

Terms of Reference for the Impact of Per Drop More Crop component of PMKSY on coverage of area under MI, incentivisation of suitable Crop Pattern, crop productivity, cost savings and water use efficiency (2016-17 to 2018-19) for achieving targets under SDG Goal-6

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1. Title of the Study:

Impact of Per Drop More Crop component of PMKSY on coverage of area under Micro Irrigation, incentivization of suitable crop pattern, crop productivity, cost savings and water use efficiency (2016-17 -2018-19) for achieving targets under SDG-6 .

2. Department implementing the Scheme:

The Department of Agriculture, Horticulture and Sericulture, Government of Karnataka

3. Background and the context:

Water is a crucial input in crop production. The judicious use and conservation of water is of utmost importance in modern Horticulture/ Agriculture. Micro-Irrigation involving Drip and Sprinkler irrigation has proven advantageous in terms of not only saving water but also in saving energy, labour, improved weed management, enhanced productivity, besides profiting to the farmer. Knowing the importance of Micro-Irrigation Programme Karnataka state is being extended assistance for Micro-irrigation programme under various schemes (PMKSY/NMSA-OFWM/NMMI/RIDF etc). State Government is providing subsidy for installation of Micro-Irrigation (Drip/ Sprinkler) units since from 1991-92 to till date.

From 2005-06 till 2013-14 the scheme was brought under Centrally Sponsored Scheme (CSS) on Micro-Irrigation. During 2014-15 the assistance for Micro Irrigation was a part of On Farm Water Management (OFWM) under the new scheme National Mission on Sustainable Agriculture (NMSA).

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From 2015-16, the Programme has been implemented under Centrally Sponsored Per Drop More Crop (PDMC) component of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - Micro-Irrigation.

Since inception of the scheme, an area of 16.51 lakh hectares (Horticulture 5.87 lakh Ha + Non-Horticulture 10.63 lakh Ha.) has been brought under Micro Irrigation by providing subsidy of Rs. 4018.05 crore (Horticulture Rs.2027.82 Crore + Non-Horticulture Rs.1990.23 crore) to 11.62 lakh (Horticulture 4.96 lakh + Non-Horticulture 6.66 lakh) farmers who have installed Drip/ Sprinkler for Horticulture, Agriculture and Sericulture crops.

Under this Scheme by increasing its State Share Government of Karnataka (GoK) is providing 90% subsidy upto 2.00 ha. and above 2.00 upto 5.00 ha. subsidy is provided according to the Government of India (GoI) norms to all categories of Farmers.

The Sharing pattern between Central and State is as follows.

Category	Central Share (%)	State Share (%)			Total (%)
		Mandatory State Share (%)	Additional State Share (%)	Total State Share (%)	
Subsidy upto 2.00 ha.					
SF/MF	33	22	35	57	90
Others	27	18	45	63	90

Expenditure incurred, area covered and farmers benefitted from last 4 years (2014-15 to 2017-18) in Horticulture & Non-Horticulture Crops are as follows.

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(Rs. In lakh) (Area in Ha.)

Financial Year	Allocation	Release (including OB)	Expenditure	% for total available fund	Physical Achievement	No. of beneficiaries
2014-15	33085.99	35660.07	32800.29	91.98	68607	80359
2015-16	32207.10	32332.31	31613.45	97.78	81330	82289
2016-17	48578.80	54286.15	51349.90	94.59	164334	159523
2017-18	86263.35	72982.54	71154.90	97.50	209850.84	212183
Total	200135.24	195261.07	186918.54	95.72	524121.84	534354

Objectives of the Scheme

1. Increase the area under micro irrigation technologies to enhance water use efficiency in the country.
2. Increase productivity of crops and income of farmers through precision water management.
3. Promote micro irrigation technologies in water intensive/consuming crops like sugarcane, banana, cotton etc and give adequate focus to extend coverage of field crops under micro irrigation technologies.
4. Make potential use of micro irrigation systems for promoting fertigation.
5. Promote micro irrigation technologies in water scarce, water stressed and critical ground water blocks/districts
6. Link tube-well / river-lift irrigation projects with micro irrigation technologies for best use of energy both for lifting and pressurised irrigation as far as possible.
7. Establish convergence and synergy with activities of on-going programmes and schemes, particularly with created water source for its potential use, integration of solar energy for pressurised irrigation etc.
8. Promote, develop and disseminate micro irrigation technology for agriculture and horticulture development with modern scientific knowledge.
9. Create employment opportunities for skilled and unskilled persons, especially unemployed youth for installation and maintenance of micro irrigation systems.

4. Evaluation Scope, Purpose and Objective

The State has 10 distinct agro-climatic zones. The total cropped area of the State is 130.62 lakh ha., with a net sown area of 105.22 lakh ha. The State has net irrigated area of 34.89 lakh ha., (33.2%) of which 11.56 lakh ha. is irrigated by canals. The area of 1.97 lakh ha. is irrigated by tanks whereas the area irrigated from wells, tube/ bore wells, lift irrigation and other sources is 21.34 %. Thus, about 60 per cent of the irrigated area is under protective irrigation, which envisages use of Micro-Irrigation systems to enhance the efficiency of water use and ultimately production and productivity of agricultural crops.

The Micro-Irrigation Programme under PMKSY is implemented effectively in all 30 districts by Government of Karnataka (GoK) from line Departments like Horticulture, Agriculture & Sericulture by providing 90% subsidy upto 2.00 ha. and above 2.00 upto 5.00 ha. Subsidy is provided according to Government of India norms (Scheme guidelines).

The Central and State Government are providing funds for exclusive and effective implementation of the MI Programme and there is large number of units installed and substantial subsidy is given. The purpose of the evaluation is to have extensive and comprehensive inspection/ random checking of the units (for which subsidy has been provided) to farmers' field during 2017-18.

Objectives of Evaluation

1. To review the scheme implementation as per the guidelines – land size, crop priorities, selection of beneficiaries etc.
2. To assess the impact of the scheme on crop diversification, crop production, productivity, energy saving, water management and income of the farmers across the regions and categories.

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3. To assess promotion micro irrigation technologies in water scarce, water stressed and critical ground water blocks/districts & linking of tube-well / river-lift irrigation projects with micro irrigation technologies for energy saving.
4. To examine quality and functional status of the machinery under the scheme by MI companies

5. Evaluation Questions/Issues

- Assess the need and impact of the scheme in India & Karnataka based on a comprehensive review of literature.

Inputs-Adequacy and implementation

- Analysis of allocation, release and expenditure under the scheme.
- Identification of beneficiaries across social groups and awareness, training, provision and release of subsidies under DBT across categories and social groups of the farmers.
- Allocation of micro irrigation systems as per timeline.
- Preparation of District Irrigation Plans (DIP) and Annual plans.
- Establishment & functioning of various committees and coordination across different stakeholders.
- Identification of MIS companies and quality and functioning of structures supplied.
- Implementation of SCP&TSP component under the scheme.

Efficiency/ Output

- Adoption rate to sprinkler and drip irrigation across agro climatic zones and farmer groups and factors influencing it.
- Training, monitoring and support for maintaining the structures.
- Incentivization and changes in cropping pattern and crop yield/productivity across region and categories and social groups of farmers.

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- Research and documentation on Micro-Irrigation -few cases of success and failures.
- Changes in cropping pattern and crop yields among SC/ST farmers.
- Social audit reports and their findings.

Impact

- Make an Economic analysis in terms of costs and benefits of MIS with annual, perennial crops and assess the change in economic Status of farmers? (Before and after adoption of MIS).
- Review the performance of the scheme in terms of following indicators as per the guidelines.

Indicators	Better performance	Moderate performance	Poor performance	Gender	
				Male	Female
MI adoption rates - % Coverage of the area under MIS					
Increase in water use efficiency – %					
Irrigation cost savings %					
Savings on fertiliser consumption – %					
Savings on energy consumption - %					
Increase in productivity: crops – % %, fruits – % Vegetables – %					
Introduction of new crops – %					
Increase in Farmers' income – % across the regions, crops and groups					
Soil health improvement %					

- Suggestions in improving the Scheme implementation, any Policy changes needs to be adopted by the Government in order to make the scheme successful?

6. Sampling and Evaluation methodology

The Evaluation is to be taken for the MIS installed during 2017-18. As per the Progress report 2.35 lakh ha. are has been covered providing the subsidy for 2.12 lakh no. farmers. A multi stage sampling methodology is being followed.

- I Stage- As the study is related to agriculture, cropping pattern, productivity etc. hence the agro climatic zones are taken into consideration. The ten agro-climatic zones in the State are considered for sampling at this stage.
- II Stage –One district is identified from each agro climatic zone for the study, The choice of the district is based on the district with maximum number of beneficiaries in the zone and relatively larger geographical area falling in the zone.
- III Stage- From the districts in each region, the sample size is calculated @ 95% of level of confidence and 4% margin of error.
- IV- stage the sample is proportionately distributed across the categories of beneficiaries in Horticulture, Agriculture & Sericulture.
- V Stage – at field level the sample to be distributed across the categories of farmers, caste and gender.
- 1% control sample of non beneficiaries in the same area.

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The sample drawn is indicated in the following table.

Distribution of the sample across the agro-climatic zones- 2017-18

Sl. No	Agro Climatic Zone	District in the sample	Total Beneficiaries	Beneficiaries Sample	Distribution of Sample		
					Horticulture	Agriculture	Sericulture
1	North Eastern Transition Zone	Bidar	6397	364	42	318	4
2	North Eastern Dry Zone	Gulbarga	9219	370	68	297	5
3	Northern Dry Zone	Belgaum	15798	376	64	306	6
4	Central Dry Zone	Tumkur	10506	372	157	193	22
5	Eastern Dry Zone	Kolar	6202	362	160	151	51
6	Southern Dry Zone	Chamarajnaagar	4475	370	205	157	08
7	Southern Transition Zone	Mysore	13592	376	68	304	4
8	Northern Transition Zone	Haveri	12360	375	78	293	4
9	Hilly Zone	Shimoga	11559	375	96	278	1
10	Coastal Zone	Uttara Kannada	4033	350	58	287	5
Total			98599	3690	891	2684	115

7. Deliverables and time schedule

The Department of Agriculture and KEA will provide the necessary information pertaining to the study and also co-operate with the consultant organization in completing the assignment task within the stipulated time period. The concerned district and taluk officials will be instructed by the Department of Agriculture for providing the required information/data at the taluk and GP levels.

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It is expected to complete the present study in 6 months time line, excluding the time taken for approvals at KEA.

Table 5: Timelines and deliverables

Inception Report	1 month after signing the agreement
Field Data Collection & analysis	3months after the date of work plan Approval*
Draft report submission	1 month after Field Data Collection & analysis
Final report	1 Month after approval of the Draft report
Total duration	6 Months

*The field work duration is extendable in special cases with proper justification upto two months by CEO, KEA.

8. Qualities expected from the Report

The evaluation report should generally confirm to the United Nations Evaluation Guidelines (UNEG) "Standards for Evaluation in the UN System" and "Ethical Standards of Evaluations".

The report should present a comprehensive review of the Scheme/ programme in terms of the content, implementation process, adequacy, information and access to beneficiaries.

The Report should provide a scientific assessment of the impact of the Evaluation of implementation and impact of Micro-Irrigation programme in the State under Per Drop More Crop component of PMKSY during 2017-18

The qualitative data should be used in unbiased manner to support or for further analysis of the reflections from the quantitative data. The analysis should provide

adequate space for assessing the variations across the regions and social categories. Case studies to be presented to bring out the realities at the household level.

The report should come out with specific recommendations based on adequate field evidence for any modifications in the programme design, content, implementing procedures, and any other modifications to improve the access and impact of the Scheme/Programme.

9. Structure of the report

The following are the points- only inclusive and not exhaustive- which need to be mandatorily followed in the preparation of evaluation report:

By the very look of the evaluation report it should be evident that the study that of Agriculture (Horticulture & Sericulture) Department and Karnataka Evaluation Authority (KEA) which has been done by the Evaluation Consultant Organization. The report should be complete and logically organized in a clear but simple language. Besides confirming to the qualities covered in the Terms of Reference, report should be arranged in the following order:

Preliminary Part

- Title and Opening Page
- Index
- List of acronyms and abbreviations
- Executive Summary- A section that describes the program, purpose and scope of evaluation, research design and methodology, key findings, constraints and recommendations.

Chapter-1 Introduction and Study design

- Background- A section that briefly covers the history or genesis of the sector under which the programme/scheme being evaluated covered. It should give recent fact sheets taken from reliable and published sources and review of the

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progress of the scheme at Taluka/District level.

- Log Frame theory/ Theory of change
- Objectives and performance of the program - This section includes the stated objectives of the program and the physical and financial achievements of the selected program in the period of evaluation. It should cover the description of the target group, aim of the program, the programme guidelines and method of selection of beneficiaries and the physical and financial achievements.

Chapter –II Review of literature and Evaluation Methodology

- Review of past evaluation reports and their findings- Theoretical background.
- Evaluation Methodology - This should include research design, hypotheses for testing, evaluation matrix sample design and size, Methodology for data collection and analysis- questionnaire design and pilot test, data analysis.
- Limitations/constraints in the evaluation study.

Chapter III - Findings and discussion

- Tables and figures are to be used to present results in summary and/or graph format to add clarity to the presentation. In addition to simply presenting the results in a straightforward manner, the author also has to provide the readers with his/her interpretation of the results, implications of the findings, conclusions. Each result is discussed in terms of the original hypothesis to which it relates and in terms of its agreement or disagreement with results obtained by other researchers in similar/related studies.
- A detail analysis of Case Studies, Best Practices and Focus Group Discussions

Chapter IV Summary and Conclusions

Chapter V- Recommendations – Recommendations to be evidence based- short term for mid course corrections & long term for change in program design/ policy change.

Annexure

- a. Sanctioned Terms of Reference of the study.
- b. Survey tools and questionnaires

- c. Place, date and number of persons covered by Focus Group Discussion (if applicable).
- d. Table showing details of major deviations, non-conformities, digressions of the program.

10. **Administrative arrangements**

The core team should comprise of the following technical members and should possess requisite qualification and experience as stated below:

Table 6: Expert Team to carry out the study

Sl. No.	Subject Experts Requirements	Subject Experts Requirements	Educational Qualification
1.	Principal Investigator	A first Class Post Graduate in Agriculture/Horticulture. Ph.D in the subject preferable	05 years of experience in field
2.	1 st Core team member	BE-/Mechanical/Electrical/Agri. Engineering	Should also possess a minimum of three (3) years of experience in allied sector projects with ability to test the MIS structures.
3.	2 nd Core team member	Post Graduate in Statistics/Economics/ MCA with knowledge of Statistical analysis	3 years experience in data analysis
4	3 rd Core Team Member	Expert in Translation (English to Kannada)	M.A in English/Kannada with expertise in translation

The Team should engage such numbers that the evaluation is completed within the scheduled time period as prescribed by the ToR.

11. **Cost and Schedule of Budget release**

The Output based budget release will be as follows-

1. The **first installment** of Consultation fee amounting to 30% of the total fee shall be payable as advance to the Consultant after the approval of the inception report, but only on execution of a bank guarantee of a scheduled nationalized bank, valid for a period of at least 12 months from the date of issuance of advance.
2. The **second installment** of Consultation fee amounting to 50% of the total fee shall be payable to the Consultant after the approval of the Draft report.
3. The **third and final installment** of Consultation fee amounting to 20% of the total fee shall be payable to the Consultant after the receipt of the hard and soft copies of the final report in such format and number as prescribed in the agreement, along with all original documents containing primary and secondary data, processed data outputs, study report and soft copies of all literature used in the final report.

12. **Selection of Consultant Agency for Evaluation**

The selection of evaluation agency should be finalized as per provisions of KTPP Act and rules without compromising on the quality.

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13. **Contact person to get further details about the study**

The Contact person details about the study is as below-

At KEA- Consultant (Evaluation) 9342331301

At Department :

Name	Designation	Contact e-mail id and Phone no.
B. Y, Srinivas	Director of Agriculture, Agriculture Department, Shehadri road, Bengaluru	agrifit@nic.in Phn. no. 080-2224272
R.N, Suman Singh	Additional Director of Sericulture (in-charge), Sericulture Department, Multi- Storied Building, Bengaluru	teamseriplan@gmail.com Phn. no. 9880537805/ 080-22256786
Dr. B, Krishna	Joint Director of Horticulture (Drip Irrigation), Lalbagh, Bengaluru	jdhdrip@gmail.com Phn. no.:9900860541 / 080-26576950

The Terms of Reference were approved by the Technical Committee of KEA
in its 44th Meeting held on 17th July 2019.

Chaya Degaonkar

Prepared by:
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Annexure

Details of Area Coverage, amount Spent and no. of beneficiaries benefitted during 2017-18 under PMKSY-Per Drop More Crop are as follows (Hort+Agri+Seri)

Sl. No.	Districts	Amount Spent (Rs. In lakh)	Area Covered (In Ha.)	No. of Beneficiaries
1	Bangalore (U)	495.07	871.62	1027
2	Bangalore (R)	1035.28	1964.52	2698
3	Bagalkote	4200.33	11582.64	11112
4	Belgaum	6773.25	15532.40	15798
5	Bellary	2002.28	5445.45	4713
6	Bidar	2578.52	7176.80	6397
7	Bijapur	3516.87	11532.69	12148
8	Chamarajanagar	1444.86	3792.32	4475
9	Chikkaballapur	3041.35	3433.94	3876
10	Chikkamagalur	1909.27	7673.79	8676
11	Chitradurga	2338.17	7549.28	8268
12	D.Kannada	141.98	553.49	616
13	Davanagere	3963.35	12628.51	13741
14	Dharwad	1277.92	4610.36	4441
15	Gadag	1219.28	4163.64	4027
16	Gulbarga	3803.16	10697.41	9219
17	Hassan	2961.94	12177.96	11049
18	Haveri	3200.01	13565.94	12360
19	Kodagu	181.18	916.73	903
20	Kolar	3941.33	6090.88	6202
21	Koppal	2753.53	4910.23	4854
22	Mandya	2809.32	7952.18	8933
23	Mysore	3692.54	13193.19	13592

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24	Raichur	1446.97	4404.52	4108
25	Ramanagar	2005.72	4130.59	4698
26	Shimoga	2511.14	11088.46	11559
27	Tumkur	3116.65	10205.11	10506
28	Udupi	254.08	905.69	1012
29	U.Kannada	837.95	3979.70	4033
30	Yadgir	1635.79	7120.80	7142
Total		71089.09	209850.84	212183