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# Huge technological gaps in maize cultivation: is it an outcome of extension deficit in tribal areas of Kashmir valley

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**Abstract**
Tribal people are most vulnerable sections of the society and they rely on subsistence agricultural practices for their living. The agricultural practices are practiced under rain-fed conditions over terraces drawn out on undulated topography. This background motivated us to analyze the maize cultivation in relationship with technological gaps so as to arrive at the extension gaps and policies to bridge them. This study mainly perused the primary data obtained from sample respondents selected in tribal area of Kashmir Valley. The results revealed that tribal people were allocating major proportion of their cropped area for maize cultivation followed by cherry and legumes. It was observed that there were huge technological gaps in the use of input technologies. Moreover their intercultural operations were far from the scientific recommendations which led to lower returns and uneconomical farming practices. Further lower productivity and fairly low quality of the produce resulted in lower returns to their little surpluses. Study revealed poor role of extension agencies in these area which could be the major cause of their unscientific maize cultivation. Only few respondents were found to have seen any extension personnel around their farms and major of them even did not know about such agencies. A significant difference was observed in yield levels of respondents having received information from friends or extension worker and those having no information. The study also examined the various dimension of their contacts and information sources and could ascertain an important role of extension agencies if their farming has to be made remunerative. Based upon findings, this study emphasized upon strengthening/streamlining extension system in these areas among other policy options.

**Keywords:** Maize cultivation, extension deficit, technological gaps, tribal areas, Kashmir valley

## Introduction

The livelihood of tribal people mainly depends on agriculture for their subsistence use. Though the technological breakthrough in agriculture has resulted in increased productivity, yet the crop yields realized on the farmers' fields are considerably low as compared to those obtained on demonstration plots and farmers of Research Stations. There exists considerable un-trapped yield potential in various crops which may be attributed to the gap in adoption of recommended practices and differences in input use levels between at the farmer's field and demonstration plots. As a step towards narrowing down the yield gap at farmer's fields, there is need to analyze the yield levels and the causative factors. Maize is the second important crop among tribes of Kashmir next to rice. Maize is a major staple food followed by other legumes of majority of population in tribal farmers and is important for its diversified utilization in animal feeds and other uses. More than 46 per cent of the total food grain area of the tribal population of Kashmir is under maize cultivation. Maize is known as the Queen of Cereals' due to its' demand and wider adaptability. India is the 6th largest producer of maize in the world, contributing about 2 per cent to the global maize production of 855.72 Mt (USDA-FAS, 2013). In India, maize is grown under resource poor conditions as a rainfed crop. Maize constitutes about 9 per cent of the total volume of cereals produced in the country and is the third most important food-grain after rice and wheat. As reported by DMR, 2012 and Chaudhary *et al*., 2012 [4], the consumption pattern for maize in India at present includes poultry feed-52 per cent, human food-24 percent, animal feed-11 per cent and industrial processing- 11-12 per cent. It is the second most important cereal crop in the world in terms of acreage and production. Global production of Maize was about 1040 million MT in the year 2016-2017, where in USA and China contributed about 38 and 23%, respectively. In India, maize is the 3rd most important food crop after rice and wheat, where about 15 million farmers are engaged in maize cultivation. In India, Andhra Pradesh ranks first in maize production followed by Karnataka with per cent share of 20.9 and 16.5, respectively. It has a share of 9% in about Rs. 100 billion agriculture sector gross domestic product. Maize can be cultivated successfully in loamy sand to heavy clay, well aerated, neutral pH soils. As of tropical origin, it is highly sensitive to water stagnation, so avoid the cultivation in low-lying or poor drainage fields. Furthermore, extended low temperature less 5 °C severally affects the crop. Optimum range of temperature for better crop growth and yield realization is 25-35 °C. Being day neutral, maize crop can be cultivated throughout the year which leads to high yield levels in a short period of time. Maize crop can grow under diverse conditions from sea level to about 3000m altitude throughout the year in many parts of the country. In Northern India, kharif (monsoon) season is main growing period while in Southern India it can be grown from April to October as warm weather conditions prevail for longer period. Maize crop requires 21 and 32 °C temperature for proper germination and growth with considerable moisture availability. Yield gaps exist mainly because known technologies that can be applied at a local experiment station are not applied in farmers' fields having the same natural resource and ecological characteristics. One main reason why yield gaps exist is that farmers do not have sufficient economic incentives to adopt yield enhancing seeds or cropping techniques. This may be explained by numerous factors, including lack of access to information, extension services and technical skills. Poor infrastructure, weak institutions and unfavourable farm policies can also create huge obstacles to the adoption of improved technologies at farm-level. Other factors can be that available technologies have not been adapted to local conditions. Solutions lie with public sector investments in institutions and infrastructure, better research-extension-farmer linkages and sound policies to stimulate adoption of technologies that improve productivity and reduce costs, thus increasing agricultural incomes. Changes in crop management techniques can also help closing yield gaps. Plant breeding plays an important role in closing yield gaps by adapting varieties to local conditions and by making them more resilient to biotic (e.g. insects, diseases, viruses) and a-biotic stresses (e.g. droughts, floods). Studies estimate that the global yield loss due to biotic stresses averages over 23 percent of the estimated attainable yield across major cereals. Besides, the state government also promotes composite seeds through State Seed Corporation and the promising varieties are generally procured from the private sector (Sood, 2011) [11]. A regional shift in production has been observed from north to south; Bihar, Uttar Pradesh and Madhya Pradesh were the major maize producing states in 1990s, but during the past two decades, southern states, especially Andhra Pradesh and Karnataka, have become the major maize-producing states (Gulati and Dixon, 2008) [6].

## Data and Methodology

The study was conducted in the tribal area of Srinagar district of Jammu and Kashmir where maize is cultivated as major crop by tribal people. In order to select a representative sample, a simple random sampling method was adopted by randomly selected the number of individuals in a particular tribal area. A complete list of these individual farmers was prepared and was categorized into marginal, small and large farmers on the basis of their land holdings. Then 100 farmers were selected from that particular area and the data were collected by direct interview method from sample respondents by using questionnaire designed for that purpose. The knowledge level of farmers about the recommended technology and methods for maize cultivation was obtained through individual ranking method by asking questions to the farmer. Consistent with the objectives of the study following analytical tools like simple ratios, percentages were estimated to analyze the data.

## Results and Discussion

The results revealed that tribal people were allocating major proportion of their cropped area for maize cultivation followed by cherry and legumes. It was observed that there were huge technological gaps in the use of input technologies. The results documented in (Table 1) revealed that the majority 56 per cent of the tribal respondents in the study area had low level of knowledge regarding the improved maize cultivation/technology followed by 35 per cent of tribal respondents who had medium level of knowledge and it was further observed that only 9 per cent of tribal respondents had high level of knowledge about the improved maize cultivation/technology. On the basis of the results the low level of knowledge percentages was very high in the study area and it may be due to the lack of awareness and lack of proper information regarding the recommended maize production technology.

**Table 1:** Distribution of the respondents according to their level of knowledge regarding improved maize production technology

| Category | Frequency (N=100) | Percentage |
|---|---|---|
| Low knowledge level | 56 | 56.00 |
| Medium knowledge level | 35 | 35.00 |
| High knowledge level | 09 | 9.00 |

The figures documented in (Table 2) revealed that 64 per cent of tribal respondents had high level of adoption gap regarding the recommended maize cultivation technology, 31 per cent of them having medium level of adoption gap and only 5 per cent had low level of adoption gap. The reason behind that more percentage in the high adoption gap level is due to unavailability of improved seeds, high cost of insecticides/pesticides and lack of irrigation facilities about the maize cultivation. It emphasized upon capacity building of farming community and the effective role of extension agencies in the dissemination of technologies especially maize composites find their place.

**Table 2:** Distribution of the respondents according to their adoption gap regarding improved maize

| Category | Frequency (N=100) | Percentage |
|---|---|---|
| Low adoption gap level | 5 | 5.00 |
| Medium adoption gap level | 31 | 31.00 |
| High adoption gap level | 64 | 64.00 |

## Economic Feasibility of Principal Crop in the Study Area

Tribal farmers were found allocating more area towards maize cultivation and have allotted major area towards land races of maize; they majorly cultivate Local maize (corn stover) in their farms and it was seen that major portion of their land is occupied by maize cultivation comprises 79 per cent of their total land holding. However, they cultivate crops as per traditional norms and deviate exclusively from scientific recommendations. The results documented in (Table 3) revealed that tribal farmers spent at an average 5179.00 Rs on variable inputs to manage one kanal of maize crop though the costs on variable inputs was more than net returns. On an average farmers harvest 130 Kg of maize out of each kanal and the yield was relatively less than expected yield. The expenditure on variable cost when captured with returns resulted in net loss owing to poor yield levels of maize and the PRR to variable costs was highly discouraging. The input-wise cost on various variables has been detailed in (Table.4). It emphasized upon capacity building of farming community and the effective role of extension agencies in the dissemination of technologies especially maize composites find their place.

**Table 3:** Economic feasibility of principal crop in the study area (`kanal)

| Crops | FFna | FFfa | Pooled |
|---|---|---|---|
| **Maize** | | | |
| Gross return (GR) | 2871.00 | 2472.00 | 2671.00 |
| Total Variable cost (TVC) | 5052.00 | 5306.00 | 5179.00 |
| Return to farm fixed resources (RFFR) | -2181.00 | -2834.00 | -2507.50 |
| Per rupee return over variable cost (PRRVC) | 0.57 | 0.47 | 0.52 |
| Yield (Kgs) | 140.00 | 120.00 | 130.00 |

**Note:** FFna = Forest Fringe near to amenities, FFfa = Forest Fringe far from amenities

**Table 4:** Input use pattern in major crop (kg/kanal/farm)

| Particulars | Quantity (Kg) | Value (Rs) |
|---|---|---|
| **Maize** | | |
| Seed | 5.50 | 109.40 |
| Urea | 2.20 | 13.70 |
| DAP | 0.60 | 15.20 |
| MOP | 0.10 | 2.20 |
| FYM(kg) | 526.40 | 863.60 |
| Human Labour(md) | 9.80 | 3659.90 |
| Bullock(day) | 0.20 | 44.30 |
| Tractor (hrs) | - | - |
| Total working capital(TWC) | - | 4708.20 |
| Interest on Working capital (WC) | - | 470.80 |
| Total Variable cost (TVC) | - | 5179.00 |
| Yield(kg) | 130.00 | - |
| Gross return (GR) | - | 2671.5. |
| Return to farm fixed resources (RFFR) | - | 2507.50 |
| Per rupee return over variable cost (PRRVC) | - | 0.52 |

The data documented in (Table.5) revealed that according to the study nine constraints had been responsible for the low yield of maize in the study area. Among them, about 68.3 per cent of the farmers reported that main constraints for low yield of maize due to the expensive costs related to cultivation followed by non-availability of timely information regarding improved maize production technology with the percentage of 66.7 per cent while the 45 per cent of farmers reported the lack of irrigation facilities in the study area. The results further revealed that 37 per cent of the farmers are unaware about the improved or scientific cultivation of maize.

**Table 5:** Responsible constraints for low yield of maize crop

| Constraints | Percentage | Ranks |
|---|---|---|
| Unawareness about improved maize cultivation practices | 37.17 | VIII |
| More expensive due to high cost of cultivation | 68.33 | I |
| Unavailability of improved seed | 49.17 | IV |
| High cost of fungicides/pesticides | 52.50 | III |
| Lack of modern agricultural equipment | 37.50 | VII |
| Lack of irrigation facilities | 45.17 | V |
| Lack of yard manure | 44.17 | VI |
| Non-availability of timely information related to improved maize production technology | 66.67 | II |

## Conclusion and Recommendations

On the basis of the results, this study concluded that tribal farmers had low knowledge and low adoption gap of maize production technology. The main reason for more adoption gap being the illiteracy of farmers, small land holdings, less annual income, insufficient availability of inputs, less irrigation facilities, fungicides/pesticides, poor access to amenities, inaccessible areas, poor infrastructure, poor roads and also proper farm equipments were not available. The farmers were seen unaware about the latest agricultural technologies and have lack of extension facilities in the study area. Tribal farmers were found allocating more area towards maize and this crop were seen to occupy major proportion of gross cropped area. Across the study area, tribal farmers were seen to have more area under cultivation and their farming was intensified. However, tribal farmers were seen to cultivate crops as per traditional norms and deviate exclusively from scientific recommendations. The expenditure on variable cost when equated with returns resulted in net loss owing to poor yield levels of maize and the returns to variable costs were highly discouraging and was not found economically feasible crop. The study emphasized upon capacity building of tribal community and the effective role of extension agencies in the dissemination of technologies and strengthening of extension services for making tribal farmers aware about scientific agricultural practices, recommended packages, improved/high yielding varieties. Low infrastructural development and distance from amenities coupled with steady population growth has made the lives of many tribal people very difficult. Government should provide them with efficient market facilities so that they may be able to sell their produce and buy inputs easily without any extra expenses.

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## References

1. Bala B *et al*. Adoption Gap in the Improved Maize Technology. Indian J Agric. Res. 2005; 39(3):208-212.
2. Badal PS, Singh RP. Agric. Economics Res. Rev. 2001; 14:121-133.
3. Griliches Z. Hybrid corn and economics of innovation, Science. 1960; 132:275-280.
4. Chaudhary DP, Kumar A, Sapna Mandhania S, Srivastava P, Kumar RS. Maize as fodder-An Alternative Approach. Directorate of Maize Research, New Delhi, 2012, 32-6.
5. DMR. A Compendium of Hybrids and Composites of Maize (1993-2012), Technical Bulletin No. 2012/5, Directorate of Maize Research, New Delhi, 2012a.
6. Gulati A, Dixon J. Maize in Asia: Changing Markets and Incentives, Academic Foundation, New Delhi, 2008.
7. Mignouna DB *et al*. Adoption of New Maize and Production Efficiency in Western Kenya, International Institute of Tropical Agriculture (IITA), Dar es salaam, Tanzania, 2010.
8. Popielarz D. An explanation of perceived risk and willingness to try new products, J Marketing Res. 1976; 4:368-372.
9. Rao PP, Rao VGK. Adoption of rice production technology by the rural tribal farmers, J Res. ANGRAU.

1996; 24(1-2):21-25.
10. Singh DP *et al*. Knowledge and adoption gap of tribal farmers of Bastar towards Rice production technology. American International Journal of Research in Humanities, Arts and Social Sciences. 2014; 5(1):54-56.
11. Sood J. Chhattisgarh will not allow GM crops. Down to Earth Magazine, 2011.
12. USDA-FAS. Corn Area, Yield and Production, 2013. Available at www.fas.usda.gov/psdonline/(verified on 08.07.2013).