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Impact of *Mera Gaon Mera Gaurav* (MGMG) Programme in Uttar Pradesh and Haryana

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ABSTRACT

The present study aimed to evaluate impact of *Mera Gaon Mera Gaurav* (MGMG) programme by developing a quantitative framework. Five clusters of villages were randomly selected from Uttar Pradesh (UP) and Haryana and 15 respondents from each cluster were selected, making a total sample size of 150. One control village was selected against each experimental village using Propensity Score Matching (PSM) technique. Four components namely, farmer-scientist interface, farm output, institutional awareness and linkage were extracted in the index by applying Principal Component Method. The analyses revealed significant increase in frequency of farmer-scientist interaction, farmers' meet and increase in yield of rice, wheat and mustard. An increase of 59.73% and 37.28% in gross return was noticed in UP and Haryana, respectively. Though significant difference in awareness level and institutional linkage was found in UP between experimental and control groups, no significant difference was noticed in Haryana. Respondents reported high and medium level (48% and 41.33%) of timeliness of services in UP and Haryana, respectively. Total 44% and 42.67% respondents in UP and Haryana respectively, reported high level of relevancy. Similarly, 54.67 % and 46.67 % respondents in UP and Haryana, respectively reported high level of satisfaction with the services. Total 41.33% respondents in UP and 42.67% in Haryana stated medium level of usefulness of the services. The mean index scores in case of UP and Haryana were 0.692 and 0.528, respectively. Strategies were proposed to enhance the performance of MGMG programme.

Key words: MGMG, Quantitative framework, Impact assessment

The present scenario of Indian agriculture demands an approach that moves beyond traditional transfer of technology. Innovative extension approaches are required to keep pace with the fast-growing technology generation and to meet diverse needs of farming community. Moreover, the national emphasis has also been shifted from production component of agriculture to farmers' welfare.

Around 68.84% of Indians live in 640,867 villages of the country (Census of India, 2011), and agriculture is the major source of livelihood for a vast section of this population. Therefore, development of villages and agricultural sector is essential for holistic socio-economic development of the country. Keeping this in mind, the Ministry of Agriculture and Farmers' welfare has initiated the ambitious programme named *Mera Gaon Mera Gaurav* (MGMG), in the year 2015; the English term of the programme was coined as "My Village My Pride". To commensurate with the changing scenario of farmers' adaptability of technology, this new initiative was extended to about 6,000 scientists functioning at the various centers and institutes of the Indian Council of Agriculture Research (ICAR), and to 15,000 scientists working under the banner of state agricultural universities (Deshpande, 2015). This innovative initiative was planned to accelerate the lab to land process through direct interface between scientists and farmers; thereby facilitated faster and more effective dissemination of useful information. For effective implementation of the programme, at institute level, many groups of multidisciplinary scientists were constituted; each group consisted of four scientists who were supposed to adopt five villages within a radius of 50-100 km from their place of work (PIB, 2016). The objective of such implementation strategy was to develop model villages, which would act as a catalyst for further development of the neighbouring villages in future.

MGMG has already completed more than two and half years of its implementation, and there is no documented report on the impact of the programme. Therefore, the present study was conducted with the aim to identify the indicators for developing a quantitative framework for impact assessment of the programme and to study the agricultural and socio-economic impact of the programme

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in the villages.

MATERIALS AND METHODS

The study was conducted in Uttar Pradesh and Haryana states of India. Five clusters, each containing five villages where MGMG was being implemented, were selected randomly from each of the states. From each cluster fifteen respondents were selected on the basis of snowball sampling technique. The "snowball" method identifies an initial set of respondents who are requested at the end of their interview to recommend potential respondents who share similar characteristics and are relevant for the purpose of the survey (Gabor, 2007). Respondents (75) were interviewed from each state, resulting in a total of 150 respondents. Apart from this, one control village was selected against each experimental village, and five respondents were selected randomly from each village. Propensity Score Matching (PSM) technique was used for the selection of control villages. The criteria for PSM were area, population,'number of households', 'literacy ratio', 'minority population ratio', 'total work force' and 'agricultural workforce ratio' of the villages. The information was collected from the District Census Handbooks of the concerned districts (Census of India, 2011). Overall performance was measured by developing an index which was constructed on the basis of extracted factors from the results of Principal Factors Analysis.

Further attempt was made to find the significant differences regarding each indicator between experimental and control groups, using with-without approach. Before-after design was used to find out if there was significant increase for the experimental group after implementation of the programme.

Developing Index for measuring impact of MGMG programme

Selection of indicators and normalization: Indicators are simply the combination, through a defined algorithm, of two or more explanatory variables to form a new derived measure (United Nations, 2007). For the present study, 12 indicators were chosen based on review of literature and discussion with the experts: (1) frequency of interaction with scientists; (2) frequency of interaction with scientists over ICT tools; (3) frequency of availing farm literature; (4) frequency of farmers' meet or Kisan Gosthi; (5) increase in yield; (6) increase in gross return; (7) awareness of Govt. schemes; (8) institutional linkage; (9)timeliness; (10) relevancy; (11) usefulness; and (12) satisfaction with the services. Each selected indicator was, thereafter, range normalized. Normalization was done based on Min-Max method with the following formula: Normalized score: (X-Min value)/(Max value-Min value).

Conducting the factor analysis: Sampling adequacy and correlation among indicator variables were checked by Kaiser-Meyer-Olkin (KMO) test and Bartlett's test, respectively. A score of 0.750 in KMO test indicated satisfactory sampling adequacy. Significant result in Bartlett's test (Approx. Chi-Square=441.599, p value=0.000) led us to reject null hypothesis of non-collineraity.

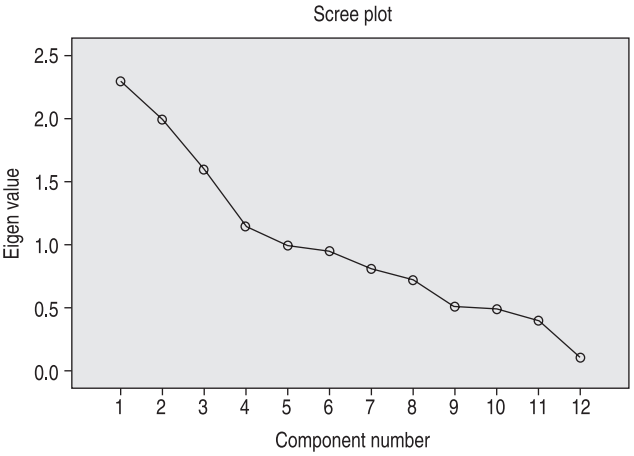

Fig 1. Scree plot showing contributions of components w.r.t. eigen values.

PCA based method was used to construct composite sustainability indicators to assess sustainability performance of the manufacturing industry in a study conducted by Li *et al.* (2012) as well. It is evident from the scree plot (Fig 1.) that eigen values of first four components exceeds 1. Thereby we selected four components, which explained 58.63 % variability. Since none of the variables had communality less than 0.6, none was eliminated.

Regressing indicators (variables) into factors (components): The rotated component matrix demonstrates the beta values which explain contribution of each indicator (Variable) to the components. On the basis of beta values to a particular component (factor), the components weregiven a name to represent the group of indicators that had major contribution to that particular component (factor). Mathematically, each component (factor) could be regressed using beta values of the indicators to obtain uncorrelated component scores of individual respondents as shown in Table 1.

Final score in index: After calculating the scores of individual components for a respondent, the total score for each respondent could be obtained by adding the regressed value of Y_1, Y_2, …, Y_4. Finally, in order to get the index score of a respondent we divided total score by the maximum possible score, which is simply the sum of all beta values.

After construction of the index, the impact of the programme was evaluated by using the index. Apart from that, individual indicators were also analyzed in detail to present a comprehensive result.

RESULTS AND DISCUSSION

The component-wise findings are presented below.

Impact Assessment of MGMG Programme

Overall Performance: Overall performance of the programme was measured with the help of mean index score. The mean index scores were simply the average of total index scores obtained by each respondent. The mean index

Table 1 Extracted components and Component scores from Rotated Component Matrix (Rescaled)

Component name	Indicators	Component				Formula for calculating component score
		1	2	3	4	
	Timeliness	0.375	0.178	0.773	-0.160	$0.375*X_1+-0.280*X_2+\ldots+0.588*X_{12}$
Quality of services (Y_1)	Relevancy	-0.280	0.042	0.757	0.056	
	Usefulness	-0.234	-0.142	0.631	0.239	
	Satisfaction	-0.012	-0.027	0.588	0.253	
Farm Output (Y_2)	Increase in Yield	-0.036	0.960	0.061	-0.021	$0.178*X_1+0.042*X_2+\ldots+-0.163X_{12}$
	Increase in gross return	0.065	0.953	-0.021	-0.055	
Farmer-Scientist Interface (Y_3)	Frequency of farmer- scientists interaction	0.100	0.112	-0.004	0.780	$0.773*X_1+0.757*X_2+\ldots+0.243*X_{12}$
	Frequency of interaction using ICT tools	-0.563	0.082	0.130	0.276	
	Frequency of farmers' meet	0.360	-0.138	-0.134	0.314	
	Frequency of farm literature distribution	0.626	0.209	-0.164	-0.087	
Institutional linkage and awareness (Y_4)	Awareness	0.744	-0.006	-0.019	-0.106	$-0.160*X_1+0.056*X_2+\ldots+-0.138*X_{12}$
	Institutional Linkage	0.588	-0.163	0.243	-0.138	

$X_1, X_2, \ldots, X_{12}$ denote the scores obtained by a respondent in individual indicator that ranged from 0 to 1, as we normalized each data.
a. Rotation converged in 5 iterations.

scores were 0.692 and 0.528 in case of UP and Haryana, respectively. The score of the component of "Institutional linkage and Awareness" was lowest for both the states (0.406 and 0.231 for UP and Haryana, respectively), which could be responsible for lowering down overall scores. Both the states had highest scores for "Farm output" component which was because of increased yield due to adoption of improved varieties which subsequently led to increase in gross return as well. In UP, 50.67 % of the respondents fell into the medium category and in Haryana 37.33 % fell into the low category regarding overall performance of MGMG (Table 2).

Further, separate analyses were conducted for each of the twelve indicators. The results are presented below.

Quality of services: Four major indicators of quality of services, namely, timeliness, relevancy, usefulness, and satisfaction were measured in three-point continuum Likert type scale. Table 3 explained that 48 % of the respondents reported high timeliness of services in UP, while in Haryana, 41.33% reported medium level of timeliness. A study by NSSO (2005) stated that one of the major problems of extension services was the practical relevance of the advice. However, in our study, 44 %respondents in UP and 42.67 % in Haryana reported high level of relevancy while, 54.67 % and 46.67 % respondents in UP and Haryana respectively, stated high level of satisfaction with the services. Total 41.33 % and 42.67 % respondents in UP and Haryana respectively, stated medium level of usefulness of the services. In some cases, the technology was not timely demonstrated, and it became consequently useless for the farmers. This could be the reason for relatively, low scores of "timeliness" and "usefulness" of the services.

Table 2 Component-wise mean index scores and categorization of farmers based on index scores

Component Name	Mean Index Score	
	UP (n=75)	Haryana (n=75)
Quality of services (Y_1)	0.712	0.562
Farm Output (Y_2)	0.892	0.817
Farmer-Scientist Interface (Y_3)	0.758	0.502
Institutional linkage and awareness (Y_4)	0.406	0.231
Total Mean Index Score	0.692	0.528
Low category	12 (16)	28 (37.33)
Medium category	38 (50.67)	26 (34.67)
High category	25 (33.33)	21 (28.00)

*Figures within parenthesis reflect percentage

Farm output: The data in Table 4 present the average yield and gross return of the two states. On an average, 39.7, 40.4, and 27.77 % increase in yield (q/ha) were noticed in UP for wheat, rice, and mustard, respectively. In case of Haryana, 42.22, 32.2, and, 24.25 % increase was noticed for the same.

In case of measuring gross return, return from selling a particular crop was measured. Therefore, gross return was the product of yield of a crop (q/ha) and the market price (₹/q) of the crop that was fetched by the respondent. For this study, only gross return out of those crops were recorded which were demonstrated under the programme in order to investigate the impact in change of gross return of respondents. The gross return of a respondent was calculated by summing up the gross return from each crop of which

Table 3 Perceived quality of services

	Timeliness		Relevancy		Usefulness		Satisfaction	
	UP (n=75)	Haryana (n=75)	UP (n=75)	Haryana (n=75)	UP (n=75)	Haryana (n=75)	UP (n=75)	Haryana (n=75)
Mean score	2.01	2.29	2.52	2.03	2.27	1.81	2.36	2.44
Low	13 (17.33)	23 (30.67)	22 (29.33)	20 (26.67)	17 (22.67)	27 (36)	11 (14.67)	19 (25.33)
Medium	26 (34.67)	31 (41.33)	20 (26.67)	18 (24)	31 (41.33)	32 (42.67)	23 (30.67)	31 (41.33)
High	36 (48)	21 (28)	33 (44)	32 (42.67)	27 (36)	16 (21.33)	41 (54.67)	35 (46.67

*Figures within parenthesis reflect percentage

technologies were demonstrated under the programme.

There was 59.73 % and 37.28 % increase in gross return for the beneficiary respondents in UP and Haryana, respectively. It was observed that the gross return of the beneficiary respondents was 60.33 % and 40.95 % more than that of control group of UP and Haryana, respectively.

Farmer-scientist interface: The average number of one-to-one interactions with the scientists was found to be 4.31 and 3.89 times per year, respectively for UP and Haryana, while the average number of *Kisan Gosthis* (farmers' meet) was found to be 4.39 and 3.98 times per year for UP and Haryana respectively. Based on Mean±SD, the respondents were categorized into three categories. 40% of respondents fell in the high interaction category in UP, while in case of Haryana, 49.33% of the respondents fell into the medium interaction category. 38.67% and 45.33% respondents in UP and Haryana, respectively were found to have medium level of frequency of *Kisan Gosthis*.

Respondents (32%) in UP had interaction over phone once a month, while in case of Haryana, 37.33% had interaction over phone twice a year. In case of 'mobile SMS' based agro advisory services, 22.67 % and 8 % respondents in UP and Haryana, respectively stated that they had contact with the scientists over SMS once in a month. Respondents (20%) in UP were using social media to stay connected among themselves as well as with the scientists once in two months, while in case of Haryana it was only 5%.

In case of UP, majority were availing farm literature once a year before implementation of the programme (54.67%) while after implementation of MGMG, majority reported to avail farm literature once in six months (46.67%). In case of Haryana, both before (61.33%) and after (52%) implementation, majority availed farm literature once a year. Around 44% and 61.33% respondents of the control groups of UP and Haryana respectively, were reported to have never availed farm literature.

Institutional awareness and linkage: For measuring awareness, an awareness test was formulated containing fifteen items that reflected the issues of national and agricultural importance, including relevant Govt. schemes, based on review of literature and discussion with experts. For measuring institutional linkage, the number of relevant institutions (KVK, ATMA, Line Department, NGOs, Private Extension Service Providers, Others), with which respondents were associated, was recorded. For each institute score 1 was given. The awareness of respondents about relevant Govt. schemes in both the states were quite low with mean of 9.92 and 6.21 (out of 25), respectively in UP and Haryana. In case of both UP (60%) and Haryana (68%), majority of the respondents fell in the category of low awareness. In case of institutional linkage also, majority of the respondents in Haryana (57.33%) and about 41.33% in UP fell in the low category.

Before-after and With-without Analyses: Both 'Before-after' and 'With-without' analyses were conducted for each indicator except the first component, i.e. "quality of services" as it was studied only for the experimental group after implementation of the programme. The results for all indicators are presented in Table 5.

Increases in average yield and gross return for all three crops were found to be significant using paired samples *t-test* in case of both the states. Beneficiary respondents were also noticed to have significantly higher yield and gross return than control group in both the states, using independent samples *t-test*. The reasons for this could be the adoption of improved varieties, which resulted in relatively higher yield

Table 4 Average yield and gross return of respondents for major crops

	Mean (UP)			Mean (Haryana)		
	Experimental group (n=75)		Control group (n=75)	Experimental group (n=75)		Control group (n=75)
	After MGMG	Before MGMG		After MGMG	Before MGMG	
Yield (q/ha)						
Wheat	51.38	36.78	33.32	53.36	37.52	40.02
Rice	40.66	28.96	29.57	35.47	26.83	23.87
Mustard	19.6	15.34	13.59	20.48	16.47	15.65
Gross return (₹/q)	100846.23	69031.43	69045.87	93285.51	70769.81	69712.54

Table 5 Significance of before-after and with-without analyses

Indicator	Before-after				With-without			
	UP (N=75)		Haryana (N=75)		UP (N=150)		Haryana (N=150)	
	Test statistic	P value	Test statistic	P value	Test statistic	P value	Test statistic	P value
Wheat yield	t value = 13.707	<0.0001*	t value = 7.653	< 0.0001*	t value = 3.630	0.000*	t value = 3.886	0.000*
Rice yield	t value = 10.984	<0.0001*	t value = 9.759	< 0.0001*	t value = 4.653	0.000*	t value = 3.672	0.000*
Mustard yield	t value = 14.284	<0.0001*	t value = 9.741	<0.0001*	t value = 3.630	0.000*	t value = 10.741	0.000*
Gross return	t value = -18.292	< 0.0001*	t value = 11.251	< 0.0001*	t value = 5.486	< 0.0001*	t value = 3.349	0.001*
Frequency of Interaction with scientists	t value = 12.562	< 0.0001*	t value = 12.333	< 0.0001*	t value = 13.588	< 0.0001*	t value = 12.200	< 0.0001*
Frequency of KisanGosthi	t value = 5.250	< 0.0001*	t value=4.662	< 0.0001*	t value = 6.439	< 0.0001*	t value = 6.126	< 0.0001*
Frequency of interaction with scientists over ICT media	V = -2.252	0.031*	V=-1.036	0.082	U = 0.003	0.007*	U = 0.108	0.047*
Frequency of farm literature:	V = -6.901	< 0.0001*	V= -1.941	0.052	U = 0.000	< 0.0001*	U = 0.000	< 0.0001*
Institutional linkage	t = 3.177	0.002*	t=1.932	0.057	t = 2.483	0.014*	t = 0.581	0.562
Awareness	NA	NA	NA	NA	t = 10.136	< 0.0001*	t = 1.225	0.223

*Significant at 5 % level

that subsequently helped the farmers fetch better return.

An earlier study conducted by Glendenning *et al.* (2010) stated that one of the key hindrances to farmers' use of extension services is inadequate contact by the service providers, which need to reach a large and complex farming community. In the present study, since there was no earlier programme that explicitly emphasized on direct farmer-scientist interface and farmers' meet, we could find significant increase in frequency of farmer-scientist interaction and *Kisan Gosthi* in both before-after and with-without analyses in case of two states using paired samples *t-test* and independent samples *t-test*, respectively.

Further, Wilcoxon Signed rank test confirmed that in case of UP, experimental group had accessed more frequent interaction over ICT tools and farm literature than before, however, no significant difference was found in case of Haryana. Further, Mann-Whitney test showed that in both the states beneficiary respondents had significantly more frequent access to interaction over ICT tools and farm-literature than control respondents. The reason could be, before implementation of the programme, farmers did not have the opportunity of establishing direct contact with the scientists over phone or social media. Such instances were very few and rare before this programme as stated by the respondents. The farmers also formed groups on social media to stay connected with each other as well as with the scientists under the programme.

In case of awareness, we found significant difference in awareness between experimental group and control group in UP, however, no significant difference was found in case of Haryana using independent samples *t-test*. This could be due the negligence about this activity under the programme. Since most of the information dissemination was regarding package of practices of crops, awareness building on Govt. policies, priority areas, and schemes remained untouched in many of the cases. Significant difference regarding institutional linkage was found in UP in both with-without and before-after analysis, while no significant difference was noticed in case of Haryana using independent samples *t-test* and paired samples *t-test*, respectively (3.2.18).

Based on the discussion with groups of scientists and the respondents of the selected clusters, some problems were identified which could be responsible for lowering performance of the programme in some clusters. Accordingly, some suggestions were formulated which are mentioned below:

- Increasing the reach of the programme beyond the contact farmers to farmers from all socio-economic classes across the village
- Need based and location specific transfer of technology

- Transfer of technologies other than varieties
- Information dissemination other than package of practices
- Leveraging the farmers with useful institutions like KVK, Line Departments, Processing units, Agri-business Centres, Cooperatives, Farmers' Organizations etc.
- Empowering farmers with knowledge and awareness on several relevant issues which are of agricultural and national importance
- More timely delivery of relevant technologies
- Clarification to the scientists about objectives and expected set of activities under the programme
- One cluster may contain less number of villages in order to serve more effectively
- Periodic performance assessment of the activities to keep track of progress of the programme and also to check the several lacunae which might take place while implementing the programme
- Separate fund may be allocated to undertake activities under the programme
- A'performance linked' reward system for the scientists may be introduced to sustain their motivation

The study presented a realistic picture of the present status of MGMG programme in the selected study area. We could find significant impacts on yield, gross return, and farmer-scientist interface. However, more efforts are required in building institutional linkage and generating awareness on several relevant issues. Outcome of the study provided some idea on the progress of the programme so far and is expected to be helpful in chalking out future work plan for the programme. The study can be helpful for the policy makers and development agencies at the national level for effective formulation of strategies and designing suitable extension interventions in future. The developed index under the study can be used by other researchers and policy makers, to assess the performance of MGMG programme across the country. Similar indices can be developed for impact assessment of other related agricultural and rural development programmes as well.

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