NEW APPROACHES AND TOOLS FOR EXTENSION AND ADVISORY SERVICES

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BEYOND TECHNOLOGY DISSEMINATION: WHY EXTENSION SHOULD ALSO FOCUS ON POLICY CHANGE?

Adoption of new knowledge and technologies is often constrained by institutional and policy challenges. Trying to promote new knowledge without addressing these challenges, often leads to poor results. Diagnosing these constraints and experimenting with new ways of addressing these constraints should be a priority for extension, argue SVN Rao, K Natchimuthu and S Ramkumar.

Cattle rearing is an important occupation for resource poor and landless families in rural and peri-urban areas of Puducherry. Cattle are the only asset for the landless poor and their contribution to the family income is quite substantial. Majority of the new generation livestock farmers are agricultural labour, forced to take up dairying due to subsidised loans provided by the government to buy cattle. Urbanization has led to conversion of farm lands for other purposes and this has led to reduced availability and high cost of fodder grass. Food crops (paddy) are being substituted by non food crops (casuarinas) which require less labour and supervision. There is almost no practice of growing green fodder crops in Puducherry and the area under fodder cultivation is less than 90 acres (PONLAIT Report, 2011). With increasing costs of fodder (especially paddy straw) and the low price for milk, farmers do not have adequate incentives to feed their cattle with purchased fodder.

Innovation System Diagnosis

In January 2008, a facilitated fodder innovation diagnosis workshop was organised at Rajiv Gandhi College of Veterinary and Animal Sciences (RAGACOVAS) now Rajiv Gandhi Institute of Veterinary Education and Research RIVER), Puducherry. This was done as part of the Fodder Innovation Project-II implemented in India and Nigeria during 2007–2011 (Hall et al, 2007). This workshop was attended by almost every stakeholder related to the fodder sector and these included officials from line departments such as Animal Husbandry, Agriculture, Krishi Vigyan Kendra (KVK), District Rural Development Agency (DRDA), Cooperative Milk Union (PONLAIT), a local NGO – MSSRF (MS Swaminathan Research Foundation) as well as the representatives from Women Self Help Groups (WSHGs) and land owners/farmers.

The diagnosis workshop noted that several of these organizations have programmes on fodder promotion focusing on distribution of seeds/slips, subsidies for fodder cultivation and training on fodder cultivation. The workshop concluded that unless and until green fodder is produced and made available locally to the landless livestock keepers, the fodder situation in Puducherry is unlikely to improve. The workshop called for formation of a fodder development forum comprising all fodder relevant actors to design, implement and evaluate interventions (with RAGACOVAS acting as the coordinating agency) and to design an institutional arrangement linking fodder growers/entrepreneurs and fodder buyers (landless livestock farmers in this case).

Multi stakeholder forum: A fodder development forum comprising representatives of all fodder

relevant actors was formed in the stakeholder meeting held in February 2008. This multi stakeholder platform identified a cluster of villages to implement the project. This forum met on several occasions to review and finalise the plans of this action research. It also served as a monitoring and learning platform and helped promote joint working relationships on programmes outside this project too.

Piloting a new Institutional Arrangement

Five farmers came forward to grow fodder on a commercial scale in 0.5 to 1 acre of their land, after they were convinced about the relative profitability of growing fodder, the technical and financial support that they could avail from different organizations and the offer to buy-back the harvested fodder by the dairy co-operative society (DCS), Sorapet. The members of the WSHG at Sorapet agreed to buy fodder from the DCS on credit. The Secretary, DCS agreed to receive fodder in 10 kg bundles and sell to the milk pourers when they come to deliver milk to the DCS. The Secretary would then deduct the amount from bills of the milk pourers and the same will be paid to the fodder growers.

Accordingly, based on several rounds of discussions and interactions with farmers and milk producers, fodder was grown on two acres of land in the selected village and was harvested and supplied through DCS to milk pourers on credit basis later to be recovered from their milk bills and finally to clear the bills of fodder growers. Initially there was a component of subsidy from the department of Animal Husbandry (DAH) which was later withdrawn due to paucity of funds.
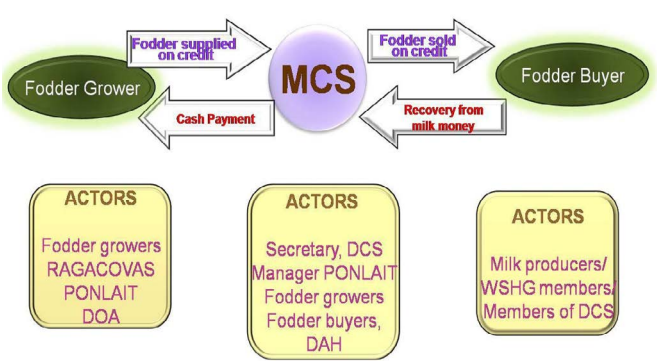

Fig. 1: Institutional arrangement of milk cooperative societies

Initial challenges: The sale of green fodder was initially good and gradually fell owing to the subsidy pull.There were instances of wastage of fodder due to late arrival of fodder at DCS, thick stems of the Napier grass and also due to poor sales of fodder. The secretary DCS found it difficult to sell fodder to members with dry cows (non

pourers of milk to the society) for cash instead of credit. Despite the efforts to include the cost of transportation in the project, this system of routing fodder through DCS did not work.

When this issue was discussed in a stakeholder meeting, the WSHG leaders came forward to accept the responsibility of fodder distribution and collection of money from the fodder buyers with a resolution passed in their group meeting. The resolution was passed by the WSHG members based on the credibility they had on the officials and their recommendations. The fodder was accordingly delivered by the fodder grower at the doorsteps of the WSHG leader (Fig. 2). This system had solved two problems – one, even if the fodder was supplied late in the evening, the leader was able to distribute to the buyers (group members). Second, fodder was supplied to any buyer (irrespective whether they were members of the DCS or not) for cash. This system did work for few months to the satisfaction of all the stakeholders. However, the fodder buyers especially the landless cattle owners had a grouse that feeding green fodder to cows was expensive and it should be subsidized. In all the meetings the issue of **"low milk procurement prices"** came up in one way or the other as it appeared to be a stumbling block for milk production-enhancement programmes.
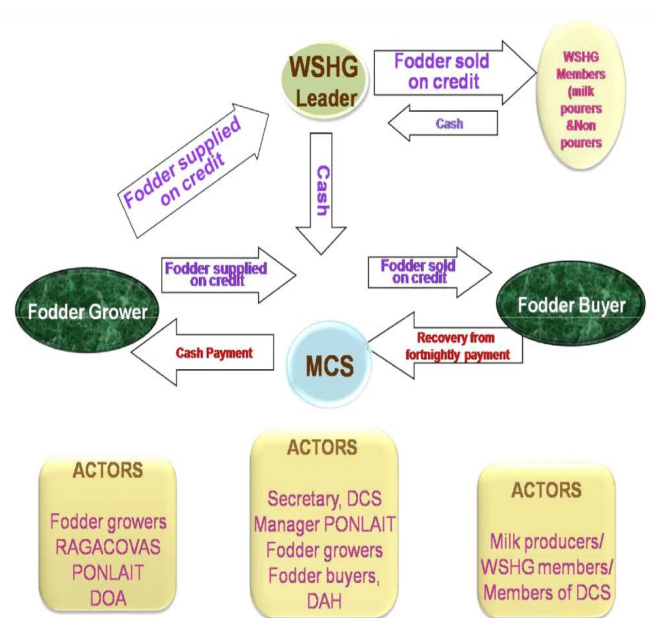

Fig. 2: Institutional rearrangement of MCS including WSHG leader

New challenges: This system worked well as long as the WSHG leaders took active part in receiving anddistributing fodder and collecting money from the buyers. Later, it suffered a serious setback when these leaders got engaged in local body elections. Though their involvement in fodder

transaction, in a way, catapulted them to the political arena, they were no longer in a position to devote time for fodder transaction. Since WSHG members (lower stratum) and DCS secretary (upper stratum) were belonging to different communities the cooperation between them on fodder transaction was not up to the expected level. The fodder growers in both the experiments suffered due to delay in payments and sometimes wastage of fodder due to poor sales.

Perceptions on feeding green fodder: Cattle rearers preferred allowing their animals to graze on public or private lands (non cash cost) and dry fodder (paddy straw) rather than spending Rs. 20 (cash cost) every day to feed one cow on purchased/cultivated green fodder, however superior the latter may be in terms of quality, Total Digestible Nutrients (TDN), Digestible Crude Protein (DCP) and palatability. The reasons for their preference to paddy straw are that they can stock and use it for 4 to 6 months depending upon the season. Purchasing (during harvest season), transportation and stocking it could be completed on one day whereas the cultivated green fodder (heavier) needs to be obtained from the fodder producer or the DCS on a daily basis which they consider as laborious.

Box 1: Institutions and policies matter

Milk testing: The milk producers especially the WSHG members after feeding the green fodder continuously for two months to their cows perceived that the income through sale of milk to the DCS did not increase and they attributed it to the faulty testing of the milk in the DCS. They were unhappy with the milk testing as it is neither transparent nor done on a regular basis. Not a single DCS out of the 93 functional DCSs in Puducherry has an automatic milk collection unit which is considered as transparent and foolproof method of weighing and testing milk. Testing of milk in these DCSs is never done on a regular basis. In most of the DCSs the milkotesters are not working. Unfortunately the milk producers/DCS members have no say in "testing of milk" and in "price fixation" although theoretically they own the DCS and PONLAIT (Rao et al, 2009). So the livestock keepers are right in their hesitation to invest in purchase of green fodder, when they don't see any benefit.

Price policy: In almost all the stakeholder meetings, the issue of low milk procurement price was discussed but without finding any feasible solution to address this. Although, PONLAIT is empowered to fix milk prices, in practice the Government will fix the price which will be in favour of the urban milk consumers (more in number) rather than the few scattered rural milk producers or members of the DCSs. The procurement price of Rs. 17 per litre (even today) offered by PONLAIT is the lowest in the country. In other words, there is no incentive for farmers to invest in any new technology or practice as there is no commensurate return on their investment.

Subsidies without other support: The government of Puducherry has been implementing several schemes which include milch animal purchase, subsidies for green fodder production, calf feed, cattle feed etc. However, these schemes haven't helped increase the milk production in Puducherry. The gradual decrease in milk procurement by the DCSs from an average of about 50, 000 liters per day in 2001–02 to 29,000 liters per day in 2010–11 and purchasing milk from other states from zero to 73,000 liters during the same period (PONLAIT, 2011) clearly shows that the subsidies are not helping the state, the milk society or the producers. Moreover, this has also adversely affected the mind set of resource poor livestock keepers as they prefer low quality subsidized inputs over the good quality purchased inputs.

Project Outputs

Even with all these challenges, the project had some positive influence on fodder growers. One fodder grower who raised fodder on one acre of land for sale realised the benefits of feeding green fodder to his cattle and discontinued selling green fodder to the DCS/WSHGs. It is economical for him to feed his cattle with *ad libitum* green fodder rather than feeding with paddy straw which is costlier than green fodder. Similarly one old lady who had three repeat breeding cows felt happy with feeding green fodder (grown on 30 cents of leased land) to these cows as all of them were conceived. A farmer has been raising fodder on seven acres of land and supplying it daily to a nearby *gaushala* which is maintaining about 270 cattle. He also sells limited quantity of fodder to milk producers of his village.

A traditional betel nut cultivator after incurring heavy losses turned to fodder production and recovered from the losses. This fodder entrepreneur used fodder cultivation as a stepping stone to enter into supply of canned drinking water to nearby villages, a more profitable venture compared to fodder production. This also reflects on the low economic status attached to fodder production by the farmers of the Puducherry region. Not a single farmer (other than the fodder entrepreneur who is supplying fodder mainly to *gaushala*) is growing fodder to sell it to the landless dairy farmers in the village. The landless continue to send their cattle for grazing on poor quality grasses which they consider as a good substitute for green fodder. They even now feel that it is worth depending on grazing rather than getting additional milk through purchased green fodder. It all depends upon their perceived economics which seems to be working out for them, the reason why they are still rearing dairy cattle. Due to financial crunch, the government has withdrawn all subsidies and the dairy farmers are at the receiving end. Shifting of occupation from dairy farming to goatery is quite discernible mainly because of very good demand for chevon (goat meat) and low price for milk.

Where do we go from here?

Beyond technology dissemination: Poor livestock keepers need access to good quality green fodder and many ofthem are now convinced about the technical supremacy of feeding their animals with green fodder. But they are not in a position to buy and feed their cattle with green fodder, without addressing the two basic issues of milk testing and milk prices. Any other types of programmes promoting fodder technology, subsidised seeds/saplings, trainings and demonstration will not have any major impact.

Engagement with policy issues: The project team strongly believes that extension should play a pivotal role in influencing policies rather than focusing only on technology dissemination as the former has a strong influence on technology dissemination, as evidenced by this project. In this case, none of the stakeholders in the state have a say or influence on price fixing policy, although everybody was convinced that the milk prices need upward revision. The milk and feed price ratios are decreasing over the years indicating thereby that the prices of feed are increasing at an increasing rate than the prices of milk (Tamizhkumaranet al, 2012). In most of the dairy developed countries, the prices of milk are linked to feed prices. However in India the policy of milk–feed ratios to fix the milk procurement prices is not being adopted.

Research on policy issues affecting technology update: There could be several such instances where technology dissemination is constrained due to lack of an appropriate policy. It will be useful if researchers bring out evidence of such instances to sensitize policy makers. Or else it will be the usual story "policy makers not aware of the research constraints; researchers not concerned about technology dissemination and sensitizing the policy makers is not the job of extension." Undertaking an innovation system diagnosis helps in raising these issues upfront.

The project team organized a workshop on

"Reclaiming Research in Livestock Development Through Policy Interventions – 12 Innovations in Livestock Development which Need Policy Support" in collaboration with Indira Gandhi National Open University (IGNOU), International Livestock Research Institute (ILRI) and Rajiv Gandhi College of Veterinary and Animal Sciences (now RIVER) in 2011. A platform was provided to selected researchers to present their research output (which is getting bogged down due to lack of appropriate policy) to policy makers (Rao et al 2011). The recommendations made during the workshop evoked a mixed response.

Either we may have to organize more such interfaces or should do something differently. We look forward to your views and experiences in this regard.

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HOW CAN TECHNOLOGIES MAKE AN IMPACT? – INNOVATIVENESS, IMPROVED DELIVERY AND INSTITUTIONAL MECHANISMS

Agricultural research rarely goes beyond production of new technologies and its pilot testing in few select villages. Promoting wider application of the new knowledge it has produced is considered as someone else's responsibility. This artificial separation has effectively constrained agricultural research from learning about the challenges in promoting large scale adoption of new technologies and also its other potential roles in the innovation process. The sustainable rural livelihoods project recently implemented by the Central Research Institute for Dryland Agriculture (CRIDA) is an exception to this general trend as it was about promoting technological changes at a large scale through development of appropriate institutional arrangements. Sreenath Dixit who played a major role in this initiative reflects on its process and outcomes as well as some of the lessons in this blog.

In the summer of 2006, Central Research Institute for Dryland Agriculture (CRIDA), a constituent research unit of the Indian Council of Agricultural Research (ICAR) was invited to submit a proposal for Component 3 (sustainable rural livelihoods theme) of the World Bank assisted National Agricultural Innovation Project (NAIP). By then CRIDA had successfully led a couple of projects on natural resource management aimed at improving the livelihoods of the rural poor. After several rounds of consultations with potential partners, a comprehensive proposal was prepared for award of sponsorship.

The project *"Sustainable rural livelihoods through enhanced farming systems productivity and efficient support systems in rainfed regions of Andhra Pradesh"* was developed based on a robust on-farm participatory framework for implementation in an action research mode. As desired by NAIP, a consortium of partners was constituted. This included five NGOs, two private extension service providers, one State Agricultural University and one CGIAR centre. Perhaps, no other project had brought on board such diversity of partners (Table 1) with it at that time, as it was largely thought to be safe to have partners only from the government sector.

In early 2007, CRIDA presented its proposal before the project screening committee. When the project outlined its hypothesis of enabling the poor with better NRM options by having an institutional mechanism to support technology adoption, not many in the screening committee could appreciate it. Pat came a question from one of the senior members *"where is research in this project,all you are presenting looks like an extension project"*. We really had to struggle to get the concept ofdevelopment research clearly to the screening committee. It was tough for us to convince the 'hardcore scientists' who talked and understood research mostly in terms of " T1 to T 6 with a control".

Teething Troubles

After several rounds of presentations, the project was approved for implementation in eight backward districts of Andhra Pradesh. Initially, it took almost a year's time to put systems in place.

The task was more challenging simply because it was not easy to develop a common vision for a complex project that was to be implemented by a consortium with a large diversity. The job seemed complex, as it involved organizations with different working cultures and capacities.

Table 1: Partners and their roles

Partners	Strength	Responsibilities
CRIDA	Strong expertise in biophysical sciences, experience in leading multi-disciplinary, multi-institute projects	Lead Center: Coordination & monitoring; overall technical support to project interventions.
ANGRAU	Strong presence across the state, leader in location specific research	CA (Adilabad); technical support & capacity building in Ananthapur and Kadapa clusters.
ICRISAT	International presence and experience in soil fertility management	Soil fertility enhancement related interventions and monitoring runoff in watersheds across clusters; capacity building for INM
WASSAN	A large network of grassroots NGOs working on watershed development	CA (Rangareddy); institutional innovations & support systems across clusters.
MARI	Strong local presence in Warangal with reputation among development departments	CA (Warangal); capacity building on community led rehabilitation of traditional water harvesting structures across clusters.
BIRD-AP	Experience in livestock development and watershed development in rainfed areas	CA (Mahabubnagar&Anantapur); technical support to livestock related interventions across clusters.
SAIRD	Strong local presence in tribal hamlets of Nalgonda district	CA (Nalgonda); technical support to village level seed production across the clusters.
CWS	Experience in policy advocacy in rainfed agriculture	CA (Khammam) and capacity building on social regulation of ground water use across clusters.
AAKRUTHI	A young private extension service provider with experience in farmer-led seed production	CA (Kadapa); supporting contract farming innovations across clusters.
I-KISAN	Experience in ICT mediation in agriculture, market linkages	ICT and market linkage activities across clusters.

CA: Cluster Anchoring

When it came to partners' field exposure, there was disappointment in waiting. Some of the partners that had a very good theoretical understanding of how livelihood systems work had little or no experience to execute on-field interventions involving farmers. This exposed that the criteria adopted to select partners were not very exhaustive. Although this appeared as an impediment to begin with, it was addressed through enhancing the capacity of the project staff to rise to the occasion. Initially, some of the partners felt that field monitoring by the lead centre (CRIDA) was too close to be comfortable. The very same partners however appreciated it during the later phase of the project, for it imparted confidence to speak more authoritatively about their philosophy.

Project Management and Monitoring

After much thought and deliberation, a unique two-tier project management framework was developed. Field level monitoring was completely decentralised by assigning one district each

to a partner. This was overlaid by another level of monitoring by a team of 3-4 scientists representing lead centre. These teams called as Cluster Coordination and Monitoring Teams (CCMT) formed for each of the eight districts facilitated technical monitoring. Monitoring was the new mantra to get the project grounded and going in the eight districts.

Many outreach projects suffer for want of close monitoring which depends directly on the mobility of the project staff. Keeping this in mind, a dedicated vehicle was kept at the disposal of the project office. This addressed the issues of delay and denial that such projects face in general in accessing vehicles for mobility from the central pool of vehicles. The project also addressed the issue of adequacy of manpower by funding good number of positions (senior research fellow/ research associate). Each partner had 2 or 3 positions and including those with the lead centre the total number of contractual positions was well over 30.

Box 2: Key Interventions

- **Resource conservation:** Mainly rainwater harvesting by adopting site specific options
- **Crop, livestock & horticulture:** Interventions to integrate all the three to enhance profitability &reduce risks
- **Value addition and market linkages:** Providing basic infrastructure for post harvest value addition andlinking the initiatives with the market
- **Institutional innovations:** Constitution of *Salahasamithis*, village advisory bodies to articulate community needs besides owning responsibility for project interventions; commodity interest groups, custom hiring centers, ICT-enabled village resource centers and sustainability fund
- **Capacity building:** Cross cutting theme to build capacity of the community members to absorb project outcomes

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The project implementation framework provided for a package of site-specific and need-based interventions to evolve so that the local resources and capacities were harnessed to the best extent to address livelihoods of the poor. Keeping participatory processes at the heart of the programme, natural resource management was promoted as the key strategy for addressing livelihoods issues. Within the broad strategy of NRM, sub-strategies were evolved to harvest and use rainwater to improve crop productivity and cropping intensity.

Project Outcomes

These can be largely categorised into two groups: technical and institutional.

Technical Outcomes

On the technical front, the major gain was in terms of rainwater harvesting and its utilization. During

the course of the project, nearly 250 rainwater harvesting structures were built, repaired or renovated. This led to the creation of an additional 4,38,000 cu. m rainwater storage capacity which in turn benefited 1600 farmers by bringing over 400 ha into the protective irrigation regime.

The overall cropping intensity jumped from 130 to over 180 %. Besides, water productivity was enhanced by promoting micro irrigation systems made available through custom hiring centres; animal productivity increased and mortality came down significantly and diversification of cropping was notably increased by introduction of vegetables, short duration pulses and horticultural crops. We can go on and present numbers to substantiate these. But the focus of the project, unlike other "productivity enhancement initiatives" was not on productivity alone. It was on brining a shift in the approach to these kinds of initiatives. In other words, the emphasis was on 'doing things

differently' although more or less the same things were done here as well. But it is very difficult to get people to appreciate this subtle difference, as many would say "this is like any other watershed development project", unless one takes time to understand the processes behind the initiative.

Institutional outcomes

The uniqueness of the project was not only its innovativeness in delivery but in setting up a backend that was responsive and dynamic. This was ably assisted by certain radical changes that NAIP had brought in. For instance, NAIP's effort to empower the Principal Investigator by giving him/her recruitment and financial sanction powers was indeed revolutionary. How earnestly this was done varied greatly among implementing centres. But those that used these powers could see its impact on the ground. This used to be apparent during project review meetings. Most importantly, the flexibility of deciding what needs to done to achieve the set objectives was very crucial to the success of the project. Another unique aspect was that there was no pressure to report only success. Failures, better worded as learning, were openly discussed during reviews. This gave the partners tremendous confidence to try new ideas.

At the implementation level, the process of articulating what kind of support the community needs from the project was institutionalised. The salahasamitis/village action teams (10-12 member body largely representing all sections of the village) were the ones that voiced what needed to be done. For instance, in Jamistapur cluster, Mahabubnagar villagers asked for support to lay a drying yard and drinking water tub for cattle; in Anantapur, members of a women SHG asked project support to repair an abandoned construction to take up calf rearing as a livelihood activity. This helped the project to ensure that demand-driven interventions were promoted. Besides, this process also ensured that the community contributed in cash or kind towards part of the required investment.

Lessons Learned

Managing multi-institute consortia: Formation of the consortium for a mega project like this is very important. Many times the leader of the consortium picks organizations that have been known or working with it without taking an objective assessment of the skills a partner is going to bring along. It is important to have a complete knowledge of the strength of partners particularly in the field and their abilities to transform ideas into workable interventions. One needs to go beyond the rapport being enjoyed between each other although it is important.

The more diverse the background of the partners, the better it is to address complex issues such as that of rural livelihoods. However, too much diversity can pose issues for coordination, as partners would not be speaking in the same frequency. Respect for partner's organization and skills besides according due recognition through appropriate credits is the bedrock of trust and confidence within the consortium. A commitment to the participatory philosophy while dealing with partners gave rise to important outcomes. For instance, the innovation of groundwater sharing through underground pipeline networking at Rangareddy district happened only because of this diversity and respect for each other. Allowing partners to deeply commit to the project vision and supporting their ideas was actively pursued all along. And this gave rise to new possibilities of accommodating community needs while promoting better technologies.

Managing multi-disciplinary team: Over 30 scientists of the lead center (CRIDA) specialized indifferent disciplines (bio physical and socio economic) were part of the project coordination and monitoring team. They provided the quintessential inter-disciplinary approach to the project. Many other consortia that were led by one or two scientists could not leverage the strength of partner especially where the project was implemented in more than four districts. Delegation of responsibility to the teams of scientists (CCMT) was very crucial for frequent monitoring which ultimately produced desired outcome.

Technologies do not diffuse in vacuum: This project is an eye-opener for all those who profess the predominance of technologies in improving the livelihoods of the poor. For, it has been very well brought out by this project that, no matter how good the technology is; it does not work unless the community is supported/ enabled to benefit from it. Many more lessons could be drawn by the organizations engaged in the research-extension continuum. This brings us to think about the premise on which governments design their development programs. For instance, the project showcased how small investments could revive the defunct rainwater harvesting structures, whereas we see in development projects, provision only for building new structures. Another important lesson for all those organizations engaged in extension as a means to bring about change is the supportive role grassroots institutions can play. So far very little effort has gone into mainstreaming institutional innovations as a strategy to bring about behavioural change. And the outcome of this project makes a strong case for one.

Listen to your stakeholders: Development organizations often consider that the innovations required to trigger development often exist outside of their stakeholder systems. But the project had a different experience. There is enough scope for fostering innovations within the stakeholder environment. There are several instances during the course of the project when innovations came along just by allowing the community to express themselves. One of the most important innovations of the project was to bring back into life the defunct rainwater harvesting structures by investing in them very modestly. This would not have come to the fore if the project has not encouraged the community to suggest ways and means of augmenting water availability.

The Road Ahead

Though this project scored well in keeping its promise and coming out with innovative solutions to improve rural livelihoods, it had the tag of a "special project". To this extent, it makes it difficult to mainstream the learnings in the existing system. There is no dearth of learnings from projects like this one. But unless such learnings are internalized in the existing system, such projects won't serve their objectives. There is a gaping void between the learnings that keep accruing and the existing system. Unless the void is bridged, we may go on implementing such projects for years on without any impact on the system. This brings us to the real issue of how this learning is going to be put to use.

CRIDA at its own level has ploughed these learnings into a large national initiative on climate change (see more on http://www.nicra-icar.in).

For instance, the successful learning of promoting innovative institutions in NAIP has been brought forward to Technology Demonstration Component of National Initiative on Climate Resilient Agriculture (NICRA) being implemented by 100 KVKs across the country. However, there are other leanings such as delegation of more powers to the Principal Investigators that were followed while implementing NAIP, need policy level commitment for mainstreaming.

The project provided all organizations whether they are at the apex or grassroots level important lessons to carry home. But these need to be well documented for use in posterity. For, learnings at organizational level and their better use will determine how well they will survive in the challenges that future has in the offing.

End Note

Personally, this project gave me a gratifying experience. While it helped me put my extension expertise in practice, it honed my inter-personal and negotiation skills. It also got me to appreciate the strengths of the NGOs in community mobilization and institution building. The overall project management also taught me how deal with budget keeping in view the basics of financial management. Mostly thought as a mundane activity, this is very important in donor perspective. On a much more personal note, the project helped me to develop patience, improved my ability to accommodate divergent views, deal with dissent and look at setbacks not as problems but as challenges to surmount. In all, I would put it as the best project I have ever involved in my career spanning over 20 years.

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FARM BUSINESS ADVISOR: THE MISSING LINK FOR FARMERS

Farm Business Advisors (FBA) overcome the last mile distribution gap of agricultural information and technology to small-scale farmers. Of all the iDE country FBA programs, Bangladesh has hosted the largest and most diverse. In this blog, Jeremy Davis and Abir Chowdhury share their experiences from promoting FBAs in Bangladesh.

Since our inception, iDE (International Development Enterprises) has positively impacted the lives of over 30 million people by leveraging technologies, supply chains, and market systems to increase both agricultural productivity and economic returns for rural farmers and microenterprises. In the decades since our founding in the early 1980s, we have maintained agriculture for entrepreneurs as a focus, continuously refining our 'Farm Business Advisor' (FBA) micro-entrepreneur model, based on evolving local contexts. iDE has developed the FBA role to overcome the last mile distribution gap of agricultural information and technology to small-scale farmers. This has been achieved through a continuous positive feedback loop in rural communities that leverages user insights, product innovation, and business model design, integrated into a simple service model. In addition to filling smallholder demand for hard-to-access quality farm products and services, FBAs also serve as alternative sources of agricultural extension. Although existing public service models are present for extension in Bangladesh's rural areas, the limited local government investment in extension does not cater to the needs of everyone. FBAs can fill this gap.

The FBA Approach

The FBA approach originated in Cambodia and Nepal in the mid-2000s, quickly expanding across other iDE country programs. FBAs work on a commission basis, providing both inputs and aggregating product for sale to wholesale markets. FBAs are entrepreneurs who go door-to-door and field-to-field, supporting small-scale farmers to grow crops that can be sold for attractive returns. FBAs provide an essential last-mile market link for farmers located in remote areas far away from commercial centres. The model requires FBAs to visit the farmer's field directly, where they learn what challenges the farmer faces– problems such as lack of irrigation, poor soils, damaging pests, or difficulty getting crops to buyers. Together, the FBA and the farmer work out a strategy, which might include investing in new equipment, like drip irrigation or introducing higher-value crops into their annual agricultural cycle. They sell farmer inputs, such as seeds, fertilizers, drip irrigation kits, and other agricultural tools, earning a commission on each sale. FBAs keep in regular contact with their farmer clients to answer questions, solve problems, and ensure that investments are yielding the expected results. Consistent with a market facilitation approach, FBAs do not receive any financial support to start their businesses; support is limited to training, capacity building, mentoring, and building linkages with customers, traders and other market actors.

FBAs as private-sector extension agents

In addition to the sale of inputs and outputs, FBAs provide their farmer clients with context-specific market information and agricultural advice. This behavior is purely market-driven, as it helps them retain customers, build trust, and provide a value-added service that traditional inputs retailers and traders cannot. In order to reach the last mile, FBAs are shown how to engage with the private sector to facilitate informational sales and technical training sessions at the community level to promote new products to producer groups.

These sessions place private sector actors, such as company sales representatives, in the role of facilitator at village-level sessions to deliver training on inputs and production practices as embedded product marketing to producer groups. These sessions are initially cost-shared with the private sector, with support gradually phased out until they are convinced of the value and are willing to assume 100% of the costs. An additional success factor for FBAs is the incorporation of production planning into the suite of activities that are done with their smallholder clients. These organized planning sessions are a means to harmonize supply and demand between markets and producers, and allow the FBA to coordinate the inputs they will sell as well as determine volumes of product they will be able to aggregate and sell to buyers at harvest time.

FBAs complementing public extension

It should be noted that the intent is not for FBAs to replace public sector extension, but rather to complement it as part of a pluralistic extension system. FBAs typically maintain close contact with the local public sector extension agent and consult with them on problems that are beyond their own expertise. They also serve as an 'extension bridge' by introducing and linking the public agent to their farmer clients.

Of all the iDE country FBA programs, Bangladesh has hosted the largest and most diverse. Over the course of the last half decade, more than 1,000 FBAs have been trained and supported. The FBA model engages the Government of Bangladesh extension officers while providing support to FBA businesses through attending events and verifying technical advisory information. What the Bangladesh team has discovered is that each FBA is truly a unique business, each having a different business plan to meet its specific challenges and needs. For example, some FBAs are school teachers during the day who spend their evenings selling agricultural inputs, seeds, fertiliser, pesticides, etc., another is a pharmacist who expanded his shop to include quality vegetable seeds. While this may seem daunting, iDE has embraced the diversity of the FBAs in Bangladesh and developed a methodology to support them based on the roles they play in their communities. FBAs self-select whether they provide input or output support (or both) to farmers. Some FBAs had pre-existing agri-businesses and used the training they received to expand their services and offerings. Others were lead farmers with existing associations or farmer groups.

Challenges

Many challenges remain. To date, only 10% of Bangladesh FBAs have been women, mainly due to cultural norms that make it difficult for women to travel alone or interact with men who aren't in their extended family. Limited access to capital constraints many FBAs from maintaining the working cash flow they need and extending short-term credit to clients. Scalability is an on-going concern as, to date, private sector lead firms, while extremely collaborative, have not shown willingness to adopt the model by recruiting and training FBAs on their own. Finally, as with most market-based approaches, inclusiveness can be a struggle. To grow their business, FBAs tend to focus on more well-off commercial smallholders rather than the poorer market segment who need their products and services the most. The diversity and sizable number of FBAs in the Bangladesh program has supplied a volume of lessons learned, data that iDE continues to analyze and explore as we press forward on increasing the income and improving the lives of the rural Bangladesh population.

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FARMERS' FAIRS: CAN WE MAKE THEM IMPACTFUL?

The Kisan Melas or Farmers Fairs are considered as important mechanism to popularize agricultural technologies among farmers. But in recent times, the organizers of such agro fairs are finding it difficult to attract the farming communities. In this blog, Tanusha and Mahesh Chander suggest ways to make these fairs more effective and meaningful to farmers.

Farmers' fairs or *Kisanmelas* are in existence for a long time. The main purpose of organising such fairs or melas is to create awareness among farmers about new technologies developed by researchers- primarily from the public sector agricultural research centres and agricultural universities. Also, these fairs help farmers enhance their knowledge on new schemes or programs. Such fairs often attract an umpteen number of farmers, scientists, students, and extension personnel from the KVKs and the agriculture and allied departments. Private sector, especially the input companies are also participating in these fairs. Organizing such events demand a lot of investments. Scientists and development professionals need to spend several weeks to organize such events. But are farmers deriving real benefits from these? Can such events be made more impactful?

Kisan Melas: A Worthy Investment?

Kisanmelas are largely funded events with the financial support from State/Central government agencies. For instance, nearly Rs. 15-20 crore were spent on Krishi Vasant (2014) and the recently held *Krishi Unnati Mela (2016)*. The central government has enhanced financial support to Regional Agriculture Fairs from Rs 6 Lakhs to Rs 15 Lakhs per fair. Investing such large amounts is important to make these events grand and successful. But on the flip side, these investments do not yield adequate returns if farmers fail to attend these events. Increasingly, farmers are abstaining from these events, whereas, many urban dwellers seen frequenting these casually.

The farmers find these fairs not attractive enough to foot the bill on travelling charges and other expenses. Moreover, the growing use of social media and other ICT tools in the current era of digital media (http://www.agriculture.com/news/technology/farmers-making-use-of-social-)media_6-ar50861)has opened the doors to avail any information at just one click instead of travelling to these events. However, the organizers of these events are often under pressure to ensure presence of a large turnout of farmers. Ambitious targets are set for different organizations to bring scores of farmers for the event. Even incentives are paid to farmers to ensure their presence. This may increase the presence of farmers but in turn diminishes the importance of these fairs. The people either are not actively involved or just come to have a good time. It is high time that we reflect on the current status of *KisanMela*s and take measures to upgrade these events to maximise returns on these huge investments.

These days, KisanMelas are organized every year by almost all of the agricultural universities. Most of the ICAR institutions organize such fairs at least once in two years. Govind Ballabh Pant University of Agriculture and Technology (GBPUAT), Pantnagar, organizes the event biannually -- one for Rabi crop season (October) and Kharif crops (March). Other ICAR institutes, like IARI, IVRI, NDRI, etc, and some SAUs hold them on annual pattern.

The objectives for the following mega events are similar:

- *Krishi Vasant* (2014) at Nagpur (http://www.icar.org.in/en/node/7374)
- *Krishi UnnatiMela*-National Agriculture Fair (2016) at New Delhi(http://www.icar.org.in/en/node/10264)
- The Agricultural Fairs organized by State Agricultural Universities (http://www.krishijagran.com/General-News/2015/10/GB-Pant-Universitys-Farmers-Fair-a-Teerth-Yatra) State Veterinary Universities (http://www.icar.org.in/en/node/10486) or ICAR institutes like the Indian Institute of Vegetable Research (http://www.icar.org.in/en/node/10141).

The Directorate of Extension, Ministry of Agriculture and Farmers' Welfare, Government of India, has a scheme of sponsoring Regional Agricultural Fairs in different agro-climatic zones of the country (http://vistar.nic.in/organisation/Farm_Information/kisan_mela/Guidelines.asp). Under this scheme, several SAUs and ICAR institutes organize Regional Agricultural Fairs every year, like the one organized by the Indian Veterinary Research Institute in 2015 (http://www.icar.org.in/en/node/8690).

Not only the public institutions, but also the private sector (http://pune.kisan.in/) and NGOs (http://www.agrotech-india.com/home.aspx) are taking interest in organizing agricultural fairs. The corporate sector's support to organizing farmers' fair is found to relieve the overburdened public institutions that often have financial crunch too, in organizing such fairs effectively.

Enhancing the Effectiveness of Fairs:

Some of the suggestions to make these fairs more beneficial to farmers are given here:

Advance publicity: Often farmers are not aware of the fairs being organized even in their vicinity. It is therefore important that farmers are informed well in advance through newspapers, radio, TV, personal contacts, mobile publicity vans etc. The extension agencies like KVK and ATMA have important role in bringing information to the notice of the farmers. The services of these agencies could be utilized to ensure larger participation in farmers' fairs. For instance, in Krishi Vasant and Krishi UnnatiMela, the KVKs and ATMA played huge role in ensuring the participation of farmers. The ATARIs were given targets to bring farmers with financial support to meet the cost of farmer participation. In the digitalized era with growing number of mobile and smart phones, awareness can be further raised among farmers through mobile text and voice messaging including Social Media channels like Facebook and Whatsapp.

Seeds and seedlings stalls: Seed stalls have always been one of the major attractions for farmersin such events. The agricultural universities, the National Seeds Corporation and private seed companies display and put on sale new varieties, plants and vegetable seeds and seedlings. The good quality seeds for the coming season should be made available at these stalls at reasonable prices. Farmers may also be given required information regarding sowing/planting of these varieties through leaflets and folders on these seeds and planting materials. Many social media platforms like Facebook and Whatsapp groups are now spreading information about promising new varieties. However, when they look for such varieties, they don't get the seeds in required quantities. If the farmers' fairs are able to cater to this need, the farmers would find visiting these fairs valuable.

Technology display stalls: Common in all the farmers' fairs, these stalls display the new kind of technologies that have entered into the market. These include everything from milking machines, growth promoters, chaff cutters, sprayers, drip irrigation systems to tractors. These stalls could be more meaningful, if opportunity of hands-on experience is provided to the farmers through method/process demonstrations on the site.

KisanGoshti: This is one very important part of Farmers'Fairs, which offers a platform for farmersto interact with scientists who can facilitate solutions to the farmers' problems. The queries of farmers may be documented for the experts to deliberate

and share solutions. The experts speaking on the occasion should base their talks on the problems of farmers rather than merely speaking about the government schemes (Mahesh Chander's Notes, In: Vijayan and LaxmipriyaUpadhyaya, 2016). The visiting farmers should be able to find solutions or answers to their problems they face in their farming operations. Often they meet disappointments on this count demotivating them to attend these fairs.

Crop-livestock demonstrations/Animal shows:
This is another fascinating event for the farmers. Organising crop yield competitions in different zones prior to the mela and bringing such award winning farmers to the farmers' fair may help draw more farmers to the event. The best animal selected based on the pre-determined criteria and prizes distributed to the owners in different categories may inculcate the good habit and interest among farmers for raising good quality animals. Also, different breeds of animals and highly prolific animals at these fairs inspire visiting farmers.

The National Livestock Show and Championship organized every year in February at Muktsar by Punjab State Department of Animal Husbandry is one good example of such show (https://www.youtube.com/watch?v=tdr4EDu0XDQ, https://www.youtube.com/watch?v=KG2hwCtfg0U). Live crop, flower and animal shows during *Krishi UnnatiMela* (2016) at Delhi in March was an appreciable effort which should be followed by SAUs and ICAR institutions with region specific attractions.

The extension principle "seeing is believing" works well in such fairs when farmers witness live demonstration of the technologies or systems in action rather than descriptions and narrations. Although it is a bit tough task to handle large number of live method demonstrations, it could add to the efforts fruitfully. Management of animals, water harvesting, drip irrigation, integrated farming, handling of new technology tools, new varieties, seeds, etc. can be demonstrated. The didactic approach should give more of experience to farmers and motivate them to adopt such techniques.

Portals and Knowledge models: Instalment of a few Internet kiosks during *KisanMelas* would help to serve farmers at large. Farmers could be taught the use and handling of the ICT tools which would help in enhancing their knowledge at a fast pace. The agropedia(http://agropedia.iitk.ac.in/) stall at the KisanMela (Pantnagar) was a huge hit. The organisers explained about the portal and knowledge models to the visitors who were enthusiastic about learning how to draw knowledge models, how to upload content in library as well as in agrowiki and agroblog(Agropedia, 2010). The LCD presentations on improved practices, information kiosks placed at vantage points in the Mela ground may add to the attractions for the farmers.

Involving Progressive farmers: Farmers would learn more effectively, if they see any success stories. The progressive farmers could be used as a source of practical information worth sharing to attract other farmers, since they would find the results more applicable to themselves. Such progressive farmers are seen as role models by the farmers (Mahesh Chander, 2016), thus, the extension services may consider involving them in activities like Farmers' Fairs (https://blog.gfar.net/2016/05/03/agripreneurs-the-emerging-role-models/).

Free check-up stalls: A benevolent provision for the check-up of the animals, soil health analysis, faecal sample testing of animals etc. should be made free of cost for the visiting farmers. They would know about the current health status of soil as also the health status of their animals. Remedies provided to them on the spot may encourage farmers to visit these fairs. The vaccination camps for the livestock can also be set up where animals would be vaccinated depending upon the seasonal requirement.

Customer care centres: The farmers should be able to contact the authorities as and when required through fully operational

customer care centres. Often participants encounter chaotic situations where no information is available from any quarters, especially when VVIPs are visiting these fairs.

Make melas more thematic: *KisanMelas* could also be organised on a more theme based pattern so the public is cognizant what there is in store for them. This would also help in organising the different sessions and stalls more focussed.

Something for Everyone: These fairs should be made more inclusive to cater to the needs of young, adult and old, women, men or youth. There should be something for every category of visitors from rural areas. Special efforts should be made to target groups like farm women, rural youth, students etc. The students of the agricultural universities should actively participate in these fairs. Interactive sessions among students and farmers should help both in understanding the conditions on the field and test the applicability of the book knowledge. Also, *KisanMelas* could be used as a platform by these students to showcase any innovative idea. Students should come up with the development of working models applicable to village conditions which a farmer can apply. To encourage such groups, events or competitions

linked with participation of farmers need to be planned. Various kinds of competitions like fodder cutting or fodder chaffing, milking the cattle, etc. help sustain a high interest for the farmers and farm women.

Boarding/Lodging and other civic amenities: Often this is the most neglected segment of any Farmers' fair. Farmers get demotivated when they are not assured of proper staying arrangements. Appreciably during recent *Krishi UnnatiMela,* there was comparably better arrangement for drinking water, clean toilets, food and stay arrangements. Here again, chaotic situation was witnessed in the matter of farmer registrations, which caused lot of annoyance among farmers.

Way Forward

When people thought radio is no longer appealing or dead, it bounced back in the form of FM channels and community radio, making it even more popular among masses due to interactive and participatory formats. The same holds true for *KisanMelas,* which need to be made more interactive, participatory and farmer friendly.

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BRANDING AGRICULTURE: CREATING BRANDS FROM COMMODITIES

Farmers' can enhance their income if they start branding their commodities. Extension and Advisory Services should support farmers with branding their produce, argues Mandeep Pujara

Due to economic growth and increase in income levels, the demand for agricultural commodities and value added products are increasing. As consumers income rise, demand becomes more discriminating, i.e., a wider variety and a higher quality is sought, particularly by the expanding groups of families having higher income living particularly in the urban areas. If the producers have to take advantage of this situation, their share in consumer prices needs to be enhanced.

In India, the producer share in consumer rupee for food grains is 55 to 65 per cent, for fruits it is 30 to 40 per cent and for vegetables it is 40 to 50 per cent. There is a need to narrow the gap between producer prices and consumer prices through proper marketing support, value addition through entrepreneurship development and branding. Brand less commodities cannot easily survive the ups and downs of the markets and development of brands for agricultural commodities is one main way forward to realize better returns for producers.

Why Branding?

Branding is a way to escape from merely competing on volume and price alone. Brands (Box 1) help differentiate products and enhance their value beyond their functional attributes. They build preferences among competing products and therefore create long-term sustainable competitive advantage. Though there is a cost associated with building such a differentiated market position, it is essential that this be weighed against the benefit of increased market share and price premium opportunities.

Box 1: What is a brand?

According to Kotler (2003), Brand is a name, term, sign, symbol or design or a combination of these, that identifies the goods and services of one seller or group of sellers and to differentiate them from those of the competitors. Brands are viewed by customers as an important part of a product and branding adds value to a product. Thus, customers attach meanings to brands and this helps them to develop brand relationships. A brand is the combination of a name, words, symbol or design that identifies the product and a company and differentiates it from the competition (Giddens et. al., 2002).

Branding serves as a way for consumers to quickly and easily identify one product from another and to associate them with quality attributes related to the brand name. Giddens et. al.. (2002), found that in general, the number one brand in a market can maintain a 10 per cent price premium over the

number two brand and as much as a 40 per cent premium over the generic store brand. Additionally, the study showed that customers who are loyal to specific brands spend three to four times as much on food items than do customers who purchase items based on lowest price. In issues of branding, it is again very important that consumers have a positive experience with the product, so that they will associate the name or brand with a high-quality, satisfying product. An association with poor or inconsistent quality can lead to the need for discounted prices.

Process of Branding a Product

A brand must be clear, specific and unique to your product. For example, the "Wheaties" brand differentiates the cereal from its competition due to its association with health and "sports excellence." To achieve the same successes with your products, you need to execute the following steps to establish an effective brand (Box 2).

Box 2: Steps in establishing an effective brand

- **Find a name:** Choose an appropriate name that is easily remembered and specific to the product. The name should be restricted to three words or less - anything longer is difficult for customers to recall. This process may require legal screening to guarantee availability of the name and customer input to assess attractiveness and appropriateness of the name.

- **Develop a slogan:** The selected slogan needs to be two to three words, catchy and easily remembered.To generate slogan ideas, you must stay focused on the buyer. Why should they buy the product? What will they like about the brand? How does competition compare? The slogan should take into account answers to these questions.

- **Create an appropriate symbol or logo:** It can be as simple as a geometric shape or as elaborate as asilhouette of a person or object. Use the name, slogan and symbol on every piece of correspondence related to the product--e-mails, invoices, letterhead, business cards, advertisements, promotions, etc. This system will eliminate inefficiencies in creative and production fees and extend the branding process throughout everything you do. In a sense, it will prevent "recreating the wheel" with each new media effort.

Benefits of Branding

Companies use branding and the consumers' ability to identify brands, to improve sales in four ways:

- Market new products,
- Protect market position,
- Broaden product offerings and
- Enter new product categories.

Branding in Agriculture

The majority of small agribusiness owners make their branding debut by repackaging their existing products under the name of their farm, ranch, organization or business, to promote brand recognition and to encourage the spread of experience attributes through word of mouth (Giddens et. al., 2002).

Marketing branded agribusiness products is important for several reasons. As stated previously, branded items are generally able to earn a higher price for the producer and can lead to brand loyalty, which leads to a strong customer base and the ability of the producer to better serve the needs of the market. Branding a product, adds value by differentiating the product and making it stand out from the other items in the market. It also conveys additional information about the attributes of the product beyond its appearance. Branding also adds value to products simply because consumers generally believe that known branded products have better quality or more attributes than unbranded products. Another merit of branding is the sense of pride or community that can be experienced by the producer from successfully creating a brand identity.

Challenges in Developing Brands

The greatest challenge faced when developing and building a brand is creating just the right name, slogan and symbol for the product. It takes a great deal of time and consideration! It needs a long-term commitment. One has to think in terms of years rather than months.

It is often difficult to achieve initial customer recognition of a new product, regardless of branding. Identification of the segments, pricing competitively, positioning of the brand and promotion of commodity, as a category, are keys to success. Branded items are more recognizable and memorable.

Effective advertising (before and after the sale) is important. Advertising and promotion before the sale are essential to obtain first purchases and follow-up advertisements after the sale, promote customer satisfaction and repeat purchases. Repeat purchases are one of the primary objectives in brand development. Repeat purchases are critical for long-term success of businesses and contribute to brand loyalty.

Key Challenges that impede Branding

Value seeking Indian consumer: The value conscious Indian consumer is always on the lookout for the lowest price. The perception that branded products are costly is deeply rooted in the Indian psyche. To many consumers, a branded product still means a product with an attractive label rather than an assurance of quality.

The great Indian retailer: India has been a land of shopkeepers. Indian retailers enjoy high trust quotient by virtue of their superior service and relationship with their customers. This in turn means, consumers trust the retailer's choice implicitly and hence do not feel the need for branded products. However, this trend has been changing with increasing awareness about various products. Retail consolidation has also been a prime mover in the picking up of branding efforts in agri produce.

Scalability challenge: A brand needs to stand for something to someone. The diversity of the Indian population in turn means extensive localization and hence becomes unviable to make investments towards building a brand across a large geography. Only players with deep pockets have the capabilities to invest and build a brand. Since the very nature of agri-business is oriented towards supplying to the local community at large, branding efforts are sporadic.

Market structure: The system of aggregation of farm produce (at *mandi* level) by itself is againstbranding. This method strives to consolidate without any allusion to the source and hence wipes out any opportunity for differentiation at the first point of sale. It does not incentivize farmers to provide a much superior produce and charge premium accordingly. This in turn goes against the grain of branding.

Poor farmer awareness: The average holding in India is way too small for any farmer to make efforts towards branding. Although dairy has seen the co-operative movement being successful in creating great brands like AMUL, there have been no concrete efforts in other spheres of agri products. The farming community in India is still caught up on efforts to sell and does not have the awareness of the relative merits of branding.

Way Forward

It is only a matter of time before the challenges are overcome. What are the ways to overcome this branding conundrum?

Quality First: "Cheap & best"possibly exists only in the Indian lexicon. However, increasingly people are realizing that both cannot always exist together. Continuous efforts need to be put on highlighting the superior quality of branded produce.

Visual differentiation is a key method of highlighting quality. For example, when branded sugar came into vogue, very clear communication about how the sugar is whiter and uniform in crystal size was highlighted.

Don't Undermine Value – Seeking: Indian consumers cannot be divorced from seeking value. Use any scope of differentiation to highlight superior value to customers. For example, long or rounded grains can be highlighted to prove that less quantity is required to be cooked.

Don't Scare Consumers: One of the strategies adopted many times by brands is to scare consumers about adulteration in unbranded commodities. That is not a good way to build a good agri brand. It might give temporary results. However, it does not add any value to the brand in question.

Role of Extension in Promoting Branding

Linking farmers to markets is currently recognized as one of the mandates of extension and advisory services. This involves providing advisory on good practices in crop production, strengthening producer-buyer linkages, development of long-term business relationships with market outlets, facilitating linkages with input suppliers, financial institutions and market outlets and helping to negotiate. Now a days, farmers are increasingly getting interested in branding their commodities so as to gain maximum share out of the consumer rupee. Farm Grocer (Box 3) and MajhaHaldi (Box 4) are such examples.

Farm Grocer is a start-up by young farmers', based at Saha Food Park, Ambala (Haryana), dealing in authentic farm products, linking farmers and consumers together through a value chain. The objective of the company is to link authentic farmers' products directly to the consumers, through direct marketing and retail centers, providing full traceability of producers and package of practices being adopted. Similarly, the business model provides opportunity to farmers and entrepreneurs to supply their products to Farm Grocer. The company is based at HSIIDC Food Park, Saha (Ambala) and has manufacturing facilities of around 50 farm products. Company is primarily dealing with Farmer Producer Organizations (FPOs) for sourcing of raw and semi finished products.

Product Range
Pulses :- Unpolished & Uncolored;
Basmati Rice :- Long, Non-Sticky, Aromatic;
Spices & Namkeen :- Home Made Quality;
Honey :- Multi-flora collected from Himalayas;
Herbal Products :- Ayurvedic Products with compliance to GMP;
Tea and Green Tea :- Special blend from trusted sources;
Milk & Dairy Products :- Directly from dairy farms with full traceability of animal health;
Fruits & Vegetables :- Fresh Seasonal fruits and vegetables
Monthly Grocery Pack
Apart from retail sales, the products may also be supplied in a Monthly Grocery Pack, so that consumers can get best farm products all together

A new online platform, www.farmerfriend.in has originated recently at Amritsar to promote farmer owned brands. It is currently trying to bridge the gap between farmers and the society, by providing a platform wherein farmers can contact the customers directly and vice versa.

Yadwinder Singh from Chogawan village in Tarsikka block, Amritsar, took initiative to redefine the traditional agriculture by diversifying from wheat-rice cropping cycle, to turmeric. But after a few years of hard work, he felt the share of consumer rupee in their income is negligible as compared to the middlemen's share. ATMA, Amritsar, helped him to find new solutions and guided him about the process of making a brand and to get it registered, to make more profit. Now he grows, processes and packs turmeric at his farm site and along with that he has a farm outlet too, to serve the local consumers.

However, most farmers do not have the knowledge of branding. Extension and advisory services can support farmers in branding their produce, by providing advisory support on the following aspects:

a. Changing consumer behavior
b. Laws related to production and sale of branded products including labeling
c. Specific demands for branded products (types, quantity, quality specifications)
d. Independent and group marketing model
e. Development of farmer owned brands and
f. Promotional opportunities for farmer owned brands.

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PLANTWISE: COMPLEMENTING DIAGNOSTIC AND ADVISORY SERVICES OF EXTENSION?

Self- medication kills!! and worst is if the advice flows from a mind vested with intention of self-interest. For decades, the farmers have no other go but the local input dealer shop to share his concern and take a solution. The local extension with its best effort could not possibly reach millions of advice seekers for whom the burgeoning issues of crop loss due to pest and disease are becoming unmanageable. Plantwise, a programme that works with national plant health systems through establishing sustainable networks of local plant clinics addresses this problem effectively argues Malvika Choudhary

Plantwise(http://www.plantwise.org/) is a global programme, led by CABI (http://www.cabi.org/), to increase food security and improve rural livelihoods by reducing crop losses. This is achieved by establishing sustainable networks of local Plant Clinics, run by trained Plant Doctors, where farmers can find practical plant health advice. Plant Clinics are reinforced by the Plantwise Knowledge Bank, a gateway to online and offline actionable plant health information, including diagnostic resources, pest management advice and front-line pest data for effective global vigilance. This programme operational since 2011, is currently in its third year of implementation. It partners with 33 countries globally out of which eleven are in Asia.

Implementation of Plantwise

Partnership with Government: The program is implemented by CABI Country Coordinators in partnerships with the National Government. Each year the program implementation is reviewed and planned by a National Steering committee which comprises of top officials across the plant health system. CABI implements this program largely in collaboration with national partners from the Department of Extension under the Ministry of Agriculture. The extension officers are trained as Plant Doctors to run the clinics regularly and address the concern of farmers by giving them recommendation for cost effective and sustainable crop protection.

Box 1: Plantwise Training Components

How to become a Plant Doctor? (field diagnosis, operation of clinics)

Plant healthcare (managing plant health problems, choosing options)

Monitoring Plant Health Performance (monitoring and evaluation methods)

Extension Messages (developing locally relevant extension materials and Pest Management Decision Guides)

Data Management (using plant clinic data for national purposes)

Establishing Plant Clinics: Plant clinics work like human health clinics run by doctors. In Plant Clinics, the Plant Doctor (extension staff) record data about the farmer, his current practices, the problems and the advice given. The one to one interaction between the Plant Doctor and farmers make them understand the need for monitoring and taking preventive eco-friendly measure and thereby reduce pesticide use and reduce crop loss due to pests. The extension officers and their support and supervisory staff, according to

their respective roles and mandates, are trained in Plantwise modules (Box 1) to strengthen their capabilities. The trainings can pertain to field diagnosis and making recommendations; clinic and data management; and monitoring and quality control of services provided in the clinic.

Pest Management Decision Guides (PMDGs): Plantwise organises write shop with national subject matter specialist and other knowledgeable people from research and academia leading to development of Pest Management Guides (PMDGs). Clinical recommendations are based on the "Green" and "Yellow" list. The initial green portion of the document advocates on prevention, monitoring and control of pest using cultural and biological methods. Due to persistence of pests, if further intervention is required, then list of chemicals approved by WHO are recommended for use. With the help of technical backstopping materials produced during the facilitated workshop, the practices to be adopted are explained to farmers.

These materials are the form of farmer friendly fact sheets which are distributed during the clinic sessions and photo sheets that give a good account of pest and its damage.

Linking Clinics to Diagnostics Clinics: Another focal point is linking the clinics with diagnostic clinics where the Plant Doctor can send samples for further analysis in case of their inability to diagnose the problem. These clinics can be at nearby research institutes or universities and colleges where the facilities are available. A directory of such diagnostic institutes is compiled, categorised and made available to Plant Doctors.

Knowledge Management: Plantwise hosts a website/ knowledge bank where the wealth of advisory information (which would otherwise is lost) is captured and is put to national use for various purposes such as identifying research needs, pest surveillance, forecasting and development of new technologies. The information flowing through this system is managed at different levels - local, regional and national. The local information is transformed to knowledge which is analysed by the National Plant protection Organisation (NPPO) which finally authorises to make it available as an open access resource on Plantwise-Knowledge Bank (www.plantwise.org/knowldegebank). This web portal holds information on pests, their distribution, method of diagnosis and control measures. It has various other interesting sections like interactive blogs and pest distribution maps and is linked to similar national and international knowledge portals.
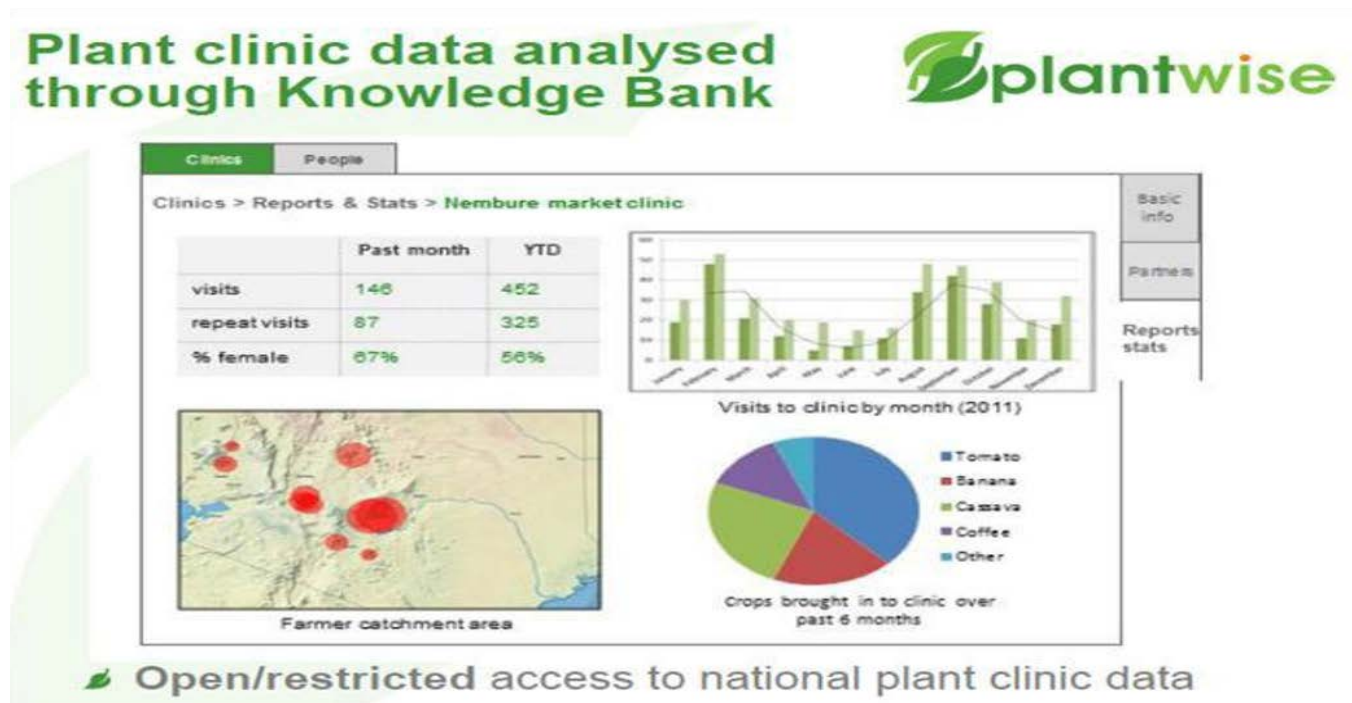

Fig. 1: Plant clinic data analysed through knowledge bank

Monitoring and Evaluation: To ensure the quality of performance of these clinics, a module to train the senior extension staff in Monitoring and Evaluation (M&E) has been developed. A monitoring plan which is supportive in nature helps the Plant Doctors to self-evaluate their performance for further improvement. It also guides the officers in supervisory roles to conduct performance analysis of the clinics and present it to their seniors and other stakeholders. An external evaluation focussing on impact of plant clinics on socio-economic conditions and

livelihoods of small marginal farmers is also planned.

Stakeholder assessment: Another significant focal area of the program is about forging linkages amongst the stakeholders of plant health system. A rapid assessment of stakeholders and their roles and linkages with other actors in the plant health system is undertaken. Plantwise works closely with extension services to strengthen its linkages between regulatory, research, input supply and farming community.

Ensuring sustainability: There are various worthwhile programs which have run into oblivion as soon as the funding phases out. To address this issue, Plantwise is working to achieve sustainability during various phases of implementation. This forms a part of Plantwise strategy, wherein countries shift from initial assessment to pilot stages fully supported by CABI. Once the impact is clear and the national partners get interested to contribute and thereby increasing their ownership towards the concept, the programme further progresses to the consolidation stage for up-scaling. The contributions made by the national partner can be in form of manpower, kind, funds or policies.
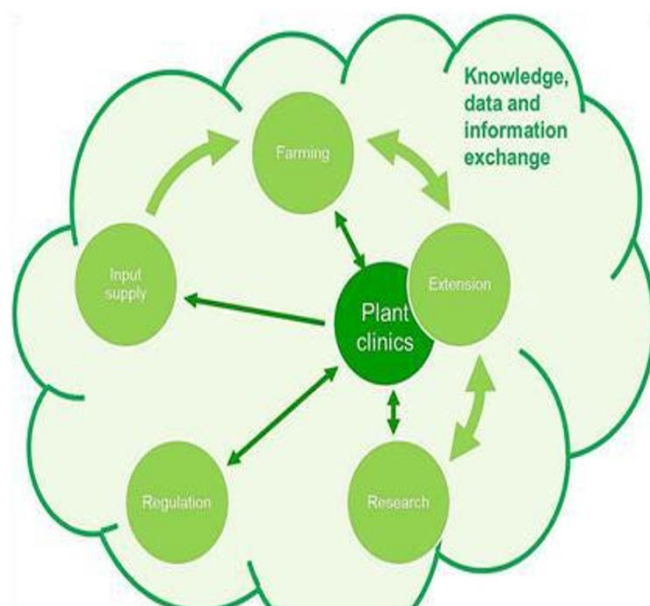

Fig. 2: Knowledge, data and information exchange procedure in plant clinics

Plantwise in South Asia

In South Asia Plantwise operates in 4 countries- Sri Lanka, Nepal and Bangladesh and India. The agreements are signed with the Ministry of Agriculture (MoA) in both Sri Lanka and Nepal and the program is being scaled up with contributions from national partners. In Bangladesh, formal signing of agreement is in offing and the planning is tentatively been done for implementation. In India Plantwise is currently implemented through NGOs like MSSRF and SEVA. There has been exceptionally huge scaling up in Sri Lanka where the number of clinics has reached 175 followed by Nepal where the 25% of the clinics are nationally owned.

Nepal: As part of consolidation for better functioning, the clinics are being grouped into clusters containing 2-5 clinics. This also helps in making Plant Doctors understand the objectives of Plantwise and creating a feeling of accountability of being part of bigger programme. The data managers are appointed at local level to collate the information coming from the clinics and sending it to the central level for national use. This makes the flow of information regular and smooth.

A supportive monitoring system where the plant doctors evaluate their performance in self assesment mode keeps them motivated and inspired for improvement. Though sometimes the plant doctors find the prescription sheet they use little difficult to complete, they do submit the forms with complete details as they recognise the significance of the information that would come out of this record. Extension material and Pest management Guides do help the plant doctors as reference material, though their validation from local subject matter specialist do take time and needs some streamlining.

For greater publcity a documentary prepared on Plant Clinics was broadcasted on national channel followed by news headlines in primetime channel. This has resulted in deeper percolation and visibility of Plantwise programme in Nepal. Radio jingles were also tried which resulted in more awareness among farmers about Plant Clinics and increased farmer attendance in Plant Clinics. The whole hearted participation and appreciation of the Minister (Agriculture) and the Secretary (Agriculture) as well as the efforts of the Director, Plant Protection who is also the National Coordinator of Plantwise in Nepal have raised the esteem of the program in the country. The recent National Stakeholder meeting held in October 2014 witnessed wholehearted participation of various stakeholders in plant health management.

Sri Lanka: In Sri Lanka, the integeration of National Responsible Organisation (Plant Protection Services) with the Local Implementing Organisation (Extension) at the district level serves as an excellent linkage mechanism between the Research and Extension wings. The district coordinators play an important part in scaling up both Plant Clinics and management of data. Plantwise works efficiently with the exisitng extension system of Sri Lanka in implementing the Plant Clinics through their network and Plant Doctors meet at monthly

intervals to report on the progress of the clinics. Though the clinics are not required to be run on the weekly basis, twice a month provides a good operational model. The national partners contribute both in terms of funds and staff time to support the clinic operations. This makes large number of Plant Clinics as part of the extension network and contribute to the development of a robust plant health system in the country.

In Bangladesh and India though the programme is yet to be implemented with national governments, these countries have displayed an impressive work with NGOs. Though, it is desirable to work with the national extension system to ensure sustainability and wider reach, NGOs are providing opportunities to train their staff as Plant Doctors to provide services in local language and offering technical backstopping to these clinics with the experience they have gained so far.

Way Forward

The Plantwise strategy is based on a vision to improve food security and rural livelihoods around the world through reduction in crop loss due to pests. It aims at achieving sustainable impacts at a scale by supporting development of an effective plant health system at the national level which can support farmers in facing current and future agricultural challenges. Thus Plantwise bridges the gap between farmers and the knowledge they need to grow more and lose less to pests.

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EXTENSION WITHOUT AN EXTENSION MANUAL?

Without an extension manual to guide millions of extension interventions, the effectiveness of extension work cannot be improved upon to meet the objectives of the agriculture sector, including the ambitious drive for doubling farmers' income, argues Suresh Kumar.

Everyone is concerned about enhancing the effectiveness of extension. Several extension approaches as well as initiatives are being undertaken to inform and educate farmers on new knowledge related to farming, and assisting them to improve their production, productivity and income. But there have not been commensurate efforts in improving the efficiency and effectiveness of using these approaches.

What has always struck me during my long association in this sector is the need to suitably appreciate/acknowledge the contribution of extension to achieving farm sector goals and to improve the effectiveness of extension interventions. I vividly remember the challenge of convincing the farmers during the earlier exciting years of promoting hybrid and high-yielding varieties(HYVs)which ushered in the 'Green Revolution',thus proving all the skeptics wrong. This challenge continued when I had the privilege to establish and operationalise the Training & Visit (T&V) system in Maharashtra over a period of more than five years when I was the Director of Agriculture in Maharashtra. There were many success stories of the T&V system, which have also remained unappreciated. T&V had some excellent features which need to be incorporated into the present system (as also recommended by the Doubling Farmers'Income Committee[1]), but that deserves another blog, another day.

Extension Reforms

Extension reforms were introduced since the late nineties. A new institutional set up with the Agricultural Technology Management Agency (ATMA) at its core was established, from1999-2003 as a pilot phase in select districts and expanded country wide with additional human resources and extension activities subsequently. Irrespective of these developments, the good old extension practices which existed during my time continue to rule, including demonstrations, farmers' training, farmers' fairs and farm visits. The scope of these extension activities is considerable. During 2017-18, ATMA alone organised 17,53,592 extension events (see Table 1). This excludes the work done by other organizations, including the Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Non-Governmental Organizations (NGOs), and the private sector.

[1] *MoA&FW.2017. Report of the Committee on 'Doubling farmers' income, empowering the farmers through extension and knowledge dissemination'. Volume XI. New Delhi: Ministry of Agriculture & Farmers Welfare.http://agricoop.gov. in/sites/default/files/DFI%20Volume%2011.pdf*

Table 1: Extension activities under ATMA (2017-18)

Sl. No.	Extension activities	Number
1.	Training courses	28,085
2.	Farmers' training	14,76,357
3.	Demonstrations	85,234
4.	Exposure visits	9,131
5.	Farmer fairs	1,48,914
6.	Farm Schools	5,871
	Total	**17,53,592**

Source: http://agricoop.nic.in/

Traditional extension methods – such as folk troupes, folk songs–that were important during my time, continue to be relevant even today while new ones keep emerging. The concepts of farmers' friend and farmers' producer companies (FPCs) are key extension reforms in recent times. ICTs are also emerging as core strength of extension. Various new initiatives and interventions ensued, including Farmer's Portal, Kisan Call Center, mobile phone text messages to farmers, field videos, community radio, Kisan Channel and so on. Every SAU/ICAR and government institution has a website for providing technical advice to farmers. The scope of these extension tools is massive. mKisan portal[2], inaugurated in 2013, has sent more than 2100 crore text messages. Kisan Call Centers (KCC) cater to nearly four crore farmers through its wide network. Millions of messages are sent every day to farmers by various organizations/service providers; and there are nearly 800 websites in their service. This provides a snapshot of the extent of extension reach and the challenge of optimally using these activities and interventions[3].

Impact of Extension Methods

The biggest challenge for an extension worker is how to convince a farmer to adopt new technologies as well as changing the habits of a lifetime/traditional practices. This is a herculean task on the ground. Despite employing the best extension approaches, I still remember that after the introduction of the T&V system, Dr Daniel Benor would demonstrate to us how an unwilling farmer can be pursued to adopt better technologies. This remains the gold standard for extension. The T&V system also published/produced very good booklets, which proved quite useful for all of us.

Impact/effectiveness of various extension methods and extension practices depends upon the quality of their performance/use. Even a likely improvement of 10-20% can make a big difference to the effectiveness of extension in the short term. Therefore the scope for improvement is much more in the medium and long term. Success of the entire extension strategy for doubling farmers' incomeand achieving various objectives of the farm sector, including food security, depends upon the quality of extension services which in turn depends upon how the various extension interventions are practiced. The vast resources being provided for these extension activities need to be optimally utilised. How should each of these (for example demonstrations, farmers' fairs, farmer visits, KCC) be planned, implemented, monitored, evaluated, reviewed, and improved upon? How should the new ICT tools be optimally used? Beyond improving the effectiveness of individual extension practice there is the challenge of integrating the use of various practices for synergy and avoiding duplication. Challenging as the role of extension is, it is expanding given the increasing complexity and importance of the farm sector. The DFI Committee, in its Draft Report XI, has assigned a key role to extension in the strategy and policy proposed for doubling farmers' income.It has recommended 24 roles (Table 2). Extension is expected to broaden its focus from productivity and production to income of farmers, as well as facilitate project-based extension and tackle emerging challenges including climate change. How will extension functionaries be equipped to understand, and theneffectively carry out, the roles expected as per recommendations of the DFI Committee over and above the already onerous responsibilities being carried out by them?

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2 *https://mkisan.gov.in/*
3 *http://agricoop.nic.in*

The issue of integrating extension resources was highlighted by the DFI Committee, which had identified 107 categories of institutions providing extension support/services apart from a very large number of other institutions that could be leveraged for extension support/services.

These include 1.57 lakh common service centres (CSCs) and self-help groups (SHGs), 1.71 lakh milk cooperatives and a vast network of credit-linked extension groups.

How should extension collaborate with this large number of institutions, considering that it is already struggling to coordinate research systems? Convergence of extension systems will be a major challenge for extension planners.

Table 2: Roles recommended for extension providers

- Providing information on going schemes and programs in agriculture & allied sectors
- Capacity building, Skilling in emerging areas
- Advocacy on farmers' interests
- Counselling for farmers' well-being
- Credit facilitation
- Critical assistance in risk management including climate change, crop insurance etc
- Documentation and Reporting roles
- Enforcement of Farmers' Charters
- Issuing Advisories on soil health management, water conservation, pest management etc.
- Facilitating access to production and post production inputs & data
- Facilitation & feedback
- Friend, philosopher and guide to farmers

- Engaging in research planning
- Promoting projectised mode of extension delivery
- ICT enabled services
- Intermediation
- Linking farmers to markets
- Building managerial competence
- Linking various support & service networks
- Organizing user/producer groups
- Planning, Monitoring and Evaluation
- PPP Promotion
- Promoter of farmer led innovations
- Redressal of grievances
- Technology selection, etc
- Feedback to research system

Source: MoA&FW 2017

Enhancing Capacities of Extension Personnel

There are nearly one lakh public sector extension personnel in the country; and almost the same number or perhaps even more representing the private and NGO sectors. In light of a multitude of roles required and expected to be performed by these extension functionaries, the challenge of extension is how each of these extension support/organisation functionary can perform the various extension activities effectively as desired and demanded. This requires improving the effectiveness of individual practice as well as the integration of these practices and extension resources.

While some sort of training is being provided currently to extension functionaries by training institutes (MANAGE/SAMETI), it is not possible to continuously train everyone and that too in the most effective manner. Therefore there is an urgent need to prepare high-quality extension manual/s for extension functionaries. The following suggestions are made in this regard, which could be implemented gradually.

1. There should be separate manuals for different groups/types of extension functionaries relevant to their specific needs, instead of one omnibus manual. There is need for a separate training manual for trainers and another one for extension planning and extension practices.

2. The manual/sshouldbe made available in both formats – hard copy/print as well as soft copy/video – suitably indexed to provide ready reference.

3. Material in the manual should constituteextension knowledge which could be used for various purposes, such as preparation/deciding of extension curricula.

The material should be suitably tagged so as to provide links to relevant modules. The manual should be updated annually in light of relevant experience acquired during the preceding year. This may be done by obtaining feedback during annual conferences of field officers.A conference at the national level may be preceded by conferences at the state level.

4. The manual should be uploaded to the internet and remarks about the content as well as personal experience of practitioners, experts and farmers incorporated for use during update. A suitable format could be devised for accomplishing the aforesaid.

5. The Department of Agriculture and Cooperation may designate a nodal institution, such as MANAGE, for preparation of manuals. It may otherwise designate any other institution.

6. There is a need for the designated institution to collaborate with other subject matter/ specialist institutions/experts for extension advice on subjects such as marketing support, climate change, IT support, irrigation extension, watershed extension. National Institute of Agricultural Marketing (NIAM) could be one example of a collaborating institution for marketing extension.

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REVERSE EXTENSION: NEED FOR A RELOOK ON THE PRESENT EXTENSION SERVICE

Extension needs new theories, frameworks and a shift in its current approach if it has to remain relevant. Reverse extension offers one way of reinventing its future, argues RM Prasad.

Reflections from practice is an important type of learning which helps everyone to draw lessons and use these for continuous improvement in his/her ways of working. The benefits of such reflections are:

- Improved critical thinking
- Empowerment
- Great self-awareness
- Personal and professional growth

For a profession, this kind of learning from practice helps us to discover new and better methods and approaches to improve the professional conduct of its members. It involves a process of relating, reflecting and mainstreaming good practices in the field.

Reverse Extension

Perhaps many of us may be aware about the concept of Reverse engineering, which is defined as the process of extracting knowledge or design information from anything man-made and reproducing it based on the extracted information. It is the process of dissecting an object to see how it works in order to replicate or enhance the use of the object. In similar lines, there is a need to relook at the concept of extension education being preached and practiced today.

Reverse Extension-Dimensions

Reverse extension has four dimensions:
1. Categorical
2. Socio-organisational
3. Managerial
4. Situational.

Categorical dimension

This refers to the concept, practice and usefulness of extension education perceived by the society at large. In this context, the need for Reverse Extension becomes obvious from the following observations:

- Extension education as currently conceptualized is inadequate, addresses all problems as technical and rational. Must broaden its mission and create a new vision (Lauzon, 1977)

- It is time to abandon the term Extension because of what it has come to mean in practice and the network of faulty assumptions at its core (Ison and Russell, 2000)

- Extension must broaden its programme portfolio to better engage the society it serves. 'Engagement' means staying attuned to the issues faced by people (McDowell, 2001)

- Extension professionals have to expand their repertoire of community interaction models and engage citizens as agri-food citizens and leaders in order to move towards sustainable development (Colasantiet al, 2009)

Though sporadic efforts are made to revive the field of extension education, it still remains alienated from various stakeholders who support and sustain development process. There are even instances where the need of extension service is doubted by the end users.

Socio-organizational dimension

This is with reference to the organizational structure of extension services. Though pluralism is the norm, extension service is dominated by the public system, while private extension service is gradually gathering momentum. The support for public extension and accountability is declining and the efficiency of services by public extension is often questioned. The institution characteristics (rules, norms, practices) of public extension (Box 1) need to be reviewed.

Box 1: Institutional characteristics of public extension in India

The public extension system in our country is characterized by the following:

- Rigid hierarchies, patterns of control with highly centralized modes of planning

- A tradition of assessing performance in terms of technology adoption

- A History of rewarding only success and Reluctance to report and analyse reasons of failure

- A tradition of working independently and a mistrust of other agencies

- A tradition of upward accountability for resource use rather than output achievement and client satisfaction Sulaiman and Hall (2004)

To overcome some of the inherent limitations, measures like renaming of ICAR Zonal Project Directorates as ATARIs (Agricultural Technology Application Research Institutes) and "farmer first" are introduced by ICAR (What changes are envisaged through these nomenclatures still remain ambiguous!) Similarly, concepts like ATMA plus, agro service centres, etc are being introduced. Are these organizational structures really able to tap the full potential of the principles and philosophy of extension education in the changing scenario?

Managerial dimension

The inefficiency of extension system in India is often attributed to the poor governance of extension service. There are many challenges facing extension:

- **Demographic challenges:** Average age of the farmers and farm labourers in the country is 50plus. Promoting and retaining rural youth in farming is a great challenge.
- **Technological challenges:** How to maximize factor productivity and minimize cost of cultivationis a major challenge.
- **Management challenges:** Various options in minimizing risks in farming are limited, lack ofconvergence efforts by different agencies is evident.
- **Professional challenges:** Extension personnel lack professional competency and related

capacityto meet emerging needs and expected responsibilities.

- **Organizational challenges:** Unchecked growth of non-governmental extension system prevails,need for public extension to be made more vibrant and competent is felt.
- **Economic and ecological challenges:** Sustainability of the farming system and livelihood securityof the farmers are at risk.

Extension programmes need to shift from a delivery model that prescribes technological practices to building capacity among farmers. The aim is to empower farmers so that they can identify and take advantage of available technological and economic opportunities. To ensure good governance in the delivery of extension services, administrative, structural and legal reforms must be carried out (Prasad, 2014).

Situational dimension

In the changing scenario of development for sustainability, extension education essentially involves the following:

- Judicious and improved management of natural resources

- Enhanced climate resilience

- Development of value chains

- Reskilling and de-risking

Extension service should address the dual challenge of supporting market competitiveness for commercial agriculture, and also poverty in rural areas (productivity as well as vulnerability). The agenda for extension needs shift from an exclusive focus on agricultural production to a broad range of services related to marketing, environmental concerns, poverty reduction, and off-farm activities (production, marketing, livelihood support).

Farmers need information that can be utilized instantly for making rational decisions in relation to production and post-production activities. Extension organizations should emerge as knowledge centres and nodal agencies for information communication (production & post production). In this context, besides technical knowledge, proficiency in management and soft skills are also needed.

Four Themes to Learn from

Extension could learn mainly from the following four areas:

1. Conservation agriculture
2. Climate resilience
3. Value chain development
4. Innovation and skill development

Conservation agriculture

Conservation Agriculture (CA) aims to achieve sustainable and profitablefarming through a set of natural resource management practices. It minimizes disruption of structure and composition of natural resources and ensures natural biodiversity. Agroecosystem analysis, which is a thorough analysis of an agricultural environment, considers various aspects from Ecology, Sociology, Economics and Political science.

Whenever a farmer is involved in farming, he evaluates his farming situation to identify the problems and search solutions so that he can make the farming system function in a sustained manner. In this way, the farmer is performing an agroecosystem analysis.

Environmentalists view agriculture as locked into an economic and technological system that encourages intensive practices and environmental harms. The issue is one of contrasting perceptions, which are reflected in the current policy debate on the impact of agriculture on the environment. Learnings from the practice of agroecology applied in the field can help extensionists to explain their position.

Agroecology is the study of ecological processes that operate in agricultural production system.

Extensionists have to learn from the principles of agroecosystem analysis as in the case of Farmer Field Schools. Extensionists have to ensure that eco-technologies are promoted which can stabilise and restore the carrying capacity in fields. Good Agriculture Practices (GAP) must be developed to ensure that the food is produced by caring about health and environment.

Climate resilience

Resilience is about creating/enhancing three different capacities:

- Capacity to respond to a disturbance or event to avoid or reduce damage to the existing system (Ecological resilience- e.g., Promoting organic farming)
- Capacity to recover from damaging events (Social resilience – e.g., Ensuring food safety)
- Capacity to transform or change the existing system to one that is more resilient to disturbance (Economic resilience- e.g., Promoting Integrated farming)

Resilience mechanisms to be promoted by extension system must include the following:

- Adaptation by use of bio-resources: Refers to adjustments in ecological, social or economicsystems in response to harmful impacts Mitigation by promoting biodiversity: Action of reducing the severity, seriousness or loss by lessening the impact of disasters
- Coping by food safety: Refers to the specific efforts, both behavioural and psychological that people employ to reduce or minimize stressful events.

Learnings from technology demonstrations under National Innovations in Climate Resilient Agriculture (NICRA) help to enhance resilience of agriculture to climate change and climate vulnerability. The interventions related to technology demonstrations cover four modules, viz., natural resources, crop production, livestock and fisheries and institutional interventions.

Value chain development

Value chains play an important rolein transforming agricultural commodities from raw material to end products demanded by the consumers. The value addition in different phases of production can be mapped into a value chain map for easy understanding. The map depicts inter-linkages between successive stages in the value chain. Farmers, traders, wholesalers, retailers, big retail chains and consumers are major actors in the value chain. With the enhanced efficiency of value chains, farmers benefit from better prices, higher

and quality yield and assured markets, services and input supplies. Value chain analysis should look into cost-cutting innovations along the value chain to benefit price conscious poor consumers, besides focusing on value-added products.

Learnings from the functioning of Farmer Producer Organizations (FPOs) reveal that farmers can increase their share in the consumer price by organising themselves as producer organizations. By resolving the issues of trader exploitation, exploring new markets, accessing timely credit and quality inputs and value chain development, farmers can reap benefits through commitment and collective action.

Innovation and Skill development

Agricultural innovation typically arises through dynamic interaction among the multitude of actors involved in cultivation, processing, packaging, distribution, and consumption of the agricultural products. These actors represent quite different perspectives and skills, such as precision farming, safety standards, intellectual property, resource economics, logistics, land rights, etc.

Farmers are dependent on human resources, which implies that where technological, managerial and other organisational development exists, need for skills development is imperative. Skills development should be seen as an investment. Appropriate skill trainings in innovative practices and solutions have to be organised for farmer empowerment.

The need for skills development is widely recognised. The importance thereof is clear in terms of the growth and development of individuals (micro level), organizations (meso level) as well as the society as a whole (macro level).

Learnings from STRY (Skill Training of Rural Youth) under Sub mission on Agricultural Extension of NMAET and ARYA (Attracting Rural Youth in Agriculture) can provide valuable inputs for extensionists in the area of skills development.

Reverse Extension needs New Theories/ Framework to move forward

Reverse extension cannot rely on the conventional theories and concepts of extension education. It needs new theories and framework and a shift in approach.

- Beyond diffusion of innovations: New look on innovations; use of multiple sources of knowledge; extension as a co-learning process
- Beyond linear ToT (R-E-F-inkages): Credit, Marketing, Product development linkages needed
- Beyond technological interventions: institutional innovations and value chains
- Beyond Research and Extension System: Support and service system –also policy and institutional changes
- Beyond existing institutions and practices: Farmer companies, RPOs, SPVs, Agribusiness incubators
- Beyond allocation based targets and achievements: Outcome based targets and achievements
- Beyond networks: Convergence and partnerships at several levels

Finally, it is to be clearly understood that reverse extension doesn't mean going back to the old paradigm of learning from farmers and seeking feedback from users on the performance of a new technology. Instead, it argues that practitioners have found new and dynamic ways of dealing with their practical challenges and exploring new opportunities, while the extension concepts and teaching have remained rather static. We need to catch up, learn, reflect and use these learnings to reinvent the profession of extension.

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EXTENSION CENSUS -THE PREREQUISITE FOR STRENGTHENING EXTENSION

Without having sufficient knowledge of 'who is doing what' in the increasingly pluralistic extension and advisory landscape, the country would fail to achieve convergence and provide quality extension support to farmers, argues Suresh Kumar.

The Committee on Doubling Farmers Income (DFI) in its draft report, Vol. XI (Department of Agriculture, Cooperation and Farmers' Welfare, Ministry of Agriculture & Farmers' Welfare, Government of India, 2017) has proposed to transform agriculture extension as an important engine for doubling farmers' income. It has made various recommendations while setting the strategic direction for agriculture extension over the years so as to double farmers' income by 2022. It has also examined the paucity of extension manpower, and suggested various measures to achieve the same.

Serious Manpower Constraint

The committee has recommended minimum ratio of extension service provider to farming family: 1:400 in Hilly areas; 1:750 in Irrigated areas; and 1:1000 in Rainfed areas. The Committee has provided the current status of manpower in Agriculture Extension in Table 4.1 on page 66 of the report. It has revealed that the current ratio of operational holdings per extension functionary was 1:1162. However, while many states may get at par with the needed ratio if 30% of vacancies are filled up, other states, including big states such as Bihar, Gujarat, Karnataka, Kerala, Orissa, Rajasthan, Uttar Pradesh and West Bengal, would continue to suffer because of manpower shortage and hence would need additional sanctions.

Present experience indicates difficulties not only in new sanctions but also in filling up vacancies. Although the number of operational holdings is as per the 2010 census, this shall keep increasing with the continuous break up of holdings. Therefore, while making efforts for new sanctions and filling up vacancies is important, yet efforts need to be made to achieve the objective with the existing status of extension manpower.

Pluralism in Extension Delivery

While recognising pluralism in extension delivery, the report noted that (paragraph 1.4.1) currently extension services are provided by various agencies representing public and private sector players. The list of extension service providers is indicated in Fig. 1.2 of the draft report.

It shows 107 categories of public and private extension service providers. This includes 22 institutions of DCA&FW, 4 institutions of DARE including ICAR,KVKs and CAUs, four institutions of DAH,D&F, 8 belonging to the Ministry of Commerce, 22 Inter Governmental Institutions, and 16 categories of private extension service providers.

Besides these, on page 68, the Committee has identified the vast network of institutions in

delivery of credit-linked extension activities, including the immense cooperative network and public and private sector banking network.

On page 69 the Committee has identified various other agencies that provide core extension, including 1.57 lakh common service centres, and self-help groups. There are 1.71 lakh milk cooperatives as well as cooperatives and institutions for fisheries, bee keeping, etc.

The Committee also notes that extension resources active in the field and thus available for extension is huge and belongs to diverse organizations and sectors, and are not limited to only those working within the ambit of the Ministry of Agriculture and Farmers' Welfare agriculture or the agriculture sector. Organizations listed in the DFI Committee report are those known to the ministry. There would be a large number, particularly in the private sector, which may be unknown to the ministry as it would only be aware of those service providers in the agriculture sector known to them.

Convergence

Despite the large network of public and private extension service providers the Committee has recognised several important concerns on page 9 of the report. One of its main concern is as follows:

Does there exist an institutional mechanism to review and converge the number of extension functionaries and the extension approaches adopted by private sector?

The report notes that "While the private sector plays an important role in agriculture extension it is natural that they would concentrate more on providing information to farmers that is related to their commercial interests, and on marketing their products. These efforts need to be made complimentary and supplementary to public extension efforts. There is scope to develop a mechanism to converge all the private extension efforts onto a single platform and achieve the needed coordination to serve larger areas and an increased number of activities. Synergy in effort by the two systems will benefit the farmers better. This will become an example of Public-private platform of extension machinery".

Broadened Mandate of Extension

In paragraph 2.4 (page 22) of the report, "Agriculture demands added role from extension manpower" the Committee has listed 24 roles under agriculture extension in Table 2.1. The success expected by government in revitalising the agriculture sector and doubling farmers' income depends upon extension being able to perform these 24 functions as anticipated.

- Public Extension Service
- Private Extension Service Providers

Table 1: Roles under Agricultural Extension

- Providing information on going schemes and programs in agriculture & allied sectors
- Capacity building, Skilling in emerging areas
- Advocacy on farmers' interests
- Counselling for farmers' well-being
- Credit facilitation
- Critical assistance in risk management including climate change, crop insurance etc
- Documentation and Reporting roles
- Enforcement of Farmers' Charters
- Issuing Advisories on soil health management, water conservation, pest management etc.
- Facilitating access to production and post production inputs & data
- Facilitation & feedback
- Friend, philosopher and guide to farmers
- Engaging in research planning
- Promoting projectised mode of extension delivery
- ICT enabled services
- Intermediation
- Linking farmers to markets
- Building managerial competence
- Linking various support & service networks
- Organizing user/producer groups
- Planning, Monitoring and Evaluation
- PPP Promotion
- Promoter of farmer led innovations
- Redressal of grievances
- Technology selection, etc
- Feedback to research system

Source: MoA&FW 2017

Tackling Resource Constraint

Performing the above-mentioned roles require massive resource commitment in terms of manpower, finances, and infrastructure. Resource commitment on this scale cannot be provided whether by central government or state government. The only option is by converging all extension efforts as recommended by the Committee. This, therefore, becomes a prerequisite for taking various other initiatives and efforts as recommended by the Committee for meeting the challenge of doubling farmers' income.

Database of Extension Service Providers (ESPs)

Creating a database of all extension service providers and resources is the first step towards convergence of extension efforts. Accordingly, an Extension Census needs to be conducted to map all extension service providers and extension resources. Methodology for the same will need to be evolved – including formats for collection of data, creating a platform for collection of data, actual collection and compilation of data, and creating protocols for their storage, protection, and retrieval. This will, furthermore, call for a digital platform wherein information can be uploaded by the concerned extension service providers. Further steps for convergence can thereafter be taken, which itself is a big exercise.

Content of Extension Census

ESP census needs to be a census of extension resources that is not restricted just to extension personnel. A few suggestions may be considered:

1. For each ESP extension resources may be indicated including personnel, infrastructure and activities including funding commitment;

2. Personnel may include numbers and skill sets as also whether they are regular or contractual;

3. Work done over the years;

4. Terms and conditions of resource deployment, including geographical area;

5. Census may include every ESP who can contribute and should not be restricted only to those belonging to the agriculture sector. A large number of other organizations may be willing and keen to contribute, including contribution under CSR.

Way Forward

1. The Department of Agriculture, Cooperation and Farmers' Welfare of the

Ministry of Agriculture and Farmers' Welfare should designate a nodal institution to conduct census, and to createand manage the database as its custodian. MANAGE appears to be the natural institution for this task. Alternatively, the ministry may designate another suitable organisation.

2. The nodal organisation should set up a dedicated cell for this purpose instead of trying to carry out the work through existing staff.

3. The nodal institution should conduct a workshop for probable major ESPs in order to flesh out the concept in detail. Basic information may be collected and compiled in the workshop.

4. A start can be made with the information compiled from the workshop.

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INDIA RICECHECK PROGRAM: A NEW EXTENSION METHOD IN MAKING?

While everyone would like to see impact of new technologies at a wider scale, very few appreciate the need for adapting new technologies to meet the varied requirements of different socio-economic, bio-physical, organisational and institutional settings. The Ricecheck programme, which follows a procedure of extensionist-assisted farmer – group's self- learning tries to address these concerns. Shaik N Meera, Noel Magor, John Lacy and V RavindraBabu share their experiences here.

My (Shaik N Meera) recent visit to New South Wales Australia, focused on understanding the concepts and operational issues in implementing *Ricecheck* program. Even though it appears not to be anything new for extension professionals, I feel the way 'concepts' are operationalized is worth learning. Being participatory and linking inputs to outputs and outcomes, is the best part of this.

All this is done by farmers (we only facilitate), no top down recommendations from R&D organizations and it is a typical output oriented than a process oriented approach – best suited for commodity based extension efforts. While implementing this in Andhra Pradesh, India during 2013, a question came to my mind as when was the last time did we (extension professionals) operationalize/ facilitate basic extension methods (such as group discussions) involving farmers? This blog is an attempt to answer this question.

Given the highly diverse and dynamic nature of rice farming in India, the AICRIP (All India Coordinated Rice Improvement Project) conducts multi-location trials and recommends location specific varieties/ hybrids and technologies. What is practical and profitable for farmers at any given site depends on the unique combination of bio-physical, socio-economic, organizational and institutional circumstances.

As a consequence, it is almost impossible for researchers to develop standard technologies that can be adopted on a large scale and can easily be replicated in different contexts. To address this problem, a participatory approach is proposed keeping in view the diversity of location specific conditions, with farmer experimentation, discussions, experiences, standardizing and adaptation of technologies.

This approach has been proven effective in Australia, Philippines, Chile, Brazil etc. There are 4 key principles and few checks for the *'Ricecheck'* programme. In India, Directorate of Rice Research (DRR) under the Indian Council of Agricultural Research (ICAR) has initiated this programme in West Godavari district of Andhra Pradesh in collaboration with the Andhra Pradesh Rice Research Institute, Maruteru (Acharya NGRanga Agricultural University, Andhra Pradesh) and the International Rice Research Institute (IRRI),Philippines. For the Rabi 2014, this approach is being piloted in Telangana, Tamil Nadu and Odisha states of India.

Box 1: What is *Ricecheck* Program?

Ricecheck is an innovative farmer participatory extension methodology where farmers decide - what are the best practices for their fields based on the 'experience' rather than on 'recommendations' from experts. The core activity under this approach is facilitating group discussions among farmers. Ricecheck is a procedure of extensionist-assisted farmer-group self-learning. It can be defined as a dynamic rice crop management system that presents key technology and management best practice as key checks; checks farmer practices with best practice to compare results and learns through farmer group discussion to sustain improvements in productivity, profitability, and environment safety. In other words, Ricecheck is learning by checking and sharing for best farming practice.

Ricecheck program benchmarks farmers' fields to identify practices (checks) for lifting yields and profits. Here comparison is made with best yielding farms rather than with the experimental plots (at research stations). In Ricecheck programme, every farmer feels that all the key checks and practices are interrelated. Its holistic many factors affect crop yields and hence farmers need to understand the relation between each practice with the output (may be number of tillers) and with the outcome (may be yield).

So, What's new in this?

In this program, the top yielding practices (checks) are identified by groups of farmers from their own crops and not top down from experimental fields. The researchers and extension officers will facilitate the process. These checks are listed simply and objectively. Once identified, we encourage farmers to adopt these checks in their respective fields. On weekly basis, group discussions are held (facilitated by extension officer/ scientists) to know how each practice is implemented and each check is achieved. On weekly basis, crop monitoring and recording practices are maintained. With this, farmers will get opportunity to understand how their practices are differing from neighbouring (best farmers) practices.

How *Ricecheck* Program is Implemented?

- Firstly, groups of 15-20 farmers are formed. This will be followed by a facilitated discussion on practices that contribute to higher yields and will also be supplemented by scientific practices wherever required. At the end of this exercise, we will have 'standard rice practices' for that village/ region identified by the farmers rather than by the scientific community.

- These practices are then categorized into 10-15 key checks. If we achieve these 'key checks' it is likely that productivity will go up. The assumption here is that without 'recommending good agricultural practices' to the farmers, they 'adopt what is good for them' in a participatory way.

- We know that in the same village while few farmers achieve 6-8 t/ha, many get only 2-3t/ha or below. Why is this happening? What practices are contributing to higher productivity? What practices are detrimental to achieve higher productivity? By bringing all these farmers together and facilitating sharing of their experiences help in setting a benchmark of 6-8 t/ha for all the farmers. The process of achieving this will then be monitored.

- Essentially, it is important to identify the key actors/ organizations that will facilitate the process. During the season in a sequential manner, best practices (contributing to achieve key checks) are discussed among farmers on monthly/ fortnightly basis. Next week, when farmers meet together, they would discuss what were 'actually practiced in their field' and why few couldn't be followed? All these are documented in records/ matrix sheets.

- At the end of the season, we will have a matrix of all the farmers - how many key checks are achieved by each and how each key check has contributed to higher yields.

- Over the next few seasons key checks and practices are standardised for that village/ cluster of villages and with all the farmers starting to adopt standard practices hence, higher productivity is achieved.

Experiences in Andhra Pradesh: Work in Progress

We have selected West Godavari district of Andhra Pradesh as it is one of the districts where rice farmers have rich experience of farming. The Ricecheck components have been customized and standardized to suit the Indian context. A total of four discussion groups (involving 80 farmers) were established and 4 group meetings were organized during the dry season 2013-14. In the first meeting, key factors (total of 45 checks) contributing to the productivity were identified through facilitated discussions. During season long group meetings, all these key checks and their level of adoption among farmers were documented. The extent of deviation from the mutually agreed key checks was also recorded. The field level constraints in

adopting all the key checks were documented and were communicated to R&D organizations as feedback.

Results related to 2 groups (40 farmers) are provided here. About 45 Checks and 15 key checks which were contributing to the higher yields in that region were identified. The adoption level among farmers were documented and analyzed. Field level constraints in adopting the key checks were documented and communicated to the R&D organizations at the end of the season.

Box 2: Ricecheck components deployed/piloted

- Recommendations booklet/knowledge source Rice Knowledge Management Portal (RKMP)
- Packaging key technologies as key checks
- Farmer discussion groups
- Crop checking and crop records
- Ricecheckdatabase–inputs, results, benchmarking reports
- Ricecheckresults used to update checks each season

Key Checks Identified

Farmers Discussion groups are key to the Ricecheck program. In the first meeting, two groups were involved in identifying what were the best suited checks for their village. Their ideas were collated and each of the practices for each technology was read back to the farmers.

Farmers were asked to add any missed technologies, practices or to clarify practices. The practices are not to be debated by researchers present and if some practices are believed as incorrect, there is an opportunity to clarify it in the draft recommendations. Finally, the following key checks were identified by the groups (Box 3).

Box 3: The key checks

1. Use high yielding varieties that is recommended for the growing conditions of your location and season

2. Use high quality seeds from a reliable source (preferably commercial source)

3. Apply a seed treatment against fungal diseases

4. Prepare a well levelled field through shallow puddling that is weed free and with clean bunds

5. Establish your nursery on time

6. Manage your nursery to obtain healthy seedlings

7. Maintain water levels using 5-2-5 Principle (5cm- 2cm-5 cm)

8. Appropriate seedling age to be followed (21 days)

9. Plant in lines and achieve a plant stand of hills per square meter

10. Apply organic fertilizers and complex as well phosphorus and potassium fertilizers with the last puddling

11. Apply top dressed nitrogen in splits and drain field before application

12. Correct micronutrient deficiencies

13. Control weeds soon after transplanting

14. Regularly monitor your fields for pests and use only approved and appropriate control agents at recommended doses

15. Drain the field before harvest and harvest when it is completely dry

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During the entire season, a series of group meetings were organised with an interval of 30 days. These meetings were aimed at promoting the key checks & practices to be undertaken during the subsequent month. Previous month's adoption level from each farmer was recorded during the meeting. Level of achievement in terms of adoption and constraints in adoption of checks were analysed. The preliminary results are provided below:
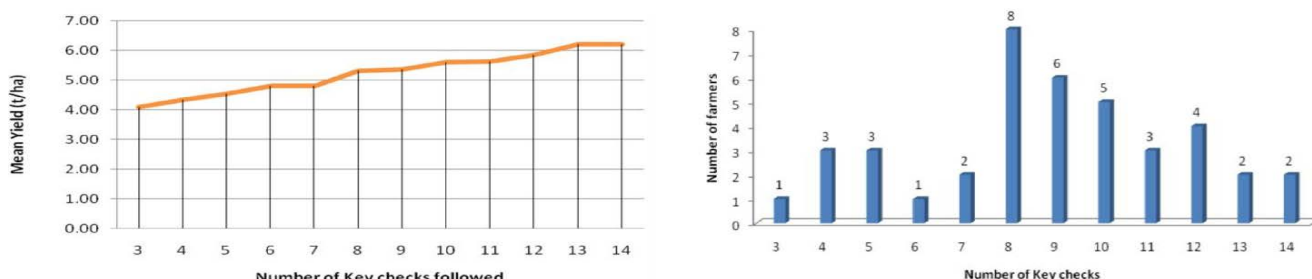
Fig. 1: Level of achievement in terms of adoption and constraints in adoption of checks

Yield range (in t/ha)	Number n=40	%	Range of Key checks
4.1-5.0	9	22.5	3 to 7
5.1-6.0	28	70	8 to 12
Above 6.0	3	7.5	13 to 14

Pearson Correlation between yield and number of key checks followed = .957 (Significant at the 0.01 level 2-tailed)

Synthesis and Application

- A serious recognition is being given to farmer experimentation in this approach in contrast to the older agricultural extension approaches based on the idea of 'information' as a commodity to be exchanged.

- A desire to document - to 'know things' in ways capable of sustaining discussion (instead of filling boxes in reports) and initiating interventions is a key component here. This will in turn lead to the establishment of an emancipatory learning environment.

- At the micro level, this approach contributed to 56% increase in rice yields on an average.

- The Ricecheck package –simple key checks, recommendations, groups, crop checking, records, database, feedback to farmers and a range of delivery methods are all important

- Discussion groups are still the key to learning and continuous improvement

- Ricecheckas a participatory extension approach is successful in improving the farm productivity.However, while planning to implement such approach, customisation of the processes is required to suit local conditions.

Key Insights for Extension

Learning is Important

Though the Ricecheck System helps farmers achieve high yield through proper crop management, its major highlight is the learning process. The learning process takes place before, during, and after each planting season. Farmers can compare their actual performance and management with the expected outputs (yield, quality, and environmental) and outcomes as indicated by the achieved key checks. Due to limited resources or for other reasons if farmers haven't adopted the key recommendations, these problems can be identified and therefore, improvements in the next season can be made.

Facilitating Group Discussions

The extension officer, agronomist or village leader can lead the groups. Group learning is preferred to individual farm visits or field days as farmers can interact, communicate and learn from each other. The farmer groups are the ideal medium for communicating and training farmers.

Box 4: Using the learning steps

The most important feature of Ricecheck is to encourage farmers to monitor and check their crops to see if they are adopting the checks. This is achieved through a number of learning steps (Lacy 1994). These are:

- Observing the crop and measuring growth and management performance
- Recording measurements and interpreting and comparing results and
- Acting to overcome weaknesses in management (non adopted checks)

The aim is to educate farmers to improve their learning and performance at each step as well as moving from step to step over time. The aim is to encourage as many farmers as possible to progress through all the steps.

Field days have a different role. They are appropriate for researchers to create awareness about new technology and are able to cater to large number of farmers. It is a top down approach with researchers showing results and inviting questions from farmers. It is not usually a forum to allow discussion of the merits of the technology because there are too many farmers present. Farmer groups can be used for this. Individual farm visit is another alternative form of communication but considering the very small number of extension officers and agronomists (in relation to farmers) its scope is limited.

Box 5: Discussion group formation

Groups should be based on localities and communities where farmers know each other. The farmer and farm chosen for the group meetings should be respected by the other farmers and keen to hold the meetings. The host farmer, extension officer, agronomist or village leader organising and facilitating the meetings need to fix convenient meeting times at important decision times (eg: first topdressing etc). It is important to set up a communication system so that all farmers are invited to the meeting. The training in Ricecheck provides a reason and focus for attending the group meetings and becoming a group member. Not all invitees will attend or wish to remain in the group as the learning style will not suit some farmers.

Group leader skills

Group leaders have to be motivated, technically competent and should have good communication skills. The ideal group size is 10-15 farmers as this allows all farmers to speak and participate.

The leader needs to encourage farmers to make comments and promote discussion. Important issues that require that answers might be recorded on a piece of paper. The leader should ensure that the answers to these questions are presented at the next group meeting.

As adults (farmers) have preferred learning styles there is a need to use a number of learning activities at group meetings. Some adults learn best from observing (for instance, posters, others by measuring- "doing" (eg; the transplanting check 25cm x 25cm spacing). Some prefer writing and for instance, the recording of rice practices suits these learners. Some learn best from talking (whereas sometimes talkers can create issues by talking too much) while some do not say much because they are "listeners". Others like comparing rice crops or demonstration plots or reading (eg: Ricecheck fact sheets and records). Some learners prefer interpreting information (eg; drawing conclusions from records). In other words, use of a range of learning styles ensure farmers engagement and learning and this will boost up attendance at the next meeting

Crop data analysis

The Ricecheck crop evaluation report provides feedback to each participating farmer showing how their crop practices compare to the Ricecheck key checks, other farmers and to high yields. Adoption of the checks is automatically evaluated. Poorly adopted recommendations or checks can be quickly identified and communicated to extension, research and other stakeholders. The database has the ability to compare any of the crop parameters with yield and produce graphs of the results. Use of graphs at farmer meetings is an excellent tool for promoting discussion and farmer learning and motivating farmers to improve practices. A simple matrix can also helps farmers to understand the relations between various checks and productivity.

Epilogue

Ricecheckprovides the framework for collaboration between farmers, research and extension. Itrecognises farmer learning and values farmers' knowledge as important as that of research and extension. As an extension method it is bottom-up, small group driven and requires superior facilitation skills.

This program can be initiated with a core group of farmers in a number of districts/regions in different States with whom extension workers and researchers interact regularly. Current management practices and knowledge gaps among farmers will be assessed in a participatory and interactive process and these form the basis upon which the program will be built. This knowledge base will provide opportunities for extension agents and researchers to collaborate with the farmers to enhance their knowledge base. This will in turn motivate them to learn and further improve practices to achieve better productivity.

Way Forward

While everyone would like to see impact of new technologies at a wider scale, very few appreciate the need for adapting new technologies to meet the varied requirements of different socio-economic, bio-physical, organisational and institutional settings. The Ricecheck programme, which follows a procedure of extensionist-assisted farmer –group's self- learning tries to address

these concerns. In other words, we areusing Ricecheck as a case to illustrate the importance of adopting such innovative approaches (or) beyond field days and demonstrations.

During the last couple of years, ICAR has re-invented the concept of 'Farmer First'. This concept recognises the complex, diverse and risk prone realities of the majority of Indian farmers and calls for enhancing farmer-scientists contacts with multi stakeholder participation. While theoretically this concept may sound good, but what is lacking is operationalising such concepts in the field conditions. We as extension professionals need to develop a series of 'toolkits' (expand the number of options in our extension tool box) to make little changes in the way extension is carried out in India and elsewhere.

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EXTENSION AND PARTICIPATORY IRRIGATION MANAGEMENT: CAN IT COMPLEMENT EACH OTHER?

Participatory Irrigation Management could be an effective model of community based extension, if extension engages more effectively with water user associations opines, Souvik Ghosh.

Community-based approaches, which involve farmer groups, have gained increasing importance for agricultural development in recent years. In extension too, this is considered important as it promised to overcome both the state failures and the market failures inherent in extension (World Bank, 2005). Farmer associations can play an important role in aggregating farmers' demands for extension and in representing farmers in participatory models of extension management so as to make extension more demand driven (Feder *et al.,* 2010). Extension should therefore ideally work with farmer groups to strengthen their capacities to articulate demands, help them link to new sources of knowledge and enable innovation. However, experiences from irrigation sector in India reveals that extension has not engaged sufficiently with the large number of water user associations in the command areas.

Box 1: Challenges for effective irrigation management in India

Irrigated agriculture contributes about 60% to overall agricultural production in India (Planning Commission, (2013). Because of its yield augmenting impact, irrigation development has always been a priority for India's agricultural development in the successive five year plans. Consequently, irrigation potential increased from 22 million hectare in 1950 to 123 million hectare currently making India the world leader in the irrigation sector (CWC, 2010). However, there is a significant gap (32 million hectare) between the potential created (123 million hectare) and utilized (91 million hectare). In India, the irrigation sector faces problems such as low irrigation efficiency (30-35%), deteriorating physical structures, inadequate maintenance, low cost recovery, under-utilization of created potential (only 74% utilized), uncontrolled water delivery, tail-end water deprivation, seepage loss, siltation, water logging and soil salinity. Inequitable and unpredictable water supply among farmers over space and time is also leading to injudicious use of water in the irrigation commands and increasing inequity within the same unit of command area (Ghosh *et al.,* 2005).

Approaches such as Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT) emerged as solutions in response to the problems of non-performance of publicly supplied irrigation system. India's National Water Policy (2002) highlighted participation of farmers in irrigation management, Accordingly, several states in India have been implementing the PIM programmes and transferring the management of irrigation systems to water user associations (WUA) with a view to provide equitable, timely and assured irrigation (Box 2).

Farmers who were considered as beneficiaries till then are now considered partners in planning, development, operation and maintenance of irrigation systems.

Box 2: Water User Associations
WUA is an association of all farmers owning land within a hydraulically delineated portion of a command area ranging in size approximately from 300-600 hectare. The WUA assumes full responsibility for operation and maintenance of the minor/sub-minor and all structures under its jurisdiction area. It ensures construction, maintenance and repair of all the watercourses, field channels and field drainage in the said area. WUA establishes its own operation and maintenance fund to meet the operation and maintenance expenditure and collects water rates from farmers. WUA decides cropping pattern keeping in view of available water for allocation, time of irrigation requirements and required repair and maintenance works in the command.

Participatory Irrigation Management (PIM) in India

About 14.623 million hectare of irrigated land has been covered under 63167 Water User Associations (WUA) in the country till the end of eleventh five year plan (Ministry of Water Resources, Govt. of India, (2012). In India, PIM followed two approaches - legislative and motivational. Andhra Pradesh and Madhya Pradesh first enacted legislation and opted for fast and extensive introduction of PIM. Maharashtra and Gujarat adopted motivational strategy followed by legislation. Odisha presently having highest number of WUAs (>15000 with about 1.5 million hectare jurisdiction of irrigation command area) too adopted motivational strategy for certain period and when attained certain level of momentum, adopted a top down strategy, i.e., legislation. If there is an imposition of sets of rules and organizational structure on the understanding of few selected experiences, it will face difficulty in enforcement mechanism. Perhaps because of this, the performance of WUAs has been mixed.

Performance of WUAs

The gap between the prescribed and performed functions of WUAs is attributed to certain factors, which need to be addressed. Effect is found to be varied between sources of irrigation as well as across the command areas of different irrigation systems (Ghosh and Kumar, 2012).

Group dynamics: Ghoshet al.(2010) tried an approach to measure group dynamics effectiveness ofdifferent WUAs under different irrigation systems identifying different dimensions and their relative importance in it.
They found that many of the parameters in group dynamics effectiveness index (participation, decision-making procedure, group atmosphere, empathy, interpersonal trust and social support) were quite low in case of major and medium irrigation WUAs whereas these were high in the case of minor irrigation (both flow and lift) WUAs. It also means that the smaller the irrigation system, the better the group dynamics.

The reasons for this kind of differential group performances may be attributed to the fact that in case of minor irrigation, irrigation management transfer (IMT) to the WUA has inculcated a sense of ownership with full access and control of the system. In contrast, in case of major and medium irrigation systems, the efforts are undertaken based on the assumption that things could be set right by organization of the irrigators at the local level despite the availability of insight that without changes in management at higher levels it is very unlikely that these local organizations (WUAs) will be successful over time.

Unpredictability and unreliability of water supply: The unpredictability and unreliability of water supplyfrom the main system to the local units is a major cause of the problems at local level. The small and marginal farmers are unaware of the WUAs in many cases especially in larger irrigation systems, where they face more problems in accessing water, as their lands are concentrated in the tail ends unlike those of large farmers. It has resulted in the dissatisfaction of the small and marginal farmers towards decision-making process, thus reluctance in participation in WUA activities.

Institutional challenges in transferring powers and responsibilities: Transfer of irrigation managementresponsibility from the government irrigation authority to local management demands both allocative and investment decisions by the farmers' group. The problem at main system level is mainly problem of allocation of rights and entitlements and therefore, of governance. Several socio-economic and political factors outside the water sector influence the irrigation management. Success of irrigation management transfer depend on a whole set of institutional arrangements and willingness to comply and enforce and/or change the rules in the light of changing circumstances. The issues of rights figures prominently in debates on irrigation management in India now. Inefficient water uses, social power capture by rural elites in the name of participation, inadequate support from government agencies and reluctance to fully transfer powers and functions to the WUA are some of the bottlenecks. Currently, there is an inadequate understanding of the linkage between socio-cultural, institutional and ecological factors affecting the outcome of the PIM reforms in India (Saravanan, 2010). There are also concerns about the effectiveness of the PIM approach and sustainability of WUAs (Reddy and Reddy, 2005; Kulkarni *et al.,* 2009).

Other uses of water: The concept of WUA does not consider other uses of water (domestic, industrialuse, etc.) and also the needs of landless people in irrigation command area. Without proper education and interface with all categories of farmers, there will not be widespread acceptance to the idea of farmers assuming management and maintenance responsibilities beyond the on-farm level. Poor people's relative benefit typically depends on allocation of water rights, which is in proportion to land size rather than, for example, on the basis of an equal quantity of water to every farm households.

PIM and Extension

Presence of WUAs in the irrigated area offers great potential for extension to improve its effectiveness. Extension can play an important role in capacity building of the WUAs not only on operation, maintenance and management of irrigation system but also in implementing efficient crop planning, synchronization of farm operations, linking WUAs to other sources of knowledge, support and services and establishing effective forward and backward linkages. Networking of WUAs for sharing of information and expertise between them would also be useful. As use of productivity enhancing inputs in agriculture is often influenced by the available irrigation water regime, the PIM under WUA umbrella would complement the other extension services well with more assured benefits from the extension efforts. Extension also need to give attention on the equal sharing of benefits among the landholders and the landless by working out the modus operandi of involving landless in WUA's activities like repair and maintenance works in irrigation network, allowing cultivation on common lands in the command, fishing rights in the minor flow irrigation system's reservoir, etc to ensure equal benefits to all. Present structural arrangements of WUA ensure involvement of both agriculture and irrigation department functionaries; thus efficient cropping and water use in the irrigation command. Involvement of other line department functionaries (livestock, fishery) would help in developing capacities of the rural households in a holistic manner with diversified livelihood options in the irrigated areas.

Missing Links

Though extension could enhance the capacities of WUAs and multiply its own impact and effectiveness by engaging with WUAs, extension hasn't sufficiently exploited this potential. A lot of discord still exists between the state departments of agriculture and irrigation in most cases. At the most, the Department of Agriculture (the main

public sector extension agency) has helped WUA in crop planning and providing inputs mainly seeds during some years (mainly initial years). Further initiatives for strengthening technical capacities related to post-harvest and marketing aspects and improving governance of WUAs are clearly lacking. It is a matter of great concern that effective and functional linkage between different agencies is still an issue in spite of co-ordination mechanisms such as the Agricultural Technology Management Agency (ATMA).

Way Forward

- Participatory Irrigation Management should embrace a new paradigm of inclusive and participatory irrigation governance and extension should support this transition.

- Extension should learn from successful evidences of farmer managed irrigation systems and use the insights from this learning to support other WUAs. It should also provide technical, managerial, marketing and entrepreneurial support to WUAs to serve its members better.

- Extension should use co-ordination mechanisms such as ATMA to bring about much more convergence to support WUAs and should support WUAs to emerge as a community based extension mechanism in irrigated areas.

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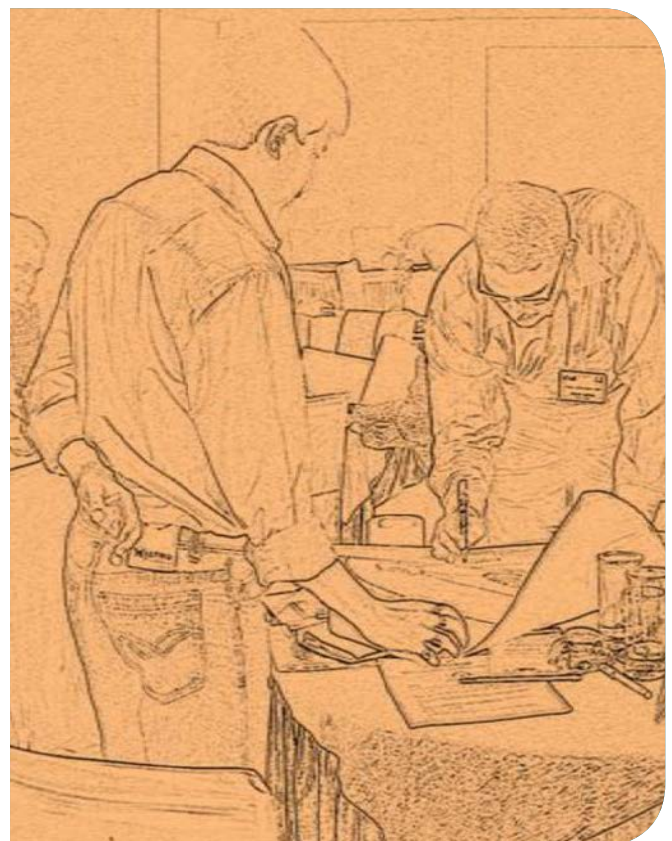
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IS IT TIME TO ORGANISE A SEMINAR ON HOW TO ORGANISE SEMINARS?

These days everywhere you turn, you see and hear about seminars, conferences and workshops. But very few of these add value by contributing to improving the quality of debate, programme implementation or the policy process. It is time to organise a seminar on how to organise a seminar, argues Suresh Kumar.

Though I have attended several seminars, workshops and conferences and came back disappointed, I never thought of writing about it, till I read Dr RM Prasad's recent meeting note in AESA (http://www.aesanetwork.org/international-conference-on-extension-educational-strategies-for-sustainable-agricultural-development-a-global-perspective/). Dr Prasad wrote about his experiences of participation in an extension conferencerecently in this meeting note and a few extension scientists commented on his note. As I did not attend this conference, I can't speak for the conduct of that event. My views and suggestions are based on my own experience of attending workshops and seminars. It would not be fair to single out agriculture or agricultural extension here. Comments are valid for such events organised in every sector.

Dr Prasad's note raised several interesting points especially those aimed at improving the quality of deliberations and recommendations. These include the need for specifying outcomes (leading to focussed recommendations including areas for future research); emphasising quality over quantity; proper time management; encouraging young researchers and the need for adopting innovative approaches for organising such events. Those who commented on this meeting note broadly agreed with the thrust of Dr Prasad's arguments and his constructive criticism and also made specific observations on lack of rigour in extension research (including lack of research competencies) and on the need for innovative approaches in conducting such events (Box 1).

The discussions mainly covered three broad butinter related issues, namely, improving the quality of extension research (including the quality of Post Graduate Research), enhancing the capability of extension faculty and improving the conduct of workshops, seminars and conferences.

All these aspects are critical not only for extension but also for all disciplines, as a nation cannot develop beyond the capability of its faculty. If I was to name one item which is most crucial fornational development, I would unhesitatingly name quality of faculty as this determines quality of both education and research, the two pillars of growth.

Improving the Quality of Extension Research

It is high time for universities and research centres to have their own Research Master Plan and a Community of Practice (CoP) around each of the research themes. The research program may be finalised jointly by education, extension and research wings. I believe that this mechanism is already in place in most cases. Same may be fine-tuned and internalised. Every research (student as well as faculty research) should contribute to this agenda. Subject of the thesis may be selected from out of the Research Master Plan. Each student research program may be part of a long term research project. Format of student research needs to be structured so that every research project could fit in the research master plan.

Quality of PhD thesis is core of academic excellence as this distinguishes academics from non academics. Every PhD thesis needs to be put on open defence through a suitable mechanism. Once a mechanism like "Extensionpedia" is created, the thesis could be uploaded on theportal (or any other similar portal) and put up for scrutiny of the CoPs.

This thesis could be discussed in a seminar for those themes to be attended by experts who could then give their opinions in the light of discussions there and the comments received from CoPs. In fact, defence of PhD thesis could be an important part of workshops and seminars. Dr Sivakumar made an excellent suggestion for a doctoral colloquium alongside where the PhD students could discuss their work. Thus, PhD students need to be invited for these professional events. Presumably the PhD thesis could be discussed as part of the Colloquium.

Improving Research Capability

Professor Rao identified it as one of the most important issue affecting quality of research. This is important for all disciplines including extension as the faculty capability virtually caps the scope of national development. This capability needs to be upgraded as part of life time capacityenhancement programme and not through a few isolated initiatives. Scope and modalities of suchinitiative need to be determined through wide consultation at all levels and finalised after a national consultation. The 12th Five Year Plan Working Group on Agricultural Extension had recommended testing competencies of extension functionaries and extension institutions quantitatively through a suitable professional system. This concept of quantitative testing of competency could be extended to ICAR and SAUs and for that matter to every organisation. Without quantification, large scale programme for capacity enhancement will not yield results. Once quantified it is possible to know where we stand, plan interventions and monitor the changes. For instance the 13thFive

Year Plan could then mention the existing extension and research capability levels at beginning of the Plan and the target towards the end of the Plan.

Conduct of Seminars and Workshops

As discussed earlier, this is the main focus of this blog. DrSivakumar's suggestions for improving quality are unexceptional and deserve to be acted upon. I would like to place a few more suggestions on how we can improve the conduct of seminars, workshop and conferences here:
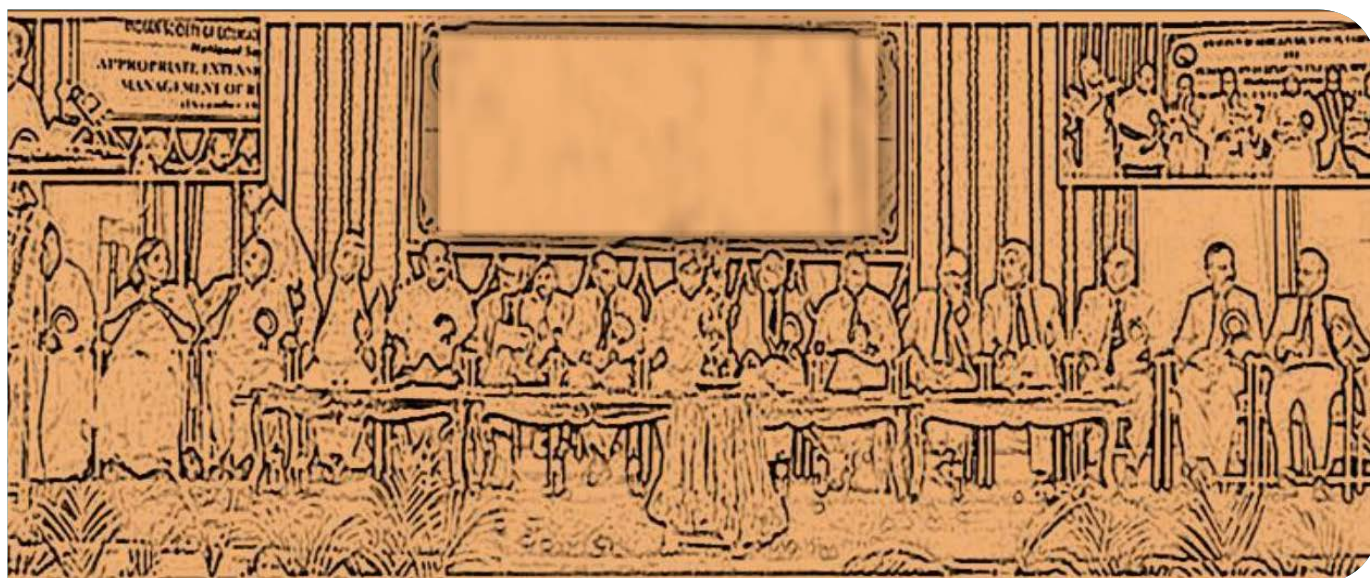
Themes: There is need for formulating theme wise issues and concerns in extension needing co-development. This "directory of issues and themes" needs to be uploaded on a platform such as "Extensionpedia" so that every stakeholder could contribute to this list of themes. This was also mentioned by Dr Prasad as an illustration of the seminar outcome. This list may be finalised at a national seminar to which senior functionaries from Planning Commission and Ministries may be invited. Authorities using the inputs and providing funding also need to be consulted for their inputs so that the directory represents the concerns of every stakeholder including, practitioners, faculty, senior managers and policy makers. This shall ensure that the themes represent the national need. Each seminar, workshop and consultation and even research study could use this directory to firm up the theme/s of their event and research.

Objectives and Participants: One or more objectives need to be clearly spelled out. The objectivescould be development of themes, assisting PhD and MSc students and researchers, exposure to new ideas, improving education etc. The nature of participants from diverse backgrounds needs to be considered carefully in line with the objectives of the event. There are good reasons to restrict participation to

have sufficient time for quality deliberations. In some cases there could be adequate reasons for ensuring wider participation from a variety of sources that could provide synergy. The objectives should determine the number as well as the nature of participants. . To maximise benefits, the proceedings could be broadcast as in case of medical conferences. Teaching videos could be prepared for colleges and professionals. Workshop papers should ideally serve as a text book for the subject and may be made available on the website.

Workshop papers: In my blog on "Extensionpedia" I had suggested that for each theme in extension, a base theme paper may be uploaded for co-development by CoPs and the theme paper finalised after a national workshop of each CoPs. This co-developed theme paper could form the base consultation paper for all seminars, workshops and conferences. The workshop papers should be related to these themes and should contribute to adding and modifying the contents. These papers could be also dropped in a drop box of the particular theme and be also uploaded. The workshop organisers could use the theme paper and also the additional papers related to this theme. This workshop may result in a revised anchor paper which may be then uploaded for co-development. One option for ensuring quality of papers and allow wider participation is to evolve the concept of Paper Bank - theme-wise pre-approved papers de-linking papers for consideration in specific workshops. A Paper Bank could be prepared for each theme. Organisers could select papers from the paper bank. Contributors could also offer pre-approved papers for various seminars.

Inaugural session: Participation of dignitaries is important as the participants would like to know thethinking of international, national and state level decision makers and experts about their

long standing concerns, their thinking about the future and also to interact with them. This however, does not happen due to the limited time available to the dignitaries which is consumed by inaugural addresses and welcome ceremonies. Welcome ceremonies could be made short and the time could be used more optimally as the time of dignitaries will always be limited. The participants who come from long distances and have rich experience would like to interact with the dignitaries but the same is not possible both due to shortage of time and there being no provision for it in the inaugural session. Provision for reactions of participants need to be included in the inaugural session. Ideally priority may be given to participants who send the list of questions in advance.

Everyone's and my own experience regarding time management in most seminars is the same (Box 2). If the power points slides are made available in advance, the participants could read the same before the session starts and this would help in finding more time for discussions. This should be default option. It would also compel the participants to come prepared. Time management ofacademic events is something all academics need to ponder both for optimal use of their time and more importantly for the respect and sanctity of the academics and the academic discipline.

Box 2: Time Management

Organisers invite policy makers and decision makers and well-known names in the discipline because they enrich the program and it reflects on the image of the seminar. The opening session comprising opinion and decision makers consumes a lot of time after which they leave and attendance thins out depriving participants of opportunity to interact. Many participants leave by the time of final session.

Experts invited to participate in these events need to be allowed enough time to enrich the seminar and their number determined by available time and expected role. If too many are invited they cannot be allowed enough time. The Chair is then compelled to ration time and keep reminding them to finish presentation quickly like a policeman regulating crowds or rapid fire talk shows. Continuous pressing of bell by the chair rather than academic discussion then becomes the most distinguishing feature of technical sessions.

Plenary session (which is perhaps the most important) often doesn't have time to build consensus. This session usually starts late and is also consumed by dignitaries delivering their addresses. There is not enough time to finalise recommendations which are often finalised after the workshop is over. Sometimes the time taken to come out with the recommendations is very long as the organising team members have to attend to normal work and clear the backlog of work that has piled up during the workshop.

The recommendations are then sent to concerned authorities (when the issues may no longer be relevant and those who attend these events may not be in position or may not recollect the discussions and may have lost interest) and it will remain as one among the mountain of documents waiting for their attention. The opportunity of their presence is lost, probably forever.

Ideally the inaugural session should be devoted to review of action taken on previous recommendations which should provide the backdrop and anchor the inaugural session. The address of the dignitaries shall then cover actions already taken by their organisation on previous recommendations, proposed course of action as also guidance about learning's from the past and agenda for the future which should guide the proceedings. Currently in the absence of knowledge about previous recommendations, the inaugural proceedings tend to be conducted in a vacuum. Past needs to provide backdrop for the future. If the list of recommendations pending with the departments under control of the dignitaries attending the inaugural session is sent in advance to them they would review and initiate action as otherwise it would reflect poorly on them. This would also pre-empt decision makers making vague promises for the future. Presumably this would require the organisers to enclose list of previous recommendations as first item in the agenda notes.

In fact, even dignitaries shall welcome this approach as it shall help them to address the pending issues and review the implementation of previous recommendations. To focus the session as recommended it may be renamed as "Recommendation Review Session-Looking at the Past" or "Action Taken Review Session-Looking at the Past'' or any suitable name as the term inaugural session somehow gives impression of a session meant to inaugurate and make some general comments..

Plenary session: This session should be devoted to finalising the Agenda for Future by modifying theDirectory of Recommendations based on the discussions in this event and may be suitably renamed instead of Plenary Session. Quite often when the recommendations are made the decision makers are not available and an opportunity is lost

as the workshop recommendations shall compete for space with a host of other documents. Plenary session is the ideal place for the policy makers to listen to the recommendations and contribute so that the recommendations reflect their concerns and acceptance. The recommendations should be finalised in the plenary session only.

To ensure that the decision makers come prepared for the plenary session summary of recommendations of each session should be communicated to concerned policy makers after each session. Efforts should be made to make sure that the departments or agencies that are expected to implement the recommendations participate in this session. Sufficient resources should be ensured to make sure that they participate and benefit from these events.

In other words, while the inaugural session looks in to the past to know what had happened and what action has been taken on past agendas, the plenary session sets agenda for the future. The sessions in between the two sessions or the working sessions facilitate leanings from the past to set agenda for the future and need to be structured accordingly giving enough time for the speakers to present their views and for the participants to interact. As mentioned earlier if the power points slides are made available to the participants in advance they could come prepared and the time of presentation could be saved and the sessions could be devoted for interaction and finalising recommendation after discussions and building consensus. Organisers should also accept responsibility for follow up of these recommendations and there should be a system to bring the recommendations to the notice of decision makers.

Directory of Recommendations: Having an up-to-date list of previous recommendations is aprerequisite for recommendations made in this blog. A theme wise portal/directory of recommendations may be prepared, incorporating recommendations made by various workshops and seminars and also based on recommendations from commissions, committees and expert groups. Unique identity may be given to each recommendation. The directory should also indicate agency which should take action and the status of action taken. Concerned agencies may be requested to indicate reasons for not accepting the recommendations. Seminars should focus on improving previous recommendations through addition/deletion/ modification and review action taken on previous recommendations and deliberate on improving implementation of recommendations. Meetings shouldn't be about repeating the same recommendations that are already made.

Workshop Resources: These should be allocated separately for administrative/ logistical andacademic purposes. Academic resources may be provided for both preparatory works as also for follow up of the workshop recommendations including follow up with concerned authorities. Non academic staff may be trained for logistical work of the seminars or a retired academic may be hired for this purpose.

Credit: Workshops/seminars should be treated as an action research project and the staff may begiven adequate credit. Currently, I believe credit is given for only papers published in a seminar. It should be considered an honour to conduct a premier workshop. Credit may also be given, depending upon the quality of paper for contribution to the anchor papers on the 'Extensionpedia' without linking with seminar presentations. This may reduce pressure for preparing seminars for presentation in seminars. It is hoped that treating seminars as action research project should allow them to spend more time on these activities thus, improving the quality and value of these professional meetings.

Rating the workshops/seminars: Regular evaluations on the quality of workshops and seminars maybe conducted and each workshop/ seminar may be rated by professional groups on set indicators. Rating should determine funding for subsequent events by the organisers.

Funding: Clearly funding by various national agencies need to be enhanced to ensure quality. Funding may be linked to the rating of earlier workshops/seminars and also on the condition that the organisers adhere to the good principles of organising events (as discussed here).In addition funding should be made available from other sources who benefit including educational and research organizations and even commercial circles.

A national seminar on how to organise seminars? This suggestion is made in full seriousness. Itshould result in detailed guidelines and a manual. There should be a review of how workshops and seminars are organised in other discipline and premium institutions in India and abroad. Perhaps MANAGE or NAARM or similar organizations may take up a project on this. Most funding agencies may be invited for their inputs so that the funding agencies may insist upon adoption of these guidelines to ensure value for these investments. This seminar could be the ideal seminar which Dr Mahesh Chander is dreaming about.

Way Forward

Many of us have been informally discussing about the need for improving the quality of professional meetings and perhaps this is something on which everyone agrees. My intention (and also others who contributed their concerns) is not to belittle the hard work that goes into organising such events. Quite often the prevailing conventions, habits and practices about seminars and workshops and resource constraints limit the choice of organisers and constrain them from thinking out of the box.

We must also admit that all professional events such as seminars, workshops and conferences contribute substantially through interactions and networking among professionals, whose value shouldn't be underestimated. Having said that, these gatherings do not deliver for the academic bandwidth available as sufficient attention is not often given to improving the quality of deliberations in these events. I hope, adoption of these suggestions made in this blog would help us reinvent the way we organise professional meetings. While this blog has mostly dwelt on organising professional events, other issues briefly touched namely extension research and quality of faculty also needs urgent attention.

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NOT JUST CROP CAFETERIAS! AN EVIDENCE-BASED VARIETAL EVALUATION AND SELECTION PROCESS TO CREATE SEED DEMAND AND MARKET

Crop cafeterias, while generating evidence about varietal performance can also be a platform that connects different stakeholders in the seed value chain, and support large scale promotion of new varieties. In this blog, Swati Nayak and Mosharaf Hossain share their experiences from promoting IRRI's crop cafeterias in Odisha.

The development of climate resilient rice varieties is a successful outcome of various breeding programmes under the agriculture research for development initiative over the last decade. These varieties have yield advantage under stress conditions and no reported yield penalty under normal conditions (in comparison to a similar farmer variety). Therefore these varieties can reduce the vulnerability of millions of rice farmers by stabilizing productivity and ensuring food security. Thanks to the community of breeders and scientists engaged in rice research, now there are several varieties with multiple stress tolerant traits, varied duration, grain type, and yield rates. This in turn have given farmers many new options while choosing more appropriate varieties that suit their specific circumstances.

In order to make choices, farmers need to be aware, sensitized, and motivated to grow these varieties. To achieve large scale impact, we need to ensure large scale promotion of these varieties and guarantee adequate availability and access to the seeds of these varieties. Rice seeds are affordable to most farmers as often these seeds are subsidized by the government. However, there are other challenges in making sure that adequate quantities of these seeds are made available at the right time. This requires an established acceptance of the variety as well as a sustained production-supply chain for the same. In order to influence the adoption behavior of farmers by addressing each of the factors leading to that, the eastern Indian state of Odisha is witnessing an innovative extension approach. Popularly known as evidence hubs (or more precisely 'varietal cafeterias'), these platforms are much more than that.

An Evidence Hub – a relatively newer knowledge platform – is meant to exhibit multiple crops/varieties as well as to analyse their performance under different management or ecological conditions. However, their reach is often limited to more scientific evaluation, ignoring the link that could be established with community/user groups as well asthe market at large. The new generation evidence hubs promoted by the International Rice Research Institute (IRRI) in the Indian state of Odisha have the potential for changing the overall purpose and impact of such knowledge platforms (Box 1).

These platforms, furthermore, are enriched with the additional concepts of experiential/comparative learning, participatory discussions, and stakeholder engagement for varietal evaluation, selection and promotion. Acting as a platform for hosting multiple rice varieties, this also incorporates the entire process of evaluation

and generation of recommendations. These hubs serve the broader goal of strengthening the seed market for newer varieties by creating policy level triggers and recommendations generated through formal institutions of influence such as the Department of Agriculture, State Seed Corporation, etc.

EVDENCE HUBS- What is New?

These new generation evidence hubs are different from the traditional ones because of the integrated event for varietal evaluation and generation of rankings (Table 1).

Box 1: IRRI and STRASA

IRRI (International Rice Research Institute) is one of the world's premier research organizations dedicated to reducing hunger and poverty through developmental research on rice. It has nearly 60 years of contribution in the domain of agriculture research and development, with offices across 17 countries in the world.

STRASA (Stress Tolerant Rice Varieties) has been a flagship project implemented by IRRI (in association with Africa Rice) since 2007, and it is funded by the Bill and Melinda Gates Foundation. This project has contributed tremendously to the development and delivery of several abiotic stress tolerant rice varieties for millions of farmers in the unfavorable rice growing environments.

Table 1: OFTs vs Evidence Hubs

Characteristic	On Farm Trials (OFTs)	Evidence Hubs (EHs)
Hosting	Primarily done in farmer fields,hosted by individual farmers or KVK farms	Can be done in departmental farms, community land, farms of research institutes, and private institutions.
Lay out	It varies based on the objective. Could be demonstration of a single technology or a comparative evaluation with treatment vs control plots	It is focused on comparative evaluation. Multiple technologies (varieties here) are put up for evaluation in sub-plots (treatment and control).
Number of technology	Number of technologies tested are limited	It can be large in number with multiple sub-plots and replication plots in place.
Data and information	Data/information collected are primarily scientific	Data/information collected are scientific, as well as discussion/insight based
Participation method	Largely individual (farmer and lead scientist)	Group based/collective
Evaluation methods	Based on measured data	Observation, measurement and feedback based. Use of scoring technique
Data triangulation/ Validation	One trialdoesn't have much scope for data triangulation	One evidence hub with several replication plots for each variety has the potential for data triangulation and validation.
Stakeholders engaged	Farmers, scientists/extension agents	Farmers, private& public institutions, researchers, delivery agents, key market players, extension agents
Extension sector	Widely known concept in public extension domain	More popular among research institutions, private institutions or extension agencies
Events	Not mandatorily organized or integrated with laid-out trials	Participatory evaluation event or varietal expositions are essentially integrated into the trial
Risks	The risk of failure and damage to trial plot is higher	The risk of failure is minimized with alternative replication plots
Immediate outcomes	Technology performance evaluation	Technology evaluation, promotion and demand creation

Stakeholders

Known as EH events, these engage many of the important stakeholders in a more strategic and participatory manner with the broader objective of creating demand and market for new (or lesser known) varieties. Therefore, it is important that the stakeholders invited to the evaluation and selection event represent the entire seed value chain, which includes seed producers, suppliers, distributors and consumers. Apart from that, in order to influence the market dynamics, and the scenario of decentralized multiplication programmes in the state, inclusion of policy

makers (or influencers) are also critical. The stakeholders engaged can be categorized into five major categories, in keeping with their own interest and influence level in the entire process as well as in the technology (read variety).

The five categories of stakeholders actively participate through a major and essentially integrated event. They go through three different sessions during this event involving the principles of classroom learning, field visit and observation, and follow-up discussion in groups. The stakeholders are familiarized with the objective and criteria of evaluation, and various non-visible traits of new varieties, and the layout of the EH. Then follows a complete tour of the EH, allowing them to visit multiple replication plots to observe, evaluate and validate their findings as well as perceptions. The follow-up group discussion gives them an opportunity to have a critical discussion and arrive at ratings or priority ranking of varieties in a more participatory manner.

This generates not only scores/feedback for all the listed varietiesand critical traits for each variety but also the overall rank of the preferred variety for a particular locality. The score sheets are validated,

acknowledged, and authorized by the District Director of Agriculture, who also participates as the key observer of the entire process and discussion and also gives his/her insights. These score sheets, collected from different districts or regional EHs,give the state functionary an overview of the localized demand and variations across districts. This also helps state functionaries to collate common varieties on demand or specific demands, and thereby prioritize the seasonal seed procurement or production based on resource and feasibility. Any non-released varieties evaluated as promising, also get an opportunity for policy intervention or dialogues that can then accelerate the release of the same in the state.
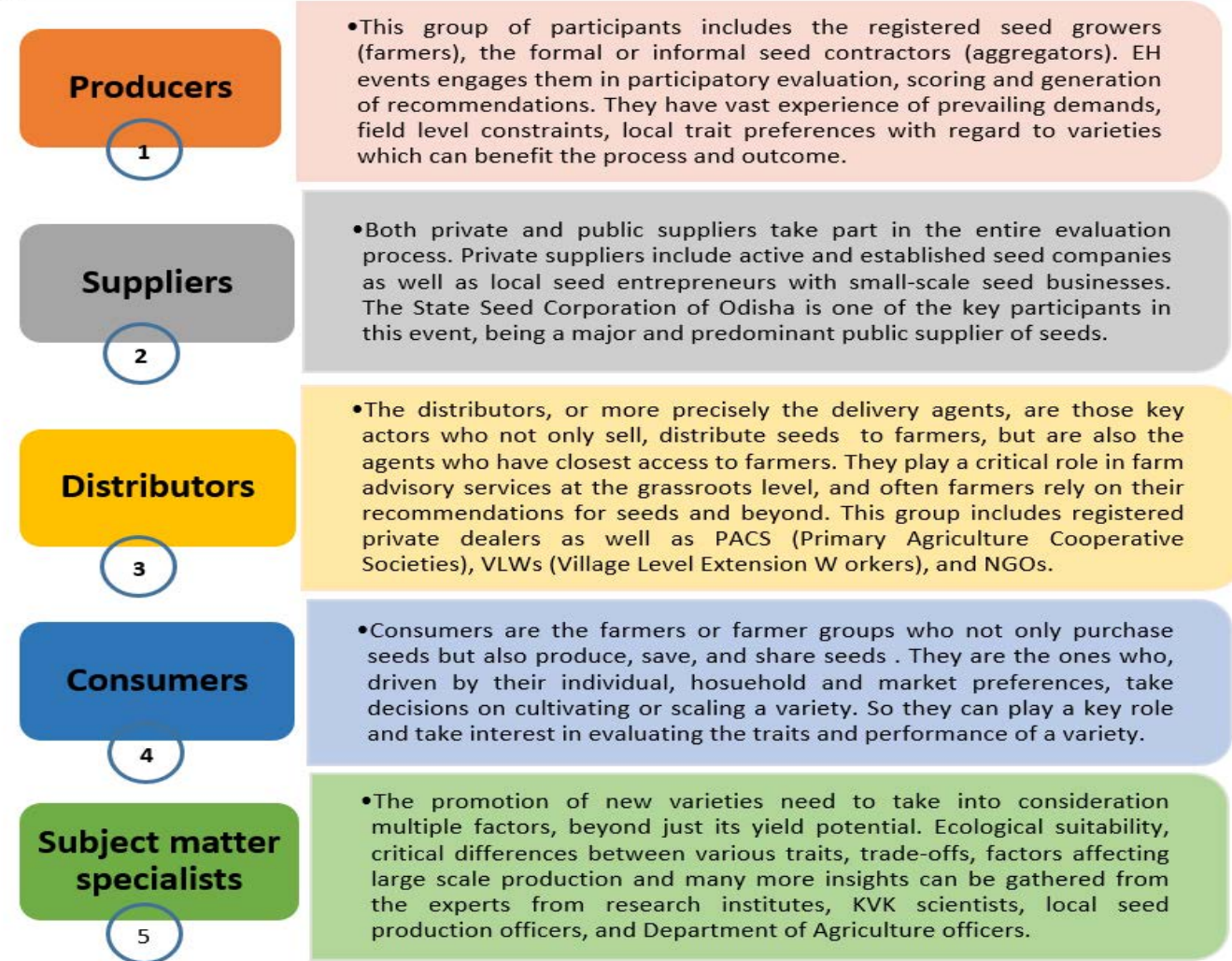

Producers 1
• This group of participants includes the registered seed growers (farmers), the formal or informal seed contractors (aggregators). EH events engages them in participatory evaluation, scoring and generation of recommendations. They have vast experience of prevailing demands, field level constraints, local trait preferences with regard to varieties which can benefit the process and outcome.

Suppliers 2
• Both private and public suppliers take part in the entire evaluation process. Private suppliers include active and established seed companies as well as local seed entrepreneurs with small-scale seed businesses. The State Seed Corporation of Odisha is one of the key participants in this event, being a major and predominant public supplier of seeds.

Distributors 3
• The distributors, or more precisely the delivery agents, are those key actors who not only sell, distribute seeds to farmers, but are also the agents who have closest access to farmers. They play a critical role in farm advisory services at the grassroots level, and often farmers rely on their recommendations for seeds and beyond. This group includes registered private dealers as well as PACS (Primary Agriculture Cooperative Societies), VLWs (Village Level Extension W orkers), and NGOs.

Consumers 4
• Consumers are the farmers or farmer groups who not only purchase seeds but also produce, save, and share seeds . They are the ones who, driven by their individual, hsouehold and market preferences, take decisions on cultivating or scaling a variety. So they can play a key role and take interest in evaluating the traits and performance of a variety.

Subject matter specialists 5
• The promotion of new varieties need to take into consideration multiple factors, beyond just its yield potential. Ecological suitability, critical differences between various traits, trade-offs, factors affecting large scale production and many more insights can be gathered from the experts from research institutes, KVK scientists, local seed production officers, and Department of Agriculture officers.

Fig. 1: The categories of stakeholders linked to the EH

The Process and Components of Evidence Hubs

A. Establishment of the Hub

Site Selection: To host an Evidence Hub, an ideal location is selected which could be strategic in terms of visibility and management. The ideal size of an EH should be one acre, making it an easily doable intervention at any suitable location. However, priority is given to departmental farms, which ensure a continuous engagement of local agriculture extension functionaries from the stage of lay out till plant establishment, along with basic infrastructure support and monitoring. Farms of private agencies or research institutions are other good options. At a few places, the community managed/farmer hosted EH has also been successful, and worth studying.

Varietal Selection: Newly released or lesser known climate resilient varieties are tested against several local checks which are popular (old or new). Each cafeteria hosts a total varietal portfolio ranging from 15-20. Ecological suitability is taken into consideration while selecting new varieties, e.g., drought resistant varieties for upland areas and submergence tolerant varieties for lowlands.

Crop Establishment: A staggered sowing practice is followed to coincide with the flowering and panicle initiation of all varieties for better comparison of visible traits. Three replication plots are allocated for each variety and each replication plot can be randomly positioned at any location of the site. This helps in generalizing the trait/performance of the variety by observing all three plots.

Scheduling of Cafeteria Event: The event is scheduled when the cafeteria is almost ready to harvest but not harvested yet. This gives stakeholders an opportunity to analyse multiple observable traits, and not just the yield. This also reduces the bias which stakeholders could have after measuring or knowing the exact yield. However, each plot is subjected to crop cuttings so as to validate the findings and make state-level recommendations for final production planning.

B. Varietal Evaluation and Selection

A scorecard is designed for each cafeteria. This consists of a set of 15-20 varieties which are evaluated in the platform. Several key traits that can influence adoption as well as overall performance of the varieties are listed against the varieties. The traits are kept similar across all varieties for comparison.

Traits / Variety Name	Stress Tolerance type (Drought/Flood/Salinity/None)		Duration (in days)	Grain Type	Crop Height	Tillering Ability	Expected yield	Actual Yield	Disease occurrence	Pest occurrence?	Overall score(1-10)	Any comment
Var 1												
Var 2												
Var 3												
.												
.											Overall Comment	DDA Signature
Name of participants	Designation	Contact No.										

Fig. 2: A template of the evaluation sheet/scorecard used in an EH Event

Some of the traits remain as visible traits which can be evaluated on the field through observation whereas some traits are explained during orientation, e.g., duration of the varieties. For traits, participants give direct score or feedback (like/dislike; more or less, etc.). The scoring is done on a 1-10 scale. After observing each trait, they are asked to give overall score to the variety (1 being the lowest score and 10 being the highest). Individual participants or a small group of participants travel across all the replication plots guided by a layout map and evaluate each of the varieties based on traits.

After the field observation and simultaneous discussion is complete, they gather in a room for a group discussion. This discussion triggers many negotiations, trade-offs and insights – coming from multiple stakeholders trying to influence as well as inform each other. At the end of a participatory discussion session, the group arrives at a consensus on final ranking and these are presented before the DDA. When there is any lack of consensus, DDA or seed production officers try to facilitate further discussion in order to arrive at a final decision. Later, the scorecard is signed and acknowledged by the DDA for formal recommendation to the state.

C. The Stakeholder Influence and Interest Matrix

The cafeterias are hosted with the objective of strengthening the seed system and market and not for merely integrating the concept of participation. In that sense it is important that the stakeholder influence and interest is analysed not just in the perspective of varietal evaluation and selection, but in the larger perspective of varietal adoption, scaling, and production.
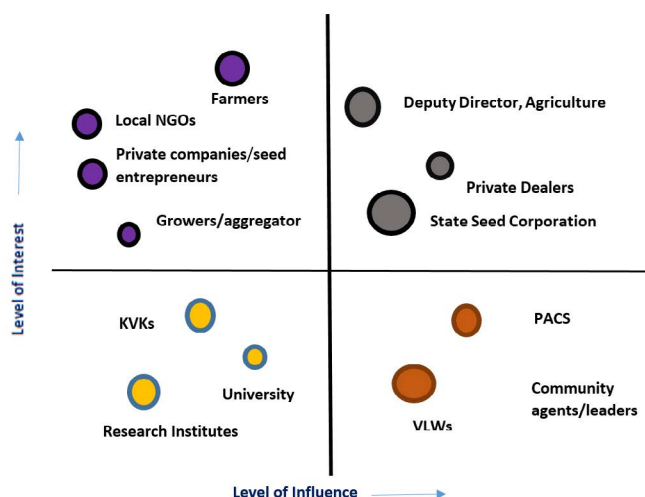

Fig. 3: The stakeholder matrix

Lessons

With more than 40 cafeterias hosted in Odisha State, focusing on micro-ecology and geographies over the last few years (2016 onwards), the interest and influence of each stakeholder seems to be varied. Even for the same stakeholder, it varies from district to district. Also it is not always the case that one group of stakeholders is more influential than another. Within the same group you may find individuals and institutions who have relatively higher influence or interest in the entire process.

For a crop cafeteria to reach its primary objectives, one of the most influential stakeholders was found to be the Deputy Director, Agriculture (DDA), the district nodal authority in the Department of Agriculture in Odisha. A DDA can influence the state's functionaries, and then in turn the state seed corporations and local seed production officers, to accept the highly-ranked variety and incorporate it in to the seasonal production/procurement plan. He has the power to incorporate these varieties across various district level programmes as well as accelerate dissemination of the same.

In the case of Odisha, the state seed corporation being one of the dominant suppliers of seed it is also a key player who has both direct influence and interest over production and scaling. It has the power to finalize seasonal production plans for districts and the state at large. Being engaged with this process of evaluation, they can get a deeper insight into varietal preferences and performance, which in turn would have direct incentives for sales volume and revenue. The other influential players are found to be local seed or agro input dealers. They have the direct motivation to promote a variety as demand can turn into revenue for them. Apart from that, traditionally, dealers have the farmers' trust as they depend on the former for most farm advisories.

Primary Agricultural Co-operative Society (PACS), which are the public arm of input dealership for farmers, are also very popular institutions. However, with multiple parallel activities and limited support infrastructure, their interests are much broader and often not focused only on seed business or varietal promotion. However, they have a higher level of influence on farmer decision and spread of varieties in a region.

Farmers, farmer producer groups, local NGOs and many private seed entrepreneurs have also been observed to show immense interest in promoting such technology and accelerating the adoption and scaling of varieties. But in order to strengthen the seed system of a particular variety they have to rely on large scale production plans and supply chain through Odisha State Seeds Corporation (OSSC), their registered dealers, as well as the Department of Agriculture.

The inputs and technical insights from research institutes and subject matter specialists from KVK are important for evaluation and selection of varieties, but again their contributions towards strengthening local seed systems and large-scale scaling would be limited.

The Outcomes and Results

The varietal portfolio of the cafeterias vary based on the host district, number of released/notified/developed new resilient varieties in a given year, the local popular varieties, ecological conditions, and past evaluation experiences. Though the combinations may vary, the basic principles remain the same.

The cost of an evidence hub varies between INR 75,000 to 100,000. However, based on the available land at the suitable location and the number of varieties available for comparison, the size of the hub can vary. This can affect the layout cost. The ideal land size for hosting an evidence hub is one acre; and the total numbers of varieties to be compared are 20. The cost of organizing the event might vary slightly based

on the number of participants and location. This makes this intervention an approach which can be taken up by institutions who work for agriculture research for development and extension domain. This may be the Department of Agriculture, the National Agricultural Research and Extension System (NARES) institutions, private firms and their extension wings, and other public institutions.

Taking into account 2017's crop cafeterias– 23 in number and most of them hosted on departmental farms – on average 20-25 varieties were compared per cafeteria. The lowland ecologies dominating coastal Odisha saw a larger number of varieties available for comparison than in the upland districts. The portfolio of varieties already being cultivated by farmers was seen to be quite popular, large in number, and some of them are being considered as mega varieties, having been grown for more than 20 years (e.g., Swarna). The ecologies in the coastal area are also varied – across shallow lowland, medium land, lowland, etc.

The selection of new varieties to compare against the older ones took into account the factors for comparison (e.g., comparable duration/land type) for generating an effective varietal replacement strategy. The range of new varieties tested gave options for the stakeholders to pair with older ones, and compare and promote the most suitable ones for varietal replacement. For example, Swarna Sub 1, a flood tolerant variety can be a suitable replacement for the variety Swarna with similar duration and ecological suitability. However, promoting SwarnaSub1 to farmers who grow Lalat could be a wrong strategy. These strategic inputs were taken into consideration throughout the discussions that followed every evidence hub evaluation event.

The overall result (average scores) across the state of Odisha showed a preference for many new stress tolerant rice varieties (STRVs) over traditional or older varieties as evinced by the concerned stakeholder group.
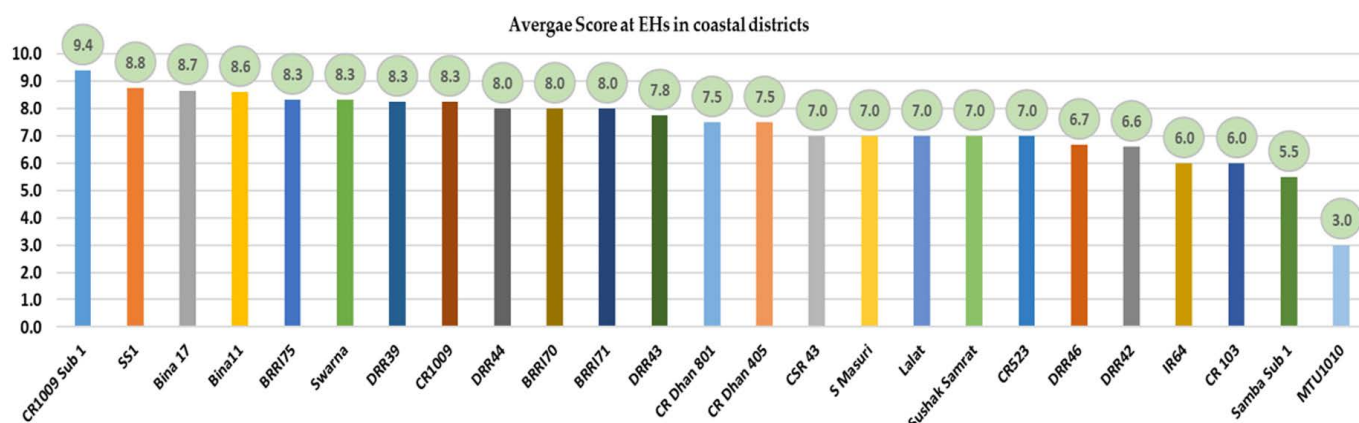

Fig. 4: The average scores/varietal ratings for coastal districts

The coastal areas witnessed the selection of varieties such as CR1009 Sub1, SwarnaSub1, BINA Dhan 11, and other climate resilient varieties over the older varieties like Swarna, Lalat, Samba Mashuri, and MTU 1010.

When validated with actual yield measurement through crop cuts, it was also observed that

Swarna Sub 1 gave yield increase of 0.1 t/ha compared to Swarna under the same varietal duration category, thereby offering a great opportunity for varietal replacement in lowland areas. BINA Dhan11 gave better yield advantage as compared to the closest comparable old varieties like Lalat, MTU 1010, etc.
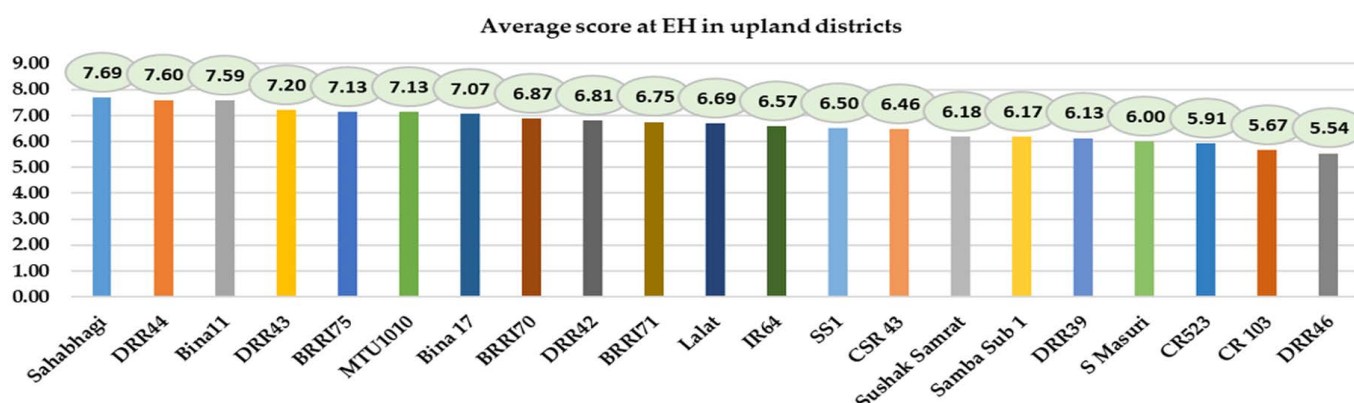

Fig. 5: The average scores/varietal ratings for coastal districts

For the upland (medium upland) areas, resilient varieties like Sahabhagi Dhan, DRR 44, as well as BINA Dhan11 emerged as stakeholder-preferred varieties as compared to older varieties like MTU1010, Lalat, and many other resilient varieties.

Even though the crop cut data demonstrated BINADhan 11 as the best performing variety in terms of yield, followed by DRR44, a variety like Sahabhagi was rated highest overall. This indicates various trade-offs and regional suitability by the stakeholders while rating and selecting a variety.

This also indicated that large scale seed production, supply and promotion of a new variety is dependent on different market dynamics and potential demand. Regional stakeholders are in the best position to discuss and decide what would be the most appropriate variety catering to the maximum market and therefore can plan the production and procurement of the same.
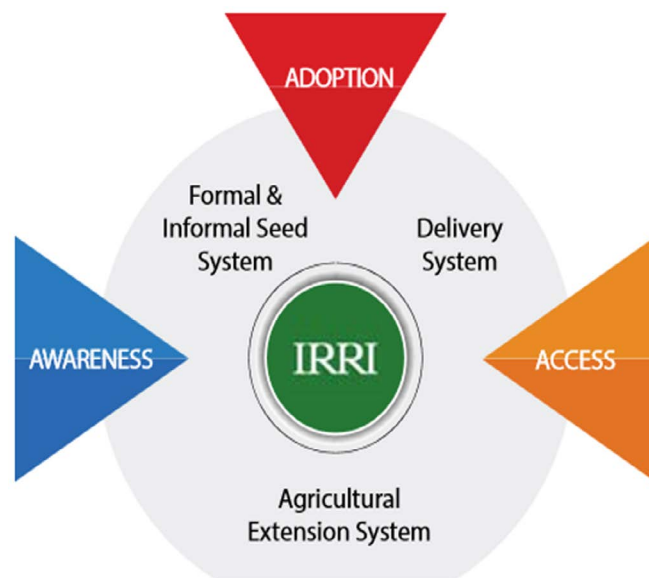
Apart from that there were many varieties which were rated high by the stakeholders, e.g., the BRRI 75 (a variety developed in Bangladesh), however, due to the fact that this variety is yet to be released in the state, it was difficult to promote it directly for production. Conversely, this definitely triggered meaningful dialogues among policy makers and key stakeholders on releasing this variety in Odisha.

BINA Dhan 11, with potential as it is high yielding and a preferred variety across all zones, was picked up as the one common variety that can help in replacing many older varieties. The government, state seed corporations, as well as many private seed entrepreneurs have now started taking up the production and distribution of this variety at a considerable scale. Remarkably, by the end of 2018 the Odisha State Seeds Corporation, facilitated by IRRI, has taken up a significant move to multiply nearly 10 quintals of BINA Dhan 11 variety procured from Narendra Deva University of Agriculture and Technology (NDUAT), Karnal. These strategic linkages have started to trigger the most significant changes in Odisha's seed market.

The Envisaged Impact

These platforms give an opportunity to create new linkages as well as strengthen existing ones. The experience combined with detailed insights, knowledge, and brainstorming coming from key stakeholders in the seed value chain makes it a more holistic approach. Primarily targeted to create demand and establish a market for new and potential resilient varieties, these tiny, localized cafeterias have been showing promising impact in the region. Actors – from delivery systems, formal as well as informal seed systems and agriculture

extension systems–are collectively using their own influence, infrastructure and capacity to streamline the supply and production chain. The steady increase in procurement of breeder seed and multiplication of many climate resilient varieties, such as Shahabhagi Dhan, BINA Dhan 11, DRR 44 by both public and private seed agencies of the region marks the significant and strategic success

that is the result of such efforts and consequential linkages.

Way Forward

An Evidence Hub can be seen as a fresh shift from traditional extension approaches.It is a participatory and interactive knowledge platform which specifically focuses on market stakeholders. The market stakeholders in the seed sector includes a lot of public sector players who havea greater holdover the policy arena of state. The state seed corporations work very closely with the Department of Agriculture. The district/ zonal level seed production officers representing seed corporations work very closely with public extension functionaries as well as private delivery agents like dealers. Together they can play a direct and decisive role in introducing, increasing or decreasing the production and circulation of specific seeds in the formal chain. These stakeholders, through their strong network of registered seed growers can also promote and incentivize the multiplication of new seeds. Institutions, like IRRI, ICAR-National Rice Research Institute (ICAR-NRRI) and other NARES bodies engaged in this process can strengthen the breeder seed linkage in the state – for multiplication and circulation of many new varieties. While being introduced to many new varieties, stakeholders are simultaneously evaluating and validating its performance and ecological suitability. In turn these stakeholders

can influence policy makers to expedite release and notification of several such varieties in the state. With so many research institutions, private seed firms, and district agriculture offices holding a mandate, there are many programmes dedicated towards testing, promoting new varieties, and accelerating both varietal and seed replacement rate. Within this context such Evidence Hubs can be taken up as strategic interventions to promote, as well as create, demand for new high yielding varieties. Lastly, this approach can be replicated for other crops as well.

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PUBLIC-PRIVATE PARTNERSHIP EXTENSION MODEL FOR THE TEA SMALLHOLDING SECTOR IN SRI LANKA

Promotion of public-private partnerships for extension delivery is the only way to bridge the demand for, and supply of, extension services among small tea holdings in Sri Lanka, argues MKSLD Amarathunga.

Tea is one of the most important agricultural commodities in Sri Lanka that brings in a significant amount of export earning while generating employment opportunities for people in many districts. Even though its relative contribution has declined in recent years, the tea industry continues to occupy an important place in the economy of Sri Lanka. Productivity and the long term viability of tea smallholding lands have been declining due to many factors. One of the most significant lacuna in the tea sector has been the low level of adoption of proven technologies related to cultural practices arising from a lack of knowledge and non-availability of inputs at the correct time (Amarathunga and Wanigasundera 2018). The importance of an effective extension services in this regard cannot be over-emphasized (Samaraweera et al. 2013).

Box 1: Sri Lankan Tea

Tea consumes large quantities of resources and provides relatively high return to the country. The tea industry provides employment to about two million people, which is 9.8% of the total population. The tea industry plays a significant role by earning foreign exchange for the country. In 2017 the total tea production of the country was 307.08 million kg, of which 288.98 million kg (94% of production) was exported, earning Sri Lankan LKR 233.3 billion (Central Bank 2017). Tea export was mainly to 20 countries, such as Turkey, Iraq, Russia, Iran, UAE, etc. It was significant that the average price per kg of tea was LKR 620.18 across 2017, which was also the highest price ever fetched by Sri Lankan tea growers. The total tea production of the tea smallholders in 2017 was 231.96 million kg, which was 76% of the total production (Sri Lanka Tea Board 2017). Even though the smallholder sector is the dominant and most important sector in the country's tea production, the average productivity is around 1991 kg/ha/year (TSHDA Annual Report 2017), which is far below its potential level of over 3000 kg/ ha/year (TRI 2002).

Extension Services in Tea

Technology dissemination in the tea smallholding sector is in the hands of public and private parties operating through various channels. However, the public extension system in the tea sector is not expanding at the required rate to meet the increasing demand mainly due to financial constraints and inadequate manpower availability. The field extension officer to farmer ratio is nearly 1:2700 when it should ideally be 1:1000. According to Obeysekera (2009), the extension coverage is extremely poor as the area under cultivation per extension worker is 814.85 ha. This shows the need for expansion of the TSHDA staff strength along with the need for more collaborative and partnership approaches to better serve the tea smallholders (Wanigasundera 2015).

The extension arms of private organizations, such as agro-input and service agencies often operating through bought leaf factories, provide information that promotes increased use of their products (Amarathunga and Wanigasundera 2018). There is no proper organizational mechanism for monitoring and evaluation of the expanding private sector extension channels so as to ensure that the recommended technologies are effectively disseminated and used by smallholders. In order to find a solution for these limitations of technology transfer for tea smallholders, I developed a public-private partnership (PPP) extension model. All major stakeholders attached to this PPP model could engage in technology transfer in an integrated and cost effective manner.

Application of Public–Private Partnership Extension Model for the Tea Smallholding Sector

PPPs are increasingly being emphasized as a mechanism for improving public service provision and for implementing development programs. Conceptually, the partnership is an extended form of group dynamics where two or more parties establish relationships and leverage resources to work together with the expectation that each of the parties would achieve the greater goal than by working individually (Morse 1996) (Fig. 1).
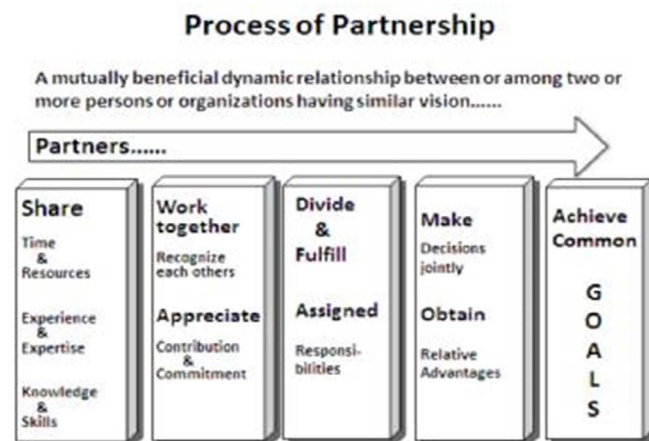

Fig. 1: Process of partnership

After applying the above concept to the technology dissemination process in the tea smallholdings sector, all key partners have to not only be working together and maintaining autonomy and independence, but also attaining their individual goals together with those of the other stakeholders in the sector. Partnership provides opportunities for all partners to learn new competence. The partnership also makes information available about the methods of accessing and using resources effectively.

Recommendations for the Establishment of an Effective Public-Private Partnership Model for the Tea Smallholding Sector

The PPP model (Fig. 2) consists of three main sub systems viz., Knowledge Generation, Dissemination, and Utilization, and each system should have a strong linking and feedback mechanism. The expectations from the proposed model were as follows:

I.   The Knowledge Generation System should initiate technology generation focusing on small holder-specific problems, and also conduct adaptive field trials on smallholding fields at different locations prior to releasing a recommendation.

II. All partners belonging to private and public sector in the technology dissemination process in the tea small holdings sector, should have strong collaboration with each other and they would be willing to work together by sharing their experience.

III. They will share resources while maintaining their autonomy and independence.

IV. In addition to dissemination of technology the

PPP extension service should proactively work together for the distribution of inputs and services on time.

V. Smallholders also should proactively participate in smallholder-specific technology generation by facilitating field-testing of new innovations on their lands, and record keeping.

VI. The internally developed public and private monitoring mechanism with the representation of all partners will drive the system efficiently and effectively, and reach the set targets within the scheduled time frame.

VII. With the active commitment and dedication of all the partners the developed mechanism is expected to facilitate the efficient and effective technology dissemination process to smallholders whilst addressing their field problems most appropriately.

Fig. 2: Public-private partnership model for the tea smallholding sector

The model exhibited in Figure 2 on Public Private Partnership (PPP) extension was developed by me after conducting a comprehensive empirical study exploring existing collaborations among the key stakeholders of technology generation, dissemination and utilization systems. I also examined the factors affecting such linking mechanisms of extension and appraised the partners' readiness for a public--private partnership (PPP) extension model for effective transfer of tea technologies to the tea smallholders.

The aforementioned empirical study clearly illustrates sufficient evidence to prove that the adoption of proven technologies strongly depend on degree of interaction between smallholders and extension agents working in partnership. Therefore, I strongly recommend that all extension agencies develop higher levels of partnership and closer interaction among themselves and smallholders.

However, since this model is practiced by only a handful of stakeholders and locations due to inadequate linkages among key partners viz., researchers, extensionists in public and private sectors, and tea growers result in systemic "bottlenecks" in technology dissemination systems and limit their effectiveness at contributing to development of the tea industry (Wanigasundera 2015). Hence, extension scientists should attempt to study and introduce different extension models and approaches for strengthening the existing extension system. Under such a mechanism, Public Private Partnership could be the most effective way to disseminate tea-related technologies to tea smallholders rather than the individual efforts of public institutions (TRI, TSHDA and Tea Commissioners' division), market oriented (fertilizer or agrochemical agencies), or bought leaf factories (Amarathunga and Wanigasundera 2018). Apart from the author's proven research findings and field experience derived by working together with all stakeholders, he emphasises that in order to achieve greater interaction among key stakeholders and their proactive participation in planning, implementation and monitoring of partnership programs, cooperation between the staff of partners, support from community leadership, mutual respect, appreciation of the contribution of partners, and effective communication, are of paramount importance in developing an effective partnership-based extension system. Hence it is recommended that the organizations responsible for developing management and fiscal procedures adopt this model and make sure that all smallholders are served through such models.
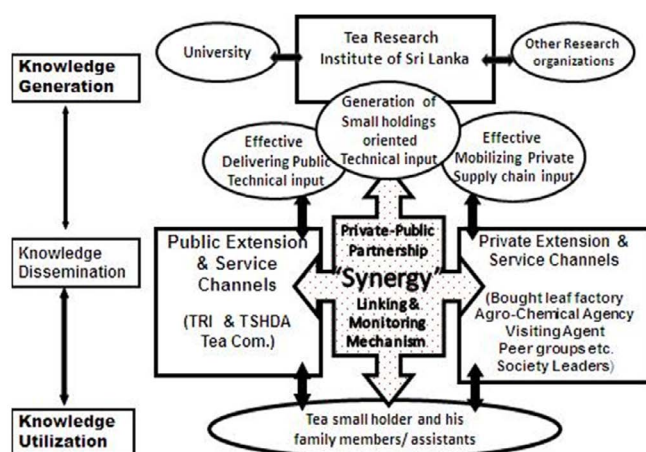
Implications

With the realization that top-down models of extension were failing to meet the needs of farmers, bottom-up models of extension emerged from the view that farmers wanted to be involved in research, development and the extension process. New models of extension are characterized by participatory involvement of many stakeholders in program planning, development and implementation. The partnership concept arose from the recognition that relationships between researchers, extension, farmers and industry, should be more actively integrated to develop effective extension programs. The Public Private Partnership model is now emerging as a possible solution to the problems pertaining to effective technology transfer, and is increasingly being emphasized as a mechanism for improving public service provision and for implementing development programs (Amarathunga and Wanigasundera 2018). With the proven research findings derived from implementing the Public

Private Partnership Extension Model for effective dissemination of tea technologies to the tea smallholding sector, the author proposes to apply the PPP concept in the following areas to fulfill the targeted goals.

Productivity improvement of tea smallholder land by enhanced replanting programs through the tea factory-based Private Public Partnership extension channels. Example 1: Most of the tea factories have a field extension service to maintain the relationship between tea factory management and tea smallholders and they assist in improving productivity, and thereby the development of the tea smallholder's livelihood. Example 2: Tea smallholder – Factory based partnership extension network of Tea Smallholder Factories Plc (private organization), has conducted a replanting project for productivity improvement of tea smallholding lands attached to the green leaf supply base of their factories since 2010. This project covers over 200 acres of tea lands under replanting with new cultivars and follows the standard good agricultural practices (GAP) recommended by the Tea Research Institute, and also with the collaboration of Tea Small Holder Development Authority (TSFL Annual Report 2017).

Introduction of appropriate mechanization techniques to field practices through PPP extension channels. The tea industry faces an acute problem of labour shortage in field operations of the cultivation process. Most of the field operations, such as land preparation, harvesting, pruning, and weeding are labour intensive and manually done using the existing labour force at a higher cost. Given this scenario, in 2013 the Ministry of Plantations of Sri Lanka launched a project to popularize machinery in tea smallholdings. The total project budget is SLR 100 million and of this SLR 67.5 million has been allocated for awareness, training and supply of machines to selected smallholder societies and factories, while the remaining 32.5 million is earmarked for research and development of harvesting machines. The government has disbursed SLR 40 million and the Tea Research Institute (TRI) has launched a program to train tea smallholders in the use of new machinery under Phase I of the program. In the initial phase, 50 tea smallholder societies and 25 private tea factories have been selected for the project covering all tea growing regions. This project is being conducted in collaboration with both public sector (TRI, Tea commissioners division, Tea Smallholder Development Authority) and private sector (bought leaf tea factories, Tea societies, etc.).

Transforming conventional technology dissemination methods into modern IT Smart methods through the PPP extension channels.

The new models of extension proposed are characterized by participatory involvement of many stakeholders in program planning, development and implementation. It is encouraging to note that some advanced research and development studies have been recently undertaken to address the needs of extension services of the tea industry. The areas of study include: development of para-extension approaches and private-public partnerships to facilitate wider dissemination of technology, setting up of IT-based information and service delivery mechanism (Sidhakaran et al. 2014; Samansiri, Wanigasundera and Wijekoon 2014; Amarathunga 2015). IT-based mechanisms operate in both public and private organizations, tele communication channels, etc. These mechanisms will surely help in delivery of updated information to all relevant stakeholders – on forecasting of seasonal climate changes in tea growing areas, mitigation measures on pest and disease outbreaks, tea market updates etc. – and to get their feedback.

Availability of effective and efficient analytical services for tea fields and on the manufacturing process through PPP approaches. Analytical services related to tea cultivation and the manufacturing process is presently undertaken only by public institutions such as TRI and Tea Board Labs. However, the currently available mechanism is not capable of meeting tea growers' demands due to limitations, chiefly of power, limited availability of new equipment, financial shortages, lack of coordination, etc. Availability of timely access to site-specific soil testing and nutrient management, coordination of inputs supply based on test reports, bio-chemical and residual analysis of different stages in the manufacturing process to ensure purity and cleanliness of the end product and so on – are all very important in providing efficient and effective services that meet the needs of stakeholders. Suitable private sector analytical service providers should be identified only after considering quality and standard of their services, timely availability, handling and capacity for wider coverage and capacity of analytical work, as well as their implementation of effective regulatory mechanisms through the involvement of relevant public organizations.

Establishment of an effective certification process for quality assurance of "Ceylon Tea" through the PPP extension channels
"Sustainability" has now emerged, along with ecological concerns such as global warming, the greenhouse effect, carbon credits, energy efficiency, alternative and renewable energy, and environmentally friendly resources. These

issues are now engaging the attention of the industry. Sensitive to these developments, it is actively addressing these issues – ranging from Good Agricultural and Manufacturing Practices, Technological Parameters and Social Responsibility to Logistics of the Value - 8 - Chain, Strategic Planning and Innovative Marketing Initiatives. However, the experiences and examples of the past stewards of the industry must not be trivialized in a misguided perception of progress. The dynamics of the future must be tempered by the morals, values, ethics and principles of the past. These values could be marketed in international business forums by the relevant public-private organizations through the establishment of effective certification processes (ISO 22000, Ethical partnership, Rainforest, GAPs and GMPs) that ensure the quality of "Ceylon Tea".

Opening up new avenues for value addition and product development through the PPP tea-related market-oriented channels.
Tea exporters have now realized the difference between trading a commodity (black tea in bulk) and marketing a consumer product (value added tea in branded packs). Commodities are products that consumers cannot differentiate, one from another, as they all seem to serve the same need and deliver the same value. Consumer brands, in contrast, are distinguished through their compelling features that make one better than another in the product category. Ceylon tea will remain vulnerable to downward demand-led price pressure as long as it is treated as just a commodity. Sri Lanka is conscious of the need to bring about vertical integration in its traditional tea exports and is now converting a major portion of tea exports into consumer packs and other forms of value added exports, thus meeting the requirements of more sophisticated markets. Considering the need for long term sustainability in the tea sector, the National Plantation Industry Policy Framework (NPIP Framework-2006) means to focus on implementation of value addition and product development through building public-private and private-private partnership (PPP) approaches. The Tea Research Institute of Sri Lanka has already identified new research areas and included these into their corporate research plan for the next five years. The focus is on development of value added tea products, such as improving the process for instant black tea production, optimizing the liquid tea-concentrate production process for commercialization, optimizing the alcoholic tea beverage production process for commercialization, optimizing polyphenol extraction from tea for commercialization, and extraction of protein from spent tea leaves.

Opening up new lobbies for promotion of brand name – "Pure Ceylon Tea" – by
marketing of heath aspects via PPP tea-related market-oriented channels.
Product differentiation, cost leadership, niche marketing, branding and customer focus were accepted as the strategies that need to be adopted by most of the firms. In addition, each firm had its own set of strategies, which differentiate it from others and offer competitive advantage over its competitors. Some of these specific strategies include fair trade, environment sustainability, strategic partnerships, outreach, market diversification and quick delivery. The firms have introduced new products into the market as well as extended the existing product range according to growing market demands. Opening up new markets abroad has been an important strategy that placed these firms among the market leaders. When the tea's sales values are considered, it is apparent that the firms that have outperformed their competitors in sales have adopted customer focus as a common strategy.

For instance, the health tea segment was selected due to the strong demand predicted and triggered by a health trend that is an ongoing craze in Scandinavia. The product planned is a green tea containing Scandinavian herbs, as Danish people tend to prefer local products. The brand name is Healthé, the packaging shows a cartoon, and the tea is packaged as tea bags. Healthé is positioned within the lifestyle segment with 'healthy lifestyle' seen as its main driver. The key attributes of the product will embody the Scandinavian traits of being energetic, healthy and happy. To promote the product an integrated marketing communication plan will be implemented. The promotion of the product will be with Global worming potentials (GWP´s) and not discounts, as Healthé is a premium product. Health and wellness trends boost the total volume sales of green tea and other fruit/herbal teas in Denmark. Green tea is the best performing major category in tea in terms of retail volume and retail value growth – with growth of 3% and of 7%, respectively, for 2010 and 2011 (Euromonitor International 2013). Black tea suffered a decline due to the good performance of green tea and fruit/herbal tea (Euromonitor International 2012).

Opening up new avenues for development of tea culture and promotion of "Tea eco-tourism" locally and internationally through PPP tea-related market-oriented channels.
Most tea plantations are located in the central mountains of the country. These areas are rich in biodiversity, and attracts tourists with its natural beauty, waterfalls, rivers, and architecture, etc. These locations have more potential to improve eco-tourism. Furthermore, there is great potential to promote Sri Lanka's tea culture by highlighting historic events, tradition, cultural values, along with a tea story that follows each step in the cultivation

and manufacturing process, value addition, and product development and diversification, etc. Therefore, effective mechanisms must be established by linking relevant public–private organizations to explore all potential avenues for improving tea-related eco-tourism. These must transcend politics and personalities and be formalized as much as possible by using proven mechanisms within, and between, each level of government and between the public and private sectors.

Way Forward

The Public-Private Partnership model in tea has significantly improved the adoption of important field practices in tea production, which is directly leading to enhanced productivity of tea smallholding land and its long-term sustainability. In order to achieve greater interaction among key stakeholders it is necessary to engage their proactive participation in planning, implementation and monitoring of the partnership programs. Cooperation between the staff of partners, support from community leadership, mutual respect, appreciation of the contribution of all partners, and effective communication are of paramount importance in maintaining an effective partnership extension system. Organizations involved in the tea sector should now develop appropriate mechanisms and fiscal procedures to adopt this model and thus make sure that all smallholders are served effectively.

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