Policy paper prepared for consideration under points 6. and 8. of the provisional agenda of the First Meeting of the Management Group of CAgM in Washington DC, 3-6 June 2003

SUPPORT SYSTEMS IN POLICY MAKING FOR AGROMETEOROLOGICAL SERVICES: BRINGING THE WORK OF CAgM OPAGs, ICTs and ETs IN A DIAGNOSTIC AND CONCEPTUAL FRAMEWORK FOR ACTION SUPPORT

Introduction
The confusion on the title of my co-ordinatorship is symptomatic for a general confusion of goals and means in agrometeorology and many other fields of applied science. In fact, a co-ordinator for policy making in agricultural meteorology should not concentrate on means, because he can leave that to the experts, when the direction of goals is clear. He should concentrate on goals and this implies that he should concentrate on agrometeorological services as the main goal in agrometeorology. Any other goals are derived ones. This can only be made workable in a diagnostic and conceptual framework in which (i) the ultimate aim is agrometeorological services in the livelihood domain of farmers and (ii) the position of various support systems becomes clear with respect to their place and tasks. If it is possible to give the work of CAgM OPAGs, ITCs and ETs a well recognizable place in such a not too complicated framework, it will be easier to see how the actual support systems can work for the establishment of focal agrometeorological services. This is a basis for policy making.

Definition and examples
We consider to belong to agrometeorological services all agrometeorological and agroclimatological information that can be directly applied to try to improve and/or protect the livelihood of farmers in agricultural production, so yield quantity and
quality and income, while safeguarding the agricultural resource base from degradation.

Good examples of such services, including the set up of pilot projects for on-farm validations, which may be abstracted from the WMO/CAGM Accra and Ljubljana Workshops are:

- the products of agroclimatological characterization, obtained with whatever methodologies;

- advises such as in design rules on above and below ground microclimate management or manipulation, with respect to any appreciable microclimatic improvement: shading, wind protection, mulching, other surface modification, drying, storage, frost protection etc.;

- advisories based on the outcome of response farming exercises, from sowing window to harvesting time, using climatic variability data & statistics of a recent past or simple on-line agrometeorological information;

- establishing measures reducing the impacts and mitigating the consequences of weather and climate related natural disasters for agricultural production;

- monitoring and early warning exercises directly connected to such already established measures in agricultural production to reduce the impacts and to mitigate the consequences of weather and climate related natural disasters for agricultural production;

- climate predictions and forecasts and meteorological forecasts for agriculture and related activities, on a variety of time scales, from years to seasons and weeks, and from a variety of sources;
- development and validation of adaptation strategies to increasing climate variability and climate change and other changing conditions in the physical, social and economic environments of the livelihood of farmers;

- specific weather forecasts for agriculture, including warnings for suitable conditions for pests and diseases and/or advises on countervailing measures;

- advises on measures reducing the contributions of agricultural production to global warming and keeping an optimum level of non-degraded land dedicated to agricultural production;

- proposing means of direct agrometeorological assistance to management of natural resources for development of sustainable farming systems in technological advances with strong agrometeorological components.

One of the conclusions in Ljubljana was that the main issue at present is how to make better use of the existing information and dispersion of knowledge to the farm level. It was also concluded that agrometeorologists must play an important role in assisting farmers as well as policy makers with the development of feasible coping strategies. This is true for nearly all countries but developing countries are particularly vulnerable.

**Support systems and a framework in which they operate**

To illustrate the confusion of goals and means I have developed a simple diagnostic framework in which some of the concepts that we use are connected. I have presented and tested this framework over the last few years at various occasions, among which in a preliminary form in Accra (1999) and at a Training Workshop for Provincial Agrometeorologists in Hanoi (2001). In a more final form I did this in a Climate Training Workshop in
Bangkok (2002) as well as in various seminars organized for me in Indonesia (2002/2003), I used it in Ljubljana (2002) and most recently in an Expert Team meeting in Banjul (2002). I have learned from exposing this approach to these audiences and I now want to use it operationally for this policy paper.

The simple distribution between agrometeorological services and support systems to such services was a logical consequence of the presentations in Accra of needs and perspectives in the future of agrometeorology. For that purpose it was sufficient. However, it is insufficient when dealing with direct actions to be supported in agricultural production and farming systems. It should be realized that with respect to these actions, support in data, research, education/training/extension (e, t & d) and policies is operating at several levels.

I have therefore distinguished below a framework with three action domains. The first one (A) is that of the livelihood of farmers in which the actual services supporting actions of producers (E2 focal guidance) have to be operated. The second domain is that of the selection/collection of knowledge (B) actually to be used to derive and establish the E2 agrometeorological services. Here are the initial and boundary conditions for problem solving in agricultural meteorology. There are three components in that B domain: (1) suitable local adaptive strategies based on traditional knowledge and indigenous technologies, (2) suitable contemporary knowledge in science and technology and (3) appropriate policy environments based on social concerns and environmental considerations. Only a right mix of these three components will deliver the kind of knowledge that can be used in developing E2 services. The third domain (C) distinguished is that of the basic support systems earlier mentioned. To use the right parts from the often full shelves in the support systems offered by the C domain, needed to compose/construct/select the right mixture in
A = Sustainable livelihood systems

B = Local adaptive strategies (knowledge pools based on traditional knowledge and indigenous technologies)
+ Contemporary knowledge pools (based on science and technology)
+ Appropriate policy environments (based on social concerns and environmental considerations, scientifically supported and operating through the market where appropriate)

C = Support systems to agrometeorological services: data + research + education/training/extension + policies

A ←------|------→ B ←------|------→ C
              |          |
E2           E1

E1 = Agrometeorological Action Support Systems on Mitigating Impacts of Disasters
E2 = Agrometeorological Services Supporting Actions of Producers
the B domain, another focal guidance is needed, that of agrometeorological action support systems on mitigating impacts of disasters (E1). Here disasters are defined as all events that considerably diminish yields in the farming systems concerned.

Going from right to left in the domains, the support systems become more and more operational. In the C domain there are a lot of autonomous scientific and technological developments, with respect to theories and methodologies, often little related to E1 or B, certainly with respect to what may be used operationally in developing countries. The E1 systems are representing our good intentions in agrometeorology to diminish the impact and mitigate the consequences of disasters, using selected and co-ordinated parts of the support systems, that are therefore lifted to a higher operational level of immediate usefulness.

However, there remains in many cases a huge gap between E1 and E2 because the use of the support systems has least been lifted, through the again selective and co-ordinating B domain, to the highest necessary operational level, that of developing and applying E2 services operating in the A domain.

So data, research, e, t & e and policies support systems to agrometeorological services have in the picture of this frame work three levels of operational use, the lowest in the C-domain, the highest in the A-domain and an essential one in between after the selection and co-ordination made in the B-domain. The first lifting to a higher operational level goes in practice often through the development of E1 Action Support Systems that select knowledge useful in disaster mitigation (or other yield protection/improvement, for that matter). This is insufficient for use of suitable agrometeorological information at the level of the farmers. We have to go through the B domain for a second lift in
applicability to get to the operational level suitable for the livelihood of farmers that have to be guided by E2 services.

Guidance of OPAGs, ICTs and ETs by the framework

In this policy paper we should now consider how OPAGs would ideally operate within this framework.

In OPAG 1, the ICT should see its task as operating as much as possible in domain A, using the most operational support systems conditions for on-farm pilot projects on and actual on-farm applications of E2 services for farmers. The three ETs have to do this in their respective fields. All members should be instructed accordingly. They should assist the OPAG 2 with obtaining knowledge from local adaptive strategies used in the A domain as well as in better definitions of farmers’ needs, and they should receive from OPAG 2 knowledge on the most operational support systems.

In OPAG 2, the ICT should fully work in Domain B, bringing support systems to that highest operational level by proposing for each agrometeorological service in view the right mixture of local adaptive strategies, contemporary knowledge and appropriate policy environments. Here the ETs should in their respective fields get away from focusing on methodologies towards focusing on applications in services, building this up from the needs of the farmers (A domain) upwards. The methodologies are but one component (contemporary knowledge) but if we forget the other two components they will not serve the final purpose. OPAG 1 is related through knowledge of local adaptive strategies and determination of farmers’ needs. OPAG 3 is connected through E1 action support systems on mitigating disasters that require certain methodologies but also certain existing strategies and policy environments from the B domain that were previously not
considered, making the E1 approaches wishful thinking and good intentions but operationally of little value.

In OPAG 3, the ICT has the task to operationally fill the gap between E1 and E2, focusing improved selections from domain C much better towards the B domain for the E1 action purposes. This can only be done after E1 action systems have been much better focused on learning from what is missing in the B domain to establish the right mix, where the relation with OPAG 2 is needed. It is essential that this is combined with making agrometeorological information in E1 action systems much more applicable for the farm level in the form of agrometeorological services to be established through intermediaries that have to be educated. Also here this applies for all ETs.

It was foreseen in the terms of reference of the OPAGs that the Chairpersons stay in contact with the co-ordinator on these matters. It is very important that agrometeorologists that have become members of the ICTs and ETs, understand the policy framework based on meeting the needs of farmers for agrometeorological services in their livelihood. They should want to get away from the situation that we (i) continue to advance so much in the C domain without much direction towards operational needs of the B domain and beyond, (ii) have established E1 action support systems without going through the essential requirements of the B domain and therefore (iii) have too often provided agrometeorological information and even E2 services with insufficient considerations of the actual conditions of the livelihood of farmers, particularly in developing countries. I am available to discuss the consequences of the scheme/framework in particular cases of individual ICTs/ETs.

ETs outside the OPAGs, because they are always related, should also be aware of this framework presented on support systems in
policy making for agrometeorological services to guide the actions of farmers in agricultural production.

March 2003

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