OSCAR Final Report
on Socio-Technological Issues Regarding Open Source Simple Computer for Agriculture in Rural Areas (OSCAR). Assessment of Perception & Appropriateness of the OSCAR Tool in Rural Areas in the Indo-Gangetic Plains (IGP)

Bangladesh, India, Nepal & Pakistan
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INTRODUCTION

This report presents the activities of the Communication and Innovation Studies (CIS) Research Group of Wageningen University in the ASIA@IT&C project entitled “Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)” which ran from January 2004 till June 2006. The objective of the OSCAR project is to initiate cooperation between European and South Asian Institutions with the view to learn about appropriate applications of ICTs in rural agricultural areas. More specific the project is envisioned to the development of a decision making tool for weed identification and control that will address the issue of the declining agricultural productivity in South Asia. In the end, the long-term objective is to contribute to the betterment of rice and wheat productivity in the Indo-Gangetic Plains by improving decision-making capacities in crop management with an emphasis on weed management and control. The Indo-Gangetic Plains (IGP) form an important region for South Asia as it provides the natural resources for rice-wheat cropping systems.

The role of Communication and Innovation Studies in the OSCAR project is to assess knowledge issues that are necessary for determining local and practical appropriateness related to social-cultural and communication related aspects of species identification systems in relation to weed control. This report is prepared by Dr. Rico Lie and consists of country reports, programs of meetings and workshops, presentations, a background paper and overall recommendations. Some of the text are written by Mr. D. Balasubramanian (French Institute of Pondicherry).

The partners in OSCAR are: Centre Coopération Internationale Recherche Agronomique pour le Développement (CIRAD) from France, French Institute of Pondicherry (IFP) from India, Rice-Wheat Consortium for the Indo-Gangetic Plains (RWC) from India, and Wageningen University (WU) from The Netherlands. The project is co-funded by the European Commission under the ASIA@IT&C programme.
FIRST MEETING IN PONDICHERRY
(16 FEBR. 2004 – 18 FEBR. 2004)

GENERAL DESCRIPTION OF ACTIVITIES (FROM THE OSCAR WEBSITE)

The first workshop of OSCAR was held in IFP, Pondicherry from the 16th of February to 20 of February, 2004. This workshop aimed at the planning of definite roles for each partner, identifying the list of weed species and the criteria for selection, socio economic status of proposed field areas and the design of methodology. It also included a field trip to paddy fields near Pondicherry and a visit to an information kiosk, so as to enhance the perception of the problem areas.

WORKSHOP RESULTS

The workshop concluded with specific tasks assigned to each partner for the next 6-month period.

- RWC – To finalise the list of weed species with CIRAD based on commonality in occurrence, invasiveness, economic impact in different countries and to finalise field areas in coordination with CIS based on economic and cultural background based on existing extension mechanisms/farmer groups;

- CIRAD – To finalize list of weed species with RWC, to collect botanical information on the list of species and to prepare images and illustrations for the listed weed species;

- IFP – To design architecture for the identification system and porting of the existing identification system to Linux platform using C/C++;

- CIS – To finalize field areas in coordination with RWC, to study socio-economic, cultural and political background on identified field areas and to study extension mechanisms in field areas.

SHORTLIST OF WEED SPECIES

The most important weed species considering the economic impact, invasiveness and commonality has been prepared. The list has 39 to 47 species found in different cropping systems in Rabi/Kharif seasons in all the four countries of the Indo Gangetic Plains.
PREPARATION OF THE DESCRIPTION OF THE SPECIES

Concerning the preparation of the description of the species and the commonly agreed data format for the identification system the following work has been accomplished.

- Verification of complete Latin names of species (genus, species and authority) and the synonymy for each species in the Missouri Botanical Garden website.

- Bibliography concerning the description of 47 species chosen to know all characters necessary to be used in the identification process.

- Analysis of the global bibliography information in order to establish the list of character states for each character and for each species. This information must be homogenous/complete for all species.

- Definition and realisation of the drawings relating to the identikit (theoretic plant), the different habits (grass, tufted, prostrated, erected, creeping and rosette) and the different root systems of species (fibrous roots, single root tuber and system of tubers).

- In parallel building up the data base on different Access tables (seven tables), in order to parameterise the information to be used by the existing software.

DRAWINGS OF THE COMPOSITE PICTURE

The work on the drawings of the composite pictures has been started and is on a continuous growing phase.

FIRST BETA VERSION FOR LAPTOP

The first beta version for laptop is on progress and it is being designed for the windows platform. The images and drawings completed are integrated into the beta version. The upcoming drawings and illustrations will be accommodated into the beta version as and when ready.

IDENTIFICATION OF VILLAGES AND FARMERS

The identification of the villages, farmers and the extension workers will be done by RWC local partners in respective countries corresponding to the field visits.

SOCIO ECONOMIC STUDY AND THE RELEVANCE OF ICT'S FOR DEVELOPMENT

The research paper entitled “ICTs for Agricultural Development. An Exercise in Interdisciplinarity” will be presented at the International Conference of the International Association for Media and Communication Research (IAMCR) in Porto Alegre, Brasil, 25 – 30 July 2004.
PROGRAMME

DAY 1 (Monday 16th February, 2004) Venue: IFP

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<td>Arrival of participants</td>
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<td>10.30 – 12.30</td>
<td>Session 1</td>
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<td>Dr. Pierre Grard (IFP)</td>
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<td>Dr. Claude Edelin (AMAP)</td>
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<td>Dr. Rico Lie (CIS)</td>
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<td>12.30 – 14.00</td>
<td>Lunch</td>
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<td>Discussion on the presentation of activities</td>
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<td>Session 2</td>
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<td>Dr. Pierre Grard (IFP)</td>
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<td>Tea break</td>
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<td>Discussion on computer aided identification</td>
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<td>17.30 – 18.30</td>
<td>Visit of IFP</td>
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## DAY 2 (Tuesday 17th February, 2004) **Venue: IFP**

**Session 3**  
**IFP Session (9.00 – 10.00)**

**Chairperson:** Dr. Pierre Grard

- *Presentation of Simputer*
- *Software design*
- *Adaptability to Simputer*
- *Constraints*
- *OSCAR e-forum*

**Tea break**  
(10.00 – 10.30)

**Session 4**  
**RWC Session (10.30 – 11.30)**

**Chairperson:** Dr. Rico Lie

- *List of weed species,*
- *Questions of common names,*
- *Identification of Field areas,*
- *Research Personnel*

**Session 5**  
**AMAP Session (11.30 – 12.30)**

**Chairperson:** Dr. Samar Singh

- *List of weed species,*
- *Drawings,*
- *Adaptability to Simputer*

**LUNCH**  
(12.30 – 14.00)

**Session 6**  
**CIS Session (14.00 – 15.15)**

**Chairperson:** Dr. Claude Edelin

- *Socio Economic Status of Field areas*
- *Network with local partners in field areas*
- *Methodology Design*

**Tea break**  
(15.15 – 15.45)

**Session 6**  
**General Discussion (15.45 – 16.30)**

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## DAY 3 (Wednesday 18th February, 2004) **Venue: IFP**

**Session 7**  
**Preparation of Nepal Meeting (9.00 – 12.30)**

**LUNCH**  
(12.30 – 14.00)
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**DAY 4** (Thursday 19th February, 2004)  **Venue: IFP**

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**Diner**  (19.00 – ....) Kailash Resort

**DAY 5** (Friday 20th February, 2004)  **Venue: IFP**

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**LUNCH**  (12.30 – 14.00)

14.00  **End of meeting. Transfer to Chennai Airport.**
Perception and Appropriateness of the “Open Source Simple Computer for Agriculture in Rural Areas” (OSCAR) – Tool.

Report on India and Nepal

by
R. Lie
INTRODUCTION

During the ‘get-in-touch/stay-in-touch’-visit to Nepal (Kathmandu, Kavre) and India (Haryana) we met with several farmers, KVK staff, governmental extension workers, research station staff, NGOs and universities (see logbook for details). For Nepal a detailed report is available, because the majority of the research team partners decided not to go to Nepal because of the political instability. Only Mr. R. Lie (Wageningen University) and Mr. D. Balasubramanian (French Institute of Pondicherry) went to Nepal. Through observations, listening to formal presentations, interactions and dialogues, information was gathered about possible end-users and possible ways of implementation of the IDAO software that is related to weed identification and management.

POSSIBLE END-USERS

We looked into the sustainability of the software with the following possible end-users:

- Farmers in the Indo-Gangetic Plains;
- Extension workers (at different levels) in the Indo-Gangetic Plains, and;
- Students and scientists.

FARMERS

The farmers in the areas that we visited have no major problem with regard to identifying the weeds. The dominant weeds are known to them. If farmers do have problems in the area of identification regarding lesser-known species, they turn to the extension officers (either during field visits or training sessions; mobile phones now also seem to be used by farmers to consult extension workers (in India)). This system seems to work well for the farmers. Problems in relation to weeds are to be found in the area of management.

There seem to be no reasons why this software should be made available directly to the farmers. First of all the farmers have no problems with identifying the different weed species that are found in their fields. Second, the current communication system with regard to weed identification and management seems to work well and there is no reason to be found to introduce a parallel system that tries to do the same. With regard to the use of the Simputer, if the software would be made available to the farmers in a direct way, it needs to find grounding/association with already existing communication systems or initiatives that associate with this system. Third, although the price of the Simputer is relatively low, if compared to other PDAs or desktop computers, compared to the communication system that is in place (through the governmental services, the private sector, the NGOs and peer information sharing) the price of the Simputer is very high (the cheapest model is around 10,000 Indian rupees). Fourth, the Simputer cannot be made sustainable if there is only one application available that the farmers can use. After the device has proven its use and the weeds are known (which is in fact already the case without the use of the software and the Simputer) it serves no need anymore.

However, if more applications could be made available that are either related to collecting digital data in the field, or using a mobile databases, the Simputer could prove its relevance.
Moreover, the Simputer could be made available through the telecenters that are in different phases of being established in the different areas in the IGPs. In this way the new device does associate with an already existing communication channel. The telecenters/information kiosks are in Nepal as well as India in an initial state.

**EXTENSION WORKERS**

Extension officers in India and Nepal might be possible end-users. However, as there is no major problem with weed identification in the area, it seems not a logical move to introduce the Simputer to them for this purpose.

Many extension personnel does not work with computers at the moment and it might be a more logical step to first introduce desktop computers in the extension system. In Nepal they only use computers in the Kathmandu area. In India they do use computers in some extension offices and KVKs, but not in others. Concrete plans to bring computers to the different levels in the extension system seem to be underway. Where computers are available at the moment, they are mainly used for email, typing, some database functions and powerpoint presentations. At the Research Stations in India, they also browse websites. Unless the Simputer comes with a package of useful information (mobile databases) and appropriate applications it seems unlogical to introduce the IDAO software through the Simputer at this time. If desktop computers are installed, the IDAO software could easily be made available on a CD, or could be downloaded if the connection speed allows this.

If an extension officer lacks knowledge in a certain area, he turns to the scientists at the Research Stations in India and to NAREC in Nepal. It seems therefore more logical to implement the IDAO software at this level. At lower levels implementation would be too isolated at the moment, although this might change in the coming 10 to 20 years.

**STUDENTS AND SCIENTISTS**

The IDAO software for weed identification seems first of all to be an educational tool, not a tool that can be used by professionals. The use of this educational tool can be made available at different educational levels, e.g.:

- Primary/secondary in-school education;
- Higher academic education (BSc, MSc and PhD levels) and professional education in agriculture, and;
- At the level of “teaching the teachers”.

How this could be done remains to be seen. At least it seems to be a logical next step to look into these end-users a little bit more and also conduct some preliminary testing of the software with students in Europe and Asia.

The level of detailedness in the software (e.g. the amount of character states; currently there are three and the students in agronomy at Tribhuvan University found this amount too low) relates to the level of education. For secondary school children, three states might be enough. For the academic level the software might be as detailed as possible. The IDAO weeds database needs to be exhaustive and very detailed in order to be useful for agronomists, botanists and
other technical scientists. It needs to have at least the same power of determination as the current tools (mainly books, but also interpersonal communication).

The power of the Simputer lies in its mobility. This means that it can be taken into the field to learn about weed species at location. Therefore, it could prove to be a good educational tool for field practicals. However, students could also collect samples of species in the field and bring them to class to compare them through the use of a desktop computer.

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**FUTURE SOCIAL SCIENCE ACTIVITIES IN OSCAR**

1) Study of the telecenter movement (maybe in combination with the Simputer and PDAs);

2) Study of the use of ICTs in extension service systems, and;

3) Study of scientists and students as end-users. Testing of the software with students.
WEED IDENTIFICATION, MANAGEMENT AND CONTROL

NEPAL AGRICULTURE RESEARCH COUNCIL (NARC)

Weed identification and control/management seem to be causing problems according to Dr. Jagat Ranjit. The specific characteristics of the problem vary in the different districts of Nepal. Labor also seems to be a problem in relation to weed management according to Dr. Jagat Ranjit. Only exploratory talks were held at NARC (including the Communication, Publication and Documentation Division – CPDD) and also CIMMYT International (see Log for more information).

CENTER FOR ENVIRONMENTAL AND AGRICULTURAL POLICY RESEARCH, EXTENSION AND DEVELOPMENT (CEAPRED)

According to the people at the Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED) there is also a problem of weed identification in Nepal. Handweeding is the main means of management and the use of pesticides is disencouraged by CEAPRED. Phalaris Minor is one of the most problematic weeds in Nepal. Labor is very expensive and the people at CEAPRED confirm that exchange of labor is very common. An additional problem is, however, that many families are disturbed by the current political situation and that many young men migrate out of the villages. The main focus of CEAPRED is on vegetables and seed production. They also work in extension, mainly providing technical advice at local levels. As far as extension services are concerned, NGOs, in contrast to the governmental services, are taking care of the marketing process. Some NGOs also work in cooperation with the District Agricultural Development Offices (DADOs). Work at the district level is coordinated.

Advice from CEAPRED with regard to OSCAR is to talk to the government. They might be interested as they have financial resources. If the people at CEAPRED lack knowledge in weed identification, they turn first to the taxonomists at the Nepal Agriculture Research Council (NARC). They might also use the library or the internet.

TRIBHUVAN UNIVERSITY

The main comment from students in botany and from staff members of the Central Department of Botany is that the tool currently has an in-between status as far as the end-users are concerned. Especially towards the use for farmers they are very critical. Questions are mainly
asked towards the phase after identification. What happens after the weed is recognized? How can this tool be an appropriate tool for farmers if it stops at only the phase of identification? The input from the staff of the department is that if the taxonomists and botanists are supposed to be the end-users, the software should be far more detailed. Not only should all the species be included, but also the three character states that the IDAO software is working with will not be enough. More character states should be included to make it useful for the scientists.

DOCUMENTS


AGRICULTURAL EXTENSION SERVICES

GOVERNMENTAL SERVICES

The extension service system in Nepal is organized by the Government. Nepal is divided in 5 regions, with a total of 75 District Agricultural Development Offices (DADOs). A complete picture of the organizational structure is made available to us.

In the Central Region, the region we visited, there are 19 districts. Training sessions are organized at different levels for staff and farmer (groups). At the regional level there are about 20 to 25 training sessions per year. At the district level there are about 3 to 5 training sessions per year. Within the district that we visited, the District of Lalitpur, there are 13 so-called Service Centers; 6 ‘Full’ Service Centers and 7 Sub-Service Centers, with a staff of 54 people in total. Each district has about 9 to 17 Service Centers. These Service Centers provide more than 50 training sessions per year for the different farmer groups at the local level. The extension program mainly runs through these farmer groups to reach the individual farmer. The groups are formed by the Service Centers based on needs assessment, interest in subjects and on what they produce. The number of training sessions differs according to needs and subjects. Subjects are for instance new varieties, control issues and marketing. The Service Centers are staffed by Junior Technical Assistants (JTAs) and Junior Technicians (JTs). At the Service Center that we visited in Taukhel (near Godawari) 3 JTAs are employed.

FARMER GROUP MEETING

In Godawari there are 4 farmer groups consisting out of 15 to 30 farmers. These farmer groups are divided by gender. There are female groups, male groups and mixed groups. In the area that we visited there are 3 female groups and 1 mixed group. On the average a farmer from this group owns 0.25 ha. of land. We met with 1 female group consisting of 26 farmers. Six farmers were present at the meeting (see Photo 1).
The cropping system in this area consists of 1 cropping season from June to October (rainy season) for rice. Other areas might have 2 cropping seasons for rice. After the rice, they mainly sow wheat, but some also turn to vegetables or potatoes. This season lasts from November till March.

Identification of weeds seems to be causing no problems in this area. With regard to labor there are also no problems in this area. Exchange of labor is a common practice and seems to be working well. The weed is used for the livestock. The farmers say that they do not use pesticides, but the neighboring villages do. The main practice of weed control consists out of handweeding. Weeding takes place 2 to 3 times per cropping season. If they weed twice, they do it 20 days after transplanting and 40 days after transplanting. If they weed 3 times they again do it after 75 days after transplanting. Weed is thus a secondary problem. The main problems that relate to productivity in this area are the quality of the soil and pest. Over the past years, production in this area has not been declining, but increasing. So, the amount of rice that is produced in this area is higher than it used to be. Problems, however, are caused by the higher costs that are related to the production.

For the Service Center, weed is also not a priority issue in the District of Lalitpur, but it might be in other districts. Consequently, there seem to be not much training organized on weeds.
SOFTWARE TESTING WITH THE FARMER GROUP

We briefly and not systematically tested some of the drawings and photos to see if the farmers could work with the forms and recognize the weeds. The farmers do recognize some of them, but others they do not seem to recognize at all. This might be caused by the fact that some of the weeds that are included in the database cannot be found in the area we visited. They also noted that they have species in their fields that do not fit the forms of the drawings.

DISTRICT AGRICULTURAL DEVELOPMENT OFFICE OF LALITPUR

A meeting with about 20 participants (all kinds of extension workers) was organized at the District Extension Office of Lalitpur. After a presentation of the OSCAR project, the participants were invited to comment on the project as a whole, but especially on the use of ICTs (Simputer, telecenters and other media) and on the use of the IDAO software. There was a lot of discussion in the Nepali language, but the general observation is that they do not use any media forms at all, besides interpersonal communication. The Chief of the District Extension Office of Lalitpur and his staff members do not make use of computers at all. There knowledge on weeds is updated by asking others and using books. The distance between the IDAO software (and ICTs in general) and the daily practices of the extension workers seems to be very large.

DOCUMENTS


The telecenter movement seems to be in an initial state in Nepal. Currently there are 19 telecenters in operation. Nine used to be controlled by UNDP and the other 10 used to be controlled by the Government. Now all 19 telecenters are under the wings of the High Level Commission for Information Technology (HLCIT) and its secretariat the National Information Technology Center (NITC). We do not know yet why UNDP pulled out. There was no time left to contact UNDP during our visit.

The HLCIT would like to use these telecenters to provide information in the following areas: a.) agricultural information, b.) telemedicine, c.) distance learning, d.) environmental protection, e.) natural disaster mitigation, and, f.) productive economic activities (see Shah, 2004). For agricultural services the telecenters make use of the website http://www.ICT4D.org.np. The site provides information on agricultural issues like new technologies in general, but also specific information on technical issues. It also provides market prices. These market prices are checked on a daily basis and put on the website by the High Level Commission for Information Technology (HLCIT). This is normally done half an hour after the prices are checked at the market.

According to the HLCIT, the 2 major constraints with the telecenters in Nepal are:

- Connectivity and the lack of telephone services, and,

- Availability of electricity/power sources.

Because of these and other constraints it is difficult to make the telecenters cost effective. The HLCIT therefore starts with looking at areas that could be classified as mixed urban/rural areas. In these areas it is relatively easier to deal with problems in relation to connectivity and electricity. Following one of the global recommendations with regard to the sustainability of telecenters, the HLCIT wants to turn responsibility of the telecenters over to VDCs, municipalities and other organizations that work at the local level. As far as content is concerned, the HLCIT recognizes that telecenters should be demand-driven with local support. To accomplish this, they are looking for linkages with local networks. The relationship with, and the role of the Agricultural Information and Communication Center (AICC), which seems to be a coordinating body for agricultural media and communication, is unclear to us at the moment. There was no time left to contact the AICC during our visit.

Currently the Government is the main supplier of hardware as well as content, but there are forms of cooperation. Besides the above-mentioned past cooperation with UNDP, there is now also involvement from the Forum for Information Technology (FIT), which consists of students from Kathmandu University. Cooperation with the private sector is almost non-existent.

VISIT TELECENTER IN PANAUTI, KAVRE

The telecenter we visited in Panauti, Kavre (see Photo 2) was established in June 2004 and run by the NGO called the Forum for Information Technology (FIT) Nepal, consisting of students from Kathmandu University. At the day we visited the center, a contract was signed between the HLCIT, the Municipality of Panauti, FIT and the computer club KOCC. With this contract, general and daily responsibilities were handed over from the national government to the Municipality of Panauti. FIT and the computer club KOCC will look after technical issues and
provide support in this area. The HLCIT will be financially responsible, and will take care of the equipment. Following this contract, HLCIT will provide 2 more computers (which will bring the total to 4) and a photcopying machine. The staff of the center will be paid for their services during the first 10 months. After that the center should be self-financed.

Photo 2. The Telecenter in Panauti, Kavre

A management committee and a user group manage the center on a day-to-day basis. Daily staff consists of one telecenter manager and two facilitators.

The current services are: a) telephone, b) fax, c) printing, d) scanning, e) email and internet, and f) photcopying. Besides these services, the center also provides training sessions for school children and other members of the community. Currently there are 3 different groups of about 5 people each that get basic training in mainly Microsoft Office applications (Word, Excel, Powerpoint…), but also general computer use, and the use of internet and email. The course runs for 3 months, 2 hours a day and costs 300 to 500 Rupees. There is also the possibility of membership, which costs 50 Rupees. The 50 Rupees is to be seen as a form of donation, but tries to bind the people to the center. We did not discuss financial sustainability of the center.

According to the people at the center, other people besides the school children (primary and secondary school) do use the services, but it is unknown to us to what extent. The main problem with the use of farmers is language. Most of the farmers do not read English. Little content is available in the Nepali language.
As far as content is concerned there seems to be little locally relevant information available. Market prices are printed every day and put outside on a bulletin board (see Photo 3). Population figures are also made available in the same way. Besides that we do not really know what information the users are looking for on the internet.

Photo 3. Bulletin Board outside the Telecenter of Panauti

We do not know if the telecenter in Panauti is representative for other centers in the country.

**DOCUMENTS**


MONDAY 20 SEPTEMBER 2004 (NEPAL)

- Arrival in the Tibet Guest House around 18.00h.
- Planning the work.

TUESDAY 21 SEPTEMBER 2004 (NEPAL)

- Arrange ticket and visa to India.
- Visit Dr. Jagat Ranjit, Nepal Agriculture Research Council (NARC), Agronomy Division, Weed Science Unit, Lalitpur, Khumaltar.
- Meeting with Dr. Bholam Man Singh Basnet, Mr. Manoj Thakur and two other staff members of the Communication, Publication and Documentation Division of the Nepal Agriculture Research Council (NARC). Dr. Jagat Ranjit was also present.
- Visit Mr. Atma Ram Lohani, Chief of the District Extension Office of Lalitpur and staff member Mr. Baikuntha Adhikari. Introduced by Mr. Manoj Thakur.
- Visit Dr. S.L. Maskey, Director Crops and Horticulture Research of the Nepal Agriculture Research Council (NARC).
- Visit Dhirendra B. Shah, Office Manager, International Maize and Wheat Improvement Center (CIMMYT International), South Asia Regional Office.
- Discuss the work plan.
- Diner Meeting with Dr. Krishna K. Shrestha, Central Department of Botany, Tribhuvan University.

WEDNESDAY 22 SEPTEMBER 2004 (NEPAL)

- Meeting with Mr. Dambar Bahadur Khadga, Mr. Arni Raj Manandhar and Mr. Manoj K. Shah, High Level Commission for Information Technology, His Majesty’s Government of Nepal.

THURSDAY 23 SEPTEMBER 2004 (NEPAL)

- Fieldtrip organized by Mr. Atma Ram Lohani, Chief of the District Extension Office of Lalitpur and staff member Mr. Baikuntha Adhikari through the Service Center in Taukhel (near Godawari).
• Meeting with 5 farmers and 2 Junior Technical Assistants (JTAs) in Godawari. Mr. Baikuntha Adhikari also attended this meeting.
• Meeting with about 20 participants (all kinds of extension workers) in the District Extension Office of Lalitpur.

FRIDAY 24 SEPTEMBER 2004 (NEPAL)

• Meeting with Mr. Pius Raj Mishra and two staff members of the Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED).
• Talk given at Tribhuvan University and interaction with students and staff members. The talk was given for students in botany, staff members of the Central Department of Botany and the dean of the Institute of Science and Technology. The meeting was organized by Dr. Krishna K. Shrestha, Central Department of Botany, Tribhuvan University. Titles of the talks given were “Information and Communication Technologies and Agricultural Development” (Rico) and “Computer Aided Species Identification Systems” (Balu). About 50 participants were present.
• Meeting with Ms. Koto Kanno, UNESCO Representative to Nepal.

SATURDAY 25 SEPTEMBER 2004 (NEPAL)

• Fieldtrip organized by Mr. Dambar Bahadur Khadga from the High Level Commission for Information Technology to the rural community telecentre in Panauti, Kavre. People present during the day were other members of the Commission, the chief of the Municipality of Panauti, someone from the VDC, members from the management of the telecentre, members from the Forum for Information Technology (FIT) (General Secretary Hari Krishna Neupane) and members from the computer club KOCC.

SUNDAY 26 SEPTEMBER 2004 (NEPAL)

• Travel to India
SUNDAY 26 SEPTEMBER 2004 (INDIA)

- Arrival in the Ganaga International Guest House around 17.00h.

MONDAY 27 SEPTEMBER 2004 (INDIA)

- Meeting at CIMMYT in Delhi
- Travel to Karnal

TUESDAY 28 SEPTEMBER 2004 (INDIA)

- Workshop meeting with all project partners
- Farmer group meeting during training session

WEDNESDAY 29 SEPTEMBER 2004 (INDIA)

- Meeting KVK Kurukshetra
- Farmers meeting
- Meeting State Government Extension Office Haryana

THURSDAY 30 SEPTEMBER 2004 (INDIA)

- Meeting Regional Research Station, Agricultural University of Haryana
- Meeting State Government Extension Office Karnal
- Travel Karnal - Delhi

FRIDAY 1 OCTOBER 2004 (INDIA)

- Meeting Manish Kumar, One World South Asia

SATURDAY 2 OCTOBER 2004

- Travel to Kathmandu

SUNDAY 3 OCTOBER 2004

- Travel to The Netherlands
• Arrival The Netherlands
The workshop on “Perception and Appropriateness of OSCAR” was launched on the 14th of March, 2005 at the administration block of Wageningen University and all the project staff were present. The workshop opened with a session on “Socio-Technical Innovations and Transdisciplinary Science”. Prof. Dr. Cees Leeuwis (Chair, Communication and Innovation Studies Group) made a presentation on the group’s project “Convergence of Science” and Dr. Rico Lie made a presentation about the “transdisciplinarity in OSCAR”. The OSCAR exercise can be viewed as traversing among the disciplines of botany, agriculture and information technology with the end users as farmers, extension officers and students from various levels. The perception and appropriateness of OSCAR tool can be assessed with the key questions of:

- the goal to be achieved
- method employed
- content
- target groups/audience and
- organisation

The target groups are well defined in the farmer community, extension officers and the new addition to these were the academic community, mainly focusing on students from Undergraduate and Postgraduate schools. It was planned to conduct some tests with the students from the Wageningen University to get their feedback about the perception of OSCAR. The discussion spanned around various issues of how to present the drawings and pictures so as to make relevance on field, what are the real needs of the farmers and extension workers at the field level, and if there is no real problem in weed identification, whether providing the much needed information on weed management and control would be useful. It will also be helpful to assess the needs beforehand in terms of what were the target groups doing in the absence of a tool like OSCAR. Introducing new institutions and new methods with new technologies will have an impact in the social learning of the target groups and the success of which will mainly depend upon the appropriateness of the goal (increasing productivity of the Rice Wheat systems of Indo-Gangetic plains), method (in our case, ICT), content (the OSCAR tool itself), the nature of the target groups and the organisation of the institutionalised effort.

Prof. Anne Van den Ban, former chair of Communication and Innovation Studies Group, who has a very rich experience in studies related to the extension services in India delivered a talk on the “Changes in Agricultural Extension”, which mainly focused on the changing needs of the farmers in the light of new technological innovations and the demands it necessitates on the extension services. The farmers’ major preference being what is more productive and what produces immediate tangible results, the new interventions need to cater to such natural and justified expectations. One also needs to balance between the importance attached to the learning of new skills and what could be more productive immediately and this should define the goals set for such initiatives like OSCAR and also need to identify to whom to cooperate with to make
such a newendeavourtobeasuccess. Theprogressof eachpartnerwas evaluated in their respective areas. As planned, the Open Source pre-release beta version of OSCAR was demonstrated in the workshop. Considering the stage of development of the open source version, the participants agreed that we need to pace ahead consistently to make the open source version stable. On the botanical aspect, a final list of 50 species has been incorporated in the database. The drawings for the identikit are being prepared and so far, the entire sets of drawings for 12 species have been completed. The Rice and Wheat Consortium staff have started working on the aspects of weed management and control measures. They also presented a basic framework for designing the solutions for weed management and control. This was well received by all the project staff and it was agreed to proceed in the same lines to incorporate the control measures in the OSCAR tool.

Dr. Ir. Lammert Bastiaans, Crop and Weed Ecology Group, Wageningen University presented the work of the group which covered the weed management practices in Netherlands, the problems and the new initiatives in weed control. This helped to improve the understanding of the various practices with their different cultural background which contribute to research and implementation of new weed control and management techniques. The interesting aspect of the discussion happened to be the growing concern of the extensive use of herbicides and how it affects weed management practices at the farmer level. The strategy of preventive and curative weed control with application of less lethal herbicide, practices like intercropping, direct seeded rice, proper residue management practices, cover crops were discussed as viable alternatives in weed management. The experience sharing with this group which has wide experience in weed control projects in South East Asia and Africa proved to be very useful. A discussion with the PROTA (Plant Resources of Tropical Africa) group was also held during the workshop. It intends to synthesize the dispersed information on the approximately 7,000 useful plants of Tropical Africa and to provide wide access to the information via Web databases, Books, and CD-Rom's. PROTA is not being selective about the species and the products are mainly derived from the web databases. It was interesting to learn the experiences of this well-established group and the advantage of using ICT for easier and effective dissemination of information, and the question of updating of the information on regular basis was discussed.

Further on, the workshop focused on the testing of the OSCAR with the students. Members of Semper Florens (Study Association of Plant Scientists) were invited for a session of the workshop where the OSCAR tool was presented to them and were asked to use the tool themselves. After the students worked on the software for a considerable amount of time identifying a two to three species, their responses against the features of the software such as:

- the drawing of the characters;
- the ease of navigation within the software (the ease with which one can reach various screens containing character states and back);
- the usefulness of scientific content of the software (the herbarium sheets, the glossary of botanical terms, the botanical description of each species).

The tests were again conducted with a group of bachelor students. Altogether, the response of the students was very positive and they felt that the graphical representation of the characters and character states made it easy to identify easily compared to the conventional identification methods. The navigation aspects needed to be improved and in general the feel of the software was well rated. The scientific content in terms of botanical description of species was found to be useful and in particular hyperlinks providing explanation for technical terms (like monocotyledons etc) in the description was appreciated.

Mr. Bharath Krishnan from RWC gave a talk on the “Design of Software” which highlighted the importance of end-user perspectives in the OSCAR. The question of integrating text-to-
speech (TTS) capability for OSCAR was discussed but was decided that presently the focus will have to remain on completing the final version of open source OSCAR software.

New deadlines were agreed upon for follow-up of work for each partner. RWC agreed to locate the translation teams and to propose weed control measures to be included in the software. CIS and CIRAD planned for the next field trip in Pakistan. The field trip in Pakistan will be organised in the month of September, which happens to be late compared to what is charted out in the project calendar, but considering the busy schedule of the staff, this was agreed upon. Subsequently the next workshop which was to be held in the month of September would be held in the month of December, 2005 in Bangladesh. RWC will handle the responsibility of organisation of the both the field trips and workshop in Pakistan and Bangladesh.

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PROGRAMME

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Workshop on
Perception and Appropriateness of
the OSCAR tool

Wageningen, The Netherlands
14 March – 18 March 2005

participants: list enclosed

venue: Ranitz Room (Ranitzaal), first floor nr. 1064, Administration Centre Wageningen University, Costerweg 50, NL-6701 BH Wageningen, tel. reception 0317-482211

facilities: The room is available for the workshop during office hours; a laptop or desktop with internet connection is available in the room
MONDAY 14 MARCH 2005

10.00h Morning Session
TRANSDISCIPLINARY RESEARCH
- Opening of the workshop
- Prof. Dr. Cees Leeuwis (chair Communication and Innovation Studies Group) on the research of the Sub-Department of Communication Science and the transdisciplinary project “Convergence of Science”
- Dr. Rico Lie on transdisciplinarity in OSCAR
- Open space for discussion on transdisciplinary research

12.00H LUNCH
- Restaurant in Administration Building

13.30h Afternoon Session
COMMUNICATION AND AGRICULTURAL DEVELOPMENT
- Prof. Dr. Anne van den Ban (former chair Communication and Innovation Studies Group) on Changes in Agricultural Extension
- Dr. Rico Lie on ICTs for Agricultural Development
- Looking back and looking ahead:
  - Presentation progress CIRAD
  - Presentation progress IFP
  - Presentation progress RWC
- Finalising the program for the coming 4 days. Planning the concrete activities.

19.00H DINNER
- Restaurant in town

TUESDAY 15 MARCH 2005

10.00h Morning Session
- Visit to the Research Group Crop and Weed Ecology (http://www.dpw.wageningen-ur.nl/cwe) contact persons: Dr. Ir. Wopke van der Werf & Dr. Ir. Lammert Bastiaans

12.00H LUNCH
- Restaurant in Administration Building

13.30h Afternoon Session
- 13.30 – 14.30h: meeting with Jan Siemonsma (en Chris Bosch) from PROTA (Plant Resources of Tropical Africa)
• 14.30 – 15.30h: Developing of the testing of the software with university students in Bangladesh, Pakistan and India
• 15.30 – 16.30h: meeting with members of Semper Florens (Study Association of Plant Scientists)
• 16.30h: Developing of the testing of the software with other possible end-users in Bangladesh, Pakistan and India (continued)

19.00H DINNER

• Restaurant in town

WEDNESDAY 16 MARCH 2005

10.00h Morning Session
• Pre-testing of the software with university students in Wageningen (contact: Pim Lindhout, coordinator course Orientation Plant Sciences)

12.00H LUNCH

• Restaurant in town

13.30h Afternoon
• City walk with visits to:
  ◦ the Herbarium (at 15.00h; contact: Folkert Aleva, tel. 0317-483163), the Tropical Glass House (at 15.30; contact: Wilbert Hetterscheid, tel. 0317-483178; Casper Pillen, tel. 0317-483284), the Botanic Garden, the river and a museum

19.00H DINNER

• Complimentary dinner offered by the University of Wageningen

THURSDAY 17 MARCH 2005

10.00h Morning Session
• Continuation of the work for the testing of the software

12.00H LUNCH

• Restaurant in town

13.30h Afternoon Session
• Planning the next phase of OSCAR
• Planning the concrete ‘get-in-touch’ ‘stay-in-touch’ activities in Pakistan and Bangladesh:
  • Pakistan (June – July 2005)
Bangladesh (October 2005)

19.00h DINNER

- Restaurant in town

FRIDAY 18 MARCH 2005

10.30h Morning
- 10.30h Departure for Visit Open Air Museum
- 11.00h – 12.30h: Guided tour in the museum

12.00h LUNCH

- Lunch in Restaurant in the museum

13.30h Afternoon
- 13.30h Transport back to Wageningen
- Open space

19.00h DINNER

- Restaurant in town
OSCAR PARTICIPANTS

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# PRESENTATION ON TRANSDISCIPLINARITY IN OSCAR

## Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)

### Transdisciplinarity

## Forms of Project Cooperation

- Mono-disciplinarity
- Cross-disciplinarity
  - Multi-disciplinarity
  - Interdisciplinarity
- Transdisciplinarity (scientists, professionals and farmers)

## Different Disciplinary Science Perspectives in OSCAR

- The technical science perspective of weed identification >> botanists
- The information and communication technology (ICT) science perspective (hardware and infrastructure oriented) >> communication/IT technicians
- The technical science perspective of developing software applications (context oriented) >> software/program developers
- The perspective of the social sciences

## How does cross-disciplinarity work?

- Cooperation between stakeholders
- The development of research questions
- From disciplinary embedding to cross-disciplinarity
  - The weed and crop science perspective in OSCAR
  - The ICT perspective in OSCAR
  - The socio-cultural perspective in OSCAR
  - The professional extension perspective in OSCAR

## Towards transdisciplinarity in OSCAR

- What is the transdisciplinary problem we are working on?
- What could be relevant transdisciplinary research questions and objectives for OSCAR?
Perception and Appropriateness of the “Open Source Simple Computer for Agriculture in Rural Areas” (OSCAR) – Tool. Software Demonstration and Testing

Report on Pakistan

by
R. Lie & C. Edelin
INTRODUCTION

Dr. Riaz Mann, Dr. Shahida Khalid (NARC, Islamabad) and Dr. Hafiz Mujeeb (Agriculture House, Lahore) hosted the OSCAR team in Pakistan. Dr. Riaz Mann is the national coordinator (rice and wheat) for the Pakistan Agricultural Research Council (PARC) in Islamabad. Dr. Shahida Khalid is a weed scientist at the National Agricultural Research Center (NARC), also based in Islamabad and currently finishing a book on the weeds of Pakistan. Dr. Hafiz Mujeeb is as an agronomist working in the area of water management at the Agriculture House in Lahore. He is also site coordinator for different rice and wheat projects at district and village levels. Dr. Riaz Mann and Dr. Hafiz Mujeeb accompanied the OSCAR team at the visits in Lahore and Faisalabad. Ms. Shahida Khalid accompanied the journey to Peshawar.

The OSCAR Pakistan team was made up by Dr. Claude Edelin (botanist from CIRAD) and Dr. Rico Lie (social communication specialist from Wageningen University). As such, the team lacked professional agricultural knowledge on weeds in the rice and wheat fields within the core OSCAR team. Dr. Riaz Mann, Dr. Hafiz Mujeeb and Dr. Shahida Khalid compensated this lack of knowledge were possible, but in absence of them discussions could not always reach an in-depth agricultural technical level. The OSCAR team decided that the main purpose of the visit would focus on the testing of the software of weed identification. This was in line with the previous combined visits to Nepal and India where the emphasis was on ICTs and the use of the Simputer in agricultural development and related to that on weed identification, management and control. Throughout all visits, appropriateness and perception of the identification tool was also addressed, but the preference was to visit students at universities, scientists and researchers in stead of farmers, farmer groups and farmers institutions. The demonstration and testing of the software with students and scientists was emphasized with the aim to get feedback on several issues related to the development of the software.

One of the main consequences of this particular focus was that out of the original identified possible end-users, (farmers in the Indo-Gangetic Plains, extension workers (at different levels) in the Indo-Gangetic Plains, and, students and scientists) interaction in Pakistan only took place with extension personnel, students and scientists/researchers, not with farmers.

The visit to Pakistan included meetings in Islamabad, Rawalpindi, Lahore, Faisalabad and Peshawar (see the attached logbook for more details). As interactions with Dr. Riaz Mann, Dr. Hafiz Mujeeb and Dr. Shahida Khalid took place throughout the whole journey, they are not recorded separately.

AGRICULTURAL EXTENSION AND WEED SCIENCE

MEETINGS IN ISLAMABAD

The transfer of technology in the agricultural sector, as it is implemented by the Transfer of Technology Institute of NARC in Islamabad, is decentralizing in the field of information dissemination. There is currently a trend from running things at provincial level to running things at the district level. Within this context, the Transfer of Technology Institute uses two techniques for information dissemination: 1. A Training and Visit System (T&V), and, 2. electronic media. Related to these techniques are the two projects that the Institute is currently running: a. The
Integration of Agricultural Research and Extension Activities, and, b. The Use of Electronic Media for the Transfer of Agricultural Technology.

The T&V system used to involve extension through front line extension officers who had a training of two years in agricultural extension. These ‘field assistants’ basically worked as facilitators. Recently the system changed and now the agricultural officers are all graduates and post-graduates in agricultural extension. This change resulted in more available knowledge within the overall governmental extension services. Other changes to the better are that the officers now have better mobility in the form of motorbikes and vehicles. There are no women working as extension officers in the rural areas. In the urban areas there are a few women working in the extension services. The Institute currently offers 56 training courses to extension agents in the public and governmental sector.

The use of electronic media mainly concerns the use of radio and television. Radio programs are aired in the different dialects and the Punjab province is taking a lead in the area of using television. The Transfer of Technology Institute has its own audio-visual production unit. The current director initiated this in 2004 after a long period of inactivity and produced in one year 348 radio programs in Urdu on agricultural topics (e.g., pesticides on ecosystems in Pakistan). The Institute also produces television programs. This is done by a private organization that uses the facilities of NARC. The programs are aired half an hour on Saturday and half an hour on Sunday.

The Institute also runs a ‘farmers helpline’. This is a telephone line that farmers can call if they encounter agricultural problems, have specific questions and want advice. It has a cord phone number and a mobile phone number. The numbers receive several calls a day. Besides the mobile phone, other new media like the internet and email are barely used in the extension system. The Institute does have a website with parts in Urdu, but this is about all the internet activity the Institute is currently deploying.

One of the audio-visual productions was viewed during our visit. This production was a short drama, containing a conversation in a natural setting on the best way to plant basmati rice. The story started with a conversation on growing rice between farmers. Then an extension officer comes in and explains things in a professional way, showing how to use fertilizers, discussing the pesticide issue, etc. The program ends with a joke and many happy faces.

Besides the visit to the Transfer of Technology Institute, other visits in Islamabad included a short meeting with Dr. Muhammad Ashraf, Director General National Agricultural Research Center (NARC), a meeting with Dr. Naeem I. Hashmi, CIMMYT Pakistan and a meeting at the French Embassy (see logbook for more details).

MEETINGS IN LAHORE, FAISALABAD AND PESHAWAR

The Governmental Agriculture House, which is based in Lahore houses three divisions: machinery (field operations), water management and extension. The extension system that is coordinated from here is complex in its hierarchy, but the trend towards decentralization is confirmed. Punjab has a total of 35 districts and each district is coordinated by a district officer. The change in the T&V system (from ‘field assistants’ to (post-)graduates) is also confirmed. In addition the governmental system tries to implement farmer field schools, for instance in the cotton production. It was also confirmed during our meetings that weed identification is not a big problem. More problems can be found in the areas of control and management. Identifying the proper weedicides is often considered to be the problem.
At the moment of our visit to the Agriculture House there was a ceremony in which the Minister of Food and Agriculture was to hand out certificates within the context of the project “Grow More Wheat”. As this program was very successful over the past year, the most successful farmers were rewarded by a certificate, tractors and other agricultural machinery.

The Agriculture House in Lahore produces agricultural radio and television programs. Every week one program is produced and aired. Every day from 13.00h – 14.00h an agricultural program is shown on television discussing all kinds of issues relevant to the farmers.

Several audio-visual programs were viewed during our visit. Among them were two short interviews related to the so-called “color chart technology”. This technology was initiated in Pakistan and involves the determination of the right fertilizer by comparing the color of the rice plant with six fixed colors on a chart. These interviews were aired on Pakistan Television World (PTV World) that can be received in 56 countries and supplemented by more interpersonal activities with farmers. Discussions were continued on how to communicate new technologies to farmers. For instance the large scale introduction of the zero tillage technology first failed in Pakistan, but in Punjab it got accepted because of several activities that specifically aimed at the local village involvement. This was initiated by the extension services from the Agriculture House.

The meeting at the Rice Research Institute in Lahore confirmed some of the findings for instance that weed identification is not a problem in Pakistan. It was also stated that in the field of control and management, the use of herbicides is dominant, but that hand weeding does exist and that farmers contract people to do this hand weeding. There is a minimum of labor exchange.

At the University of Agriculture in Faisalabad Dr. Zahid Ata, weed scientist at the Department of Agronomy, emphasized that it is very important for control issues to identify the weeds in very early stages. He produced a guide book on how to use weed herbicides efficiently. It was also emphasized that weed control and management techniques need to be very cheap. Weed control and management is a serious issue in Pakistan. The loss of yields in the wheat production is about 18-30% and in the rice production about 17-39%.

Dr. Rai Niaz Ahmad, Director of the Water Management Research Center at the University of Agriculture in Faisalabad gave a presentation on the four-row wheat bed planting machine; a new weeding technology. The four-row wheat bed planting is a technique that saves more than 50% of water and increases the grain yield with 12%. A demonstration was also given on a new technique to make distilled water.

At the meetings at the NWFP Agricultural University of Peshawar (Departments of Weed and Botany) it was confirmed that the costs of the Simputer are too high and that people prefer to take species back home in stead of bringing a mobile computer to the field. Staff and PhD students expressed a lot of interest in the OSCAR project. General feedback on the software was collected and integrated in the next section.

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1 Figures were given in the *Dawn Economic & Business Review*, June 10 – 16, 2002, p. III.
SOFTWARE DEMONSTRATION AND TESTING

The software was demonstrated and tested in several places during our meetings in Pakistan (see logbook for more details). Basically, the students and scientists had little problems working with the software and there were little Asian specific issues observed. The only Asian specific observation was that of the difference in educational philosophy between Western European countries and Asian countries. The software has a Western European bias in the sense that it presents an open interface and gives the users a lot of freedom of choice. There is not one right way to use the software and the Asian students often ask for this.

SPECIALIZED VERSUS GENERAL INFORMATION IN THE DATABASE

If there is only general information in the database and only the common species are included, it will be of no use to the farmers, the extension officers or the students/scientists. The farmers and extension people have no problems with basic weed identification. If they do 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 (there are no women working as extension officers in Pakistan) turns to the specialist at NARC. For the students, general information will not be enough for use as an educational tool. For them, the information needs to be as detailed as possible. Putting general information in the database would only make sense if the focus is on the general public or on lower level students, like those in a high school biology class.

THE ROLE OF PRIOR KNOWLEDGE ON PLANT DETERMINATION

Feedback was mainly gathered from weed scientists and Phd students and other staff members who already have a lot of prior knowledge on weeds. This of course jeopardizes the ‘objectivity’ of their remarks and influences their way of working with the software. It was for instance noticed that people with prior knowledge often start with selecting the most specific character of a specific weed. Still they sometimes did not end up with the right species, although they used the software in a correct way and knew the name and details of the specific plant. This had in our opinion often to do with either some bugs in the prototype of the software that still need to be fixed or with the quality of the initial observation.

CHARACTER STATES AND TYPES

With regard to the order of selecting the characters, students often asked which character they needed to select first (e.g., first the habit, or first the leaf). No feedback was gathered on the amount of characters states.

STAGES OF GROWTH

To make the tool relevant for extension purposes, it is very important to include information about the weeds in early stages of growth. The seedlings should therefore be included in the database. There was also talk about including the seeds. The flowers and the fruits were not included in the prototype we used for demonstration and testing, but it was found to be very important to include them.
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 added to the database. Weed specialists in the different countries can help providing this information. Difficulties in this regard 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, but even in this regard there is diversity in the region.

LANGUAGE ISSUES

Language issues relate to the type of end user. To use local languages in the software is only necessary if the end-user does not read English. To have the names of the species in all the local languages and dialects is of interest to all end-users. However, to translate the descriptions in the local languages will not be necessary. If the software will 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 description into other languages.

THE USE OF THE “SEARCH” BUTTON

The function of the "search" button is to help the user to identify the plant by suggesting the most useful characters to observe. This function is available only when no species has been found at 100%. However, when several species reach this score it becomes inactive and cannot be used for their discrimination. Besides, the tests have shown that even with the use of the “search” button, species cannot be found when we make wrong observations.

A button that can search on text would also be appreciated, for instance if you only know a local name of a weed, it would be useful to type the name of the weed and have the right plant pop-up on your screen.

GENERAL REFLECTIONS ON THE OSCAR PROJECT

The database could be seen as the core of the application. The way of entering the database through the identification software is additional. Integration with existing projects and databases is in this regard an important issue. Ms. Khalid is for instance writing a book on weeds in Pakistan and there are more initiatives in Pakistan and the other countries of the IGPs.

Students are often looking for the right way to use the software, whereas the basic idea of the software is that you can start wherever you want. This probably relates to educational philosophies that are different from those in Western Europe. Therefore, guidelines would be useful to include.

It was found that the observation itself is a critical moment in identification. It doesn’t matter too much if you use traditional flora or the software, if your observation is not good, your identification will be wrong.
In order to initiate further developments after the OSCAR project, the project needs to make use of a **funnel approach**. It needs to make a decision on who the end-users of the project are going to be. If the end-user is selected and the geographical area is selected, the software and database could be developed in more detail. It could for instance focus on the production of an educational module for high school students in biology. In this case the software doesn’t need to be very specific and for instance only the most common species of a particular plant could be included in the database. The interface could then be developed accordingly. If the end-users are going to be agronomy students at a Bachelor or Master level, the software needs to be far more detailed.

Another future path of development after the OSCAR project could be to use an **umbrella approach**. In this case the focus is on the umbrella of ‘ICTs in agricultural development’ and the weed database and identification software is one of the projects that is sheltered by this umbrella. A follow-on project could include comparison with other projects that are ongoing in this field. It could also initiate another line under the same umbrella.

Another idea for a follow-on project is to focus on **seed identification**. The farmers could have samples of their soil checked and determine control issues accordingly. Dr. Shahida Khalid, the weed scientist at National Agricultural Research Center (NARC) is currently working on this technique.

It is very important to emphasize that the software is distributed **free of charge**. Books are for the different organizations and universities very expensive. If the software and its database can serve the same function as the books, it is of great interest to the people in Pakistan. A recommendation is that a leaflet could be produced on the availability of the software and information should be included on from where it can be downloaded. This leaflet can be send to the different organization in the IGPs that are involved in weed identification, management and control.

Some scientists also make it clear that they would be happy if they could **modify the software themselves**, for instance by adding species and other information like local names.

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**SPECIFIC REFLECTIONS ON THE USE OF THE SIMPUTER**

This section discusses pros, cons and alternatives for porting the software to a LINUX operated Simputer as they were learned in Pakistan. It also includes the knowledge gathered from previous interactions within OSCAR.

**CONS**

The cons to porting the software to the Simputer are the following:

- The size of the screen of the Simputer is too small for a proper and readable use of the software.
- The sun light that falls on the screen might cause problems reading the screen.
- It was learned that people prefer to bring a real sample of a species back home and identify it using the desktop computer with the OSCAR software. It only gets interesting
to bring a mobile computer to the field if you cannot bring a species back home. In the case of weeds this causes no problems.

- The cost of the Simputer is too high for all end-users in the IGPs.
- The temperature might in some cases be too high for a proper functioning of the Simputer and its batteries. (E.g. above 50 degrees Celsius).

PROS

- It might be more fun for students to work with the Simputer in stead of with traditional flora. It can stimulate and motivate learning.

ALTERNATIVES

An alternative could be to make the software available through the internet, like it is done with the mangrove software. In this way scientists, students and extension officers who do have access to the internet can download the software and install it on their own computer. It could also be possible to have an on-line version. In both cases the software is offered free of charge.

If a mobile version is required, the software can be run on a laptop computer. During our visits we observed no laptops running on LINUX, so there might be no need to make a LINUX version of the software at this time. Putting the energy into producing an on-line version would make more sense.

Testing the software in a systematic way and cumulating detailed feedback on its functioning can be done in Western Europe, as well as in the IGPs. As the software is primarily developed in Montpellier in France, there is no specific need to do the testing of the software in the IGPs. It can be done in France as well. There were no specific Asian problems or typicalities observed during our demonstrations and group testings in the different countries of the IGPs.

REFLECTIONS ON THE END- USERS OF THE SOFTWARE

The following new possible end-users were added:

- High school students in developing and non-developing countries
- The general public (hobbyist) in developing and non-developing countries
MONDAY 12 SEPTEMBER 2005

- Arrival in Islamabad at 7.00h.
- 14.00h. Meeting with Dr. Riaz Mann: Planning the work.
- 20.00h. Second dinner meeting with Dr. Riaz Mann.

TUESDAY 13 SEPTEMBER 2005

- 9.00h. Meeting with Dr. Shahida Khalid, weed scientist at National Agricultural Research Center (NARC).
- 9.30h. Short meeting with Dr. Muhammad Ashraf, Director General National Agricultural Research Center (NARC).
- 9.45h. Longer meeting with Dr. Shahida Khalid, weed scientist at National Agricultural Research Center (NARC).
- 11.00h. Visit to the University of Arid Agriculture Rawalpindi.
  - Meetings with Prof. Dr. Muhammad Azim Malik, Chairman of the Department of Agronomy and Prof. Dr. Muhammad Afzal, Center for Information Technology.
  - Lecture given on OSCAR and interaction with students and staff (about 20 people).
  - Informal group testing of the software with 2 groups of 4 people (post graduate students and teaching staff).
- 13.30h. Lunch
- 14.00h. Meeting with Dr. Naeem I. Hashmi, CIMMYT Pakistan.

WEDNESDAY 14 SEPTEMBER 2005

- 9.00h. Visit to the French Embassy.
- Meeting with Jean-Paul Bouliou, Counsellor for Cultural, Scientific and Technical Cooperation and Dr. Sonia Darracq, Education and Scientific Attache.
- 10.30h. Meeting with Dr. M. Ashraf Sahibzada, Director Technology Transfer Institute, National Agricultural Research Center (NARC).
- 12.30h. Lunch meeting with Dr. Shahida Khalid and regular meeting on weed seeds project.
• 15.00h. Departure for Lahore.
• 21.00h. Arrival in Lahore and dinner.

THURSDAY 15 SEPTEMBER 2005
• 9.00h. Meeting with Hafiz Mujeeb, an agronomist working in the area of water management. He is our contact person in the Agriculture House in Lahore and site coordinator for different rice and wheat projects at district and village level.
• 9.30h. Meeting with Dr. Muhammad Anjam Ali, Director General Agriculture (Punjab extension), Agriculture House.
• 10.30h. Continuation meeting with Hafiz Mujeeb and Riaz Mann.
• 15.00h. Meeting with Mr. Mushtaq Ahmad, Director Rice Research Institute in Kala Shah Kaku. Also software testing with the scientists at the Institute.

FRIDAY 16 SEPTEMBER 2005
• 9.30h. Sight seeing Badshahi Mosque in Lahore.
• 11.00h. Departure Lahore.
• 15.30h. Arrival Faisalabad.

SATURDAY 17 SEPTEMBER 2005
• 10.00h. Meeting with Dr. Zahid Ata, weed scientist at the Department of Agronomy, University of Agriculture, Faisalabad.
• 10.30h. Presentation given on OSCAR, demonstration software, discussion and group testing. Participation of about 30 students and staff from the Department of Agronomy.
• 13.00h. Meeting with Prof. Dr. Muhammad Ashfaq, Dean of the Faculty of Agriculture and acting as Vice Chancellor of the university at the moment of our visit. Also present was Dr. M. Iqbal Zafar, Professor and Chairman of the Department of Rural Sociology.
• 13.30h. Visits to different laboratories at the university and demonstrations of different ongoing projects.
• 15.00h. Meeting with Rai Niaz Ahmed, Director of the Water Management Research Center at the University of Agriculture, Faisalabad.
SUNDAY 18 SEPTEMBER 2005

- Travel from Faisalabad to Islamabad (incl. a visit to the salt mines).

MONDAY 19 SEPTEMBER 2005

- 8.30h. Departure from Islamabad to Peshawar.
- 12.30h. Arrival at the NWFP Agricultural University of Peshawar and meeting with Prof. Dr. Khan Bahadar Marwat, Chairman of the Department of Weed Science.
- 13.00h. Demonstration and group testing with 3 PhD students in weed science.

TUESDAY 20 SEPTEMBER 2005

- 9.00h. Due to an electricity power failure at the Department of Weed Science at the NWFP Agricultural University of Peshawar it was not possible to present the OSCAR project and demonstrate the software here. A meeting at the Department of Botany was organized instead.
- 9.30h. Visit to the Department of Botany and presentation and demonstration given on OSCAR for about 10 participants (scientists and PhD students).
- 14.00h. End of the visits and travel back to Islamabad.
- 19.30h. Arrival in Islamabad.

WEDNESDAY 21 SEPTEMBER 2005

- 3.40h. Departure to Europe
Software testing with staff and students at the University of Arid Agriculture Rawalpindi

Hafiz Mujeeb (Agriculture House, Lahore) and Riaz Mann (NARC, Islamabad)
Software testing with scientists at the Rice Research Institute in Kala Shah Kaku

Lecture, demonstration and software testing with staff and students of the Agronomy Department of the Agricultural University in Faisalabad

Software testing with PhD students in weed science at the NWFP Agricultural University Peshawar
Presentation OSCAR project and demonstration software for staff and students at the Department of Botany, NWFP Agricultural University Peshawar
Organisation of the Bangladesh Field Trip and Workshop

Report on Bangladesh

by
Mr. D. Balasubramanian
INTRODUCTION

The field trip and workshop in Bangladesh was organised between 28th November to 10th December, 2005 with the help of the partner Rice and Wheat Consortium (RWC) for Indo-Gangetic Plains. RWC had arranged for field trips in the districts of Dinajpur, Rangpur, Gazipur and the workshop was to be held at Dinajpur. Dr. Frederic Borne and Dr. Pierre Grard were not able to attend the proceedings of the workshop because of their visa issues and other administrative issues with their parent organisations. The rest of the team attended the workshop and the field trips in different phases. The aim of the field trip was to assess the appropriateness of the latest releases of OSCAR with farmers, extension workers and students. The workshop would review the progress of work of all the partners, suggest improvements based on the feedback generated through the field trip and also would decide on the future tasks for the partners according to their responsibilities.

FIELD TRIP IN DINAJPUR, RANGPUR, BOGRA AND GAZIPUR DISTRICTS OF BANGLADESH

The field trip in Bangladesh was mainly organised to assess the appropriateness of OSCAR with the three target groups - farmers, extension workers and students. The OSCAR tool had been updated with new character states and weed description pages and we also had a beta release for the simputer version. It was decided to conduct tests with the target groups with both the desktop and simputer versions.

Tests were conducted with farmers from the Dinajpur district who were associated with the activities of Wheat Research Centre, Dinajpur. This included demonstration of OSCAR with farmer groups in organised meetings and also direct tests with individual farmers on their fields.

Tests with extension workers comprised of concise introduction of OSCAR and letting them to use the software individually or in groups of two or three. They were asked to identify a few weed species on their own. Feedback was collected after the individual/group tests were conducted. The Department of Agricultural Extension was approached in the districts of Dinajpur, Rangpur and Bogra to organise the tests. Most of the tests were conducted parallel to the training sessions organised by the DAE to the Assistant Agricultural officers and the sub-assistant agricultural officers.

Tests with students were conducted at the Universities in Dinajpur and Gazipur districts. They were the Haji Mohammed Danesh Science and Technology University, Dinajpur and Bangobandhu Sheikh Mujibhur Rahman Agricultural University, Gazipur. The tests involved faculties and Masters and Ph. D students of Botany, Ecology and Agronomy. A short presentation of the project and demonstration of the OSCAR software was made followed by hands-on testing of the software by the students and faculties either in individual or groups of two.

The outcomes of the testing with all the target groups can be summarised as:

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. All the end users felt
comfortable with the interface design and found it easy to identify weed species. Though there were issues with their first exercises, subsequently every one was able to navigate through the software with ease.

**NATURE OF INFORMATION**

Information that is provided as part of the species description pages was found very useful to the students. For the extension workers and the farmers information on weed control measures needs to be updated. The scope for an ICT based tool like OSCAR is well felt in the field areas provided that it addresses the real needs of the target groups, here, the information on weed management and control. This needs to be immediately addressed in our future tasks.

**CHARACTER AND CHARACTER STATES**

It was felt in many places that not all character states were present for the Leaf character. Also the possibility of adding the characters of fruits and flowers needs to be explored. It might prove useful to add these characters as it may result in discriminate identification of species.

**LOCAL LANGUAGE ISSUE**

It was found necessary that providing weed control measures in local language, here Bengali is important for farmers. But for the other target groups such as extension officers and students it was not felt as important as the medium of instruction is English in all universities.

**OTHER RELATED ISSUES**

It was a common question among the farmers and extension workers on how to continue using such useful software unless they have constant access to a computer. Though this is a typical question in the rural areas of the third world which is not covered by the scope of the project, we should also recognise the importance of the question. Deploying simputers with all its limitations of high price, long term support, availability of a number of relevant customised applications can only be judged over a long period. A follow-up of OSCAR is a possibility where we can try to work with a smaller project area with a specific target group and evolve a comprehensive ICT approach to rural areas.

The fact that OSCAR is free and open source needs to be emphasised and it seems to catch the imagination of the end-users, right from the farmers to the faculty of universities. They felt this could be a major advantage of OSCAR so that they can customise and enrich the software with the weed species of their region.

**WORKSHOP AT WHEAT RESEARCH CENTRE, DINAJPUR**

The pre-final workshop was held at the Wheat Research Centre, Dinajpur, Bangladesh on the 4th December, 2005. As mentioned earlier, except for Dr. Pierre GRARD and Dr. Frederic BORNE from IFP all other staff members of the project were present.

A review of the progress of work of all partners was done. Dr. Rico LIE and Dr. Claude EDELIN made a presentation about their experiences of Pakistan field trip. They highlighted various issues regarding the software and its appropriateness to different target groups. They also emphasised that with for a proper and wholesome ICT approach for agriculture, OSCAR needs to be part of a suite of applications and cannot be deployed alone.
Various issues related to the software were discussed based on the feedback collected during the field trips held in the preceding days. The possibility of developing different versions for different target groups was discussed. As farmers would require a version of species description and control measures in local languages and not the other target groups it was decided that only the species description pages will be translated to local languages.

The issues relating to simputer were also discussed in detail.

1) On one hand, there is no standard development platform available for both the versions of simputer available in the market.

2) One uses free software for application development (GTK) while the other uses proprietary libraries for application development.

3) The limited availability of space in simputer is also a major handicap.

4) The pricing of simputer is also very high in a rural context. A simputer with a color screen will cost around Rs. 24000/- (USD 500) whereas now one can buy a full fledged desktop computer for the same price. And compared to the tasks that a simputer and a PC can accomplish, simputer does not any more sound convincing except for its portability.

5) Obtaining support for a simputer will prove to be very difficult given our own experience with the vendors. Nor that it can be repaired with local expertise where as a desktop can be easily repaired locally. It reaffirms our belief that technical innovations cannot be thrust ed from top without considering costs and local expertise.

Given all these restrictions, it was decided that the possibility of porting OSCAR as a webbased application shall be immediately explored. This would make OSCAR more visible and enable to reach to a much wider population and area.

OSCAR needs to find its space in a broad ICT perspective amidst the initiatives in the Indo-Gangetic Plains and this can only be through the implementing or facilitating agencies like NGO's or state intervention. In this regard, it might be useful to negotiate with NGO's who are already active in the IGP who can take forward and deploy OSCAR in the field areas extensively. Meetings with an NGO called Dipshika and Sustainable Development Network Bangladesh (SDNBD) was held. They were eager to cooperate with the OSCAR team and work towards mutually complimentary goals. For example, SDNBD is involved in the access to ICT aspects in Bangladesh and they are willing to deploy OSCAR as part of the applications that are currently being provided by them to the rural areas. Similar willingness among the NGO's in IGP needs to be explored and followed up so as to make OSCAR sustain in a longer term.

Various deadlines for the immediate tasks were agreed by the partners namely, botanical aspects to be completed by CIRAD, weed control recommendations and translations to be completed by RWC and the porting of OSCAR by IFP by the end of March. This will give us enough time to revise the software according to the agreed specifications and release the final versions in time.

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TRANSLATION OF IDAO TO OPEN SOURCE

The period between October and December mainly focused on porting the windows based version of OSCAR to open source. On one side, enriching of IDAO with botanical data continued and resulted in accumulation of more characters and related character states. These
were incorporated into the windows version of OSCAR. Developers at IFP went for hands-on training at Encore Technologies Pvt. Ltd for the porting of OSCAR to Simputer platform. This proved immensely useful and the porting witnessed a considerable progress that we were able to take a working version of OSCAR in simputer for the Bangladesh fieldtrip. Embedding of html pages (species description pages) within the GTK application still needs to be sorted out which will hopefully be resolved by February, 2006. Once this is sorted out then we can release the open source version of OSCAR on the website. Also once the translations are received from RWC it will also be incorporated into OSCAR and finalised by the end of March.

OSCAR was also presented in the FOSS.IN 2005 held between 29th November to the 2nd December, 2005 at Bangalore. A talk titled – “FOSS in Agriculture, Science and Education – An example” was delivered by Ms. Srilatha, Software Developer working on OSCAR at IFP. OSCAR was also showcased as one of the best FOSS projects in the accompanying exhibition. Feedback from the talk and the exhibition was that a web based version would be greatly helpful for the scientists and the students.

OSCAR is also selected as one of the case study for successful FLOSS projects around the world by the UNDP International Open Source Network IOSN. A film is being prepared of all the projects which will be broadcast in BBC. The filming and publishing of the projects will happen after March, 2006.
Additional Information from Bangladesh

CENTRAL QUESTIONS

1) What should be the content and form of the software?
2) How to make it available to the end-user?
3) How and where to ground it?

Ad. 1) The content and form of the software is the core issue of the project. For the farmer the database is important, not the identification tool.

Ad. 2) To answer this question, we need to make a distinction between the three possible user groups: farmers, extension officers, researchers/students. To make it available at community level through the Linux-based Simputer seems to be an impossible road to take because of the following reasons: 1. There is no grounding to introduce the Simputer, especially if there is only one software program available, which is of little relevance to the farmers. 2. The Simputer is too costly. The cost of the Simputer is currently around US$300, but even if it could be sold as a US$100-Simputer the costs would be too high to meet a village budget.

Ad. 3) The question posed here relates to the basic rule in development initiatives to relate to already existing structures and initiatives. For new technology to be appropriate it must find grounding. This grounding refers to the state of development of the country, especially as it is related to ICTs. What is already there to link up with?

There are for instance no computers used in the extension chains in many of the IGP countries at levels lower than the national or sometimes regional levels. But even at the district level in Nepal no computers are used. The Simputer is an alien thing to many of the farmers.

ISSUES CONFIRMED

- Computers are only used from district level upwards. Not at the farmer level.
- Through questions like “What is the main problem in weed control and management?” and “Do you have problems with weed identification?” and if so, “Where do you go to resolve your problems?” we learned that identification is also in Bangladesh not a priority issue. If farmers have problems with weed identification they have their channels to get the information they need. There seem to be little problems in this area. Areas of concern are of an economic nature. Currently there is an interest in using herbicides, instead of the traditional hand weeding. 95% is hand weeding. If extension officers do not know how to deal with a certain weed, they advise to remove everything. This causes no problems with hand weeding.
• Training sessions for farmers relate to broader environmental and social issues than only technical issues. Nutrition, HIV/AIDS... extension plus.
• Neither the extension officers, nor the students have fundamental problems with using the software. It is user friendly.
• Focusing the project on students is of course also focusing on farmers, because it is the farmers in the end who will profit. It is no direct empowerment of the farmers. It is about better and more appreciated education. The software seems to be primarily an educational tool.
• Testing of the software can be done anywhere. It does not seem to have a region specific feel.
• Minor remarks with regard to the software are:
  • If people want to add additional information, they can do so in their personal copy of the software. If they think it is relevant for everybody, the info could be send to CIRAD/IFP for verification and publishing.
  • The idea was also launched to publish a beta-version on the website and let people register and sign up for a commitment to give feedback on the beta-version.
  • The selection of the roots is not clear. It is unclear which character states are available and how to select them.
  • During selection people expect to double click, or see for instance a color change during a mouse-over. Boxes seem to disturb the clarity of the total, but somehow it should be made clear how selection of a character state works.
  • People expect a <back>-button during the identification process to go one-step back, if there is unsatisfaction.
  • Language translation only seems to be necessary for the names of the species (for all end users) and for the control and management information (for the farmers). If the software and the database are primarily seen as educational tools, translation will not be necessary as all education at the university level in the different IGP-countries is in English.
  • During the workshop, the idea was launched to have a dialogue box directly after the program start. The first idea for this dialogue screen was to offer three options: 1. Identification, 2. control and management, 3. botanical descriptions. Control issues could then again be subdivided into: a. cultural control, b. biological control, and, 3. chemical control. A matrix, which would include the different type of end-users could also be an option.
  • Concerning the development of the project, the following idea was also launched. Choose one target group, e.g. botany students at the BSc level. Produce a working prototype for this specific group and make recommendations for the other possible end-users.
  • The best option is to make the software available through a website, so that it can be downloaded by those who are interested.
  • Cybercenters/telecenters are in an initial state of development in Bangladesh. Currently there are only a few in operation (around 6). The focus of their use is mainly on agriculture, education and health. The use of ‘the rice-doctor’ is upcoming.
FINAL MEETING IN NEW DELHI
(22 APRIL 2006 – 30 APRIL 2006)

PROGRAMME

DAY 1 (Monday 24th April, 2006) Venue: RWC Office

Opening (9.30)
Arrival of participants

Opening Session (10.00 – 10.30)
Welcome speech
DR. RAJ GUPTA

Presentation of the project and staff
DR. PIERRE GRARD

Session 1 Review of Activities

Presentation of activities:
- RWC
- IFP
- CIRAD
- CIS

Dr. Samar Singh
Dr. Pierre Grard (IFP)
Dr. Claude Edelin (AMAP)
Dr. Rico Lie (CIS)

DISCUSSION ON THE PRESENTATION OF ACTIVITIES

LUNCH (12.30 – 14.00) Lunch break

Session 2 Finalization of OSCAR Application (14.00 – 17.30)

Presentation of the software
Dr Pierre Grard (IFP)

Tea break (16.00 – 16.30)

Discussion on:
- Technical aspects
- Communication Aspects
- Botanical and Agronomical Aspects

TEAM
DAY 2 (Tuesday 25th April, 2006) Venue: RWC Office

Session 3 Finalization of Recommendations (10.00 – 12.30)

Recommendations:
- Technical aspects
- Communication Aspects
- Botanical and Agronomical Aspects

LUNCH (12.30 – 14.00)

Session 4 Finalization of Reports (14.00 – 16.30)

Technical aspects
Communication Aspects
Botanical and Agronomical Aspects

Tea break (15.15 – 15.45)

Discussion Continued

DAY 3 (Wednesday, 26th April 2006) Venue: NASC Complex

Session 5 OSCAR Application – Launch & Press Meet (17.00 – 18.30)

Welcome Address
Dr. Raj Gupta

Oscar Project Presentation

Felicitations:
- Ambassador, EC
- Ambassador, France
- Ambassador, The Netherlands
- Minister of Env & Forests, India

Meet the Press

Cocktail Dinner (19.00 – 20.30)

DAY 4 (Thursday, 27th April 2006) Venue: RWC Office

Session 6 Finalization of Reports continued (9.00 – 12.30)
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<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>LUNCH</td>
<td>12.30 – 14.00</td>
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<tr>
<td>Session 7</td>
<td>Administration of OSCAR Project</td>
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<td>(14.00 – 16.30)</td>
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<td></td>
<td>Day 5 (Friday 28th April, 2006) Venue: RWC Office</td>
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<td>Session 8</td>
<td>Discussion and Closing Session (9.00 – 12.30)</td>
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<tr>
<td>LUNCH</td>
<td>12.30 – 14.00</td>
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<td>14.00</td>
<td>End of Final Workshop</td>
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PROGRAMME OFFICIAL LAUNCH OF THE APPLICATION

OPEN SOURCE SIMPLE COMPUTER FOR AGRICULTURE IN RURAL AREAS
APPLICATION LAUNCH – Program Sheet

DATE: Tuesday 25th April, 2006
VENUE: Hotel Jypees Siddharth – Conference Hall
3, Rajinder Place, New Delhi

OSCAR Application – Launch & Press Meet (11.00 – 13.30)

Welcome Address
(11.00 – 11.05)
Dr. Raj Gupta
Head, Rice-Wheat Consortium

Presidential Address
(11.05 – 11.15)
H.E. Mr. Dominique Gizard
Ambassador of France in India

Address of Chief Guest
(11.15 – 11.25)
H.E. Mr. Francisco da Cunha S. C. Gomes
Ambassador - Head of Delegation, Delegation of the European Commission to India, Bhutan and Nepal

Preliminary Address
(11.25 – 11.35)
H.E. Mr. Eric Franciscus Charles Nishi
Ambassador of the Netherlands in India

OSCAR – Relevance to NARS
(11.35 – 11.40)
Dr. Mushyuniya
National Director, National Agriculture Innovation Project, ICAR

OSCAR - Presentation of Activities and Results
(11.45 – 12.00)
Dr. Pierre GRARD
Project Manager – OSCAR, IFFP

Vote of Thanks
(12.00 – 12.05)
Dr. Rico LIE
CIS, Wageningen University

Meet the Press
(12.05 – 12.30)
The OSCAR Team

Lunch
(12.30 – 13.30)

The OSCAR project is co-financed by the European Commission’s Asia IT&C program. This project is a collaboration effort with IFFP as the leader and CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement), France, Communication on Innovation Studies, Wageningen University, The Netherlands and Rice-Wheat Consortium for Indo-Gangetic Plains, India as partners in the action.
# Presentation of Results on Perception and Appropriateness of the OSCAR Tool

## Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)

**Perception and Appropriateness of the OSCAR tool**

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
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<tr>
<td>- Simple to use and cost-effective</td>
<td>- Limited software and database capacity</td>
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<tr>
<td>- Easy to repair and maintain</td>
<td>- Compatibility issues with existing infrastructure</td>
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<tr>
<td>- Suitable for different educational levels</td>
<td>- Limited hardware support</td>
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<tr>
<td>- Energy-efficient</td>
<td>- Limited software and database capacity</td>
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<tr>
<td>- Cost-effective</td>
<td>- Compatibility issues with existing infrastructure</td>
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## OSCAR as an Exercise in Interdisciplinarity

- The Biological/Agricultural Technology Perspective in OSCAR
- The Communication Technology Perspective in OSCAR
- The Social Science Perspective in OSCAR

## The Weed Database & the Determination Software

- Different learnings from the testings in The Netherlands and Igor countries about the content of the software (e.g., on the openness to the software, the amount of data, etc.)
- The software seems to be primarily an educational tool.
- Language translation only seems to be necessary for the names of the species (for all end-users) and for the control and management information (for the farmers). If the OSCAR software and the database are primarily seen as educational tools, translation will not be necessary as all education at the university level in the different Igor countries is in English.

## End-Users of the Software & Database

- Farmers in the Indo-Gangetic Plains
- Extension workers (at different levels) in the Indo-Gangetic Plains
- Students and scientists
  - Primary/secondary in school education
  - Higher academic education (BSc, MSc and PhD levels)
  - Professional education in agriculture
  - At the level of “teaching the teachers”
- The general public (hobbyist) in developing and non-developing countries

## OSCAR as a Tool for Agriculture in Rural Areas

- Used as an exercise in interdisciplinary learning
- The Weed Database & the Determination Software
- End-Users of the Software & Database
- The Simputer
- The Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)

## Future Directions for OSCAR

- A Funnel Approach
- An Umbrella Approach
- An Integrated Approach
### Future Directions for OSCAR

<table>
<thead>
<tr>
<th>A Funnel Approach</th>
<th>A Funnel Approach</th>
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<tr>
<td>OSCAR needs to make a decision on who the end user of the project is going to be. If the end user is selected and the geographical area is selected, the software and database could be developed in more detail. It could for instance focus on the production of an educational module for high school students in biology. In this case the software doesn’t need to be very specific and for instance only the most common species of a particular plant could be included in the database. The interface could then be developed accordingly. If the end users are going to be agronomy students at a Bachelor or Master level, the software needs to be far more detailed.</td>
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<tr>
<th>An Umbrella Approach</th>
<th>An Integrated Approach</th>
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<tr>
<td>Another future path of development after the OSCAR project could be to use an umbrella approach. In this case the focus is on the umbrella of ‘ICTs in agricultural development’ and the weed database and identification software is one of the projects that is sheltered by this umbrella. A follow-on project could include comparison with other projects that are ongoing in this field. It could also initiate other lines under the same umbrella.</td>
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<tr>
<td>An integrated approach refers to an integrated perspective on interdisciplinary cooperation. The focus is on how different sciences and professionals can work together to develop relevant agricultural technical databases and promote their use for end-users (farmers, RDPs, students and scientists). OSCAR showed for instance that the interface between the database and the end-user is an important factor to consider as early as possible in the development of appropriate and sustainable projects.</td>
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**Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)**

© Wageningen UR
PRESS COMMUNIQUE

OSCAR is a collaborative effort, initiated by IFP (French Institute of Pondicherry) with Rice-Wheat Consortium for Indo-Gangetic Plains, India, CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement), France and Communication and Innovation Studies of Wageningen University, The Netherlands and as partners in the action. This project was co-financed by the European Commission’s Asia IT&C program under the “Get-in-touch & Keep-in-touch” activities in the focus areas of Agriculture and Society.

The project aims at building an open source weed identification system for the major weed species for Rice-Wheat cropping systems of Indo-Gangetic Plains covering Pakistan, India, Nepal and Bangladesh. Launched in January 2004 it has now reached its final stages and the open source versions of the application are launched today as part of the project’s final workshop in New Delhi.

The Head of the Rice Wheat Consortium for Indo-Gangetic Plains, Dr. Raj Gupta welcomed the delegates present for the application launch. He pinpointed key areas in which OSCAR addresses relevant concerns of not only the farmers but also scientists working in agriculture research and development.

His Excellency Mr. Dominique Girard, Ambassador of France in India, represented by Mr. Bernard Heulin, the Scientific Counsellor, French Embassy in Delhi, delivered the presidential address in which he lauded the franco-indian initiative in this project and hoped that the partners of the project will continue to work towards promoting similar initiatives in future with an enhanced spirit.

His Excellency Mr. Francisco da Câmara S. C. Gomes, Ambassador - Head of Delegation, Delegation of the European Commission to India, Bhutan and Nepal was the Chief Guest of the event and he noted that European Union's Asia IT&C program promoted IT&C cooperation between European and Asian non-profit organizations, for the benefit of the Small and Medium Enterprises, and aimed to link Asia with Europe in the search for compatible IT&C solutions and standards. It was a Euro 30 million programme covering 18 South and South-East Asian countries, including India. Areas of activity comprised Agriculture, Education, Health, Society, Transport, Tourism, Intelligent Manufacturing and Electronic Commerce. The Asia IT&C programme concluded in December 2004, after completion of its 5-year programme lifespan. Nevertheless, several Asia IT&C projects, including OSCAR, are ongoing even today. The broad objectives of Asia IT&C are now being pursued by the EC under the Asia-Invest Programme.

His Excellency Mr. Eric Franciscus Charles Niehe, Ambassador of the Netherlands in India felicitated the project saying this project signifies the growing Europe - Asia Cooperation resulting in a fruitful exercise of knowledge sharing in the areas of Agriculture, Society and Information Technology. Also he noted that needs to situate such initiatives in ICT not only in a regional and international milieu but more importantly in the rural social contexts, specifically the large populations reliant on agriculture.

Dr. Mruthyunjaya, National Director, National Agriculture Innovation Project, Indian Council for Agricultural Research highlighted the relevance OSCAR brings to the national agricultural research systems across South Asia. It provides an ideal backdrop for researchers and extension workers to provide better services using information technology, to farmers bringing about overall success and learning in our institutional framework.

The project’s activities encompassed the whole of Indo-Gangetic plains in the past two and half years covering the countries of Pakistan, India, Nepal and Bangladesh. During the course of
the implementation of the project, a list of 50 most significant weed species from the region were identified. Extensive field trips were undertaken in these countries to gain an understanding of the biological, social and cultural aspects of weed management and control. This understanding resulted in the development of a model open source software which addressed the concerns of the relevant target groups viz farmers, extension workers, students and researchers. Alongside this process of software development, continuous studies on the appropriateness of the software for the different groups were undertaken resulting in an enriched knowledge of the needs of the end-users. Accordingly the software was adapted to suit the needs of the end-users, like using pictures to help easy identification of the weeds and providing on demand weed control measures in respective local languages viz Hindi, Urdu and Bengali.

Dr. Pierre Grard, Project Manager - OSCAR, IFP demonstrated the capabilities of OSCAR in a detailed presentation of the software highlighting the easy usage, as a good decision support system and the relevant information available in local languages.

Dr. Rico Lie, Communication and Innovation Studies, Wageningen University delivered the vote of thanks in which he noted that OSCAR has been a good learning experience, specifically thanking the teams from Pakistan, Bangladesh and Nepal and he hoped that this successful collaboration will be sustained by new initiatives.

This software is now available in four different versions. They are a MS Windows version, a linux version, a PDA (Simputer) version and a web based version available online at www.oscarasia.org/oscarweb. The potential of the utility of the software as seen by the OSCAR team is tremendous especially for the extension services and in academia. This could help the on-job training exercises with updated information for the extension services, help improve the capacity building in taxonomy amongst students and researchers and can also be deployed by grass root level organisations involved in ICT initiatives for agriculture in rural areas of South Asia.

Please visit:

www.oscarasia.org – project website

www.oscarasia.org/oscarweb - online version of the software
BACKGROUND PAPER: ICTS FOR AGRICULTURAL DEVELOPMENT. AN EXERCISE IN INTERDISCIPLINARITY

By Rico Lie

ABSTRACT

This paper focuses on a concrete, non-mainstream example of bringing ICTs to rural agricultural areas. In elaborating on this example of ‘ICT for Development’ (ICT4D), it tries to provide insights into the integration of the natural sciences, the technical communication sciences and the social sciences in a project called: Open Source Simple Computer for Agriculture in Rural Areas (OSCAR). The objective of the OSCAR project is to initiate cooperation between European and South Asian Institutions with the view to learn about appropriate applications of ICTs in rural agricultural areas. More specific the project is envisioned to the development of a decision making tool for weed identification and control that will address the issue of the declining agricultural productivity in South Asia. In the end, the long-term objective is to contribute to the betterment of rice and wheat productivity in the Indo-Gangetic Plains by improving decision-making capacities in crop management with an emphasis on weed management and control. The Indo-Gangetic Plains (IGP) form an important region for South Asia as it provides the natural resources for rice-wheat cropping systems.

The partners in OSCAR are: Centre Coopération Internationale Recherche Agronomique pour le Développement (CIRAD) from France, French Institute of Pondicherry (IFP) from India, Rice-Wheat Consortium for the Indo-Gangetic Plains (RWC) from India, and Wageningen University (WU) from The Netherlands. The project is co-funded by the European Commission under the ASIA@IT&C programme.

INTRODUCTION

New Information and Communication Technologies (ICTs) and development seem to have found each other and merged into a new field, which is often called ‘ICTs for Development’ (ICT4D). These new ICTs include computers, internet and email, but also mobile phones. In a sense history seems to be repeating itself as again communication technology is in the center of the discussions on development. In the ‘60s and ‘70s we had a similar focus on the role of the mass media. Television was thought to play a decisive role in bringing about social change in rural and remote areas. For instance in 1964 in American Samoa, the teachers were simply kicked out of the classrooms and replaced by television sets (see Schramm, et.al., 1981). At that time, the small unincorporated territory of the United States of America had the largest educational television station in the world. In India, the Satellite Instructional Television Experiment (SITE) project, which started in 1975, aimed to reach 2,400 villages in 20 districts with satellite television...
broadcasts (Agrawal, 1985). The basic idea was to broadcast synchronized agricultural, health, nutrition and family planning messages to the rural farmer.

Despite these and other failures in achieving meaningful change through means of mass communication technologies, many international organizations involved in development and change now again incorporate a perspective on the use of the new ICTs in their activities. Many initiatives can be identified. Just to name a few:

- InfoDev, the Information and Development Program of the World Bank published many documents on the topic (http://www.infodev.org);
- UNCTAD monitored ICT changes around the world (UNCTAD, 2003);
- UNESCO and the ITU, who have a mandate for communications issues at UN level, paid a lot of attention to the potentials of the new ICTs (http://www.unesco.org; http://www.itu.int/home). Both agencies are also involved in the World Summit of the Information Society (WSIS), bringing together all stakeholders involved in the so-called ‘digital revolution’.

Examples outside UN circles are also manifold and for instance to be found among the activities of development organizations such as the International Institute for Communication and Development (IICD). The launch of the new Indian Journal I4D, which grew within the years 2003 and 2004 from nothing to a leading monthly magazine on ICTs in development, is also a good example of the growing interest in ICT4D issues.

Not only these multi-sectorial organizations show a concern with the possibilities of these new ICTs, but also more specific organizations involved in agricultural development turned to this field. The Technical Centre for Agricultural and Rural Cooperation (CTA) has been very active through the organization of the ICT Observatory “ICTs – Transforming Agricultural Extension?” in 2003 (see http://www.cta.int and Engelhard, 2003) and already produced the report “Information Revolutions” in 2001. The organization continues to monitor the developments of ICT4D (http://ictupdate.cta.int). CGIAR now has a special program called the ICT-Knowledge Management Program (http://ictkm.cgiar.org/index.html). FAO and FES reviewed combined radio and internet projects in a report edited by Bruce Girard (Girard, 2003), and so on….

This renewed interest in ICTs for (agricultural) development is remarkable and triggers the question: “What is the difference between the classic mass media attempts and the ‘new’ attempts to use ICTs as instruments for bringing about change?” The first thing that seems to be different relates to the shift in paradigmatic thinking about change and development in general and the role of ICTs in development in particular. This change is often framed under the heading ‘from modernization to multiplicity’ (see for instance Servaes, 1999). The new paradigm emphasizes non-linear bottom-up perspectives and local cultural relevance. The second thing that seems to be different and is more specific is that the new ICTs, such as internet and mobile phones are not only and primarily used to reach the masses as the mass media were supposed to do. The new ICTs can also cater for small and specific audiences, which opens up possibilities for sharing more relevant and even tailor made information. As the mass media mainly aimed at national development, the new ICTs can also be appropriate instruments for aiming at local, community levels. We have also learned that the implementation of any technology needs to be participatory and sustainable in its very nature. Although difficult to implement, the new ICTs have the potential of becoming a more democratic medium than traditional media such as national television that is often operating in a national power driven environment. So, an important difference between then and now seems to lie in the possibilities of the technology itself. The possibilities of the ICTs have changed towards more flexibility as it is related to speed, convergence of media forms, interactivity and specificity (see Lie, 2003a for more information).
Also in the area of ‘agricultural extension systems’ or ‘agricultural knowledge and information systems’ (AKIS) (see for instance Röling, 2004), one of the changes taking place is the integration of new information and communication technologies. The mainstream focus of bringing ICTs to rural areas seems to be lying on (multi-purpose) telecentres or information kiosks as they are called in India. Two mainstream ICTs in the debates seem to be the use of the internet (including email) and the use of mobile phones, although mobile phones seem to get far less attention. Besides these two ‘new’ ICTs, radio remains one of the most important communication and information technologies for rural areas. But also the overall paradigmatic thinking about agricultural extension has changed. We no longer think in terms of ‘adoption and diffusion of innovations’, but talk about ‘agricultural knowledge and information systems’, emphasizing social learning and negotiation, participation and interactivity, the sharing—in stead of transmissions—of all kinds of knowledges, knowledge markets and networks and continuous change (see for instance Leeuwis, 2004). Within this paradigm shift from ‘extension’ to ‘communication for change’ in the agricultural sector, there is also a growing recognition of the importance of cooperation and integration of the natural sciences and the social sciences, in our case the communication sciences. Without intrinsic transdisciplinary cooperation, ICTs would only have a limited chance of being successful in an appropriate and sustainable way.

OPEN SOURCE SIMPLE COMPUTER FOR AGRICULTURE IN RURAL AREAS (OSCAR)

This paper focuses on a concrete, non-mainstream example of bringing ICTs to rural agricultural areas. In elaborating on this example of—what is now generally referred to as—‘ICT for Development’ (ICT4D), it tries to provide insights into the integration of the natural sciences, the technical communication sciences and the social sciences in a project called: Open Source Simple Computer for Agriculture in Rural Areas (OSCAR). The objective of the OSCAR project is to initiate cooperation between European and South Asian institutions with the view to learn about appropriate applications of ICTs in rural agricultural areas. More specific the project is envisioned to the development of a decision making tool for weed identification and control that will address the issue of the declining agricultural productivity in South Asia. In the end, the long-term objective is to contribute to the betterment of rice and wheat productivity in the Indo-Gangetic Plains by improving decision-making capacities in crop management with an emphasis on weed management and control. The Indo-Gangetic Plains (IGP) form an important region for South Asia as it provides the natural resources for rice-wheat cropping systems.

In order to produce the decision-making tool, the project will build on existing software for species identification. This software, called IDAO, is developed by the Centre Coopération Internationale Recherche Agronomique pour le Développement (CIRAD) in Montpellier, France in cooperation with the Institut Français de Pondichéry (IFP) in India. This tool has been developed for training purposes and for assisting non-botanists in processes of species identification. The tool helps to overcome problems encountered in the areas of a.) identifying the species without its flowers or before it flowers; b.) the use of the so-called dichotomous keys, which are widely used tools in the biological sciences to identify organisms by making sequences of decisions in a dichotomous way, and c.) the use of technical terms that are not understood by non-specialists. The multi-media approach of IDAO helps to overcome these problems in the

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2 The partners in OSCAR are: Centre Coopération Internationale Recherche Agronomique pour le Développement (CIRAD) from France, French Institute of Pondichéry (IFP) from India, Rice-Wheat Consortium for the Indo-Gangetic Plains (RWCC) from India, and Wageningen University (WU) from The Netherlands. The project is co-funded by the European Commission under the ASI@IT&C programme.
following way. First of all it uses drawings instead of technical jargon. It provides an easy way of navigating and dichotomous decision making based on visual comparison of characteristics of the actual species with the drawings. Thirdly, the software is multilingual and uses technical names, English names and indigenous names for the species. Among other projects the software has already been used for weed identification in West Africa and on Reunion Island (see for more detailed information, Grard, 2004). Within the OSCAR project, the software will in a pilot phase be adapted to run on a Simputer (Simple, Inexpensive, Multilingual Computer).

The Simputer itself is invented, developed and produced in India. It is a handheld PDA-like computer device. By being inexpensive, by being portable, by running on the open source operating system Linux, by having network (including internet) facilities, by having text-to-speech facilities, by being able to run on three AAA batteries, and by being robust, the original idea was that it could be capable of playing a role in closing the digital divide. The Simputer was intended to be 'an access device for the masses' (Manohar, 1998) and aimed at farmer communities in rural areas. Critiques have been skeptical about these intended target groups (see for instance McCollum, 2002; Noronha, 2003, and; Ganapati, 2003). Technical issues as well as economic and socio-cultural issues remain unclear. There were power problems, sales and production costs problems, but also, only a few projects have been recorded that actually use the Simputer in rural change projects. In July 2003, it was reported that 600 Simputers had been sold (Noronha, 2003) and 1,500 to 2,000 Encore Simputer machines were out in the market in September 2003 (Ganapati, 2003). According to Fonseca & Pal (2003:13) “there is limited evidence of end-user consumer purchases in rural India.” The only information that seems to be available on existing projects that use the Simputer is the information that is provided by PicoPeta, one of the organizations involved in the manufacture of the Simputer (I4D, 2004). These projects involve fields such as spot billing in electricity metering and microfinancing in Karnataka, India (see for more information http://www.picopeta.com/showcase/index.php). With the coming of the new Amida model of the Simputer in April 2004, the market also seems to have shifted a little bit to the urban rich and urban young who cannot afford to buy an expensive PDA, but can afford to buy a Simputer. For them the Simputer could be an interesting alternative as the price is more interesting. This shift in markets is emphasized by the way the Simputer is advertised (for instance on the website of the Simputer itself (http://www.amidasimputer.com; http://amidasimputer.com/gallery/).

The above does not mean that the Simputer could not be of interest to rural areas anymore, but, to make it meaningful, we need to look at how different disciplines that are involved in projects related to ICT4D, could work together in order to develop appropriate and sustainable technological applications.

**CROSS-DISCIPLINARITY: MULTI-DISCIPLINARITY, INTERDISCIPLINARITY AND TRANSDISCIPLINARY**

Within this context of ICT4D in the agricultural sector, OSCAR has adopted a cross-disciplinary approach. Cross-disciplinarity refers to crossing disciplinary boundaries and that can be done in many different ways. It could therefore serve as an umbrella term for multi-, inter- and transdisciplinarity. When a cross-disciplinary academic research project has adopted a multidisciplinary approach, it can do more than one thing, but not in an integrated way. The different disciplinary perspectives exist side by side and provide parallel insights. They are essentially additive (see also Klein, 1990:56; Heijnsdijk, 1970). The different disciplines share an interest in a

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3 The Simputer is a joint product of Bharat Electronics Limited (BEL) and PicoPeta.
topic, like weed identification, HIV/AIDS, leprosy, or simply water, but the disciplines have their own disciplinary based perspectives and objectives. When we talk about interdisciplinarity, the emphasis is on ‘inter’, so on what is created in-between or through the intersection or at the interface of the two or more disciplines. The emphasis is on the relation, not on the separate disciplines that contribute to the whole. Interdisciplinarity is when one scientist or one group of mono-disciplinary scientists integrate disciplinary theories and perspectives that one is not familiar with through academic education and experience. It is in fact a difference between ‘merging disciplines’ and merely ‘working across disciplinary boundaries’ (Leeuwis, 2004).

Elsewhere (Lie, 2003b:199), I stated that interdisciplinarity is in fact a meeting of disciplinary cultures and made an inventory of concepts that try to grasp processes of cultural mixing. Some of these concepts could also be adapted to processes of the mixing of natural and social sciences. Terms like creolization, transculturation and hybridity could very well be applied to processes of disciplinary mixings. In this field of cultural studies, we moved from concepts such as assimilation, integration over multiculturalism to concepts such as hybridity and transcultures. The first are referring to processes of cultural adoption and unequal forms of mixing to mere co-existence. The latter are referring to forms of more equal cultural communications and the emergence of new kinds of mixed cultures. It is these kinds of new forms of transcultural disciplinary perspectives that are often seen as ideal options for future disciplinary cooperations.

In the slipstream of the emergence of the participatory paradigm, the term transdisciplinarity seems to gain momentum in the fields that deal with crossing human, social and technical sciences (see e.g., Leeuwis, 2003; Tress, et al., 2003; Visser, 2004). There seem to be at least two different perspectives on what transdisciplinarity entails. The first follows the work of Tress, et al. In addition to interdisciplinarity, transdisciplinarity tries to integrate non-academic perspectives and knowledges into interdisciplinary projects. A transdisciplinary project is a joint enterprise where non-academic stakeholders like farmers, fishermen, village leaders and extension officers create joint project ownership with academics who work in an interdisciplinary way. Academic disciplinary knowledges (interdisciplinarity) merge with non-academic, indigenous knowledges (see Tress, et al., 2003:183). The second perspective implies that a transdisciplinary approach is an integrative approach, “based on an equal partnership between the social and the natural sciences” (Visser, 2003:27). What is essential here, is that something new emerges out of a collaboration; ‘new’ in the sense that it does not intrinsically belong to one of the interacting disciplines. This can be a new perspective, a new methodology or approach, it can be the use of new concepts or the emergence of new knowledge (see also Leeuwis, 2004:354-355). Like in the field of mixing cultures where transcultural processes refer to the emergence of something new; new forms of culture like they are for instance emerging through processes of reterritorialization. Reterritorialization is “the process in which deterritorialized cultures take roots in places away from their traditional locations and origins” (Short & Kim 1999:78).

**OSCAR AND CROSS-DISCIPLINARITY**

OSCAR is not a transdisciplinary project, although it could become one. It is primarily an interdisciplinary exercise in $\beta\gamma$ cooperation (Beta-Gamma cooperation). The term $\beta\gamma$ cooperation is used here to refer to efforts that try to establish a research cooperation, or even an integration, between the ‘hard’ technical natural sciences such as the biological, agricultural and medical sciences, biotechnology, agroforestry, health and nutrition (the $\beta$ sciences) on the one hand, and, the ‘soft’ social sciences such as anthropology, communication studies, economics and the social sciences in general (the $\gamma$ sciences) on the other hand. The OSCAR project brings different scientists and different scientific perspectives together on the topic of weed.

In the OSCAR project at least four different technical and social disciplinary perspectives come together. On the technical side we can at least distinguish three kinds of scientific
perspectives and three kinds of scientists: 1.) the technical science perspective of weed identification >> botanists; 2.) the information and communication technology (ICT) science perspective (hardware and infrastructure oriented) >> communication/IT technicians; and, 3.) the technical science perspective of developing software applications (content oriented) >> software/program developers. The first perspective is a natural science technology perspective and the second and third perspectives are information and communication science perspectives. On top of that and what makes OSCAR an exercise in β-γ integration is the adding of the perspective of the social sciences. Although the social science perspective is far from being one coherent perspective and incorporates many different disciplinary focuses, OSCAR adds this perspective to the different technical perspectives.

One of the main fundamental differences between the perspectives is based on the fact that the different sciences define problems as they relate to the topic (weed in our case) from within their own disciplines. The nature of the problem statements and the formulation of the objectives are intrinsic to the respective sciences, which causes different approaches to projects. Problem definitions in the natural sciences are grounded in epistemologies that do not involve human subjectivities at the researched side (researcher vs. researched). The relationship between the researcher and the researched is a subject-object relationship; whereas in the social sciences it is a subject-subject relationship (see e.g. Lie, 2003b:3-5). A biological science identifies and formulates a problem statement at a biological technical level. Meaning that a project stays within the biological world and does not enter a human social world.

A research project that is framed from a social science perspective would start as follows. First, a human, social problem is identified. This problem can be formulated from within the domains of the different social science perspectives. Thus, the problem could be seen as having primarily an economic nature, a socio-cultural nature or a political nature. Most of the times these natures are interrelated, but the problem is firmly grounded in human life. In OSCAR, the human problem is that the production of agricultural products has been decreasing over the past decade in the IGP area in Pakistan, India, Nepal and Bangladesh. Consequently, farmers and their families and other dependencies have growing difficulties with sustaining their livelihoods. This is a human problem, asking for research and in the end, solutions. OSCAR is not primarily a social science project. It is an interdisciplinary project, but grounded in a biological science of species identification. The formulation of the problem statement from a biological perspective lies in species identification and control. The associated question is: “What is the best way to identify weed species?”, and once we know the specific species, “What is the best way to control them?”. The project tries to bring these two disciplinary problem formulations and related questions together. In doing this, it needs for instance to find out to what extent the decline in the production of agricultural products is caused by weed identification and control issues.

The communication technology perspective that is added here, primarily seeks human social applications for technical solutions. These technical solutions are not participatory in nature. The technology is not developed in continuous interaction with end-users. The question that is asked here is “How can the Simputer be used for species identification?” This is solely a technical question and still has to determine a possible need for this with end-users. Combining a technological perspective with a human development perspective would lead to the more general question: “How can ICTs be of use to agricultural development?” or more specific “How can the Simputer be used for agricultural development?”. If we question this role of ICTs in general, we can identify three perspectives on the role of ICTs for development in interdisciplinary projects; a technology perspective, a (political-)economy perspective, and, a (socio-)cultural perspective. These perspectives are explained in Figure 1.
### FIG. 1. THREE PERSPECTIVES ON THE ROLE OF ICT4D IN INTERDISCIPLINARY PROJECTS

<table>
<thead>
<tr>
<th>BASICS</th>
<th>A Technology Perspective</th>
<th>A (Political-)Economy Perspective</th>
<th>A (Socio-)Cultural Perspective</th>
</tr>
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<tbody>
<tr>
<td>The perspective stays within the domain of technology. Human beings are primarily seen as users of technology.</td>
<td>The perspective is primarily ‘from the outside in’ and ‘from the top down’. Human beings are primarily seen as economic factors.</td>
<td>The perspective is primarily ‘from the inside out’ and ‘bottom up’. Human beings are primarily seen as socio-cultural actors.</td>
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<tr>
<td>No association with other fields of development (outside technological development) is envisioned. This does not mean that the ICTs could not be of use to other fields of development, but the technology is not developed in a participatory way.</td>
<td>Close association with political development, policy and regulatory reform. The creation of the so-called ‘knowledge economy’ is the primary objective.</td>
<td>Close association with social development, processes of democratization and human rights. Access to information, the right to communicate and the use of appropriate technology are among the key concerns.</td>
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<tr>
<td>The total development of a community equals the technological development of that community. ICTs are part of that technological development. Technological development is a necessity for economic development.</td>
<td>The total development of a community equals the economic development of that community. Technological development and innovations are necessities for economic development. Social and cultural development is a(n) (automatic) spin-off of economic development.</td>
<td>The total development of a community is of an economic-political nature as well as of a socio-cultural nature. Both aspects are given equal attention, but the economic-political development should serve the socio-cultural development. Technological-economic development is not a goal in itself.</td>
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<tr>
<td>The guiding objective is the innovation of technology.</td>
<td>The guiding objective is to offer media forms and ICTs to bridge the digital divide and thus (automatically) close the information gap between and within communities. The perspective is technology and media centered.</td>
<td>The guiding objective is to offer relevant, cultural, and social sensitive information. The media form (which can include ICTs, such as the Simputer and the internet) is chosen accordingly. The perspective is information, content, and socio-cultural centered.</td>
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Based on the above, the remaining part of this paper discusses the (communication and information) technology perspective and the (socio-)cultural perspective in more depth. The
political-economy perspective will not be discussed, as this perspective is not (yet) represented in the OSCAR project.

THE COMMUNICATION AND INFORMATION TECHNOLOGY PERSPECTIVE

THE SIMPUTER

The Final Report of ITU-D Focus Group 7 (ITU, 2000:59) reports on the potentials of handheld computers and identifies the following potential rural uses: a.) digital image capture, b.) internet/multimedia information access (WWW, ftp, telnet), c.) e-mail/messaging, and d.) voice- or text-based database access. Although the Simputer is included in the review of the ITU, additional possible technical features of the Simputer—as they were mentioned earlier—are that it is inexpensive (hardware wise\(^4\) as well as software wise by running on the operating system Linux), that it is portable (as of course all handheld computers are) and robust.

The people from the Simputer Trust describe the device as follows:

The Simputer is a low cost portable alternative to PCs, by which the benefits of IT can reach the common man. It has a special role in the third world because it ensures that illiteracy is no longer a barrier to handling a computer. The key to bridging the digital divide is to have shared devices that permit truly simple and natural user interfaces based on sight, touch and audio. The Simputer meets these demands through a browser for the Information Markup Language (IML). IML has been created to provide a uniform experience to users and to allow rapid development of solutions on any platform.

(http://www.simputer.org/simputer/)

Although the Simputer looks like a PDA (a handheld palm sized computer), it is not a PDA and it is not primarily meant to run PDA kind of applications like keeping an address book and agenda.

FREE, LIBRE OR OPEN SOURCE SOFTWARE

The Simputer runs on Linux, which has been given much attention in the ICT4D discourse. Linux is the name of an Open Source Operating System (OS) that can be used on desktops, laptops and also the Simputer. Unlike Windows, the best known proprietary software (the opposite of Open Source Software) that was developed by the Microsoft Cooperation, Linux is free in the sense as mentioned below. The Texas, Canadian and Chinese governments have for instance already shifted to Linux and Appache, the Open Source Software that runs on webservers now has a market share of 63\%, more than twice that of Microsoft products (Reddy, 2003).

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\(^4\) Originally the price was intended to be around USD 200;--. The prices in April 2004 for the three Amida models (Amida 1200, Amida 1600, and, Amida 4200) are respectively in Indian Rs 9,950, 12,450, and 19,950.
Free Software, Open Source Software and Libre Software are confusing terms for those who are not familiar with software development as most of the end-users are. Underneath the wings of the World Summit of the Information Society (WSIS), the Free Software Foundation (FSF) Europe produced a document to clarify the concepts (FSF Europe, 2003). This document first of all makes it clear that it is important to understand that Free in Free Software is referring to freedom, not to costs. Quoting one of the first documents that defined Free Software the following four freedoms are referred to: 1.) the freedom to run the program for any purpose, 2.) the freedom to study how the program works, and adapt it to your needs, 3.) the freedom to redistribute copies so you can help your neighbor, and, 4.) the freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

The term Open Source is in fact a term that was introduced in the late 90s to market Free Software. The term Open Source is less value laden and was introduced to promote the type of software by using primarily the technological features and not the ideology of freedom that is implicitly associated with the use of the term Free Software. Libre Software is then a third term for the same and was introduced by the European Commission to avoid the ambiguity of the English word Free Software and to end misunderstandings with the term Open Source Software. Open Source Software is therefore not per definition free of charge (although some of it is), but basically tries to break through Microsoft’s global monopoly by introducing competition (and cooperation) again.

BRIDGING THE DIGITAL DIVIDE WITH TECHNOLOGY

Bridging the digital divide by using the Simputer that runs on Linux, means introducing ICTs and providing infrastructure (wireless or connected to desktops). From an end-user perspective, open source software is not always an interesting option. First of all, Linux, and applications that are running under Linux do not have the same status as Microsoft’s operating systems and applications. Second, it might in some cases be more appealing to run illegal versions of Microsoft software than to turn to Linux. Linux is still far from being widely accepted. Although this is a known critique, it seems to have relevance only to less portable projects than the Simputer. The critique mainly applies to telecenters, school projects and other projects where major office application, such as Word and Excel can be run. Although it is possible to do basic text editing and to work with a spreadsheet on the Simputer, it is not comparable with the major desktop/notebook applications. To compare the use of the Simputer with PDAs would make more sense, but there is still little research done on the possible uses of PDAs in development.

Within this technological perspective, we must note that the tool—in our case the Simputer—that is going to be used to bring about change for the better has already been selected before the interdisciplinary problem statement has been formulated. The technical problem statement and the social problem statement have been formulated separately. This does not mean that the tool can never be appropriate in an agricultural development context, and it does not mean that we cannot match up the tool with a suitable problem. But, the fundamental question is if we should match technology with problems and find suitable problems for ICTs to solve or that we should let the character and the specific features of the problem determine the appropriate tools to be used. In this respect it might be more relevant to adopt a people centered approach in stead of a technology centered approach. Don’t ask: “What can the people do with the technology we have developed?”, but ask: “How can we develop technology that people need?”, “What are the technologies that are already there?”, and “How can they be improved in a participatory way?”
PARTICIPATORY INFORMATION AND COMMUNICATION TECHNOLOGY DEVELOPMENT (PICTD)

Participatory Technology Development (PTD)—or if related to ICTs, Participatory Information and Communication Technology Development (PICTD)—is in fact a reaction to the many failures of technology transfers in a perspective that is closely related to the ‘diffusions of innovations’ and traditional ways of looking at extension services interpreted as ‘telling the people what is best for them’. PICTD refers to the close cooperation of all kinds of stakeholders for the development of appropriate ICTs, but refers particularly to the participation of the end-users in the development process. The idea is that the end-users are involved in all stages of technology development. PICTD is not a garunty that the technology will be appropriate and of relevance to the end-users, but reduces the risk of the technology not being suitable. One of the most important phases in which to include the end-users is the phase of the formulations of the problem.

Many scholars wrote about Participatory Technology Development (PTD) and the approach being essential to developing appropriate technology and provided examples of cases (see e.g., Conroy & Sutherland, 2004). Others tried to structure the approach and identified phases, stages or steps (e.g., the Sustainable Agriculture Extension Manual published by the IIRR at http://www.iirr.org/saem/contents.htm, and; http://www.gtz.de/agriservice/english/topics/reform/topics1d2.htm). Important to recognize in these processes is that in order to bring about social and structural change in a sustainable way, the problem must be felt as a community shared problem and the ‘solutions’ must be community based. Individual behavioral change and communications that are related to this kind of change, could be part of it, but as ICTs and especially mass media are collective tools, the focus is on collective change related to the function of a community. Therefore, the formulation of the problem must be a community activity and the problem statement must be shared by the members of that community. In the end, the problem statement should not only be an integrated beta-gamma problem statement, but also a problem statement that is carried by the community (a transdisciplinary problem statement).

THE SOCIO-CULTURAL PERSPECTIVE

Seen from a socio-cultural perspective, the Simputer has in fact little to do with bridging the digital divide for the so-called ‘rural poor’ (often farmers). For the rural populations in developing countries ICTs probably corresponds to learning Microsoft Office and Internet functions. “It means learning the functions which are associated with getting jobs or advancing into higher education (word processing, including CV writing, and spreadsheets) (Slater & Tacchi, 2004:9)”. Bridging the digital divide is about learning to be comfortable on a mainstream computer. The Simputer is merely a digital tool that can be used in specific circumstances and for specific purposes such as electricity billing and maybe weed identification. Having said this, let us now turn to a socio-cultural perspective within OSCAR.

APPLYING A NODAL POINTS APPROACH

To establish a socio-cultural perspective in the OSCAR project—which also tries to incorporate the political-economic perspective and the technological perspective—I will build on the nodal points approach which was first put forward in Servaes & Lie (2002) and later embedded in a perspective on spaces of intercultural communication (Lie, 2003b). Basically, the nodal points approach identifies five nodal points. The nodal points serve as focus points of
research and are created through crossing horizontal societal levels and vertical flows. The frame of analysis that is used in the nodal points approach distinguishes four vertical flows: a power flow (consisting of regulation and policy), a communication flow (consisting of media content or other information, but also products and commodities), a flow of interpretations and a flow of (counter)actions. The power flow and the communication flow are top-down flows. The interpretation flow and the action flow are bottom-up flows. The horizontal societal levels are laid out on a vertical continuum, ranging from the global level to the local level. In-between we find macro-regional levels (either defined by culture, politics or economic relations and alliances (e.g., Africa, the European Union or South Asia...). National levels are defined by the nation states. At the intra-regional levels we find provinces, counties, villages and all kinds of local communities. By crossing the societal levels with the different flows, the following nodal points can be indentified at the different levels: production (PRO), regulation (REG), representation (REP), consumption (CON), and action (ACT).

FIG. 2. THE NODAL POINTS ANALYTICAL FRAMEWORK

THE NODAL POINT OF CONSUMPTION

Consumption is the most pressing nodal point. The basic question here is related to who the end-users of the Simputer and the weed identification software will be. There seem to be three
possible groups of end-users in this regard: a.) farmers, b.) extension officers, and, c.) students and scientists.

The envisioned end-users of the software for species identification will not be the farmers at local community level. The project will not use a primary user model, but a mediated user model. This means that the end-user will not interact directly with the technology. Instead, a trained user will serve as an interface between the farmers and the technology. (Fonseca & Pal, 2003). The reasons for the decision to work with mediators are the following assumptions. a.) There will not be sufficient facilities for maintenance of the hardware at the local community level. b.) The identification of species could much easier be coordinated at a higher level of centrality. Extension officers could play an initiating role in identifying the different weed species and recommend ways of dealing with the weeds; c). There is no long term perspective related to the introduction of the Simputer and the IDAO software if it would be introduced at the farmer level. Once the farmers know how to identify the different weed species, there is no need to keep the Simputer and its software in the community. It is a short term learning tools. Although, it might be possible to combine the species identification software with other kinds of applications that are relevant at the community level, it does not seem useful to bring the ICT’s directly to the farmers and make it ‘community property’ (see also McCollum, 2002). Many studies have shown that when new technology is introduced without any form of training, guidance, maintenance and other sustainability building instruments, the project is doomed to fail.

Next to extension officers, students could be other possible end-users. As the Simputer could be used as a mobile training device, different kinds of mobile databases could be made available in the field through the Simputer. So, instead of trying to apply the Simputer at the local community level, it seems more appropriate and sustainable to implement it at a higher regulatory level (students and extensions agents). The nodal point of consumption for study therefore shifts from the local level to the intra-regional level. In the first place to the level where the extension managers operate. Fonseca & Pal (2003: 13) note in this regard that the Simputer was originally designed as a general-purpose device for a specific audience, but that it would be more logical to aim at a general audience and develop applications for specific purposes. OSCAR, however, was originally designed to aim at a very specific audience with a very specific purpose. The audience was thought to be (illiterate) farmers who experience weed identification and control problems and the purpose of the IDAO software and hardware computer device is to provide a mobile tool for weed identification and control related decision making. Both purpose and audience were therefore very specific. It seems logical to look for other audiences and other applications. Extension service providers in the public and private sectors in the Indo-Gangetic Plains (IGP) in Pakistan, India, Nepal and Bangladesh seem to be logical end-users in this regard.

THE OTHER NODAL POINTS

If we apply the whole frame of analysis and the other nodal points to the OSCAR project and the role of ICTs and the Simputer in agricultural development, the nodal points of production and to a lesser extent regulation have already been discussed under the technology perspective. Under production we have seen the Simputer technology that was first put forward as a national Indian invention. Although the Simputer could of course be used in other parts of the world, it is primarily targeting at a (rural) Indian audience. The IDAO software is a global tool, aiming at a variety of fields at a global level. The software is not restricted to a particular audience in a particular region of the world. The Simputer itself and the information that is generated by and communicated through the Simputer, the IDAO software and the knowledge about weeds make up the communication flow. Within this communication flow different nodal points of the production of hardware, software, information and knowledge can be identified. In the end—to make it useful to the local end-users—the aim is to produce information/knowledge that is as close as possible to the local level. The nodal points of regulation (power, politics and policy) are
closely related to the nodal points of production through the political-economy perspective. However, this perspective is not discussed in this paper.

The nodal points of representation and action are important here for being aware of issues related to how the perception of this tool is in the different regions within the IGP. How the tool itself, but also the LINUX software is represented is on important topic. People are more familiar with desktop and notebook computers running on Microsoft software, than that they are with a PDA-type computer running on LINUX. Action than refers to being aware of activities (meetings, daily conversations, negotiations) that counter(act) upon the whole idea of the Simputer or computer in general. An example of such a counteract is provided by Slater and Tacchi where they quote an angry man from a remote Himalayan village coming up to the researcher saying: “What will poor people do by learning computers? If we go to learn computers who will feed our stomach? Poor peoples spend their life as a laborer. None of us here has time for computer. Will starve if we don’t work for a day. Anyway what is the use of learning computers? Hey Nima lets go for work, why do we need to waste our time here? We are not going to benefit anything out of it. It’s the same old thing, they simply document, nothing will happen practically… (Slater & Tacchi, 2004:8).”

**AGRICULTURAL DEVELOPMENT, EXTENSION AND ICTS**

The relevant question to ask is still about the potential value of the Simputer for agricultural development, assuming that rural areas are intrinsically linked to agricultural development issues. Potential users are thus, farmers, extension agents and students in agricultural sciences. These are the relevant end-user stakeholders. Based on the above, extension officers and students in agriculture and agricultural extension seem to be the most interesting groups to look at for possible uses of the Simputer. Extension and ICTs relate primarily to the communication flow as identified above. If the extension is non-participatory and the ICTs are merely used to disseminate information to the rural farmers, there is in fact a higher level involved than the local level and information is produced at a university (at regional, national or international level), or is from government agencies at different policy levels flowing down to the rural farmers. It is mainly in this field that extension and ICTs are related to agricultural development.

Extension in the field of agricultural development has seen many changes in the past decades. First of all, with the change in philosophy and rationale behind extension services towards more participatory approaches and participatory technology development (PTD), a shift has been made in thinking about the role of extension services in broader information and knowledge sharing processes. (see for instance Leeuwis, 2004). A second trend in extension services, situated at a less conceptual level and a more professional level, seems to be the development towards what Sulaiman calls ‘extension-plus’ (Sulaiman, 2003). Extension has long been primarily associated with ‘transferring technologies to farmers’. ‘Extension-plus’ means that extension now plays an expanded role. It seems to be a recognition that extension should merge with, or at least should incorporate, other fields such as improved access to markets, research, advice, credit, infrastructure, farmer organization development and business development services. “Research and extension strategies should emerge out of a broader livelihood analysis organised through a wider consultative exercise.” (Sulaiman, 2003:xi). Next to these developments in fundamental thinking in the academic and professional worlds, a third global economic trend from public services to private services can be identified. Although, for instance in India, the state Department of Agriculture (DoA) continues to dominate extension provisions, initiatives towards privatization and public-private partnerships do exist.

The specific role of ICTs in extension services for agricultural development is another new development and has been discussed on several occasions (e.g., Engelhard, 2003 and especially for India, e.g. Sulaiman, 2003 & Maru 2003). Maru (2003), for instance, reviewed the
development of the use of three ICTs in agricultural extension in India: radio, television and the internet. The state run All India Radio, the Doordarshan Television and newspapers in local languages are still important extension channels, if you prefer to use the word ‘extension’ in this regard. However, they do remain traditional mass media channels and especially the Consultative Expert Meeting (CTA, 2003) called for new, more participatory forms of sharing information. In theory, the new ICTs could facilitate this, and make the sharing of information more demand-driven and more relevant to the needs of the farmers (see also Ban, 2004; Meera, et.al., 2004; Richardson, 2003).

An example of such an innovative use of new ICTs is the implementation of the so-called telecentres or information kiosks. In the south of India (Tamil Nadu) the kiosks, in so far as they are providing services to the rural farmers, make use of IndiaAgriline (www.indiagriline.com). IndiaAgriline is a web based service (a portal) that connects, according to its own saying, “farmers and others in rural India to markets and to market price information, knowledge like weather data, agricultural extension services and crop cultivation practices, social welfare agencies like Primary Health Centers and to their peers” (www.indiagriline.com). In Tamil Nadu there exists a network of information kiosks, for a large part working with the IndiaAgriline website portal and aiming at the sugarcane farmers. Farmers need to register as members, but the service is provided free of charge (except for the costs of access at the information kiosk; around 5 Indian Rupees per hour; author’s visit February 2004).

Little has been documented on the specific use of PDAs in development processes. It might be clear that ICTs, and in particular those provided in the form of information kiosks, can easily be used for providing databases to farmers and extension workers (see also Van den Ban, 2004), but the question to ask in relation to the possible uses of PDAs and the Simputer is about ‘mobile databases’? When, if at all, do farmers, extension officers or students need a ‘mobile database’? Or when do they need other kinds of mobile information or when do they need to collect data in a digital format? PDAs could in theory serve specific purposes in specific fields and situations under specific circumstances. What these services are and if these services are appropriate remains to be seen. Bridges.org has in this regard launched a competition to support innovative uses of handheld devices at the local level (see www.bridges.org/ipaq_competition; Deadline for entry: 8 October 2004).

CONCLUSIONS

We need to cross borders and we have got to break out of boundaries. Processes of cross-disciplinarity are manifold, needed, but difficult. They incorporate understanding, respect and negotiation. It seems important to realize that crossing borders lies in more than one field and that it is important to identify these fields for each particular cross-disciplinary project. It is often not one border that needs to be crossed, but many. Topics and questions that relate to OSCAR and other cross-disciplinary projects that involve ICTs in agricultural development are:

- **Using Appropriate ICTs and ICT Applications**: 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.

- **Crossing Knowledge Borders**: What is at stake here is academic and non-academic cooperation: How can we improve cross-disciplinary cooperation? What are the
conditions for successful cooperation in transdisciplinary projects? Crossing the knowledge borders means taking indigenous knowledge seriously and stimulate transdisciplinary knowledge systems. The role of extension in agricultural development changes in this regard to something like ‘participatory extension’ and ‘extension-plus’. This involves joint learning and changes the work of the extension agents. He or she has to become a good listener and a facilitator.

REFERENCES


GENERAL OSCAR PRESENTATION

Open Source Simple Computer for Agriculture in Rural Areas (OSCAR).
ICTs for Agricultural Development

What is OSCAR?
- EU funded project by ASIA@T&CC
- Partners:
  - Centre Cooperation Internationale Recherche Agronomique pour le Développement (CIRAD) from France.
  - French Institute of Pondicherry (IP) from India,
  - Rice-Wheat Consortium for the Indo-Gangetic Plains (IWHR) from India, and,
  - Wageningen University (WUR) from The Netherlands.

Objectives of OSCAR (1#3)
- To initiate cooperation between European and South Asian Institutions with the view to learn about appropriate applications of ICTs in rural agricultural areas.

Objectives of OSCAR (2#3)
- More specific the project is envisioned to the development of a decision making tool for weed identification and control that will address the issue of the declining agricultural productivity in South Asia.

Objectives of OSCAR (3#3)
- In the end, the long-term objective is to contribute to the betterment of rice and wheat productivity in the Indo-Gangetic Plains by improving decision-making capacities in crop management with an emphasis on weed management and control. The Indo-Gangetic Plains (IGP) form an important region for South Asia as it provides the natural resources for rice-wheat cropping systems.

The IGP Transects

Features of OSCAR
- Contextual embedding in discussions on ICTs for Development (ICT4D):
  - What is the difference with the believe in the mass media in the 1960s and 1970s?
- An exercise in interdisciplinarity
  - Technical sciences (biological and agricultural sciences)
  - Technical communication sciences
  - Social sciences

The Biological/Agricultural Technology Perspective in OSCAR
- Constraints in species identification:
  - The difficulty encountered by non-botanists when identifying weeds using standard flora is centered around three major constraints, namely:
    - The ability to identify the species without its flowers or before it flowers;
    - The use of dichotomous key which cannot tolerate any error and imposes the choice as well as the order of questions; and
    - The use of technical terms not understood by the non-specialists.
The Biological/Agricultural Technology Perspective in OSCAR

Needs:
- A software with a graphical and multimedia interface for:
  - using drawings instead of technical jargon;
  - providing users the freedom to choose the character that needs to be described;
  - permitting missing information or data, which allows the identification of incomplete samples;
  - tolerating a surface level of observational errors, and;
  - giving at each step of the identification process a probability of resemblance for each species. Thus species are sorted by decreasing order of similarity.

The Communication Technology Perspective in OSCAR

Features of the Simputer:
- inexpensive
- portable
- open source operating system Linux
- network (including internet and email) facilities
- text-to-speech facilities
- powered by three AAA batteries
- robust

The Social Science Perspective in OSCAR

- How can the technology be of use for development?
- Is the Simputer helping to close the digital divide?
- What about Participatory Technology Development (PTD)?
- Consumption: Who should be the end-users?
  - A primary user model vs. a mediated user model (farmers vs. extension officers)
  - General purpose device / specific audience vs. specific purpose device / general audience

Open Source Simple Computer for Agriculture in Rural Areas (OSCAR)
OSCAR SOFTWARE TESTING. GUIDING QUESTIONS

DEMONSTRATION/INDIVIDUAL TESTS

1. OSCAR project introduction and introduction participating partners / description of the group
2. Demonstration OSCAR software or individual tests
   a. Group demonstration of the software, or
   b. Individual tests to see how people work with the software (The preference is for individual tests.)
      - Give 5 different real species of weed plants or 5 sets of photographs.
      - Ask the participants to start the software on the laptop and to identify the species one by one using the software. Researchers make observations. If possible ask the participant to tell what they are doing, why they make certain decisions, what they find difficult, etc.
      - After the completion of the test, conduct the interview (see questions below).

INTERVIEWS

This is a semi-structured oral interview that needs to be conducted after a group demonstration or an individual test. Preference is, also after a group demonstration for individual interviews.

QUESTION SET 1

CHARACTER STATES

There are currently 9 character states to identify the plants: the habit, the shape of the roots, the type of the leaves, the shape of the broad leaf, the shape of the grass leaf, the apex of the broad leaf, the base of the broad leaf, the presence of latex, the section of the grass leaf (please note that not all character states are functional in this prototype of the software. The base of the broad leaf and the section of the grass leaf are not functional and will not be used for testing.).

- The habits are grouped in x different categories.
- The roots are grouped in x different categories.
- The leaves are grouped in x different categories.
- The flowers and fruits are not yet included.

- Do you think this is enough? Should there be more, or should there be less?
- What character do you analyse at first?
• Are these categories covering all possibilities? (Are they exhaustive?)

• Are these categories mutual exclusive? (no overlap?)

• Do you have any other comments on the character states?

**QUESTION SET 2**

**INTERFACE DESIGN AND THE RECOGNITION OF THE DRAWINGS**

• Do you think the interface is clear enough?

• Did you have difficulties recognizing some of the drawings? Were some drawings unclear? Which ones? Which drawings confused you?

• Did you have problems with recognizing the size of the plants?

• Do you have any other comments on the drawings?

**QUESTION SET 3**

**NAVIGATION AND THE PROCESS OF IDENTIFICATION**

• Did you have a systematic approach? Where did you start? When did you stop?

• Did you get good and enough feedback on your mistakes?

• Did you need any guidance during the process of identification?

• Do you think there is enough guidance during the process of identification? Do you think the balance between guidance and flexibility of the programme is sufficient?

• Do you think the guidance is efficient enough? If not, what suggestions could you make to improve it?

• Do you have any other comments on the navigation and the process?

**QUESTION SET 4**

**THE APPROPRIATENESS OF THE TOOL ITSELF AND THE END-USER**

• How do you currently identify weed species? What tool for identification are you using now?

• Can you tell what the advantages are of using the OSCAR tool over using your current tool? Are these major advantages?

• Do you think the tool is an addition to your current tool or a replacement?
• Who do you think could be the end-users of this program? Why?

• What do you think about putting the software on a mobile computer so that you can take it into the field?

• Do you have any other comments on the tool itself?

• Do you have any other comments?
RESULTS AND RECOMMENDATIONS

THE END-USERS

- Farmers in the Indo-Gangetic Plains
  - Farmers have no major problems with weed identification. The dominant weeds are known to them. If they experience problems, they turn to extension officers.
  - The IDAO software currently finds no grounding with the farmers. The current communication systems in place seem to work well as far as weed identification is concerned.
  - Priority problems with the farmers are not with identification issues. 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) in the Indo-Gangetic Plains
  - Extension workers at different levels can be possible end-users. However, there are no major problems with regard to weed identification among extension officers. In a rare case that 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 the following fields: a.) primary/secondary in-school education, b.) higher academic (agricultural) education (BSc, MSc and PhD levels), c.) professional education in agriculture. Moreover it could also be relevant for in-service trainings at the level of “teaching the teachers” (extension officers).
  - In all the countries there was a lot of interest among scientists (different disciplines) and students (all levels) to use the software.

- The general public (hobbyist) in developing and non-developing countries
This is a spin-off target group that might be interested in the software and the database.

**THE DATABASE AND THE SOFTWARE**

The software was demonstrated and tested in many different places during our meetings in India, Pakistan, Nepal, Bangladesh and The Netherlands (see country reports for more details). Basically, the students, the scientists and also the farmers had little problems working with the software and there were little Asian specific issues observed. The only Asian specific observation was that of the difference in educational philosophy between Western European countries and Asian countries. The software has a Western European bias in the sense that it presents an open interface and gives the users a lot of freedom of choice. There is not one right way to use the software and the Asian students often ask for this. What follows is a summary of the results/recommendations with regard to the database and software.

- **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. All the end users felt comfortable with the interface design and found it easy to identify weed species. Though there were issues with their first exercises, subsequently every one was able to navigate through the software with ease.

- **Specialized versus general information in the database** – If there is only general information in the database and only the common species are included, it will be of no use to the farmers, the extension officers or the students/scientists. 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 NARC. For the students, general information will not be enough for use as an educational tool. For them, the information needs to be as detailed as possible. Putting general information in the database would only make sense if the focus is 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 added to the database. Weed specialists in the different countries can help to provide this information. Difficulties in this regard 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, but even in this regard there is diversity in the region.

- **Language issues** – Language issues relate to the type of end user. To use local languages in the software is only necessary if the end-user does not read English. To have 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 description 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 will 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 description into other languages.
• **Accompanying manual** – It would be interesting to have an accompanying manual that gives basic instructions on how to use the software. Especially in the IGP countries this would be appreciated as these countries have a less open learning philosophy compared to Western European Countries.

• **Updating and maintenance of the software and the database** – If people want to add additional information, they can do so in their personal copy of the software. If they think it is relevant for everybody, the info could be send to CIRAD/IFP for verification and publishing. It is recommended to let people register before downloading the software.

• **Stages of growth** – To make the tool relevant for extension purposes, it is very important to include information about the weeds in early stages of growth. The seedlings should therefore be included in the database.

• **Text search button** – A button that can search on text would be appreciated. If for instance only a local name of a weed is known, it would be useful to type the name of the weed and have the right plant pop-up on your screen.

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**THE SIMPUTER**

During the visits to all of the IGP countries and in The Netherlands it was learned that there are far more cons than pros for using the Simputer.

**CONS**

• The OSCAR application does not fit into the memory of the Simputer unless all other applications are removed.

• The costs of the Simputer is too high for all end-users in the IGPs.

• There are maintenance/support problems with the Simputer.

• There is no local rural grounding for the Simputer.

• Although the mobility factor is important there are alternatives to consider (PDAs, laptops...)

• The size of the screen of the Simputer is too small for a proper and readable use of the software.

• The temperature might in some cases be too high for a proper functioning of the Simputer and its batteries. (E.g. above 50 degrees Celsius).

• It was learned that people prefer to bring a real sample of a species back home and identify it using the desktop computer with the OSCAR software. It only gets interesting to bring a mobile computer to the field if you cannot bring a species back home. In the case of weeds this causes no problems.
PROS

- It might be more fun for students to work with the Simputer instead of with traditional flora. It can stimulate and motivate learning.

ALTERNATIVES TO THE SIMPUTER

- An alternative to the Simputer could be to make the software available through the internet. In this way scientists, students, extension officers and other interested parties, who do have access to the internet can download the software and install it on their own computer. It could also be possible to have an on-line version.

  - It was decided by the OSCAR team to produce the following four versions within the boundaries of the OSCAR project (pilot version with 50 species). For technical reasons, and OSCAR being an open source project, no version for Internet Explorer (Microsoft Windows) was developed.
    - An on-line version for Mozilla Firefox v1.5 (open source version). The URL is: www.oscarasia.org/oscarweb
    - A downloadable version (to be installed on a stand alone machine) for Linux (open source). The URL were it can be obtained is: www.oscarasia.org/oscarweb
    - A downloadable version for the Simputer. The URL were it can be obtained is: www.oscarasia.org/oscarweb
    - A downloadable version (to be installed on a stand alone machine) for Windows (Microsoft Windows). The URL were it can be obtained is: www.oscarasia.org/oscarweb

  - In all cases the software is offered free of charge.

- If a mobile version is required, the software can be run on a laptop computer. During our visits we observed no laptops running on LINUX, so there might be no need to make a LINUX version of the software at this time. Putting the energy into producing an on-line version would make more sense. Having an open source version might of course stimulate others to produce software for LINUX.

  - The OSCAR project produced the above-listed four version of the software.

- Testing the software in a systematic way and cumulating detailed feedback on its functioning can be done in Western Europe, as well as in the IGPs. As the software is primarily developed in Montpellier in France, there is no specific need to do the testing of the software in the IGPs. It can be done in France as well. There were no specific Asian problems or typicalities observed during our demonstrations and group testings in the different countries of the IGPs.

  - There are currently no concrete plans to test the software in a more systematic way. The ad-hoc testing of the software in the IGPs already gives a fair understanding of issues related to the use of the software.
JOURNAL OUTPUTS

Three articles still will be submitted to three different journals:

- The paper ‘ICTs for Agricultural Development. An Exercise in Interdisciplinarity’ will be rewritten so to include some of the results and recommendations of OSCAR. It will then be submitted to an academic journal.

- A second academic article will be submitted to the Pakistan based journal “Weed Science Research”.

- A 4-page article will be submitted to the Indian journal “I4D. Information for Development”.

FUTURE DIRECTIONS

During the final workshop in New Delhi, three possible future directions as follow-ons of the OSCAR project were identified. These future directions were named: a) a funnel approach, b) an umbrella approach, and c) an integrated approach.

A FUNNEL APPROACH

OSCAR needs to make a decision on who the end-user of the project is going to be. If the end-user is selected and the geographical area is selected, the software and database could be developed in more detail. It could for instance focus on the production of an educational module for high school students in biology. In this case the software doesn’t need to be very specific and for instance only the most common species of a particular plant could be included in the database. The interface could then be developed accordingly. If the end-users are going to be agronomy students at a Bachelor or Master level, the software needs to be far more detailed.

AN UMBRELLA APPROACH

Another future path of development after the OSCAR project could be to use an umbrella approach. In this case the focus is on the umbrella of ‘ICTs in agricultural development’ and the weed database and identification software is one of the projects that is sheltered by this umbrella. A follow-on project could include comparison with other projects that are ongoing in this field. It could also initiate other lines under the same umbrella.

AN INTEGRATED APPROACH

An integrated approach refers to an integrated perspective on interdisciplinary cooperation. The focus is on how different sciences and professionals can work together to develop relevant agricultural technical databases and prioritise their use for end-users (farmers, RDPs, students and scientists). OSCAR showed for instance that the interface between the database and the end-user is an important factor to consider as early as possible in the development of appropriate and sustainable projects.