# Cross-cutting Experiences of Rice Knowledge Management Portal

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**Genesis**

In India, rice is the major cereal crop and it represents all kinds of diversity under which rice is grown across the globe. No other crop is as versatile as rice. Rice crop is interwoven in the cultural, social and economic life of millions of Indian and it holds the key for food and nutritional security of the country. Enormous knowledge has been developed about this crop and there is a need to share this knowledge for the betterment of our society. Indian rice research and rice development programmes have been recognized as successful model endeavors all over the world. However, given the burgeoning task of further enhancing the production and productivity of rice, the existing information sharing mechanisms appear to be insufficient. To make this knowledge readily available to the users there should be transformational change from the existing traditional extension approaches to integrate with the emerging ICTs and Knowledge Management Strategies.

The new agricultural paradigm will have to be recast to take advantage of the wealth of knowledge available to achieve multiple goals of sustaining the food security, income, jobs, etc. The ICTs along with Knowledge Management (KM) strategies have significant role to play in evolving such a vibrant agricultural system. In this backdrop, the project was conceptualized to develop an exhaustive knowledge management portal on rice with the main focus framework development and design of appropriate content for the various stakeholders in rice and effective delivery through the internet services.

**Problems addressed by the project with regard to the knowledge sharing in rice sector:**

- Potential users (farmers, scientists, extension officials, private sector and other key players) within and outside the country are not familiar with many of the rice technologies, data sets, usable form of rice information. There is a need for a concerted effort to promote awareness about the availability of such information at national, regional and local level.
- There is an inbuilt inability to cross-search rice information available in India in an isolated manner, at once. There is presently no single gateway through which a user can search all the information resources available on rice.
- Even the rice workers themselves do not have a single window of identifying commonalities between their work and that of their colleagues in other rice research stations.
- There is increased risk of duplication of efforts while collecting, analyzing and processing scientific rice research information, technologies, technological & information needs of farmers, socio-economic and institutional information of different rice regions of the country. Such duplications lead to excessive wastage of time and other monitory resources on the exchequer.

- At various hierarchical levels, the existing information sharing mechanisms do not allow unifying efforts of various stakeholders working in the area of rice cutting across the rural development sectors.
- Existing traditional training programmes and facilities are inadequate to meet the demand of millions of rice stakeholders including farmers.
- At organizational levels, there is no real time Knowledge and technology exchange among the rice based institutes, state departments of agriculture, other stakeholders and the farmers. The virtual triangle of access, quality and costs of knowledge interventions are high.

In these circumstances, it becomes imperative to strengthen the capacity to enable rice workers to create, manage and share information for the benefit of all stakeholders. This includes scientific, technology-related information (for research and research management and for extension outreach), market information for the agencies and farmers, generic information for the public and comprehensive information for better decision making for the policy makers. There is a need to catalyze the mobilization of a critical mass of researchers, extensionists and farmers into leap-frogging the knowledge barriers to modernization of agriculture in India. It is with this vision; the Rice Knowledge Management Portal (RKMP) was developed.

**Objectives**

- To develop structure and content of RKMP comprising research information systems, extension information system, market information system, farming information system, general information system and e-learning platforms related to rice.
- To pilot these information systems for uploading, sharing and harnessing rice knowledge amongst rice stakeholders.
- To build the capacity of the stakeholders in using the Rice Knowledge Management Portal for effectively transforming rice knowledge and information as a viable factor of production.

**Division of work among partners**

The portal is built by the Directorate of Rice Research, Hyderabad in association with 8 consortium partners, two convergent partners and 20 AICRIP partners.

The project was implemented in a consortium mode. Each consortium partner has specific roles to play based on their core competency. DRR has lead the consortium. ICRISAT and CDAC are technical partners focusing KM models and font technologies respectively. CRRI has been involved in a couple of information systems. Other partners are called 'content collaborators/ partners', whose primary responsibility was to develop local content in collaboration with the AICRIP centres, SAUs and other stakeholders from the states within their jurisdiction.

**OUTPUT**

**i. Finished products / processes/ protocols developed and /or adopted under NAIP.**

***One comprehensive portal***

For providing the most comprehensive agricultural knowledge directly from the scientific community, Rice Knowledge Management Portal was launched in the presence of Honourable Prime Minister of India during 83rd ICAR Foundation Day on 16th July 2011.

RKMP now serves as an information highway for sharing rice knowledge across the country. It has several global firsts in terms of comprehensiveness and utility. Built on web 2.0

standards, this portal caters to location specific information needs of many stakeholders in local languages.

With about 20 platforms, more than 15,000 pages of content, 5000 minutes of audio, 58 video clips, this is the first comprehensive agricultural portal of the country.

Unlike other initiatives, this is the first time existing public sector R&D organisation in providing the credible information to the farmers and other stakeholders of rice. Striking feature is that context specific information is provided catering to information needs of different stakeholders.

For delivering the information, different domains are available;

In Research domain, we deliver following content/services:

1. Data Repository
2. AICRIP Intranet
3. Status of rice production state wise
4. RiceVocs (2500 rice relate vocabulary)
5. Bio-informatics Tool
6. Research Themes
7. Research Fora (Community of Practices)
8. Directory of Rice Researchers
9. India Rice Research Repository (i3R)
10. Guidelines
11. Tools and Techniques
12. History of Rice Breeding
13. Rice Research in India

In Extension domain, we deliver following content/services:

1. Production Know How of rice (2500 heads)
2. Package of Practices (state specific)
3. Expert Answers on Rice (EAR)
4. Government Schemes
5. Extension Methods
6. Diagnostic Tool
7. FAQs
8. Frontline Demonstrations
9. Production Concerns of the Month
10. Farmers Innovation
11. Ferti-meter
12. Spot nearest Research/Extension Office/Dealer
13. Recap Sheets
14. Audio Gallery
15. Video Gallery
16. Weed Management
17. Weed Information System (Wisy)
18. Indigenous Technical Knowledge (ITK)
19. Statewise Contingency Plans
20. RKMP on youtube

In Farmers domain, we deliver following content/services in LOCAL LANGUAGES:

1. Production Know How
2. Package of Practices

3. Expert Answers on Rice (EAR)
4. Government Schemes
5. Farmers Innovation
6. Audio Gallery
7. Video Gallery
8. Digital Photo Library
9. Weed Management

In Service domain, we deliver following content/services:

1. Trade Information System (Trade Know How)
2. Mandi (Market) Prices
3. Spot nearest Research/Extension Office/Dealer
4. Weather Information
5. Rice Varieties recommended
6. Contingency Plans

In General domain, we deliver following content/services:

1. History and Evolution OF RICE
2. Rice in Indian Culture
3. Rice Facts
4. Rice in Human Nutrition
5. Rice End-Products
6. News and Events
7. Virtual Rice Resources
8. Virtual Tour
9. Seed Availability

In Rice Stats, we deliver following content/services:

1. Rice Almanac
2. GIS Maps

In E-learning, you can browse through the following Platforms:

1. LearnRice - Moodle
2. LearnRice

***Products***

- E-Books/E-Manuals
- Protection Concerns of the month (Flash object)
- CD on In Vogue Extension Tools and Techniques
- CD on Indigenous Technical Knowledge in Rice cultivation
- Offline CD for Hybrid course Videos
- Android Application on Rice Vocs.
- Rice Varieties Recommended for Different states- Interactive Map
- Online E-learning videos course

Rice Knowledge Management Portal (www.rkmp.co.in) comprising of 1300 RLOs of generic content, 1580 RLOs of State specific content, 900 RLOs of State specific content in local languages, 58 video clips and 5000 minutes of audio clips on different topics of Rice, 37 Theme papers, 2800 RiceVocs terms, 110 Rice researchers in directory, 75 Government schemes, 48 RLOs of Extension Methods, 459 FAQs, 37 Innovative farmers profiles, 8 RLOs of History & Evolution, 40 RLOs of Rice in Indian culture, 56 Rice facts, 62 recipes in Rice in

Human nutrition, 12 Rice End products, 1340 News & Events and 37 Virtual rice resources, 30 Recap Sheets, 91 local language Government schemes, 27 local language Innovative farmers profiles, 254 RLOs of local language Weed management, 558 Photos in Digital Photo Library

**ii. Needing validation and scaling up**

***Institutionalizing RKMP with AICRIP:***

Institutionalizing of RKMP activities will serve two important purposes. 1. Knowledge from the AICRIP system will directly flow into extension system that will help ushering knowledge intensive rice production across the country. As many KM theories suggest, a system in place will enable enhanced efficiency in transfer of technology. 2. Showcasing the visible impacts of AICRIP system by creating and sharing research products through this platform. This will enhance the visibility of ICAR system online.

**Synergizing Krsihi Vigyan Kendras (KVK) System and RKMP:** This portal is an example of harnessing the enormous potential of ICT & KM strategies to manage the voluminous knowledge in the existing All India Coordinated Rice Improvement Project (AICRIP) set up. If this knowledge is delivered through state departments of agriculture, KVK networks involving other stakeholders, visible impacts can be realized at farm level. **Agriculture Knowledge Management Portal (AKMP) Framework** – can be developed for synergizing the AICRIP and KVK systems that help upscaling for other crops/ sub-sectors.

**Synergizing NFSM and RKMP :** To implement the resolution of National Development Council (NDC) envisaging increase in the production of Rice, Wheat and Pulses to the tune of 10 million tons, 8 million tons and 2 million tons respectively, 'National Food Security Mission' (NFSM) has been launched from 2007-08 in 311 districts of 17 States. NFSM-Rice comprises a cafeteria of technological interventions was planned and implemented (ex; Demonstrations, Distribution of Seed Minikits etc,). If RKMP knowledge is delivered through state departments of agriculture under NFSM, visible impacts can be realized at farm level.

***Mobile Application:*** Onset of web and mobile revolutions in India will allow partners to empower citizens by embodying knowledge with time critical services. This would contribute to the enhanced productivity and hence income levels of poor farmers. This activity will analyze structural and functional aspects of mobiles in rice sector and potential to fine tune the extension system using mobile applications.

**Indicators of performance** (Technical/research management/financial management - short but critically analysed account supported by evidence/quantitative data)

This portal is the first national level one-stop-shop for rice knowledge in India, which is a semantic web portal build on web 2.0 standards with 2600 registered users and average online users of 900 per day at any point of time and a total hits of 7, 67,000. Perhaps, this is the most comprehensive source for credible containing 15,000 pages of validated, relevant and contextual information on rice to this scale anywhere in the world.

RKMP believes in the data-information and knowledge transformation continuum and provides rice researchers access to a large database of about 27000 datasets related to AICRIP multi-location trials conducted for last 45 years across the country. Research domain provides information on state-wise Status of rice production for 18 states, various Research Themes papers on 25 thematic areas. The portal also caters to the needs of other stakeholders through service domain, general domain and 19 E-learning courses and 32 e books for knowledge updating.

Apart from this a video gallery with 52 Video clips, 6 offline CDs and 5000 minutes of audio clips along with the details of various front line demonstrations are sure to benefit the rice

farmers in need of reliable and convincing information. In order to reach thousands of rice stakeholder of the country, several RKMP awareness and popularization activities specific for researchers, extension functionaries, farmers were undertaken 5205 personnel were trained across the country. The Linkages developed with **IRRI**, **CABI**, **MANAGE**, **AAU (Jorhat)**, **CAU**, **Imphal IIT** – Kanpur, State Department of Agriculture, KVK/NGOs, Private Firms/Millers, rice exporters and Rice Farmers. Directorate of Oilseeds Research(DOR) & Directorate of Sorghum Research(DSR) have approached for support in developing a similar portal for Oilseeds and Sorghum. Mahindra Samriddhi, Savannah seeds, Common Service centers have shown interest to collaborate for sharing crop information.

**Analysis of publications**

| S.No | **Publications** | |
|---|---|---|
| 1. | Articles in NAAS rated journals | 1 |
| 2. | Articles in other journals | 6 |
| 3. | Book chapter(s) | 8 |
| 4. | Popular article(s) (English) | 4 |
| 5. | Seminar/Symposium/Conference/Workshop Proceedings | 7 |
| 6. | Manual(s) | 1 |
| 7. | CDs/Videos | 58 |
| 8. | Popular article(s) in other language | 8 |
| 9. | Folder/Leaflet/Handout | 6 |
| 10. | Report(s) | 1 |
| 11. | Success stories | 1 |

**Discussion**

Building first semantic portal in Agriculture was another challenge. The portal is built on Drupal (open source) with effective tagging of 1000 content heads, this is the most comprehensively defined agricultural semantic portal of the country. Plug ins and ad-on platforms (such as .Net and java based) gives additional strength to the portal. This portal is hosted on www.rkmp.co.in connected to 100 mbps line of National Knowledge Network.

Such portal should enable multidimensional search by means of rich domain ontology. For that, different types of information were categories into semi-structured and extensible sub-heads allowing for bottom-up evolution and decentralized updates. Effectively tagging of these terms hierarchically made users add new classification and organizational schemas and extend the information structure. With concept maps at application layer, portal content is stored and managed in a decentralized way with effective manual tagging and auto-tagging processes. One of the striking activities of RKMP is a thorough and hierarchical validation process undertaken by the experts.

The portal and the platforms have been developed at very nominal investments. In most of the cases, open source CMSs/ LCMSs are used, where in-house expertise (indirect costs such as contractual staff, CPI time contribution) with some level of customization (direct costs) is done.

Some platforms such as AICRIP-Intranet were developed using commercial software where in there is direct cost. EAR and i3R platforms are developed by consortium partners

(ICRISAT). High quality video films are developed by outsourcing. These are all developed as one time investment. Effective knowledge management will have far reaching consequences in bridging the knowledge gap in rice sector. Since there is an in-built sustainability of these platforms (to be owned by AICRIP from 12th Five Year Plan onwards), there will be continuous use of these platforms. This makes all these platforms economically viable. Indirect benefits of these platforms include; integration of context specific information and knowledge needs of stakeholders, relative easiness, speed and accuracy of knowledge access etc.

The mammoth task of driving the knowledge sharing process in rice requires lot of capacity building exercises. The capacity building requirement for this was undertaken at various levels. Training on Knowledge Management strategies, exposure training to knowledge management initiatives in agriculture worldwide, Acquiring the first hand information and managerial skills for sustaining the RKMP etc., (received by the Consortium Principal Investigator). The CoPI from CRRI also got training in this direction. This helps strengthening and sustaining the RKMP in all future endeavors. Further this may also help planning future KM Portals of ICAR.

Trainings on orientation towards the RKMP, content development strategies and basic skills of KM strategies are of utmost importance to the Consortium Partners. Hence it was proposed to get CoPIs of the sub-project to get trained in these areas. This helped strengthening the organizational capacity to harness KM strategies in the overall agricultural development.

At another level, training is imparted to the "Communities of Practice". Representatives from all the rice stakeholders of the country got exposed to different areas of RKMP. Training includes, orientation to RKMP, content sharing procedures, capacity building in harness the power of RKMP, workshops for motivating the stakeholders to trickle down the utility of RKMP. Senior Rice Workers got orientation to KM strategies in rice sector. Other than this online support for effective browsing / adding/ editing / use of content is provided for all the registered users.

To popularize the portal, various activities like Awareness cum hands on training, awareness activities during National and International events like Agri-Fairs, Symposia, Annual Rice Group Meetings, Farmers' day, International Expos were undertaken. Radio talks, TV Shows, Newspaper articles and advertisements were also undertaken. Publicity materials like RKMP mugs, costers and standees for display were used. A page on RKMP was created in the Facebook, twitter &. youtube videos.

**Conclusion**

RKMP is the first step in terms of the application of ICTs and KM strategies in agriculture to build a product like this semantic portal with enormous content. The portal which serves as an information highway for rice sector for farmers, researchers, extension professionals, policy makers, home makers, students etc. The vision is to realise higher productivity and production of rice through improved knowledge and skill sets. The efforts will pave the way to reduce the gaps of the growing "digital information divide" specifically in the important cereal crop of the country namely Rice. The success of these strategies can be up scaled to reach the rice stakeholders with more features and can be emulated in other important crops. The efforts are coinciding with the increasing technological advances, technological reach and ICT readiness at the grassroots level which is a positive signal for the more investments.

The technology mediated knowledge management in agriculture is relatively new concept. While efforts are going on to address the digital divide in terms of connectivity what appears to be limiting factor is the availability of relevant contextualised, validated content in usable format. In the developing world, R and D organisations need to take up content development on large scale so that the knowledge flows amongst agricultural stakeholders are strengthened. Developing knowledge repositories require certain standards in terms of methodologies and frameworks.

**Cross-learning**

Background Information

In most developing countries, agricultural institutions have not moved to a level where new and consistent information services to farmers and other stakeholders are offered based on quality and contexts. This necessitates us to develop strong Agricultural Knowledge Management strategies that are built on huge agricultural content (Data- information-Knowledge). Now we are beginning to see increasing attention to the content and services that ICTs can deliver – digital communication (email), portals for health and development, and services identified as eCommerce, eGovernance, eBanking, eAgriculture, eHealth, eLearning and so on.

In this changing scenario, Indian Council of Agricultural Research (ICAR) aimed to promote the use of Information and Communication Technologies (ICTs) in agriculture by developing national level knowledge management portals. As a first step towards achieving this objective, an exclusive portal on rice viz., Rice Knowledge Management Portal (RKMP) is developed by ICAR under the NAIP project. The portal is built by the Directorate of Rice Research, Hyderabad in association with 8 consortium partners, two convergent partners and 20 AICRIP partners. The RKMP has several global firsts in terms of comprehensiveness and utility. Perhaps, this is the most comprehensive and one stop shop source for credible, validated, relevant and contextual information on rice to this scale.

**Cross learning during project formulation stage**

**Partner Selection & Consortium formation**

Portal is not a simple web site! It is a lot more and provides at least a modicum of data services. The design is done as a combination of repositories, data containers, work flows (that facilitate document creation and review), folders to receive dynamic data, servers to host audio/video clips, news blogs etc. While efforts were mainly on the development of portal design and development and hosting by DRR, the content development strategies were implemented simultaneously. "Portal is less of softwares, but more of content. Defining the functional requirements for a portal, that addresses information needs of 700 rice scientists, 1,10,000 Public sector extension officers, 225 civil society organizations, 600 Farm Science Centres, 4.26 lakhs stakeholders etc., was going to be a herculean task. Since RKMP was envisaged to be 'content portal' rather than 'collaborating portal', it was decided to involve the partners with a focus on content development.

The project is implemented in a consortium mode. Each consortium partner has specific roles to play based on their core competency. DRR lead the consortium. ICRISAT and CDAC are technical partners focusing KM models and font technologies respectively.

Other partners are called 'content collaborators/ partners', whose primary responsibility is to develop local content in collaboration with the AICRIP centres, SAUs and other stakeholders from the states within their jurisdiction. The design, planning, coordination, execution, technical expertise, and hosting and maintenance of the proposed Rice Knowledge Management Portal were taken up by the Directorate of Rice Research,

Hyderabad in association with its collaborating institutes. The information support is provided by the selected stakeholder in rice sector of the country.

Many insights came out during discussion with partners that were highly useful at the later stage of project implementation. One of the important insights is the concept of "Content validation" for the content uploaded from general registered users by scientists from concern discipline of the state and content should be made visible only after suggested revision and validation by the scientists.

**Cross learning during project implementation**

Similarly during the project implementation, various contribution of advisory committee

- Actionable points were given by PMAC Review Committee. As RKMP is an innovative project lot of methodologies in innovation were developed.
- The activities of the RKMP were fine tuned with the help of insights/feedback during the 11World bank Implementation Support Mission Meetings (4-11 June. 2011 & 21-31 Jan 2013 )

Contribution of meetings/formal discussions

- Recommendations and suggestions given by senior colleagues during ARGMs, RAC, workshops, high level meetings at NAIP, CG meetings were all accommodated in the action plan.
- As suggested by National Director NAIP a domain name in national language- www.dhaangyan.in was registered in addition to the existing domain name www.rkmp.co.in
- Developing short video films covering main aspects of rice in India with consolidating funds from all consortium partners
- Contingency plans for different situations zone/ state wise should also be made available on the portal
- Need to develop a database of rice researchers in India, which led for development of Directory of Rice Research with contact details, field of expertise, area of specialization of the researcher.
- For showcasing the field level impacts of RKMP lot of insights were developed from other consortia/organizations.

**Cross cutting that helped in technical advancement or administrative improvements or financial management**

We have refined according to the suggestions of Scientists in Annual Rice Group Meetings at DRR. Some of the actionable points were added or strengthened by IRRI – India work plan.

Cross check progress with users mandate and interests was done in the Private Sector Meetings. Based on the need and feedback many features have been added on to the portal other than expected outputs. Some of them are,

- Daily updates on News and Events
- Seed availability- Information on seed varieties available including quantity available and contact details
- Statewise contingency plan
- Rice Vocs- A Compendium of Rice related vocabulary
- Recap Sheets- Recapitulate already existing knowledge on rice crop into one page sheets comprising of most comprehensive information on select topics
- E-books and E-manuals

- Weed Information System (WISY) - An exclusive platform for weed information
- Bioinformatics Tool Suite
- Directory of Rice Researchers

**Attitudinal changes brought about by cross-culling experiences**

NAIP has brought about the positive changes in enhancing the technical competence of scientists and staff involved in the project. Their sharing of resources and the project has given an opportunity to create a centralized facility for the common use. By undertaking the project, it has brought overall attitudinal changes among the partners involved with respect to Scientific quest, Collaborative team work, Goal oriented research and Subjecting to monitoring.

**Cross learning that could help in implementation of other projects/ programmes in your Institute**

There are several unique aspects of NAIP consortia management and other cross learning that could be institutionalized for operating other projects and schemes like,

- Freedom to operate with institutions outside ICAR.
- At every Institute many activities can be undertaken under planned and non-planned expenditure using the methodologies adopted under NAIP.
- Delegation of power to CPI under the close supervision of Director will help in speedy, effective and transparent implementation of the project.
- Procurement procedure in NAIP sub projects can be adopted for all the sub projects undertaken by the institute.
- The operational flexibility enjoyed by the CPI has helped undertaking some additional activities to supplement the approved work plan. This has ultimately resulted in achievement of objectives comprehensively.

**Whether cross learning experiences during NAIP programme be institutionalized easily or should then be any other support to be offered** Yes

**Comment on whether any of the outputs/outcomes/ has come because of cross-cutting experiences** (in other words, what was the bearing of cross cutting experiences on the output/outcome of your project, whether l here were outputs which came up only because of cross-cutting experiences) NA