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IDENTIFICATION, COLLECTION, CONSERVATION AND APPLIED FOR REGISTRATION FOR FARMER'S RIGHT OF TRADITIONAL RICE VARIETIES IN CHHATTISGARH STATE OF INDIA FOR CLIMATE CHANGE ADAPTION

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ABSTRACT: Farmers over generations developed different varieties and land races for different agro-climatic and socio-economic conditions. A wealth of varieties of indigenous rice as a source of unexplored gene pool occurs naturally. These varieties have great scope for climate change adoption. However, there has also been tremendous loss of traditional knowledge associated with traditional agro-ecosystems and production practices. The present study developed as institutional arrangement for identification, collection of climate resilient rice varieties for conservation. Total 14 district namely; Balrampur, Baster,Bijapur,Bilaspur, Dantewada,Dhamtari,Janjgir-Champa, Jashpur, Kanker, Kawardha, Korea, Narayanpur, Rajnandgaon, Surguja falling under tribal forest region or biodiversity rich especially in rice genetic material were selected for the programme. Institutional arrangement, capacity building and awareness programme for different stakeholders were at different levels organized during the period 2013-14 to 2015-16. The result of the study indicated that highest climate resilient varieties were identified in Baster agro-climatic zone. The different climate resilient characteristics of the identified varieties were low water requirement, short duration, early maturity, resistance to different biotic stress like pest and diseases etc. The major climate resilient varieties were Chudidhan, Turiakabri, Laldhan, Lalchudidhan, Gudmadhan, Tulsighati, Jondra-nagdi etc. The study also suggested policy implications for identification, conservation and multiplication of seed of such varieties.

Key Words-Climate resilient; Traditional Rice varieties; Identification and Conservation; Tribal ecosystem, farmer's right

Rice is the staple food of over half of the world's population and 90% of Asians. Also, it has extensive curative properties known from the ancient days. Chhattisgarh, the newly formed state of India, has been considered a rice bowl of the country. Agriculture in Chhattisgarh is subsistence agriculture. Foodgrains are grown in 88.37 percent of the net sown area. Among foodgrains grown, rice is the major crop that is grown on 39.91 lakh hectares and covers 77 percent of the net sown area. Traditional farmers were cultivating approximately 19,000 rice varieties. Chhattisgarh is traditionally known as the Rice Bowl of India and over 20,000 rice varieties have been recorded in the region. These are a result of centuries of rice farming by indigenous communities through selection and adaptation to a variety of soil, water and micro-ecosystems conditions including predators. Farmers over generations developed different varieties and land races for different geo - climatic and socio-economic conditions. A wealth of varieties of indigenous rice as a source of unexplored gene pool occurs naturally. Established traditional knowledge systems of self- healing and nutrition that are based on knowledge of the Bio-wealth, is a unique feature of various communities of Chhattisgarh. Though these local varieties and land races of rice are under tremendous pressure of globalization, traditional farmers still grow countless local varieties of rice. Today these varieties are being lost with market forces promoting so called high yielding varieties and synthetic fertilizer and pesticide-based agriculture that focuses only on yield, as well as the general but incorrect perception of traditional varieties as low yielding. There has also been tremendous loss of traditional knowledge associated with traditional agro-ecosystems and production practices. Indigenous and traditional agricultural communities throughout the world depend on, and are custodians of, agro-biodiversity maintained within agricultural landscapes through various forms of traditional resource management. These communities are coping with an increasing number of interlocking stresses that result from different aspects of global change, including the problems related to population increase, insecure and changing land ownership, environmental degradation, market failures and market globalization, and protectionist and inappropriate policy regimes and climate change[i]. Climate change presents a major concern, often interacting with or exacerbating existing problems. It makes new demands for adaptation and coping strategies, and presents new challenges for the management of the environment and agroecosystems. Indigenous and traditional agricultural communities are adapting to change and

are developing ways of strengthening the resilience of agricultural landscapes through various local strategies based on the protection of traditional knowledge and agro-biodiversity. The approaches being adopted include the use of centuries' old traditional practices (e.g. the forest management of indigenous Hani people of Yunnan province in China, and 3000 years old Cajete terraces and the associated agricultural system in Mexico) and their adaptation to changing conditions, as well as the development and adoption of new approaches. Keeping the above background in view, the study was conducted in the state of Chhattisgarh with the objective to conserve the rice genetic materials with specific characteristics. The subsequent matter & description gives the methodology.

METHODOLOGY

The data were collected through semi-structured interview schedule and the specific characteristics such as duration, colour, drought resistant characteristics, abiotic and biotic stresses, medicinal values, grain colour and size etc. were recorded. The information were also correlated to each other. All the recorded characters based on farmers and tribal communities long time experiences. The characteristics of all the collected varieties have been recorded with name of respective varieties.

Selection of the district

Total 14 districts namely Balrampur, Bastar, Bijapur, Bilaspur, Dantewada, Dhamtari, Janjgir-Champa, Jashpur, Kanker, Kawardha, Korea, Narayanpur, Rajnandgaon, Surguja falling under tribal forest region or biodiversity rich specially in rice genetic material were selected for the programme. To represent the true sampling, seven districts were selected among the districts having highest area under rice and remaining seven districts were selected from having lowest area under rice. These districts jointly contribute more than of total rice area and 50 per cent of production of the state[ii].

Institutional arrangement

Institutional arrangement, capacity building and awareness programmes for different stakeholders at different levels were organized during the period 2013-14 to 2015-16. At first level, three trainings were organized for Subject Matter Specialists of the KrishiVigyanKendras. The major aspects of the trainings were provisions under farmers' rights act, process of identification of varieties, application process, etc. At second level, awareness programmes were organized by the trained subject matter specialists for farmers. Total 20 awareness programmes were organized in the state during the period of study. At third level, exhibition cum fares were organized and process of identification of characteristics of varieties, maintenance of genetic material and filling of application for registration the process of application was explained. Programmes were jointly organized by ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-VII, Jabalpur, Madhya Pradesh and Protection of Plant Varieties and Farmers Right Authority (PPV&FRA), New Delhi.

RESULTS AND DISCUSSION

More than 120 collected traditional rice varieties were analysed by selected KVKs. The traditional collected rice varieties from the study were categorised on the basis of their suitability under different agro-climatic and farming situations like duration, climate resilient characteristics such as water logging resistance, drought resistance, resistance to different biotic and abiotic stresses, fragrance, size and colour of the grains, medicinal properties etc. Based on duration, varieties collected were classified as very short duration (<60 days), short duration (60-80 days), medium duration (80-100 days), long duration (100-120 days), very long duration (>120days) in nature. By and large, the short duration varieties were found to drought resistance as these varieties can escape later stages of drought. The similar correlation of varieties with drought tolerance was reported by earlier studies[iii,iv,v, vi,vii].The analysis of varieties based on duration reveals thatthe varieties suitable for upland condition are short to medium duration have low yield potential, red in colour having good iron content.These varieties are also suitable for drought condition. Grain size are medium to bold. Drought resistant varieties are also low duration, low water requirement, multiple insect-pest and disease resistant in nature, having high mineral content and low fertilizer requirement. Some of the varieties like-Ramdin, Sathiya,Chhinmohri, Kalazeera,Raghunath, Devardhan shows drought tolerance characteristics which can be important from climate change adaptation point of view. The resistance to different abiotic stresses were also reported in earlier similar studies[viii, ix, x,xi,xii]. Short duration varieties are suitable for upland condition having drought resistant in nature having low yield potential. Scented rice varieties are medium to long duration, low fertilizer requirement, grains are fine in texture, medium to high yield potential. Varieties suitable for water logging conditions are medium to long duration in nature having medium to high yield potential, suitable for low land condition. Traditional varieties such as*SausariDhan, Tulsighati,MatkoDhan, Dandras,Painbudi, Saldhenti,BhursiDhan, GadakhutaDhan* can be grown in 30-35cm water standing condition.

Some of the varieties like *DeshiBarsaBhog, Gangabaru,LkmaBenzo, Kheerasar,Davardhan, Gadakhutia* were also considered to be resistance to insect infestation by the farmers. Varieties suitable for biotic stress conditions are suitable for upland; water requirement is very less, low fertilizer requirement. The varieties having medicinal value are drought

resistant, insect-pest resistant having high mineral, protein and vitamins content[xiii], [xiv],[xv]. The study found that the yield potential though the traditional varieties was tend to be low but it should still continue to cultivate these varieties as traditional are low risk prone[xvi],[17,18]

Conclusions and policy implication

Chhattisgarh, the newly formed state of India, has been considered as a rice bowl of the country. By and large, the short duration varieties were found to drought resistance as these varieties can escape later stages of drought. The varieties suitable for upland condition are short to medium duration have low yield potential,red in colour having good iron content. Drought resistant varieties are also low duration, low water requirement, multiple insect–pest and disease resistant in nature, having high mineral content and low fertilizer requirement. Short duration varieties are suitable for upland condition having drought resistant in nature having low yield potential. Scented rice varieties are medium to long duration, low fertilizer requirement, grains are fine in texture, medium to high yield potential.Varieties suitable for water logging conditions are medium to long duration in nature having medium to high yield potential, suitable for low land condition.Traditional varieties such as;Sausaridhan,Tulsighati,Matkodhan, Dandras,Painbudi, Saldhenti,Bhursidhan ,Gadakhutadhan can be grown in 30-35cm. water standing condition. Some of the varieties like*DeshiBarsaBhog, Gangabaru,IkmaBenzo, Kheerasar,Davardhan, Gadakhutia* were also considered to be resistance to insect infestation by the farmers. Varieties suitable for biotic stress conditions are suitable for upland, water requirement is very less, low fertilizer requirement. The varieties having medicinal value are drought resistant, insect-pest resistant having high mineral, protein and vitamins content. Studies concluded that, the state has lot of biodiversity among rice traditional farmer's varieties having diversified and desired characters suitable for different agro-climatic conditions and climatic aberrations. The study found that the yield potential though the traditional varieties was tend to be low but it should still continue to cultivate these varieties as traditional are low risk prone. Farmers prefers the traditional rice varieties for different farming situations and agroclimatic conditions because of these varieties have lot of diversity,olerant against biotic and abiotic stresses, easy to agronomic practices. These varieties are very friendly with festival and cultural events of local tribal peoples.There is a need to make a common plate form for conserving these farmers' traditional rice varieties by policy makers, researchers, extensionpersonnel. Emphasis should be given to start new crop improvement programme for upgradation and make the provision for these varieties comes under seed chain as per the situations of agro-climatic condition and climatic aberrations. Participatory research on integration of traditional rice varieties with high yielding popularized varieties should be emphasized. Decentralization of community research institute should be established in these biodiversity hot spot where traditional rice varieties are existing. There should also be fix a royalty to farmers and farming community, those who are conserving these traditional rice varieties. This will be helpful to our farmers, farming community and consumers also.

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