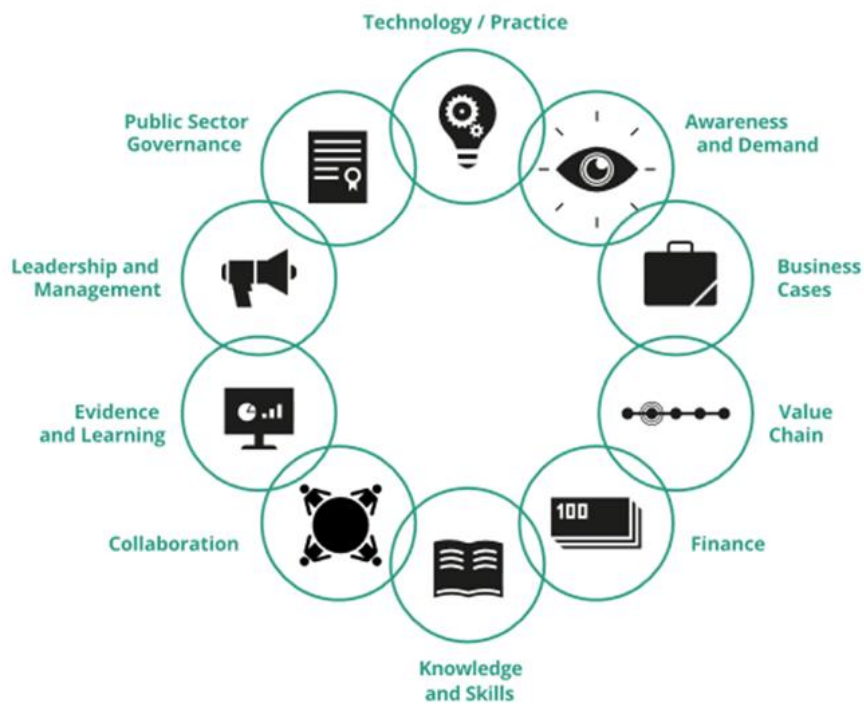


Assessment of Scaling Ingredients for Smart Irrigation Toolkit (SIT)

CIMMYT (The Scaling Scan)



Improving the livelihoods of marginal farmers, by outscaling irrigation and agricultural practices, through collectives, in the Eastern Gangetic Plains (WAC 2018 163)

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DRAFT PROJECT REPORT Number 5

August 2020

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The CIMMYT Scaling Scan approach presents ten different areas or ingredients that need attention in order for scaling to be successful. Members of the project team considered four questions that probe into the key drivers for reaching scale within each of the ten scaling ingredients. Key points raised by participants are provided for each of the questions below.

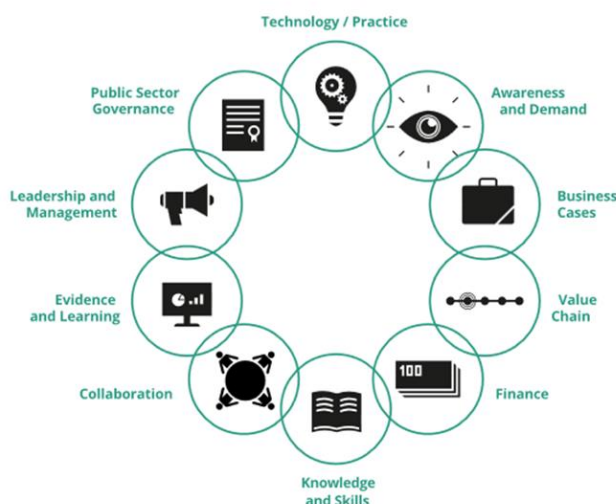


Figure 1: Areas to consider in order for scaling to be successful

The project team considered four questions that probe into the key drivers for reaching scale within each of the ten scaling ingredients and scored their level of confidence in scaling capability using the ratings below.

1. No, this is very uncertain or not enough information to answer
2. Serious doubts
3. Some doubts/unsure
4. Quite confident
5. Yes definitely, this is not an issue for my scaling case OR not applicable

Results are collated in the graphics below.

Table 1: Rating across ten scaling areas and individual questions informing each scaling area

	Overall score		Question 1	Question 2	Question 3	Question 4
1. Technology/ practice	4.1	1. Technology/ practice	4.7	4.2	3.8	3.7
2. Awareness and demand	3.7	2. Awareness and demand	3.8	3.0	3.5	4.3
3. Business cases	2.3	3. Business cases	2.0	2.0	1.7	3.3
4. Value chain	2.6	4. Value chain	3.5	2.0	2.8	2.0
5. Finance	3.3	5. Finance	3.3	3.0	4.7	2.3
6. Knowledge and skills	3.6	6. Knowledge and skills	3.0	3.3	3.7	4.5
7. Collaboration	3.6	7. Collaboration	3.2	4.0	4.3	2.8
8. Evidence and learning	4.1	8. Evidence and learning	3.2	4.7	4.3	4.3
9. Leadership and management	3.8	9. Leadership and management	3.7	4.0	3.3	4.0
10. Public sector governance	3.0	10. Public sector governance	3.2	3.7	2.3	2.8

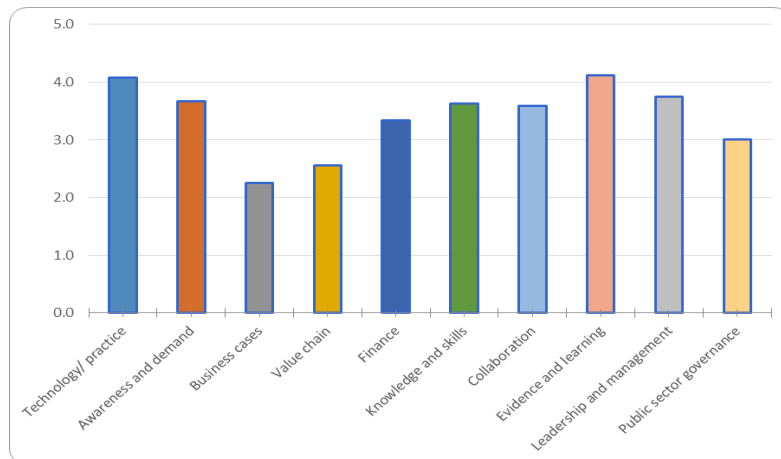


Figure 2 Graphical representation of overall scaling ratings

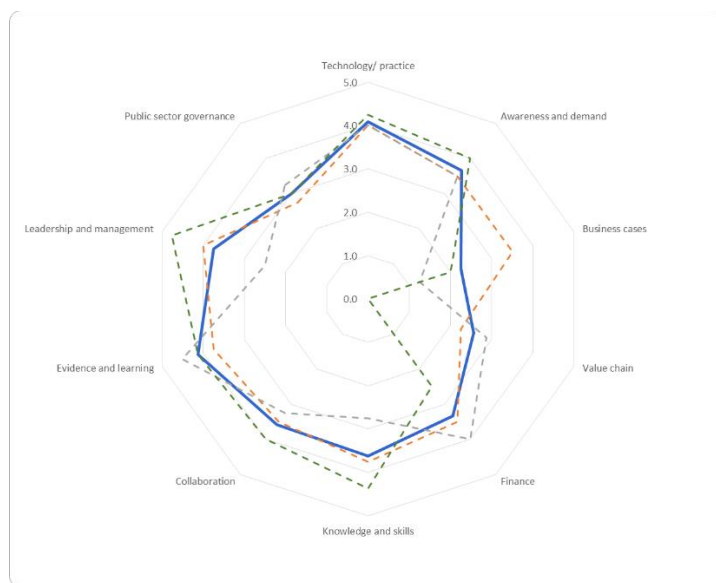


Figure 3 Example of scoring variability across scaling dimensions for three participants

Points raised by participants on the ten scaling areas and individual questions informing each scaling area are given below.

1. Technology/ practice [4.1]

1.1 Is your innovation relevant to your target group? [4.7]

The Target Group is well defined and comprises:

- Target Group 1: Government and private sector irrigation investors, agencies, advisors and managers of irrigation schemes. They seek to manage the quality of an investment and identify weaknesses in on ground installations. The Smart Irrigation Toolbox supports improved system operation on commissioning and training and effective use of scheme infrastructure and government/donor investments
- Target Group 2: Progressive farmers and marginal farmers ideally as part of a collective, where the benefit is in terms of improved farm productivity and irrigation water use efficiency improvements and reduced costs (eg energy) and possibly time and labour advantage.

The importance of on-farm irrigation management is well understood, especially by target group 1 and the innovation (SIT) directly addresses the challenge of on-farm water management through processes and technologies for direct assessment of the efficiency of irrigation infrastructure.

1.2 Does the innovation have a comparative advantage over existing alternatives? [4.2]

- Improved irrigation performance and associated benefits are achievable with relatively minor interventions.
- Advantages are not always obvious and require some measurement and analysis. This is an important part of the toolbox.
- The key is to package standard approaches with training for systematic application. The alternative is no measurement and monitoring, which seems to be the norm.
- Irrigation equipment is installed (with varying quality) and expected to perform and farmers have no concept on what is good and bad performance.
- Irrigation improvements can in some cases be easily demonstrated immediately (e.g. better flows or reduced fuel consumption). Others can only be realised over the season (e.g. improved production through better irrigation scheduling).
- Piloting of SIT on a larger scale is required to demonstrate the advantage of the approach, package the technology for easy application and develop institutional and ultimately policy support.
- Farmers who are direct beneficiaries of better irrigation practice are unlikely to adopt without institutional and incentive support.

1.3 Is the innovation easy to adopt? [3.8]

- While application of SIT is relatively simple it requires field implementation by trained staff, with associated time and costs.
- Delivery is ideally institutionalized as part of the package of scheme development and implementation.
- Delivery of SIT needs to be tailored to suit the local conditions (irrigation system type, cropping system).
- Very little customisation of the technologies is envisaged and most customisation will be in extent of measurement and resulting management practice changes.
- Building the link between farmers and irrigation officers will be crucial.

1.4 Is the innovation compatible with local circumstances and preferences? [3.7]

- Perception of the need for improved irrigation performance are favourable. However irrigation scheme developers are interested in getting systems on the ground and then tend to walk away from maintenance responsibilities. This has negative long term impacts.
- A change in mindset and demonstration of long term benefits to improved irrigation practice is required. Approach can be targeted at subsets of the toolbox. This should be part of the strategy.
- Application of SIT can be modified to local environmental and social circumstances relatively easily. The technology and approach can be experienced, tested, and discussed with other users (peer-to-peer) for obtaining (social) credibility.
- As demonstration in DSI4MTF, there has been a positive perception from farmers with some farmers participating in field measurement which improved understanding of need for changes to practice.
- Some components of the tool are however more appropriate for skilled staff, such as solar pump assessments.

2. Awareness and demand [3.7]

2.1 Do important stakeholders recognize that a new technology/practice is necessary and desirable? [3.8]

- The detail of improved on-farm irrigation management is often overlooked and the extra effort involved to improve irrigation performance is often seen as a cost to the system.
- Thus while the target group understand the importance of irrigation management they do not always appreciate the benefits to their investments or farming operations. This needs to be demonstrated in a piloting program.
- Farmers often have a misguided and unwavering trust in the suppliers. Considering the poor level of irrigation and on-farm irrigation infrastructure management in many developing countries, tools and approaches such as SIT have an important role to play.
- Policy change may be required to support scaling and adoption especially in the government sector.

2.2 Does the target group have access to information about the innovation and are there effective communication channels? [3.0]

- Information needs to be further developed and packaged. This is best done as part of a pilot project alongside a large implementation agency to develop the path for scaling.
- While appropriate communication channels exist in the regions (eg government, private sector, local institutions and progressive farmers), training and exposure is required to exploit these.

2.3 Do you have evidence that demand for the innovation is real and growing as anticipated? [3.5]

- Improved water management should be front of mind for farmers and irrigation agencies and managers.
- The benefits of improved irrigation through application of SIT is easily conveyed. However there still needs to be convincing as to how improved on-farm irrigation programs using SIT could be implemented and the business case.
- Funding this by capturing costs as part of scheme investment and maintenance costs is one option, however other innovative financing models need to be considered targeting the divisions of the organisation responsible for water management.
- Stakeholders are generally not aware of the need yet, hence the motivation for broader piloting. The cost of the innovation is certainly likely to be low when compared with the potential benefit.

2.4 Can you distinguish segments of the target group for effective marketing of the innovation? [4.3]

- Different segments of the target group are easily distinguished. For example farmers, extension officers or irrigation program managers. This can be further segmented, based on the district or region, with marketing and deployment tailored to the local context.
- Appropriate components of the irrigation system can also be targeted for monitoring and evaluation, depending on the local priorities (e.g. furrow irrigation or drip irrigation; pumping or irrigation scheduling).

3. Business Cases [2.3]

3.1 Are there viable business cases for the technology/practice for all actors along the value chain? [2.0]

- All value chain actors (e.g. farmers, service providers and irrigation scheme developers/managers) benefit from improved on-farm irrigation management and adoption of SIT. There are both economic, social and environmental benefits.
- Clear business cases do not exist. These need to be developed to document who benefits (irrigator, scheme operator or s investor), who should pay for system evaluations and how they should be funded. The role of the private sector and system installer/contractor will also be important and needs to be assessed as part of a pilot study.

3.2 Is enough information available to continue developing and sharpening business cases for the technology/practice? [2.0]

- There is insufficient information for a comprehensive business case. DSI4MTF has some demonstration data which showed significant benefits, however this needs to be further developed in association with an agency/partner who has responsibility for the irrigation scheme and as part of a follow on pilot project.
- Key information needed includes the competitiveness of the proposition, demand/supply analyses, cost/benefit analyses, market size and segments and risks.
- End users are unlikely to be ready to pay for these services in the short term and until the value proposition is demonstrated. Institutions and government agencies are most likely to be key implementation partners in the short term.

3.3 Do all value chain actors have a genuine interest to continue and improve the supply and use of the technology/practice? [1.7]

- Irrigation scheme investors do not appear to have concerns about on-farm performance. It is not part of their mandate.

- The farmers themselves are not well educated or informed. The system designer and installer is concerned primarily about reduced cost.
- Ongoing performance and maintenance is generally forgotten after system installation. This is the gap that needs to be filled and a business case for this needs to be demonstrated with cost-benefit for each party.
- Appropriate models could be customised and replicated across other regions by the implementing organisation and across organisations.

3.4 Is the business climate conducive to the business cases of all actors? [3.3]

- Water shortage, energy costs, lower profits are all drivers for improved monitoring and measurement leading to improved practice change. A simple set of tools and processes to achieve this is timely. Competition will not impact the innovation.
- Regulation and governance should see increased focus on WUE driven by climate change and environmental impacts creating opportunities for SIT.
- A strong business case still needs to be developed. This is best done as part of a broader irrigation development program with sufficient scale to demonstrate opportunities to all actors.

4 Value Chain [2.6]

4.1 Can the value chain provide/enable the technology/practice with the right quality, in the right quantity, and in a timely manner? [3.5]

- The value chain could include a number of following: project investor (eg World Bank), government development agency (eg State Govt), scheme designer/contractor, scheme manager (could be private sector or agent for Client, or WUA, or collective association representing the users), farmer/irrigator (the end user).
- SIT technology supply, in terms of hardware, is readily available. Service/extension staff responsible for data collection will need to be supported by implementation organisations. Quality assurance will be key with appropriate training of staff possibly with certification.

4.2 Are relations between the various actors in the chain adequately developed? [2.0]

- Relations between the various actors in the chain are somewhat fragmented and most likely strengthened around an irrigation scheme development project with formal recognition as part of a delivery and maintenance service.
- There is an imbalance of power between actors in the value chain.
- Suppliers and installers of irrigation hardware should be brought into the initiative. They have a responsibility to deliver irrigation systems which meet user requirements and best practice. They need to be made accountable. This is only likely through contractual obligations imposed by the development agency.

4.3 Is the overall performance of the value chain conducive to scaling? [2.8]

- Overall performance of the value chain is potentially very low.
- This will be scheme specific. The value chain identified above is inefficient.
- Contractual obligations or financial incentives are required for good performance of the value chain actors with clear roles and responsibilities.
- The value chain is scalable and will be location/scheme specific. Some organisations exist already, however this need to be formalised. Roles, responsibilities.

4.4 Are the target group and other value chain actors adequately organized? [2.0]

- The target group (marginal farmers) need to be organized via farmer organizations, collectives, cooperatives, business associations, for best benefit.
- Through the organization of value chain participants input provision, marketing, access to services and bargaining power would benefit from economies of scale.
- There is likely to be inadequate organization/coordination across different types of value chain actors for adequate strategic direction and joint priority setting.
- There is a need for institutional change for the SIT to be implemented with incentives and rewards at appropriate levels.
- Development of this business model is required in association with actors. While the innovation can be brought into existing organisations (WUA, collectives, etc), there is the risk of this being seen as 'just

another service' that they fail to deliver adequately. There is a need for service delivery to be supported by higher level programs.

5. Finance [3.0]

5.1 Can the target group finance the investment in, and operation of, the innovation? [3.3]

- The investment to implement SIT would be relatively small when compared with large scheme implementation costs.
- Farmers couldn't afford to pay and the business model would probably require costs to be built into scheme development with handover over time for ongoing support by for example a WUA on association of collectives.
- Integration of this model as part of a larger modernisation and optimisation program, rather than one paid for by farmers would be preferable.
- Prices and subsidies and other modes of delivery can only be worked out after it testing on a wider scale.

5.2 Are relevant financial mechanisms available, accessible, and affordable for all value chain actors? [3.0]

- These financing mechanisms could be established but would require consideration of all the actors along the supply chain. This is the main challenge of the innovation. This is why a project is required to evaluate the business model.
- Funding would most likely initially be from irrigation scheme project development or maintenance and operating funds. Government agencies could cover costs of technical support through extension services as part of operational/service costs.
- The immediate beneficiary would be the farmers and with no outlay, this will be seen very positively.
- Programs must fund the staff time (and hardware, software) which can be at relatively low cost.

5.3 Are financial risks acceptable for value chain actors and financial institutions/investors? [4.7]

- The financial risk would be small as the initial investment is very low.
- The operating costs are more of an issue (officers undertaking monitoring and measurement). This could be phased out via training of trainers (ToT) of local agencies with responsibility for agriculture and water management. These agencies do not at this point carry the responsibility for this.
- The concept needs to be piloted to demonstrate the value for money to programs. Implementation has low costs and low risk, and is highly trial able and reversible.

5.4 Is there sufficient and sustainable funding secured so that the scaling ambition can be achieved? [2.3]

- Initial funds are required for research and development to work alongside an implementation project where the above could be evaluated and refined and documented for scaling and commercialisation.
- The concept has been tested in 6 locations but on a localised scale and not as part of a broader implementation program.

6. Knowledge and Skills [3.6]

6.1 Does the target group have the necessary knowledge and skills to use the innovation in the intended way? [3.0]

- The central implementation agencies (eg government) would have people (engineers) with the knowledge and skills, however they will not have focussed on this type of field development monitoring and evaluation approach.
- This needs to be packaged into a program for delivery. Passing this on to the WUA or local agency would be a next step.
- Part of the piloting step would be in the delivery of training and skills development. The practical application needs large scale demonstrations and knowledge transfer.

6.2 Are appropriate training materials and methods available to allow the target group and other value chain actors to adopt and promote the innovation? [3.3]

- These are well defined but need to be developed further.
- A key part of the project is the development and customisation of the technologies and packaging. This would be first and second phase of the project.
- Identifying how these materials need to be customised to suit local conditions will be important.

6.3 Are the right actors engaged to provide and improve the training programs necessary for sustainable adoption of the innovation? [3.7]

- The actors supporting capacity building who have the mandate and self-interest to implement and adapt the SIT approach would be readily identified for each irrigation scheme, development being targeted. This could then be incorporated into relevant programs.
- One example would be officials of ADMIP in West Bengal. The DSI4MTF SRA has developed stakeholder networks and identified actors.
- Ensuring diffusion of the innovation beyond a pilot or program needs to be considered.
- Training would focus on the officials of the institutions in initial phases, who would train the large number of on the ground field staff in further structured training programs.

6.4 Is there an institutional environment in which actors (such as knowledge institutes) develop and improve the technology/practice within the national and local system? [4.5]

- The value chain provides a wide range of resources that can improve the technology and adapt. We have example of NGO (eg CDHI working with UBKV) to achieve the same.
- There are a range of water user and local organisations involved in water management in south Asia. Networks of NGOs, KVK extension, etc already operate in this space.
- Local institutions can develop and improve the innovation with support from lead institution

7. Collaboration [3.6]

7.1 Are all actors relevant to scaling the innovation engaged? [3.2]

- There is a business case for each actor in the value chain. This does need to be documented though... documentation includes costs/benefits of each actor, each's inputs to the process, links to their values and drivers, scale and influence.
- DSI4MTF has identified a number of stakeholders and these will need to be engaged. The value of the innovation aligns with environmental and sustainability narrative that accompanies programs.
- The detailed scaling plan would need to be worked out with different stakeholders

7.2 Are roles and responsibilities of key actors clear, accepted, and complementary? [4.0]

- These need to be defined for each scheme. The contracting and implementation process can be defined to capture this and funding distribution (eg contingency for training and M&E) as well as retention for post commissioning
- This will need to be developed in the business case. However there is a clear idea of the linkages between various actors and the roles they hold.
- The roles and responsibilities are sufficiently established and agreed to allow adequate progress and there a unlikely to be points of conflict.

7.3 Are there effective networks or (sector) platforms for joint strategic direction-setting, advocacy, and creating buy-in? [4.3]

- Certainly if aligned with new development and investment.
- In the case of existing schemes there needs to be a project for system maintenance and upgrade that includes the on farm water distribution element. This is relevant to all cropping systems and irrigation systems - needs consideration.
- This will require buy in from a number of players.
- The pilot will be crucial in identifying the organisations that offer the most leverage into policy.

- The platform already established under collaborative projects can be used effectively.

7.4 Do you have effective links with parallel initiatives or policy processes that could serve to scale the innovation? [2.8]

- They are there but we don't know enough about them.
- Parallel linkages are essential for this innovation. The toolkits concept can be linked to either existing or new programs.
- It can provide information back to decision makers on the success or otherwise of installations

8. Evidence and learning [4.1]

8.1 Is there useful and credible data available on the impact and other parameters, which could help in understanding the scaling process?[3.2]

- We have evidence for a local pump, irrigation system basis but not at scheme level. This needs to be documented to demonstrate impact at scale. This will come with a pilot, however it is expected that the evidence would be easily demonstrate benefit.
- The innovation is in essence a monitoring and evaluation concept.
- While it will provide useful feedback to farmers it can equally give detail on success of irrigation modernisation programs.
- Data is available from a few pilot sites, and direct impacts are well known.
- The impacts of scaling needs to be assessed.

8.2 Is effective use being made of modern data and IT tools to support, analyze, share, and promote the innovation and to drive the change process? [4.7]

- There is potential for this and would be a key selling point of the Smart Irrigation Toolkit.
- The integration of data for scheme wide and cross scheme benchmarking would be a selling point.
- The technology needs to be further developed around a large scale project.
- A key component in the toolkit is a software system of apps and backend databases. These IT tools will be used in the field but can also be interrogated to find regional or temporal trends. It is expected that the technology will be a key selling point for the innovation.

8.3 Are data and monitoring (including bottom-up/field data) effectively being used to steer the scaling process and change course where needed? [4.3]

- Potentially yes. Data collected in the field will be used guide technical and strategic decisions from the farmer and the funder/program manager respectively.
- Data and monitoring is adequate, but needs to be further widened to match drivers and local biophysical conditions

8.4 Are you enabling institutional learning so the scaling process becomes more sustainable? [4.3]

- Institutional learning would occur through a pilot project working with an agency (say ADMIP) to implement SIT approaches with their irrigation technical and extension staff.
- Would also work alongside extension type agencies (local Government department (DoI etc)) who would/could have longer term responsibilities.
- Ultimately the implementation of SIT could be part of a WUA funded from farmer revenues.

9. Leadership and management [3.8]

9.1 Is day-to-day leadership of the scaling process adequately established, recognized, and connected to the relevant actors? [3.7]

- This would need to be part of the pilot scaling project design it is site dependent.
- The concepts of who and how have been considered but not formalised.
- The scaling strategies can be formulated identifying potential leaders

9.2 Are different actors and stakeholders sufficiently affecting the larger process and decision-making? [4.0]

- This would be part of the pilot project design

9.3 Are there adequate, influential and compelling spokespersons, messengers, conveners and power brokers for the innovation? [3.3]

- This would be built in through Pilot project partners.
- Needs to be established - it is expected that the pilot will collect evidences that will build a conversation and spokespersons.
- There are currently no 'Ambassador's' for the innovation.
- A strong team, involving people with these specific characteristics, can be formulated.

9.4 Does the leadership support internal and external change management processes to achieve organizational/institutional changes required? [4.0]

- The innovation is flexible and trialable.
- Changes to the delivery are very possible.
- Perhaps there are a range of models to be explored.
- No major internal changes are required in the system, existing setup can be utilized.

10 Public sector governance [3.0]

10.1 Is the role of the government in reaching your scaling ambition clearly defined? [3.2]

- This would be developed as part of pilot.
- Working alongside government would determine how the approach could be "institutionalised" as part of their standard business approach.
- Government and extension services are integral.
- This needs discussion with local and state governments. Although, the supportive role is clear, the level and kind of support needs to be assessed.

10.2 Are local and national strategies, policies and regulations conducive to scaling the technology/ practice? [3.7]

- While national strategies and policies are in place for irrigation and water they do not devolve down to irrigation system performance and resource monitoring. This is an operational area that has been ignored.
- This innovation aligns well with sustainability and environmental SDGs
- Although it matches with the local priorities, it needs assessments and holding workshops, discussions and meetings for finalization

10.3 Are government agencies actively supporting scaling the innovation? [2.3]

- Not at this stage. The idea would be to demonstrate why this is important.
- Once introduced and the potential benefits are realised, the government agencies will definitely support the scaling

10.4 Are relevant government financing mechanisms (such as subsidies or tariffs) smart and can they be applied to benefit scaling the innovation? [2.8]

- There are many financing mechanisms.
- Arguably they could be tailored and designed to address this area. The innovation is squarely aligned with government financing (programs) as well as donor development programs.
- The true cost and finance requirements of the innovation are still unclear.
- This innovation has not been tested at large scale and has not been demonstrated to governments. The possibility of government financing needs to be explored.