

An exercise in ICT, agriculture and society

This article discusses OSCAR project's aim of integration of user & technical perspective on the development and use of an open source based weed identification software programme.



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FLOSS (Free/Libre Open Source Software) has opened democratic spaces for the participation of civil society, thus creating potential for developing ICT tools to address problems at local level. The OSCAR-project (Open Source Simple Computer for Agriculture in Rural Areas) is an initiative from European and South Asian Institutions to develop Open Source ICT solutions to assist decision making in agriculture.

OSCAR is a collaborative effort, initiated by IFP (French Institute of Pondicherry) with the Rice-Wheat Consortium for Indo-Gangetic Plains from India, CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement) from France and the Communication and Innovation Studies Group from Wageningen University in The Netherlands as partners in the action. The project is co-financed by the European Commission's Asia ICT programme under the 'get-in-touch and keep-in-touch' activities in the focus areas of agriculture and society.

The project aims at building an open source based weed identification system for the major weed species for rice-wheat cropping systems of the Indo-Gangetic plains, covering Pakistan, India, Nepal and Bangladesh. Conceived as a decision support system for the target groups, the OSCAR prototype application contains 50 major weeds, considering their economic impact, invasiveness and commonality in different cropping systems in rabi/kharif seasons in all the four countries of the Indo-Gangetic Plains. The OSCAR-project integrates a technical perspective and a user perspective.

Need for technical perspective

The difficulty encountered when identifying weeds using standard flora is centred on three major constraints, namely:

- ability to identify the species without its flowers or before it flowers;
- use of a dichotomous key, which cannot tolerate any error and imposes the choice as well as the order of questions;
- use of technical terms not understood by the non-specialists.

To overcome these constraints, the OSCAR-project developed a software programme that uses a graphic interface based on the identity kit system, which reconstitutes the plants, using images. It is designed to remove the main difficulties encountered by non-botanists, when identifying species, using standard flora as it uses only drawings instead of technical jargon and provides users the freedom to choose the character that needs to be described. Missing information or data are permitted, thus allowing for the identification of incomplete samples. The users can access the photos, the description, and the botanical illustrations of the species at any moment. In case, users encounter doubt in the choice of characters (for description), they could ask the program for the most pertinent one. If the probability of a species identified is less than 100 %, the programme indicates the characters that contain observation errors by the user. The descriptions of the species are available through the Internet website. The programme is multilingual and caters to wider section of people. All the technical terms used are highlighted as a hypertext, and an illustrated definition is accessible. Once the correct weed species is identified, the description page is displayed which contains the weed control measures for it. These control measures include botanical, mechanical and cultural control measures. These species description pages are made available in English, Hindi, Urdu and Bangla to cater to the language needs of the IGP.

The OSCAR application is available in four different versions, MS Windows version, linux version, PDA (Simputer) version and web-based version, all of which are available online at www.oscarasia.org. The software is offered free of charge. Apart from the MS Windows version, OSCAR is developed using FOSS tools and is an open source product.

Need for user perspective

An integral part of the OSCAR-project is to look at three different potential users - farmers, extension officers and scientists and students in agricultural sciences. The project learned about perception and appropriateness of the tool through extensive interactions with farmer groups, extension personnel, IT specialists, NGO and UN staff, government officials, scientific researchers and Ph.D. students in various disciplines and M.Sc. students in all the four IGP countries. A summary for the findings reads as follows:

Farmers in the Indo-Gangetic Plains:

- The current communication systems in place seem to work well as far as problems with weed identification are concerned;
- Priority issues for farmers, as far as weeds are concerned, lie with management and control and have an economic nature.

Extension workers (at different levels):

- There seems to be no major problem in weed identification among extension officers. In a rare case, when an extension officer cannot identify a certain species, he turns to the scientists at national or university level for help. It seems therefore more logical to offer the software and database at this level.
- Computers are, in most countries, available from the regional/district level upwards. In most rural areas, there are no computers used in extensions services.
- The software and the database could be of relevance to in-service trainings.

Students and scientists:

- The software seems to be primarily an educational tool. It could find its relevance in school education, higher academic (agricultural), education (B.Sc, M.Sc and Ph.D levels) and in professional education in agriculture. It could also be relevant for in-service trainings at the level of 'teaching the teachers'. In all countries, there was a lot of interest among scientists and students to use the software.

Advantages of the software

The software was demonstrated and tested in India, Nepal, Pakistan, Bangladesh and The Netherlands. Basically, the students and scientists, farmers and extension officers were very enthusiastic in working with the software and no major problem was observed. Some of the findings in this area are as follow:

- **Visual interface:** Provision of a visual interface to the identification process is a major advantage in the tool. This eliminates any prerequisite botanical knowledge about weed species. The interface design was easy to use and to identify weed species. Though there were issues with their first exercises, subsequently everyone was able to navigate through the software with ease.
- **Specialised versus general information in the database:** The farmers and extension people have an occasional problem with weed identification. If they have a problem with a specific species

that they do not know, the farmer turns to the extension officer and if the extension officer doesn't know, he or she turns to the specialist at the National Agricultural Research Centre. Putting general information in the database would only make sense if the focus were on the general public or on lower level students, like those in a high school biology class.

- **Weed management and control:** Many people felt that if the software would be useful for extension people and farmers, issues on weed management and control should be emphasised in the database. Weed specialists in the different countries can help to provide this information. Difficulties are that if management and control are socio-economically determined and differ accordingly between the many regions in the IGPs, standard use of pesticides and herbicides could be included.
- **Language issues:** Language issues relate to the type of end user. To use local languages, software is only necessary if the end-user does not read English. Having the names of the species in all the local languages and dialects is of interest to all end-users. To have the control and management descriptions in the database available in the local languages is of interest to the farmers/extension officers. However, to translate the descriptions in the local languages will not be necessary. If the software be used as an educational tool for students at higher levels of education in the different countries of the IGPs, to have the description only in English will be enough. There is no immediate need to translate the descriptions into other languages.
- **Updating and maintaining the software and the database:** If people want to add additional information, they can do so in their personal copy of the software. The fact that they can enhance or customise the current version according to their own specificities was seen as a positive aspect. If they think the additions are relevant for everybody, the info could be sent to CIRAD/IFP for verification and publication. It is recommended to let people register before downloading the software.
- **Open source aspect:** The free/open source nature of OSCAR seems to kindle some interest among target groups, particularly among scientists and students.

Conclusion

Processes of technical and social integrations are difficult, but needed. It seems necessary to try and combine technical perspectives with user and social perspectives. These kinds of interdisciplinary processes incorporate understanding, respect and negotiation. It is important to realise that crossing disciplinary borders lies in more than one field and that it is important to identify these fields for each particular socio-ICT project. It is often not one border that needs to be crossed, but many. Topics and questions that were learned from OSCAR in the field of 'ICTs for agricultural development' relate among other things, to using appropriate ICTs, ICT applications and crossing knowledge borders. For appropriate ICT applications and realistic opportunities in the field of development and social change, we need to think about combining situations from inside and outside agriculture. ICTs give the potential of integrating information in a cross-sectorial way, e.g. through 'mobile databases'. Participatory Information and Communication Technology Development (PICTD) can play an important role in this regard. ■