examine the Sustainability of Rice Varieties in North Konkan Region (M.S.)

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#### ABSTRACT

North Konkan region has 240100 ha area under rice cultivation. In the Konkan region 369000 ha area is under rice cultivation of which North Konkan region shares 65.07 per cent and South Konkan region shares 34.93 per cent hence the North Konkan region selected purposively for the study. Study is based on primary data collected through personal interview method. The sustainability of rice crop varieties was analysed for the period from 2005 to 2016. For this study 270 rice growers were selected. Eighteen varieties of rice (Viz., Ratnagiri-1, Ratnagiri-2, Karjat-3, Karjat-4, Palghar-1, Palghar-2, Panvel-2, Panvel-3, Ratnagiri-73, Sahyadri, Phalgun, Sughandhamati, Heera, Jaya, Ratna, Komal, Supriya, Panvel-1) performed well on the rice growers field. Kanak and Mahsuri varieties of rice performed well upto 2012 but after this these two varieties are out of cultivation.

#### Keywords

Variety, Rice,  
District, Area,  
Konkan,  
Sustainability

#### Introduction

Rice is grown extensively in India on 43.86 million ha followed by China (30.16 million ha) However, highest production of rice is in China (144.85 million tonnes) followed by India (104.80 million tonnes). This is due to higher productivity of rice in China (6.86 t ha<sup>-1</sup>) than India (3.77 t ha<sup>-1</sup>) (Anon. 2017). In India rice is cultivated in both cropping seasons – winter and summer.

The major rice growing districts in Maharashtra are Palghar, Thane, Raigad, Ratnagiri and Sindhudurg on west coast (Konkan region) and Chandrapur, Bhandara districts in the eastern part of the state. In

Nagpur, Kolhapur, Satara, Pune and Nashik districts also it is grown to some extent. The rice production in Maharashtra in 1960 was 19.84 lakh tonnes which increased to 52.96 lakh tonnes in 2016. Thus, during last 56 years the rice production has increased by 5 times. The rice productivity in 1960 was 1.53 t ha<sup>-1</sup> and it has increased to 3.4 t ha<sup>-1</sup> in 2016 (Anon. 2017). This increase in rice production and productivity was due to cultivation of newly released rice varieties and hybrids grown under recommended package of practices.

In Konkan region of Maharashtra has 5 districts viz. Thane, Palghar, Raigad, Ratnagiri and Sindhudurg. Highest

productivity in Konkan is in Sindhudurg district (4.89 t ha<sup>-1</sup>) followed by Ratnagiri (4.66 t ha<sup>-1</sup>), Palghar (4.1 t ha<sup>-1</sup>), Raigad (3.99 t ha<sup>-1</sup>) and Thane (3.88 t ha<sup>-1</sup>).

In *Konkan* region, rice occupies an area of about 3.69 lakh hectares with annual production of nearly 15.69 lakh tonnes. The area under rice in Konkan is about 23.71 per cent of total cultivated area in Maharashtra and productivity of Konkan region is 2.9 tonnes per hectare.

After the establishment of Konkan Krishi Vidyapeeth Dapoli on 18<sup>th</sup> May, 1972 (later on renamed as a Dr. Balasaheb Sawant Konkan Krishi on 2000), breeding programs were guided by modern rice technologies and resulted in the development of several rice varieties with high yield potential and other desirable traits. University has developed approximately 25 high yielding varieties with improved architecture and 5 excellent rice hybrids of various durations. In addition to development of varieties, University has recommended several modern rice technologies for benefit of farmers.

The average yield in tonnes/ha must be increased basically through improved cultivation practices and new techniques. To meet the expected increase in demand for rice. More specially, green revolution denotes the large increase in crop yields which in recent years, resulted mainly from the development and adoption of new hybrids and the improved technology associated with their culture. Agricultural Universities in the state are engaged in releasing new high yielding and hybrid varieties of different food grain crops suitable for different agro-climatic zones. Similarly, on the basis of continuous research, new technologies are developed and released for farmers due to which the production and productivity of different crops have been increased

considerably. On the basis of research, scientists are giving different recommendations for increasing productivity and ultimately for minimizing the per hectare cost of cultivation. But fact is that, farmers are not adopting these all technologies completely as per recommendation therefore there is a big gap between the potential yield and actual realized yield on farmers field. It is essential to understand that, at what scale, these technologies are used by the farmers.

## **Materials and Methods**

### **Selection of study area**

North Konkan region has 240100 ha area under rice cultivation. In the Konkan region 369000 ha area is under rice cultivation of which North Konkan region shares 65.07 per cent and South Konkan region shares 34.93 per cent hence the North Konkan region selected purposively for the study. Three tahsils each from the three districts and three villages from each selected tahsils was selected randomly. From each selected village, 10 rice growers were selected randomly. Thus, final sample were consist of 3 district, 9 tahsils, 27 villages and 270 rice growers. A schedule was designed for data collection by keeping in view the objectives of study. The information for *Kharif* 2016-2017 was obtained through personal interview with the sample rice growers.

### **Sustainability analysis of technologies of rice cultivation**

Sustainability of rice crop varieties released by the state agricultural universities is defined as the period for which the varieties were under cultivation from the date of their release. The Sustainability of rice crop varieties was analysed for the period from 2005 to 2016.

## **Results and Discussions**

### **Sustainability of rice crop varieties released and cultivated in North Konkan**

The study has documenting the sustainability of varieties released by the Dr. B.S.K.K.V., Dapoli University at the field level. Konkan is a coastal region of Maharashtra state. It contributes maximum to the rice production in the state of Maharashtra. Konkan being a high rainfall zone, most of the area is under rice crop during kharif season. However, rice being main crop of Konkan region. Due to modernization of rice crop cultivation technology and due to availability of improved high yielding varieties of rice increased per hectare yield of rice in Konkan during recent years.

Rice is the most staple food crop of North Konkan region. Considerable research efforts have gone into rice crop in the state. In all 53 varieties of rice are being cultivated in the North Konkan region of Maharashtra during last 12 years. Among the 53 varieties cultivated, 29 varieties have been developed by and released by the Dr. Balasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli as indicated in Table 1. Out of these 29 varieties released, 22 varieties are still being cultivated. During the year 2005- 2016, eighteen varieties of rice (Viz., Ratnagiri-1, Ratnagiri-2, Karjat-3, Karjat-4, Palghar-1, Palghar-2, Panvel-2, Panvel-3, Ratnagiri-73, Sahyadri, Phalgun, Sughandhamati, Heera, Jaya, Ratna, Komal, Supriya, Panvel-1) performed well on the rice growers field. Kanak and Mahsuri varieties of rice perfored well upto 2012 but after these two varieties out of cultivation.

Taichung variety released in 1949 and cultivated upto year 2008 but after out of cultivation. Kolamba-42 and Bhadas-12-11 performing well on field upto 2009 and 2010

respectively then that two varieties discontinued for three years and again cultivated for two-three years and after 2013 out of cultivation. Karishma variety of rice cultivated up to year 2007 then discontinues and again cultivated from year 2014.

Seven varieties of rice (Viz., Bhadas-1303, Kolamba-226, Warangal, Bhadas-386, Garvel-1-8, Bhadas79 and Zinia-14) are cultivated up to 2005 on the rice grower's field and have been replaced by superior varieties. 22 varieties (Viz., Suruchi, Kolam, Sahyadri-3, Pooja, Karjat-5, Bhogavati, Avani, Sahyadri-2, Ratnagiri-24, Karjat-7, Sahyadri-4, Samrudhi, Karjat-184, Suvarna, Ratnagiri-4, Karjat-8, Ratnagiri-5, Sahyadri-5, Gujrat-11, Rupali, Vaishanvi and Sonam are introduced during later 2003 year and continue after released and performing well on rice growers field, only Samrudhi variety of rice discontinue from year 2015.

The study attempted to document the sustainability of rice crop varieties released and cultivated in the rice grower's field.

Fifty-three varieties of rice were being cultivated in the North Konkan region. Out of these, 29 varieties have been developed by and released by the Dr. Balasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli. Cultivation of 13 varieties has been discontinued. The remaining varieties were performing well on the field since their release. The long standing varieties identified such as Ratnagiri-1, Ratnagiri-2, Karjat-3, Karjat-4, Palghar-1, Palghar-2, Panvel-2, Panvel-3, Ratnagiri-73, Sahyadri, Phalgun, Sughandhamati, Heera, Jaya, Ratna, Komal, Supriya, Panvel-1, Suruchi, Kolam, Sahyadri-3, Pooja, Karjat-5, Bhogavati, Avani, Sahyadri-2, Ratnagiri-24, Karjat-7, Sahyadri-4, Samrudhi, Karjat-184, Suvarna, Ratnagiri-4, Karjat-8, Ratnagiri-5, Sahyadri-5, Gujrat-11, Rupali, Vaishanvi and Sonam.

Table.1

Table No. 1 Sustainability of rice crop varieties released and cultivated in North Konkan region (M.S.) (2005 to 2016)																		
Sr. No.	Crop variety	Origin/Identification*	Year of release	Duration												Duration days	Productivity in qtl ha	
				2005	6	7	8	9	10	11	12	13	14	15	16			
1	Ratnagiri-1	Dr. B.S.K.K.V.,Dapoli	1986														110-115	47-50
2	Ratnagiri-3	Dr. B.S.K.K.V.,Dapoli	1993														140-142	42
3	Karjat-3	Dr. B.S.K.K.V.,Dapoli	1994														115-120	45-50
4	Palghar-1	Dr. B.S.K.K.V.,Dapoli	1988														120-125	40-45
5	Palghar-2	Dr. B.S.K.K.V.,Dapoli	2002														125-130	30-35
6	Panvel-2	Dr. B.S.K.K.V.,Dapoli	1987														110-115	33-41
7	Panvel-3	Dr. B.S.K.K.V.,Dapoli	2000														125-130	45-50
8	Ratnagiri-73	Dr. B.S.K.K.V.,Dapoli	1979														90-95	30-35
9	Sahyadri	Dr. B.S.K.K.V.,Dapoli	1998														125-130	65-70
10	Phalguna	-	1978														145-150	56
11	Sugandhamati	-	2004														144	43
12	Heera	-	1997														80-90	35
13	Jaya	-	1969														130	50-60
14	Ratna	-	1974														115-120	45-50
15	Komal	-	1999														125-130	20-25
16	Supriya	-	1973														125	40
17	Panvel-1	Dr. B.S.K.K.V.,Dapoli	1984														125-130	40-43
18	Kanak	-	1989														130-135	40-45
19	Mahsuri	-	1986														145	45-50
20	Taichung	-	1949														120-125	30-35
21	Kolamba 42*	Dr. B.S.K.K.V.,Dapoli	1924														145-150	28
22	Bhadas 12-11*	Dr. B.S.K.K.V.,Dapoli	1946														130-135	28.50
23	Karishma	-	1999														115-120	35-50
24	Bhadas1303*	Dr. B.S.K.K.V.,Dapoli	1952														135-140	30.00
25	Kolamba 226*	Dr. B.S.K.K.V.,Dapoli	1932														145-150	25
26	Warangal-487*	Dr. B.S.K.K.V.,Dapoli	1942														155	29
27	Basmati-386	-	1997														150-155	21-35
28	Garvel-1-8*	Dr. B.S.K.K.V.,Dapoli	1954														150-152	24.5
29	Bhadas 79*	Dr. B.S.K.K.V.,Dapoli	1932														130	29.00
30	Zinia-14*	Dr. B.S.K.K.V.,Dapoli	1958														145-150	28

				Table No.1 Continue...					
31	Suruchi	=	2004					130-135	70-80
32	Kolam	=	2005					110-120	30
33	Bhogavari	=	2007					110-115	35-40
34	Sahyadri-3	Dr. B.S.K.K.V.,Dapoli	2006					125-130	65-70
35	Pooja	=	1999					140-150	40-45
36	Karjat-5	Dr. B.S.K.K.V.,Dapoli	2007					125-130	45-50
37	Avani	=	2000					115-120	35-40
38	Sahyadri-2	Dr. B.S.K.K.V.,Dapoli	2006					115-120	55-60
39	HMT	=	2008					135-140	40-45
40	Ratnagiri 24	Dr. B.S.K.K.V.,Dapoli	2009					105-115	36
41	Karjat-7	Dr. B.S.K.K.V.,Dapoli	2009					115-120	45-50
42	Sahyadri-4	Dr. B.S.K.K.V.,Dapoli	2009					115-120	55-60
43	Samrudhi	=	2008					125-130	40-45
44	Karjat-184	Dr. B.S.K.K.V.,Dapoli	2010					100-105	30-35
45	Suvarna	=	2011					145-150	40-45
46	Ratnagiri-4	Dr. B.S.K.K.V.,Dapoli	2010					125-130	40-45
47	Karjat-8	Dr. B.S.K.K.V.,Dapoli	2010					140-145	35-40
48	Sahyadri-5	Dr. B.S.K.K.V.,Dapoli	2012					140-145	65-70
49	Ratnagiri-5	Dr. B.S.K.K.V.,Dapoli	2012					115-120	30-35
50	Gujrat-11	=	2012					118-124	48
51	Vaishanvi	=	2014					110-120	40-45
52	Rupali	=	2014					130-140	40-45
53	Sonam	=	2015					120-126	40-45
				(Multicolour line shown stastanability of variety)					



These all long standing varieties were moderately to highly resistant to blast, bacterial leaf blight, neck blast, brown spot, leaf folder, sheath rot, stem borer, gall midge, false smut, Rice Tungro Virus etc. and mostly were high yielding varieties. Newly Rupali rice variety was the first preference for family consumption given by rice growers and Sonam, Komal, Suruchi were also popular varieties in North Konkan region area. Thus, the Dr. B.S.K.K.V., Dapoli (Agricultural University) have made a significant contribution in terms of evaluation of varieties in rice.

Similar observations were made by Husain *et al.*, (2001) and Ananth G. S. (2004), Hossain *et al.*, (2006), Dongsop-Nguezet *et al.*, (2011), Simtowe *et al.*, (2011) and Shinde *et al.*, (2018) about sustainability of varieties of different crops in their areas of study.

On the basis of results obtained from study following conclusions are drawn In North Konkan region, Fifty-three varieties of rice were being cultivated in the North Konkan region. Out of these, 29 varieties have been developed by and released by the Dr. Balasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli. Cultivation of 13 varieties has been discontinued. The remaining varieties were performing well on the field since their release. Kanak and Mahsuri varieties of rice performed well upto 2012 but after these two varieties out of cultivation. Karishma variety of rice cultivated up to year 2007 then discontinued and again cultivated from year 2014. Newly Rupali rice variety was the first preference for family consumption given by rice growers and Sonam, Komal, Suruchi were also popular varieties in North Konkan region area.

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