

Workshop Conclusions and Recommendations

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The participants were organized into three breakout groups based on the following topics:

- 1) Assessment of agrometeorological criteria for conservation and management of natural and environmental resources;
- 2) Agrometeorological themes for efficient management of natural resources for sustainable agricultural development; and
- 3) Agrometeorological guidelines for conservation and management of natural resources.

The following conclusions and recommendations were then compiled from the output of the groups and were presented to the workshop by each breakout group.

Conclusions

- 1) Effective conservation and management of natural and environmental resources are considerably impacted by climate variability, climate change, increasing energy costs, environmental regulations, changing demographics, and access to appropriate technologies.
- 2) Developing better modeling and forecasting tools to provide users with greater flexibility in decision making is significant both for the scientific issues involved as well as for the practical relevance of the results.
- 3) The impact of weather and climate on conservation and management of natural and environmental resources is increasingly viewed in the context of risk management.
- 4) Land degradation, water resource management, drought, and fire (forest, bush, and grass) are the main topics that agrometeorologists need to focus on in the future. Weather extremes and natural disasters, combined with explosive population growth, seriously challenge the future quality-of-life for all, therefore effective coping strategies for natural disasters are essential.
- 5) The major agrometeorological themes in managing natural resources for sustainable agricultural development include: preparedness (best practices), monitoring (data), assessment (vulnerabilities), mitigation, and adaptation.
- 6) Good stewardship of the land is essential for sustainable agriculture. There is a growing recognition that land degradation is a major world-wide issue and there is a need for more complete evaluation of the expansion of degraded land around the world.
- 7) There is a lack of effective communication in exchanging ideas among multidisciplinary sciences concerning the management and conservation of natural resources.

Recommendations

- 1) To provide adequate and appropriate weather and climate information from the meteorological observation networks to users on a near real-time basis, especially for developing risk management strategies to cope with climate variability and climate change. To integrate station, gridded, and remotely sensed data in order to improve model accuracy and provide more useful products.
- 2) To place high priority on free and open access among disciplines for data, results, findings, and management successes to increase cost-effectiveness and to disseminate rapidly time- sensitive information regarding meteorological phenomena and its application for land resource management.
- 3) To provide greater emphasis on the quantification of natural and environmental resources by developing and providing access to hydro-meteorological and geographical databases and environmental impacts.
- 4) To promote a long-term perspective of resource use for sustainable agricultural development rather than short-term measures since there is a finite capacity of natural resources and the environment, especially under changing demographics.
- 5) To collate knowledge-intensive and locally-adapted best management practices and technologies and make them available to users while taking into consideration long-term conservation of natural resources, increasing energy costs, and knowledge of local weather and climate.
- 6) To develop and implement agrometeorological information systems in close collaboration with the user communities, e.g., development of fire-weather systems.
- 7) To encourage the development of robust models that provide probability based results that can be used for risk assessment and management.
- 8) To re-evaluate the current strategies for conservation and management of natural resources and incorporate preparedness and mitigation plans to effectively cope with the increasing frequency of extreme events and natural disasters and their impacts on agriculture.
- 9) To improve technology transfer, especially to Least Developed Countries (LDCs).
- 10) To promote and improve the interactions between the NMHSs and Ministries of Agriculture and other natural resource organizations and user groups.
- 11) To ensure that risk and vulnerability assessments are carried out at an appropriate scale and incorporate socio-economic factors along with the agrometeorological analysis. To

include analyses of economic values of the information products and services provided by the agro-meteorology community.

- 12) To promote the use of an integrated risk-management framework that takes into account preparedness, monitoring, assessment, mitigation, and adaptation and encourage the development of robust models that provide probability based results. To develop risk management scenarios to deal with the environmental, economic, and societal impacts of more frequent and extreme natural disasters on regional scales throughout the world.
- 13) To integrate comprehensive data monitoring/data management systems for managing land use and mitigating land degradation.
- 14) To validate/reemphasize the current agriculture zoning and practices in response to climate variability and change. To develop policies and promote legislation to protect against overuse of lands. To develop appropriate triggers for identifying critical thresholds where different cultural practices should be implemented.
- 15) To provide appropriate decision making information to users that is tailored to their needs through rapid dissemination such as internet-based, early warning, and decision-support systems that also include geographic information. To ensure that feedback mechanisms are constantly evaluated and updated.
- 16) To develop and promote the use of operational fire-weather/danger-forecasting systems (i.e., currently used in Hawaii) that are relatively inexpensive and that can quickly disseminate a broad range of information for more informed management decisions and for better organizational efficiency.
- 17) To increase the outreach and education regarding the impacts of climate variability and weather extremes on land conservation while recognizing the need for that land to support an ever increasing population.