# IFA INTERNATIONAL WORKSHOP on Effective Last-Mile Delivery

10-12 February 2010, New Delhi, India

# ASSESSMENT OF LAST-MILE DELIVERY SITUATION IN DEVELOPING COUNTRIES; VISION AND STRATEGY TO IMPROVE DELIVERY PERFORMANCE

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ifa Agriculture

# Assessment of last-mile delivery situation in developing countries; vision and strategy to improve delivery performance

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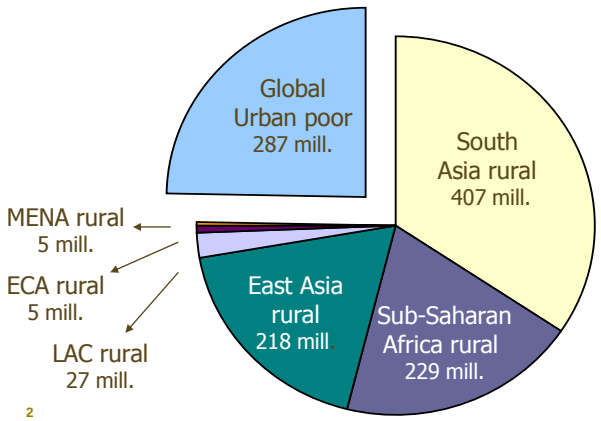
**February 10, 2010, New Delhi, India**

BILL & MELINDA GATES foundation

AGRICULTURAL DEVELOPMENT

## Agriculture is a source of livelihoods for billions, but a huge reservoir of poverty

Global extreme poverty 2002, $1.08 a day




- 2.5 billion people involved in agriculture
- 800 m smallholders
- 75% of poor are rural and the majority will be rural to about 2040
- 900 m extreme rural poor ($1/day)
- In Sub-Saharan Africa, farming accounts for 2/3 of employment and 1/3 of GDP
- In South Asia, the rural poverty rate is still approximately 40%

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AGRICULTURAL DEVELOPMENT

# Global Agriculture R&D: record of past success

- **Production**

  Cereal output in developing countries has grown 2.8 percent annually for three decades

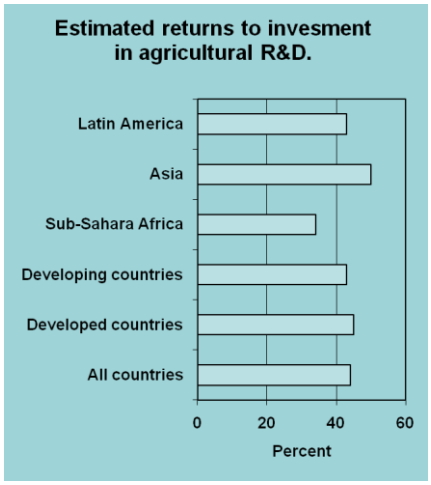
- **Productivity**

  Yields, not area, were responsible for growth. Genetic gains during the past decade are now <1% p.a., except for maize

  TFP grew along with yields

- **Prices**

  Long term declining trend in real food prices

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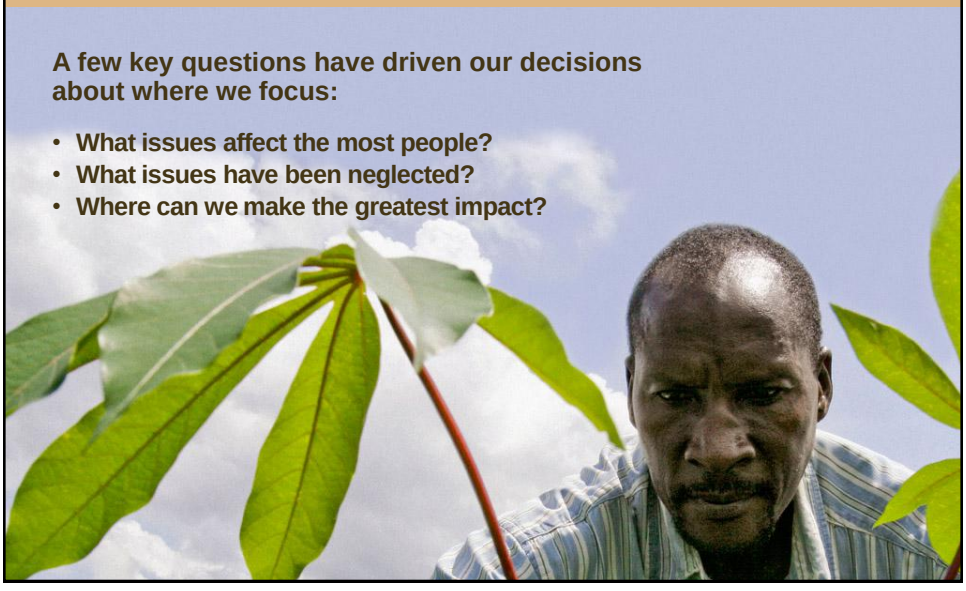
FOUNDATION OVERVIEW

# Choosing Our Areas of Focus

**A few key questions have driven our decisions about where we focus:**

- **What issues affect the most people?**
- **What issues have been neglected?**
- **Where can we make the greatest impact?**



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# Support the Full Range of Farmers' Needs

**We know there's no single, simple solution. We take a comprehensive approach, from seed to sale.**

| 1. Science & Technology | 2. Farmer Productivity | 3. Market Access |
|---|---|---|
| • Research and development on crop improvement issues | • Quality seeds<br>• Irrigation<br>• Fertilizer<br>• Education and training | • Access to information<br>• Access to new and existing markets<br>• Structured demand |



**4. Policy & Statistics**

• Data and statistics • Research and analysis • Advocacy and policy change • Learning and improvement

AGRICULTURAL DEVELOPMENT

# Priority targets for African crop improvement

>60% 15-30% 45-60% 0-15% 30-45%

| Crops | Current yield (t/ha) | Attainable yield (t/ha) | Yield gain by countering biotic stresses (%): Insects | Viruses | Fungi | Bacteria | Weeds | Post-harvest pests | Yield gain by countering abiotic stresses (%): Drought | Soil nutrients | Total calories (Million kcal) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cereals | | | | | | | | | | | |
| Maize | 1.2 | 5.1 | | | | | | | | | 95,701 |
| Rice | 1.5 | 3.8 | | | | | | N/A** | | | 35,174 |
| Sorghum | 1.3 | 2.8 | | N/A** | | N/A** | | N/A** | | | 71,797 |
| Millet | 0.6 | 2.0 | | N/A** | | N/A** | | | | | 48,888 |
| Roots & Tubers | | | | | | | | | | | |
| Cassava | 9.0 | 37.3 | | | N/A** | | | | | | 111,786 |
| Sweet potatoes | 4.2 | 20.0 | | | N/A** | | | N/A** | | | 9,753 |
| Legumes | | | | | | | | | | | |
| Groundnuts | 0.7 | 2.5 | | | N/A** | N/A** | N/A** | N/A** | | | 33,733 |
| Cowpea | 0.9 | 2.2 | | | N/A** | | | | | | 11,792 |
| Beans | 0.4 | 0.9 | | | | | N/A** | | | | 8,521 |
| Others | | | | | | | | | | | |
| Plantain/banana | 7.7 | 40.0 | | N/A** | | | | N/A** | | | 20,845 |

*Based on ~45 survey responses, ~25 interviews and a workshop with leading experts*

**Not a significant driver of yield gap according to surveys

Source: Crop improvement surveys, Expert interviews, team estimates, literature survey

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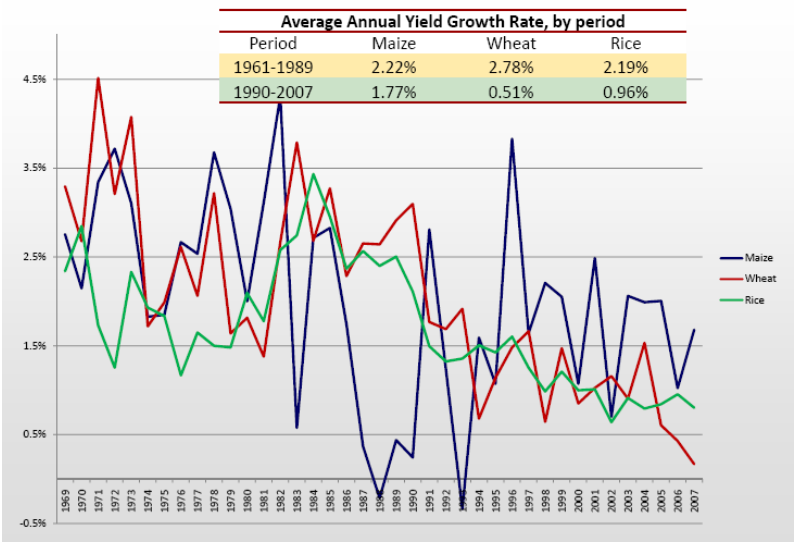
## Global Average Yields – Annual Percent Change (8 year moving average)

Average Annual Yield Growth Rate, by period

| Period | Maize | Wheat | Rice |
|---|---|---|---|
| 1961-1989 | 2.22% | 2.78% | 2.19% |
| 1990-2007 | 1.77% | 0.51% | 0.96% |




P. Pardey, Univ. of Minnesota

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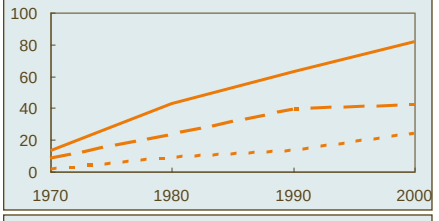
AGRICULTURAL DEVELOPMENT

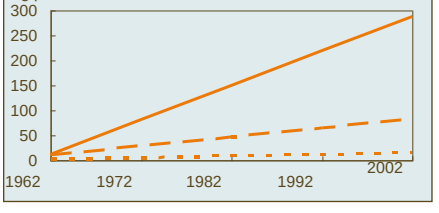
## Sub Saharan Africa lags other developing regions in attained crop yields by 2-5x

Asia
Latin America
SSA

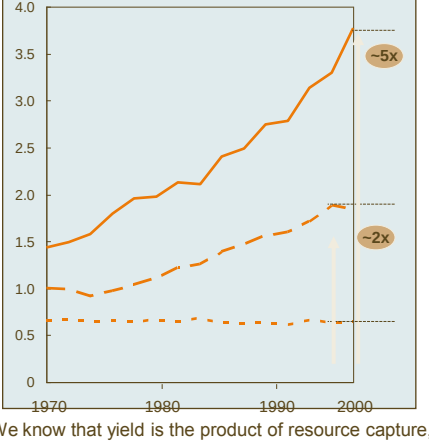
**Modern maize varieties 1970-2000**
Percent of land under cultivation




**Fertilizer use by region, 1970-2000**
Kg per ha of arable land




**Average cereal yields by region, 1970-2000**
mt/ha




"We know that yield is the product of resource capture, resource use efficiency, and resource partitioning for the inputs of water, radiation, and nitrogen," Jeff Schussler, Pioneer Hi-Bred, CSA News, Nov. 2009

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Source: Journal of International Affairs, 2005; IFPRI; FAO; USDA

## Science and Technology Priority Filters: maximizing impact

**Need:** Meeting biggest needs of small holder farmers in developing countries

**Feasibility:** What is scientifically and technically possible in the near, mid and long term

**Value:** Net Present Value of investments measured against the cost of alternatives to fulfilling the need

**Comprehensiveness:** Portfolio of projects for comprehensive coverage of needs; near, mid and long time frames

**Learning:** Provide an opportunity for early action and learning

**Leverage:** Additive to and incentive for other funding, not substitution of our funding for others

**Scale & Risk:** Opportunities for large scale and higher risk projects where other donors can't or won't invest

**Sustainability:** Program will reach a point of viability and continuation without our support

**Gender:** Will benefit women and girls as well as include women in key roles in the work

**Environment:** Will benefit or at least do no additional harm to the environment

**Capacity of Partners:** There are people and institution able to execute the work plans successfully

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# Extension

**Agricultural extension was once known as the application of scientific research and new knowledge to agricultural practices through farmer education. The field of extension now encompasses a wider range of communication and learning activities organised for rural people by professionals from different disciplines, including agriculture, agricultural marketing, health, and business studies.**

**1965:** ***Agricultural extension has been described as a system of out-of-school education for rural people.***

**1974:** ***Extension involves the conscious use of communication of information to help people form sound opinions and make good decisions.***

**1997:** ***Extension [is] the organized exchange of information and the purposive transfer of skills.***

**2004:** ***Extension [is] a series of embedded communicative interventions that are meant, among others, to develop and/or induce innovations which supposedly help to resolve (usually multi-actor) problematic situations.***

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## Four generations of extension in Asia

Colonial agriculture: Focus of attention was usually on export crops such as rubber, tea, cotton and sugar. Technical advice was provided to plantation managers and large landowners.

Diverse top-down extension: Commodity-based extension services with production targets. Various schemes were initiated to meet the needs of small farmers, with support from foreign donors.

Unified top-down extension: During the 1970s and '80s, the Training and Visit system (T&V) was introduced by the World Bank. Regular messages were delivered to groups of farmers, promoting the adoption of "Green Revolution" technologies.

Diverse bottom-up extension: When World Bank funding came a patchwork of programmes and projects funded from various other sources remained. The decline of central planning, combined with a growing concern for sustainability and equity, has resulted in participatory methods gradually replacing top-down approaches.

11 Don Richardson http://departments.agri.huji.ac.il/economics/gelb-how-11.pdf

## The Last Mile – an appropriate analogy for extension

The "last mile" or "last kilometre" is the final leg of delivering connectivity from a communications provider to a customer. The phrase is therefore often used by the telecommunications and cable television industries. The actual distance of this leg may be considerably more than a mile, especially in rural areas. It is typically seen as an expensive challenge because "fanning out" wires and cables is a considerable physical undertaking.

To overcoming the challenge of the last mile two major challenges must be addressed: linguistic diversity and geographical distance.

Successful experiments bridging the last mile have been ones where *recipients have been successfully integrated into the communications model* both as peers and, even more significantly, as *originators* as well as *enhancers* of data.

Ashish Rajadhyaksha. 2009. *Rethinking the Last Mile Problem*

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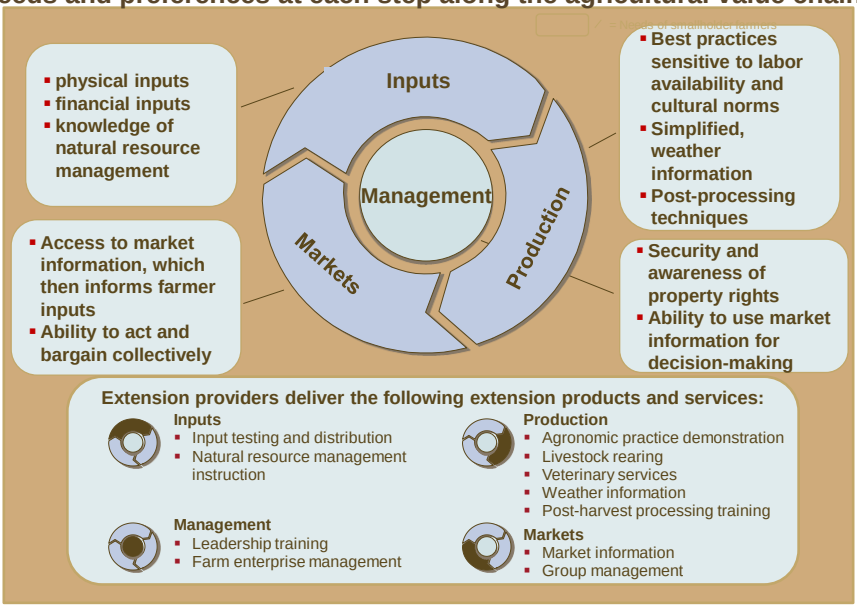
## Smallholder farmers require relevant extension that reflects their needs and preferences at each step along the agricultural value chain

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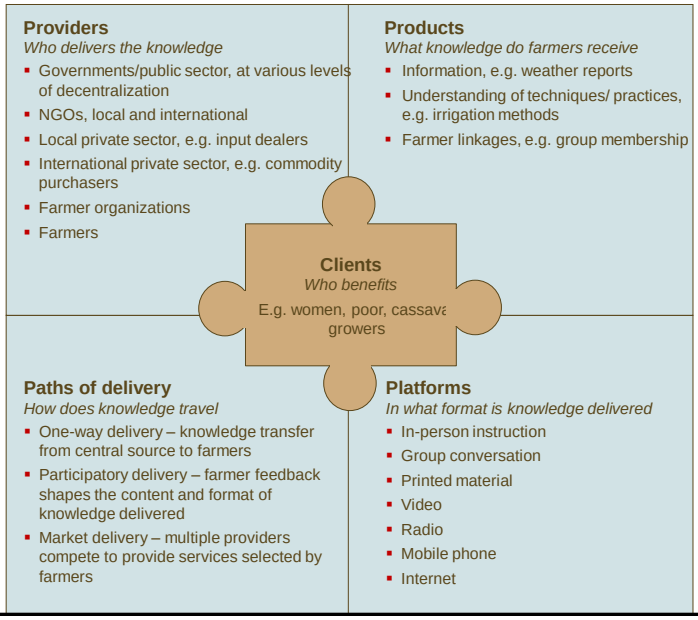
Sources: IFPRI Note 13; WMO-AGM workshop notes; Extension Strategy Team; Farmer Extension Strategy V18

## Grant proposals bring together technology providers, products, platforms and paths of delivery

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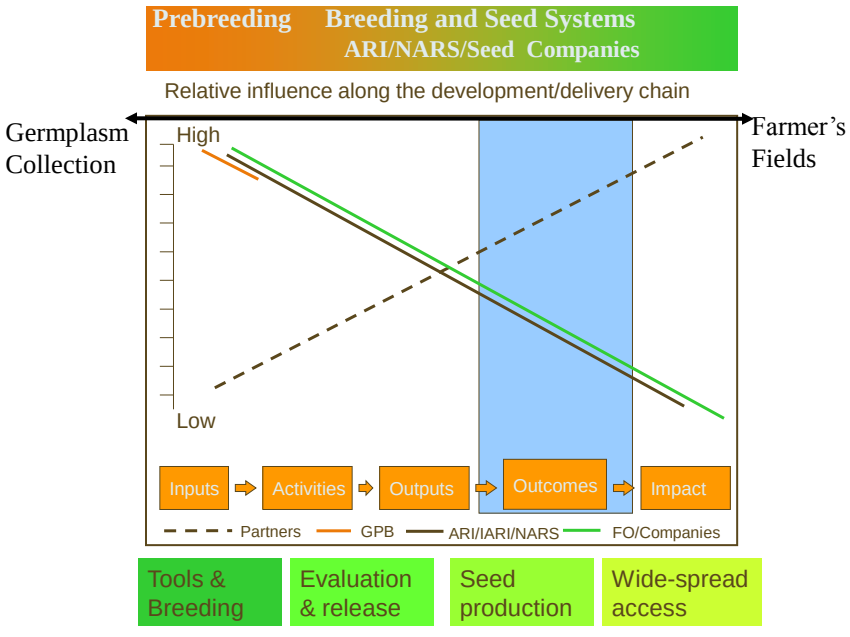
## There are five primary categories of contextual factors that have implications for the success of an extension model

| | Factors to consider | Implications for extension activities |
|---|---|---|
| **Political** | ▪ Current governmental role in extension<br>▪ Government attitude towards international organizations and the private sector | ▪ Primarily affects: providers, paths of delivery<br>▪ Large scale extension models must be consistent with government extension policy in order to sustainable |
| **Cultural** | ▪ Religious beliefs<br>▪ Ethnic farming systems<br>▪ Attitudes toward women | ▪ Primarily affects: providers, products, paths of delivery<br>▪ Adoption of technologies less likely if doing so means violating cultural norms<br>▪ Ethnic farming systems determine key actors and decision-making structures |
| **Socio-economic** | ▪ Infrastructure/development<br>▪ Existence of credit markets<br>▪ Literacy levels | ▪ Primarily affects: products, paths of delivery, platforms<br>▪ In less-developed regions, technologies requiring working capital may be less successful, participatory methods more important to tailor approach, and use of radio more effective than modern ICTs |
| **Geographic** | ▪ Climate variation<br>▪ Terrain<br>▪ Population density | ▪ Primarily affects: products, platforms<br>▪ Knowledge delivered must take into account local geography and climate<br>▪ Lower population density means that person-to-person media will be more expensive |
| **Commodity- and market-specific** | ▪ Existence of a developed market and value chain for a commodity in question<br>▪ Role of private sector and other commodity-specific actors | ▪ Primarily affects: providers, paths of delivery<br>▪ Private sector may take a larger role in delivering and funding extension when a market exists<br>▪ Cost-recovery methods become more feasible when the value chain is intact |

Sources: IFPRI Note 13; Extension Strategy V18; Extension Strategy Team





## "New" actors in extension systems

- Farmer as both extension client and extension provider
- Linkage, learning and knowledge management facilitators
- Private sector players
- Market players and market information providers
- NGOs, CBOs, and private sector providers
- Health, education, environment, and other sector players
- Telecommunication players

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## Bottom line: right information at the right time in the right format from the right (trusted) source with the right feedback.

**Development communication entails not merely providing access to data and information but also ensuring that the information is properly and effectively used and that it leads to an improvement in some aspect of the lives of the people. Thus, even if ICT is extended and connectivity provided to rural areas, human intervention appears to be essential to bridge the last mile and minimize unintended consequences and opportunity costs.** A. Neelameghan and Greg Chester 2006

**Solution providers:**

- **Telecommunications service providers (also know as operators);**
- **Regulators and policy-makers;**
- **Telecommunications policy reform advocates (sometimes nascent in rural areas);**
- **Rural clients (current and potential);**
- **"Last Mile" entrepreneurs – phone shop operators and cybercafe/telecentre operators; and**
- **Extension managers/other professionals who deliver rural services.**

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## How Can Agricultural Extension Best Harness ICTs

**Any ICT intervention that improves the livelihoods of poor rural families will likely have significant direct and indirect impacts on enhancing agricultural production, marketing and post-harvest activities – which in turn can further contribute to poverty reduction.**

**Developing countries each have location-specific agricultural and rural development constraints and opportunities, and country-specific telecommunication constraints and opportunities. The skills and resources of stakeholders need to be harnessed to determine, plan and implement appropriate ICT interventions to improve rural livelihoods. Two important trends to consider:**

- **• the trend toward decentralizing, privatizing and pluralizing the delivery of extension, and**

  **• the trend toward liberalizing telecommunication marketplaces in favour of competitive, multi-service provider, multi-service marketplaces.**

Don Richardson. How Can Agricultural Extension Best Harness ICTs to Improve Rural Livelihoods in Dev1eloping Countries?

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## Major barriers to effective communication

- **Language-related - including jargon**
- **Culture-related – misinterpretation of local practices/different views**
- **Media-related; technology-related – inappropriate, destructive, etc**
- **Relation between communicator and communicatee – power dynamic**
- **Level of communication competence of communicator and of communicatee – education, specialization**
- **Presentation of information - clarity and organization of ideas, repetitive, style, etc.**
- **Legal, administrative and political factors – mis/disinformation, restrictions of use, transborder data flow, copyright, patent,**
- **Physical handicaps of communicator and communicatee; and**
- **Information system-related – source, service, personel, user-friendly, cost, delays in access, user education,**

A. Neelameghan and Greg Chester 2006 Environmental Knowledge and Marginalized Communities: The Last Mile Connectivity http://www.webology.ir/2006/v3n1/a24.html

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## ICT project investments should be directed to achieve the following measurable development outcomes

- **Increased farm family income** which is spent on agricultural livelihood improvements, investments in small businesses, shelter, and to access basic rural infrastructure**,**
- **Increased farm family savings** which can be invested in livelihood strategies that improve the efficiency of agricultural production
- **Improved family health** related to improvements in income and food security, and relevant knowledge**,**
- **Greater access to education and training,**
- **Reduced vulnerability** to unexpected losses and the effects of natural disasters
- **Reduced rural out-migration,**
- **Sustainable use of natural resources such as the implementation of land ownership policies and procedures**
- **Improved risk management decision-making at the farm level**

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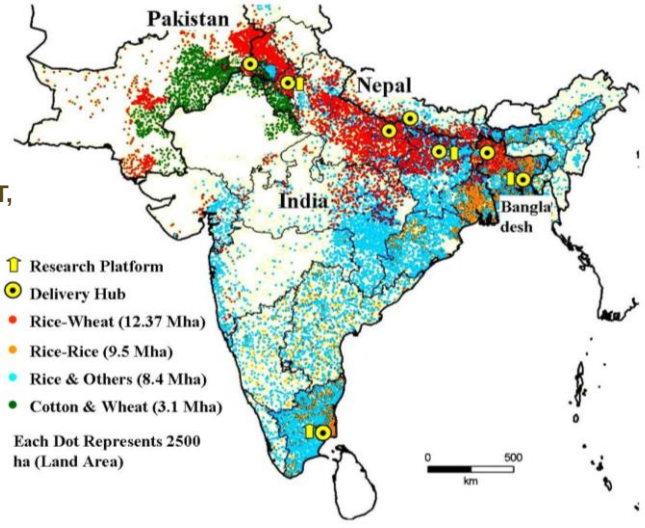
## Cereal Systems Initiative For South Asia (CSISA)

**Phase 1: 2009-2011**

**BMGF: $19.6 M**
**USAID: $10-11 M**
**WB, RWC: $0.9 M**

**CGIAR:IRRI, CIMMYT, IFPRI, ILRI**
**NARES**
**Private sector**
**NGOs**
**ARI**
**Universities**
**Societies (ASA)**

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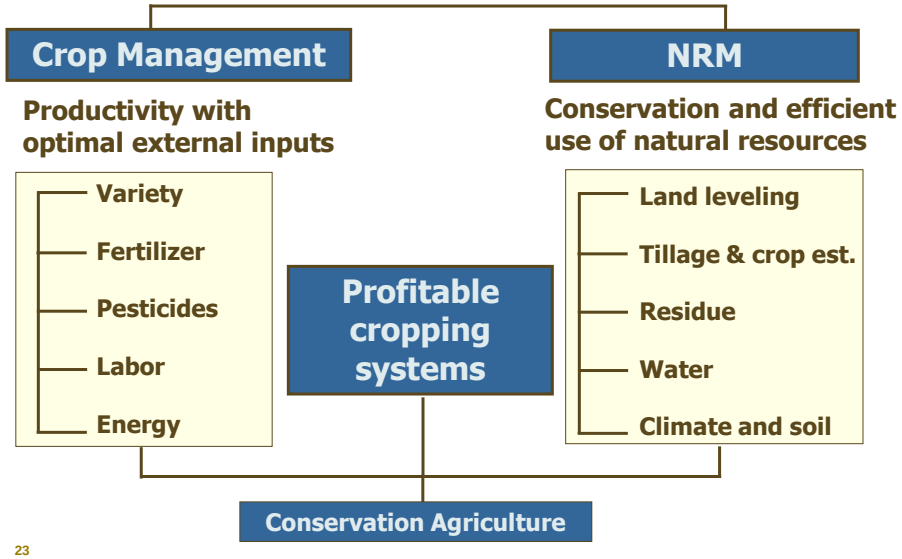
## Integrated Crop and Resource Management "Ecological Intensification"

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Science & Technology

## Participatory Variety Selection in India

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## Cereal Systems Initiative For South Asia (CSISA)

**Objectives:**

1. Delivery of new technologies through public-private partnerships
2. Future cereal-based systems
3. Rice breeding for current and future systems
4. Wheat breeding for current and future systems
5. Maize breeding for current and future systems
6. Technology targeting and improved policies
7. Capacity building: scientists and professional agronomists
8. Project management, communication and impact assessment

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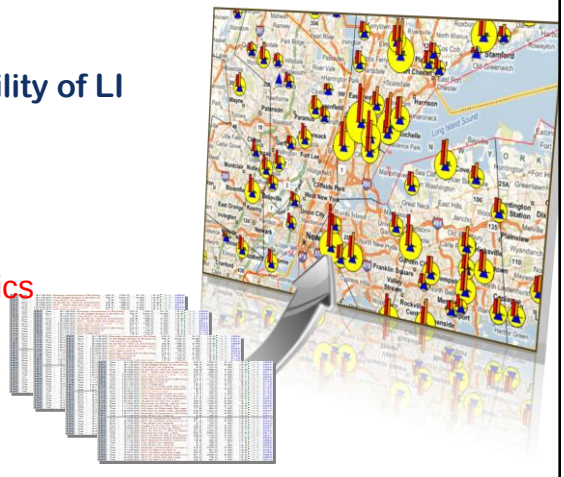
## Hub Communication Platform Activity 1.3

**Location Intelligence (LI):**

**Actionable insight at the point of decision**

- Move the interpretability of LI to the 'front office'
  - Useful geo-visuals
  - Accessible content
  - Powerful geo-analytics



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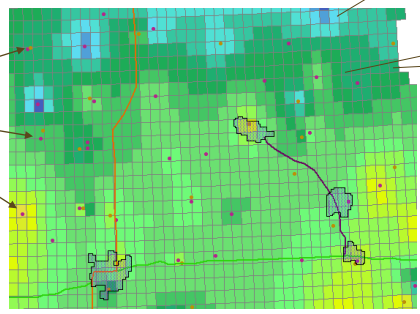
## Example content: Weather Surfaces – historical, current, forecast (10 day) + Models (pests) and Tools (i.e. growth stage planner)



5 'minute' (about 8 kilometer) grid

Meteorological Observation Stations

**Surfaces**

Minimum Temperature
Maximum Temperature
Precipitation
Minimum Relative Humidity
Maximum Relative Humidity
Solar radiation
Wind Speed
Wind Direction

Cities, Roads,
- All part of the 'spatial' database

Daily/hourly weather data for any location:
Real time and historical (10-30 years)
*risk/power assessment/timing*

Web interactive or deliverable to desktop
South Asia: http://www2.awhere.com/CSISA/Homepage.aspx
East & Southern Africa: http://www2.awhere.com/AISEA/homepage.aspx

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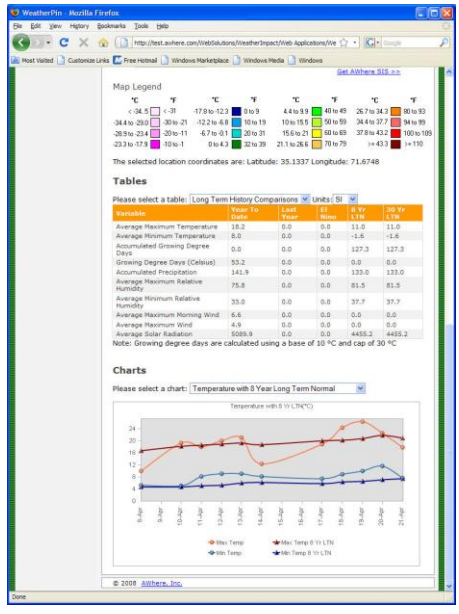


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## Communication!

- Alerts
- Disseminated survey system
  - Up and Download
  - GPS!
- Dynamic aggregation
- Communication

Connect the team (Forum, FAQ Blog, etc.)


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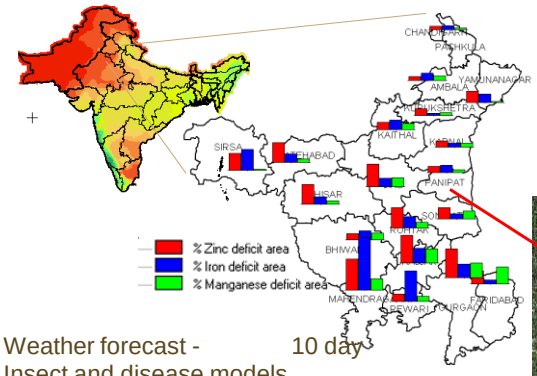
## Typical layout of a Choupal Sagar

Location Intelligence = actionable insight at the point of decision.




Weather forecast - 10 day
Insect and disease models
Field trial results (what works, where)
Tools
http://www.awhere.com/CSISA/Homepage.aspx

make the content relevant for the area of responsibility – e.g. Haryana

***to the right person, at the right time.***


## Key takeaways

**ICT has tremendous potential to go the last mile to deliver agricultural knowledge and services to farmers provideded the design reflects the different ways in which individuals and groups learn, communicate and use information. Choices of communication technologies and methods to employ them can only be determined with the participation of all relevant stakeholders (Michiels & Vann Crowder, 2001; Ramirez, 1998; Batchelor & Sugden, 2003).**

**Collaboration among agencies supporting traditional media and new ICTs can achieve important multiplier effects as agencies harmonize their efforts (Richardson, 1997) (e.g. radio and ICT).**

**What is the mix right between public and private extension and the role of cooperatives and farmer organizations? Issue of financial sustainability is the one major issues in extension. Clearly each partner has offers a unique advantage and role.**

**Bottom line: right information at the right time in the right format from the right (trusted) source with the right feedback.**

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## "take it to the farmer." Last words spoken by Dr. Borlaug

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## Strengths of ICTs in extension

- New range of additional media that can be part of the communication-for-development "mix" of traditional and/or appropriate media;
- Where accessible, these new media have features that enable bottom-up articulation and sharing of information on needs and local knowledge;
- Can increase efficiency in use of development resources because information is more widely accessible;
- Can result in less duplication of activities because information is more widely accessible
- Tend to reduce communication costs (often dramatically) in comparison to other available communication choices;
- Provides global access to information and human resources; and
- Rapid speed of communication - locally, nationally and globally.

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## Weaknesses of ICTs in extension

- Can lead to technological dependence;
- Capital cost of technologies, and the cost of on-going access and support can be high;
- There is an inherent need for capacity building;
- Lack of accessible telecommunication infrastructure;
- Many ICT projects do not use participatory planning;
- Funding agencies often desire a “magic bullet” solutions,
- ICT projects often lack attempts to integrate with existing media, and local communication methods and traditions; and
- ICT projects often lack of involvement of all stakeholders in planning - especially women and youth.

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