

URGING POLICY FORMULATION ON MILLETS: AN INDISPENSABLE SOURCE OF NUTRITION FOR *PORAJA*, *KANDHA* AND *PENTHIA* TRIBAL COMMUNITIES IN KUNDRA BLOCK, ODISHA, INDIA

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Abstract: Traditionally finger millet (*Eleusine coracana*) and little millet (*Panicum sumatrense*) have been regarded as major cereal crops in tribal communities of Kundra, Odisha state providing food and nutritional security. The influence of the food habits of urban population, distribution of cereals like rice by the Government of India at a subsidised rate/free of cost under social welfare programmes, lack of knowledge on scientific agronomic practices and absence of strategic policy planning for sustainable agriculture and food and nutritional security in tribal tracts of Odisha state have threatened the very existence of nutritious millets. Millets, known for their climate resilience and high mineral and vitamin content, are healthy cereals providing a great solution to the global challenge of food security under the present context of climate change. The present study highlights the traditional inter-linkage of three tribal communities namely *Poraja*, *Kandha* and *Penthia* with millets, planning of scientific interventions in participatory mode with the communities to promote millet production, consumption and commerce and study of the impact of interventions for policy formulation on sustainable agriculture and food and nutritional security. The encouraging outcomes with policy recommendations are disseminated at local, national and international levels involving all stakeholders such as government agencies, not for profit organisations, print and electronic media, scientific community, funding agencies, traders and farmers with a view of favourable policy formulation to ensure sustainable agriculture and enhance food and nutrition security in ancient tribal tracts of Eastern India.

Introduction

The tribal communities of Koraput district possess a rich culture with unique recipes for several types of foods and beverages. Numerous kinds of grains, pulses, tubers, vegetables and fruits form their diversified food basket. The present study on three primitive tribes of Koraput district in Odisha state of India, namely *Poraja*, *Kandha* and *Penthia* aims at assessment of level of nutritional knowledge and food habits in relation to use of under-utilized cereal crops in the household diet, attitude towards nutrition, practices followed in each community and identification of key elements for policy formulation on sustainable agriculture and food security. The level of nutritional awareness of a community is distinctly reflected in its traditional food habits. Paddy and small millets comprising of finger millet (*Eleusine coracana*) and little millet (*Panicum sumatrense*) are the major cereals whereas black gram, red gram, horse gram and cow pea are the most widely cultivated and consumed pulses in these communities. Suitable policy planning and development of implementation strategies for food and nutritional security in a tribal context need to be designed considering the existing food habits, scope for promotion of nutritious underutilised crops under rainfed agroclimatic conditions, awareness creation and mobilisation of local, state and national level government planning agencies to counter endemic hunger and hidden hunger.

Materials and Methods

The study was conducted in six villages of Kundra block in Koraput district. This involved seventy households randomly sampled out of total 243

households. This includes households of *Penthia* tribe in Kaudiaguda, *Kandha* tribe in Bhadraguda and Heruguda and *Poraja* tribe in Pipalguda, Narakenduguda and Chendijhilligaon. Two surveys were carried out in the same seventy households using a pre-tested questionnaire in September 2011 and January 2013. This questionnaire was used to collect both qualitative and quantitative data. It consisted of questions related to nutritional knowledge, attitude towards nutrition and food practices.

Based on the findings from the preliminary nutrition survey, specific agronomic and nutritional interventions were planned in consultation with professional specialists and tribal communities. Impact assessment was carried out using questionnaire method after two agricultural seasons. Based on the impacts of the interventions, key issues were identified and were shared with the media, local and district level self governance bodies, government departments and government planning agencies to promote policy formulation for sustainable food and nutritional security in less developed tribal communities.

Results and Discussion

All three communities exhibited high level of nutritional knowledge on the benefits of consumption of grains, pulses, milk and milk products, vegetables, fruits with egg and meat. All respondents were aware of the fact that eating some quantity of pulses along with rice or millets every day is better than eating rice/millets alone. Regular consumption of millets is considered as a healthier practice than consumption of rice by all respondents. They opine that millets provide greater energy than other cereal crops and give a filled-stomach feeling for a longer duration. 81% respondents believe that millet based food have medicinal properties and regular consumption of millets prevents frequent sickness. 96% households relate better eye sight and higher longevity to regular consumption of millets. The most widely consumed millet is finger millet followed by little millet. Millets are never used as feed for the local livestock and poultry birds by any of these communities. Agricultural by-products such as millet straw, paddy straw, rice bran and broken rice are used as animal feed.

All communities regard rice as their major staple food followed by millets, pulses and vegetables. A major finding supported by 99% households focuses on recent changes in food habits of these tribal communities as a consequence of distribution of rice

by the Government of India supported Public Distribution System (PDS). During the last two decades rice has replaced millets as the main staple food because of cultivation of high yielding varieties of paddy in place of traditional landraces, availability of rice at a lower price and in many cases free of cost under several social welfare programmes through PDS, low yield of traditional varieties of millets and influence of modern food habits of urban population (Bala Ravi et al, 2006). 99% respondents propose that distribution of millets through public distribution system and fixation of a minimum support price for millets by the Government of India will encourage its production and consumption. 97% respondents are aware of the fact that the outer coat of rice contains some nutrients and polishing of rice grains degrades the nutritional quality of rice. 93% respondents consider little polished parboiled rice more nutritious than polished rice.

Noticeable difference was observed in the consumption pattern of major food grains in these communities. The widest use of millets as a fasting food is found in *Kandha* community. In case of *Poraja* and *Kandha* communities, millets serve as the major grain to be offered to Gods in religious rituals. *Poraja* and *Kandha* communities prefer to offer millet based food to guests whereas *Penthias* prefer rice for offering the guests. The *Penthias* and the *Porajas* mostly consume millets in the morning and the noon. The *Kandhas* usually consume millet based food thrice a day making it an indispensable source of nutrition in their daily diet. The *Penthias* and the *Kandhas* prepare snacks and sweet dishes using millets more frequently in comparison to the *Porajas*. These food items are usually prepared on festive occasions, religious ceremonies and celebrations. *Mandia jau* (finger millet gruel) is the most common finger millet based preparation across three tribes followed by *Tampa*. *Tampa* is also known as *Anda* in *Poraja* and *Penthia* tribes. This is cooked as a thick porridge from finger millet and broken rice. *Mandru* (finger millet based sweet and spicy thick porridge), *chakuli* (finger millet based pan cake) and *Suan khiri* (little millet based sweet porridge) are usually prepared during ceremonial occasions.

No community prepares any food using millets and pulses simultaneously. The widest use of millet for preparation of any beverage is noticed in the *Penthia* community. A finger millet based alcoholic beverage *Landa*, prepared by germination of finger millet grains followed by drying, pulverisation, cooking with water and fermentation, is widely consumed across three tribes. Intake of *Landa* is significantly

high among men in the *Poraja* and the *Kandha* tribes with 96% and 92% respectively, followed by a relatively moderate intake by 42% men in the *Penthia* tribe. 81% tribal women belonging to the *Poraja* community consume *Landa* followed by 74% and 22% women in the *Kandha* and the *Penthia* communities. The adolescents above 15 years of age are allowed to consume *Landa* during religious ceremonies and celebrations in the *Poraja* and the *Kandha* tribes. In case of the *Penthias*, consumption of *Landa* among the adolescent is not encouraged. This is mostly restricted to adult male members of the community with sporadic consumption by the women. Across the three tribes, *Landa* is preferably consumed during forenoon and late afternoon with occasional intake in the evening. During religious ceremonies and celebrations, its consumption is also preferred in late evening. Among pulses, black gram has got the highest acceptance in all the three communities, followed by green gram and horse gram. The highest inclusion of pulses in daily diet is noticed in the *Penthia* tribe. A most significant finding of the study from nutritional point of view across these communities is that cooking of millets/other cereals/pulses with water is the most common method of cooking followed by draining/pouring the surplus water leading to loss of water soluble vitamins and minerals. 89% households regularly follow the practice of washing tubers, vegetables and fruits after cutting resulting in loss of water soluble vital nutrients.

The preliminary survey carried out in September 2011 highlighted some of the major constraints related to cultivation and consumption of millets in Kundra block. 94% households agreed that little millet is not regularly used as it is difficult to process. 99% respondents identified pulverization of finger millet using traditional hand operated stone pounder as a major constraint in millet processing. Availability of unhealthy fast food and deep fried snacks with better palatability in local markets at affordable prices was held responsible for diminishing consumption of millets by the younger generation in tribal communities. Low yield and uneconomic return because of traditional agricultural practices were ascertained as major deterrents for millet cultivation resulting in continuous diminishing of area under millet cultivation.

Findings on nutritional habits and practices in a tribal context were pivotal in planning interventions to educate women and children to improve nutritional status of rural households and to promote household consumption of under-utilized food grains. Based on

the above findings, interventions involving introduction of improved varieties of finger millet and little millet, participatory varietal selection trials (PVS), yield enhancement trials, quality seed production, gene-seed-banks, introduction of line sowing of millets using customized row markers and mechanical weeding by Kono weeder, partial farm mechanization with tractor and power tillers, vermicomposting and capacity building on integrated pest and disease management and soil fertility management were planned and carried out. Customized nutritional awareness programmes with attention to healthier culinary practices were conducted to enhance nutritional awareness of tribal communities. Focus was laid on educating children and the youth to improve nutritional health of the communities in a sustainable manner. Supportive activities were extended to tribal communities through farmer participatory technological interventions together with appropriate capacity building for increasing the productivity and production of locally important under-utilized crops in semi-arid, hilly and mountainous regions. This also included introduction of finger millet based value added products with market linkages for commercial production and household consumption. Electric operated finger millet pulverizers were installed in participatory mode with the tribal communities to reduce the drudgery of women in pulverizing finger millet using traditional stone pounders.

The final survey was conducted in January 2013 to assess the impact of agronomic and nutritional interventions in six tribal villages. Within two years of intervention, while the number of households growing millets showed only a marginal growth of 1%, the area under millet cultivation increased substantially from 32% to 40%. Similarly, cultivation using traditional methods (broadcasting) produced an average yield of 198 kg per acre; while following the improved methods of millet cultivation (line sowing with application of recommended dose of inorganic fertilizers with vermicompost) resulted in an average production of 578 kg per acre.

For greater nutritional awareness creation in tribal communities, activity based capacity building programmes were extended to 329 students under the project intervention area. This resulted in consumption of millets by 62 students who never preferred millets in their diet earlier. 68% women learnt finger millets based recipes namely *chakli*, *laddu* and finger millet malt powder. 19% households took active interest in preparation of the abovementioned food products during leisure time for

Table.1 Role of gender in millet cultivation and seed management

Activities of Millet Cultivation	Decision Making (in %)			Work cipation (in %) Parti		
	Men	Women	Both	Men	Women	Both
1. Selection of crop	84	0	16	60	3	37
2. Selection of variety (seed)	71	8	21	67	7	26
3. Purchase of seed	89	2	9	60	40	0
4. Field cleaning	43	27	30	17	51	32
5. Land preparation (ploughing)	99	1	0	95	1	4
6. Transport & application of manure	69	14	17	29	20	51
7. Seed treatment	100	0	0	100	0	0
8. Sowing seeds (broadcasting / line sowing)	93	2	4	91	3	6
9. Inorganic fertilizer application	95	3	3	96	4	0
10. Hand weeding	30	47	23	0	93	7
11. Interculture / mechanical weeding	67	33	0	50	50	0
12. Plant protection measures	100	0	0	100	0	0
13. Watching for crop damage	73	20	8	53	15	32
14. Harvesting of crop	40	27	32	6	50	44
15. Threshing & cleaning	60	7	33	36	10	53
16. Cleaning & drying grain	20	66	15	7	79	14
17. Transporting the grain	56	14	31	35	16	49
18. Use of grain (seed / consumption / marketing)	30	33	37	27	37	37
19. Storage of grain	38	16	46	20	26	53
20. Seed selection and storage	40	19	41	17	49	33
21. Marketing of grain/fodder	42	2	56	82	7	11
22. Receiving & handling funds	54	4	42	51	4	45

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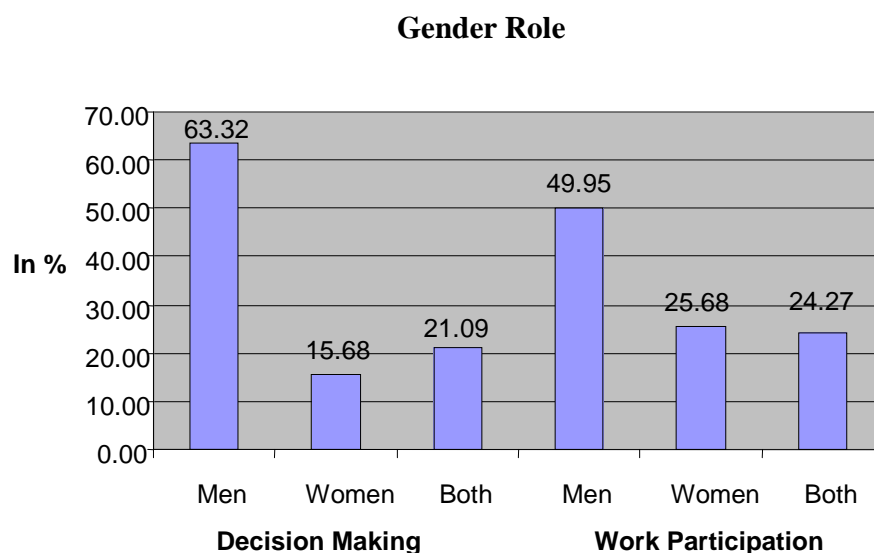


Figure: 1 Gender role in decision making and work participation in millet cultivation

commercial marketing and this marginally improved their economic condition. 47% households started preparing these newly introduced millet foods at least once in a fortnight. 54% women reported higher consumption of finger millet by the youth of the household because of more palatable recipes introduced as part of the project intervention. Awareness was created towards hygienic grain storage and healthier culinary processes through repeated cooking demonstrations and interactive sessions. This led to discontinuation of the habit of draining/pouring the surplus water after cooking millets, other cereals, pulses and vegetables by 34% households. 62% women adopted the regular practice of washing tubers, vegetables and fruits before cutting. Millet pulverisers installed in each tribal community in participatory approach received with varying degree of response. This drudgery reduction facility was instantaneously accepted by the *Kandha* community, where as it took longer time to motivate and mobilise the *Penthia* and the *Poraja* households.

Gender Roles

The millet cultivation involves active participation of both men and women in all the three tribes. The findings indicate the unequal distribution of decision making power between men and women in tribal

households.

Land preparation, seed treatment, inorganic fertilizer application and adoption of plant protection measures are the major responsibilities of men. Women contribute largely towards agricultural operations such as weeding, post harvest grain processing and seed storage. Overall labour contribution by women is higher than that of men in millet cultivation (Bala Ravi et al, 2010). Introduction of certain improved practices such as line sowing and mechanical weeding has changed the work participation by men and women farmers in millet farming. Seed was usually broadcasted by men in tribal communities, but the practice of line sowing involved both men and women because of significantly higher requirement of manpower at the time of sowing in comparison to that of broadcasting. Traditionally hand weeding was exclusively carried out by women whereas mechanical weeding by using Kono weeder was mostly done by men.

Policy recommendations

Based on the findings, thrust areas for sustainable agriculture in tribal communities addressing an age-old challenge of malnutrition and food insecurity were identified. These key issues mainly consisted of three aspects namely sustainable agriculture, post

harvest food grain processing and storage and socio-legal interventions.

Initiatives for quality seed production, germplasm conservation of native crops, application of organic manures like vermicompost for soil health management, balanced inorganic fertilizer application, line sowing in millets, introduction of cost-effective farm mechanization, selection of climate resilient crops and need based capacity building of men and women farmers promise a bright future for sustainable agriculture. The results were shared with government agencies, not for profit organizations and print and electronic media for creating support in favour of effective policy formulation by state and national governments. A few tribal welfare agencies adopted the policy recommendations on sustainable agriculture to be implemented in other tribal regions.

Policy recommendations for introduction of affordable drudgery reduction mechanisms in post harvest food grain processing such as threshing, destining, grading, pulverization and entrepreneurship development through value addition to native crops were welcomed by government and non-government agencies, local self-governance bodies and local and district administration based on the findings.

The socio-legal aspect focused on empowerment of tribal women, inclusion of millets in the Government of India supported Public Distribution System (PDS), fixation of minimum support prices for millets, direct procurement of millet grains by agencies of the Government of India for public distribution under food security initiatives, marketing support for popularization of millet based value added products and awareness creation for neglected nutritious cereal crops. Increasing popularity of millets due to its health benefits has drawn attention of national policy makers during the last decade (Sarah et al 2004).

Awareness creation at local, national and international level platforms for favorable policy development based on the impact study of the initiatives designed and carried out with available local resources, social customs and traditions and scientific recommendations are expected to be rewarding for the native population in future.

Conclusion

Empowerment of tribal communities in improving household food and nutritional security and income generation opportunity through introduction of

scientific agronomic practices resulted in enhanced productivity and nutritional status. A farmer participatory approach in identification and application of improved, environment friendly and sustainable production practices received significant acceptance in *Poraja*, *Pentha* and *Kandha* communities. Persistent efforts for capacity building on healthier nutritional practices brought about visible changes in some of the most primitive tribal communities of Eastern India with encouraging results. Introduction of women-friendly technologies to remove drudgery and increase efficiency was progressively welcomed by tribal women. These primitive tribal communities possess valuable traditional knowledge in nutrition and agriculture. Technical guidance and capacity building with complimentary policy support will certainly be able to eradicate poverty and malnutrition from tribal communities inhabiting agro-biodiversity hotspots of India. Endeavour to influence the state and national level policy makers for effective policy planning calls for support and cooperation of all the stakeholders. Effective policy adoption and implementation with reinforcement of skills and knowledge of the tribal farmers with a scientific approach promise a healthier community with sustainable practices in the future.

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