Complying with farmers' conditions and needs using new weather and climate information approaches and technologies

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We particularly discuss and recommend suitable policy and policy support options; to comply with farmers' conditions and needs that determine their vulnerabilities as well as their windows of opportunity.

This includes the role of weather and climate information approaches and information technologies, and whether new approaches and technologies have roles to play. And if so what determines the scope of the application of such developments.

We belong to the schools
that want to make a plea
for achieving a
"culture of disaster preparedness".

We feel
that the term "risk management"
should be abandoned
for all but the richest farmers.
For other farmers the key word is
"resilience", not "management".

Lassa (2006) emphasized that disaster should be considered a forced marriage between a hazard and vulnerability.

We will handle the four policy issues that Lassa (2006) distinguished:

(i) mitigation practices;

(ii) disaster preparedness;

(iii) contingency planning and responses and disaster risk mainstreaming.

Another important introductional issue
are the parallels found between problems with policy options for structural preparedness for and rehabilitation from disasters, *such as in well selected agromet services for such purposes,*
and some basic difficulties generally encountered in establishing services.

A first basic problem
in Aceh/Sumatra
appeared to be one of
appropriate need assessments.

There was a call
for more critical consideration
of local needs.

For more than 20 years now, we have been arguing and practicing in agrometeorology the local bottom-up determination of "which problems with agromet components that farmers bring up need to be solved first".

This should replace the offers of agrometeorologists of what they are able to solve.

The second important issue is that the biggest challenge facing all organizations working in the affected regions in Sumatra is collaboration and coordination, between agencies and between actors at different levels.

In agrometeorology Lomas noted particularly the lack of cooperation between the institutions providing information & relevant advisories and those responsible for their transfer to the farming communities, which I earlier echoed.

It would also be helpful if establishment of agrometeorological services could be guided at the lowest administrative level.

Related to the above is the observed urgent necessity in Sumatra of attention to a "missing middle layer" in this co-ordination.

And this is again exactly the need for "intermediaries" between NMHSs, Research Institutes, Universities and agrometeorological extension close to the farmers, which we have advocated over already many years in agrometeorological services.

The observed needs for capacity building in these directions, *including better involvement of the lowest local government levels, that is presently absent in Sumatra/Aceh*, has again its parallel in the need for capacity building for agrometeorological services.

This is in the observed insufficient involvement through education and training of the user community.

The latter includes the farm advisory services that can provide relevant assistance, to be derived and adapted from more general weather information and advisory products .

The three remaining issues in Aceh/Sumatra are all related to policy matters, distinguishing:
(a) environmental issues,
(b) infrastructural and market issues and (c) issues related to the lack of base line data and the support to collect and collate these.

Point (c) obviously applies to routine meteorological and agricultural data in rural and other remote areas. And also to data from fields stricken by pest or disease.

However, it almost even more so applies to basic socio-economic data, causing completely wrong approaches in agrometeorological designs due to completely wrong assumptions.

With appropriate macro-economic policies provided by the government, existence of suitable market forces and sufficient attempts to accommodate the inescapable urbanization trends, ***the development of rural economies depends mainly on capacity building and services in rural communities.***

After **improving, adapting and focusing rural information and education systems,** ***information and communication technologies (ICTs) could play very important roles in such capacity building and services.***

Primary information leads to informative products that cannot yet be absorbed by most users in poor areas. Suppliers or communicators of derived information encode it in a more client friendly form and disseminate the encoded information to receivers through some services channels and media.

After decoding
and using this information,
the receivers ideally give feed back
to the suppliers through
some of the same or other channels.

This is a
continuously running loop.
Sometimes
suppliers and receivers interchange their
roles with each other
(e.g. farmer innovations).

Many farmers in China believe that by obtaining technological information, including weather & climate related information, and market information, they could carve out or enlarge their production scale and raise profits.

Therefore, they are eager to understand new things in order to make highly efficient low-risk decisions.

The results from a countrywide survey in China showed that farmers are mostly concerned with two kinds of information, i.e. (i) information on practical technology with low investment and instant profits and (ii) information on market demands for agricultural products.

In 2002, the Institute of Science and Education, Northwest Normal University, *suggested that although farmers are heterogeneous, both in their occupations and their information demands, this diversity had not been genuinely identified, and their detailed priority information demands had not been properly revealed.*

Tan Ying et al. showed that four different income-levels of farmers treated the technological and related information differently, and their levels of satisfaction were different too.

Also, they appeared to receive the information largely through different channels.

Tan Ying et al. also showed that when the villagers had similar occupations *(planter, cultivator, businessman, village technician, village leader)* **their information requirements were close to each other, but different income type farmers used again different media channels to receive the information.**

The following categories are now distinguished

- Very poor farmers.

  They have limited technological information demands and mainly obtain information from leaders, neighbors and relatives.

  Very poor farmers can't use the existing technological information services and therefore have such limited demands for such services.

The following categories are now distinguished (cont.)

- Low-income farmers.

  Most of them are planters and cultivators and have only had primary school. The main information channels for this type of farmers are mass media, leaders, able friends and relatives.

  The awareness of low-income farmers of technological information services is too small.

The following categories are now distinguished (cont.)

- Middle-income farmers.

  Most of these farmers are somewhat larger planters and cultivators/growers whose information demands are comparatively strong. Besides TV & radio and personal communication, they begin to pay more attention to newspapers, brochures and books related to agricultural production.

  Middle-income farmers' can't utilize information services very efficiently.

The following categories are now distinguished (cont.)

- Richer farmers.

  Most of these farmers are 35-45 years old and influential planters, growers and traders (self-employed workers, entrepreneurs). The information channels for these farmers mainly are TV, the press, radio broadcasts and Internet, personal communication such as the marketplace, telephone, etc. Most have studied in high school or taken adult education and new technological training thereafter.

  Rich farmers have greatest ability of utilizing effective information services.

It followed from the survey contacts that about utilization of technological information and effect acknowledgement/acceptation, 90 percent of farmers thought that ***the flow paths combining personal communication with mass media played an important role in farmers' information selection.***

Therefore, although
information service systems have been
shaped and established,
the scientific and technological
requirements
of investigated farmer households
have not been met yet.

Implications for information approaches and technologies

- For poor farmers, transfer and adaptation of simple innovative technology developed by others and of simple operational knowledge of all kinds to improve their conditions and income

  are possible information services for this group.

- **Because of its temporary character, without investment of any kind being involved, the simplest information approaches and technologies will have to do.**

Implications for information approaches and technologies (cont.)

- Because of the importance of social capital, being least developed within these groups, for poor farmers assistance to bring down the simplest successful agrometeorological services from one level higher up social classes with comparable farming systems or occupations appears the best approach.

- **Examples of Lassa (i) "mitigation practices" and (ii) "disaster preparedness" should this way be transferred downwards; in Lassa (iii) "contingency planning and responses" and (iv) "disaster risk mainstreaming" the public domain should be involved with appropriate supportive policies.**

Implications for information approaches and technologies (cont.)

- For low income farmers, in the long run, specific training of extension intermediaries, such as already existing village technicians and in-service trained members of Agricultural Extension Services and the NMHSs, in to the point fields of applied services, will be a lasting solution.

- **Field classes to train these farmers have been shown to be effective means that such intermediaries can use.**

Implications for information approaches and technologies (cont.)

- Rural radio and where possible TV appear to be the best instruments to structurally use at this level in addition to and as part of the field classes mentioned.

- Improved agrometeorological bulletins could have impacts already at this level, but only with organized assistance for interpretation and use. Illiteracy may, however, be a serious problem here.

- **Community based mitigation practices and disaster preparedness should be transferred using these media and training approaches, while contingency planning and responses as well as disaster risk mainstreaming may have the usual public as well as less common private aspects based on how the social capital can be locally organized for low income farmers.**

Implications for information approaches and technologies (cont.)

- Also for middle-income farmers, specific training of the same extension intermediaries in to the point fields of applied services to such middle-income farmers will be a lasting solution. The actual needs of these farmers for such services change much more dynamically.

- **In addition to field classes, mass media, bulletins, other information technology can be introduced or stimulated, with mobile telephones appearing to become an obvious choice for middle-income farmers. This, however, means that establishment and use of agrometeorological services should be adapted to this information medium.**

Implications for information approaches and technologies (cont.)

- It is also at this level that stakeholder-driven funding mechanisms for agricultural innovation may be part of the solution. This is about funding for technology development and dissemination interactively controlled and managed by stakeholders.
- As to mitigation practices and disaster preparedness, training, media, new communication technologies and social capital are the critical resources for bringing change to rural communities in China at this level. Contingency planning and responses as well as disaster risk mainstreaming should be a mix of local government initiatives and private initiatives by these social actors for the middle income level.

Implications for information approaches and technologies (cont.)

- Generally, richer farmers have had (much) more formal education and are therefore also able to use newer communication technologies such as mobile telephones, computers and internet facilities. The commercialization of services, also agrometeorological services, may start here, assisted by government support where richer farmers are able to play a role at lower social levels.

Implications for information approaches and technologies (cont.)

- For mitigation practices and disaster preparedness (Lassa policy issues (i) and (ii)), the same applies while contingency planning and responses as well as disaster risk mainstreaming (Lassa policy issues (iii) and (iv)) should be a mix of private initiatives and local government guidance and services with financial implications for those richer farmers making use of them successfully.

Implications for information approaches and technologies (cont.)

- Now that large countries like China, India, Brazil and several other Latin American countries have announced to be tackling the services problems in rural areas, while the same was done by donors with respect to Africa, agrometeorological services should be seen as part of these new approaches to rural services (including information approaches and technologies).

- Without such a general overhaul of the services climate also agrometeorological services will remain slow in contributing to poverty alleviation.

For other developing countries
a similar differentiation
will definitely be valid,
but the stories that belong
to each of their income groups
and rural occupations will differ
and the implications also.

This has been explicitly confirmed
by the co-authors from
Cuba, India, Nigeria and Sudan.

The paper contains a large section with examples from the countries of the co-authors, illustrating
with some explicit case studies
of successes and failures how
differentiation and upscaling play
a role in agrometeorological services.

Policy matters appear to be crucial,
capacity building pivotal.

We will end with what WMO/CAgM should realize as implications for the future of weather and climate information approaches and technologies in agricultural production

WMO has recently warned that

"*in developing countries there remain risks that very few high-level agrometeorological personnel and limited resources are geared towards modern specializations*".

This situation is accentuated by low quality data and the limited absorption capacity of agricultural decision makers for such agrometeorological products.

This can be confirmed from the above illustrations of the situation in China.

The above results question the idea
"*that the key to future activities of CAgM*
will be how to take advantage
of the rapid innovations in technology".
This definitely is a key in richer countries
with low and decreasing farming populations
with a high level of education.

The Chinese results show that
this also may be a key for a group
of richer farmers distinguished, *but*
for all other farmers in developing countries this is
for the time being only true in very limited ways.

Other factors are key factors here, depending on income level and occupation.

Understanding the actual needs and scope for agrometeorological services, the bottlenecks in the establishment of agrometeorological services and how to guide their introduction for various target groups is much more important.

Already in this recent WMO/CAgM publication it is recognized that enhancement of the communication channels for the improved dissemination of agricultural meteorological information "***should take into account the literacy levels of users, socio-economic conditions, level of technological development & accessibility to improved technology and farming systems***".

The Chinese results reported explain details of this picture.

They also improve and refine the idea that in the developing world, "*lack of resources and skills are the basic limitation to enhanced web-based dissemination of information*", but the emphasis asked for rural radio use is confirmed.

The five "Aceh/Sumatra" issues discussed earlier should guide us. **Such studies as made in China but now specifically with respect to agrometeorological services would help us even more in getting the right picture,** ***and in being able to give the right guidance for important differentiation and upscaling operations.***