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## Information needs

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*Deborah L. Rogers and workshop participants*

### Information management

Improvements in communication are necessary to better manage forest genetic resources. These improvements could help to prevent redundancy in conservation efforts and to improve efficiency through the sharing of information. Improving communications technology, and communications among scientists, will allow new information to be quickly accessed, allow coordination of conservation activities, accelerate decision-making, and enhance conservation objectives.

Workshop participants offered the following suggestions for improving communications:

1. Develop a genetic resources metadata base and improve links among components (WWW/ Gopher, computer to computer).
2. Increase the level of awareness of genetic resource conservation and improve communication at the social (general public), political (decision makers, ad-

ministrators), and technical (scientists) levels.

3. Encourage, through FAO regional forestry commissions, information gathering and strategy implementation for conservation of forest genetic resources.

### Research

“Genetic conservation is not only a genetic question, but a social challenge” (Discussion Group IV-2, Workshop on the Status of North American Temperate Forest Genetic Resources). A discussion of the research needed to support conservation of genetic resources would ordinarily start with, and perhaps be limited to, the biological questions. However, participants in workshop discussion groups that were requested to address research

needs emphasized the need for social research—for example, how social groups feel about conservation, and the impacts of sociopolitical structures on the effectiveness of programs

*We recommend that the FAO encourage the development of a centralized metadata base of genetic resources. We see this as composed of local databases, coordinated through a network and designed to facilitate exchange within the international community. (Rec. no. 7)*

for the conservation of genetic resources.

One theme that emerged in the discussions was that there was a spectrum of research needs—ranging from simple inventories of species and populations in some geographic areas to analysis or re-analysis of existing data, to assessment and synthesis of existing information, to basic scientific research. In addition, participants confirmed the nature of research as iterative and incremental—the next step is not necessarily obvious but depends on the findings from the preceding step.

Given the large numbers of species involved, and the large number of possible research directions, one approach to organizing conservation-directed research is to develop a matrix of species versus threats to their survival. The species list could be divided into ‘guilds’ (subgroups of species with functional similarity within the subgroup, Clements 1905), with guild membership based on vagility, geographic, demographic, and genetic population structure, patterns of distribution (e.g., geographic, edaphic), and taxonomic status. Framing research in this way might help to determine when results could be extrapolated to other species or situations, and might illuminate connections

between biological features and vulnerability.

Population viability analysis (PVA) is high on the list for conservation-related research. What are criteria and indicators of a healthy population? Finding connections between molecular markers and adaptive traits would be a major contribution to PVA. Life history characteristics are likely to play a strong role in population viability, necessitating the study of representative species with various life history characteristics. However, this is unlikely to be a question that can be addressed for all species using one or two model species.

*We recommend an increase in funding for research on conservation of forest genetic resources. This research should involve, when appropriate, interdisciplinary, interagency, and international collaboration.*

*Some (nonprioritized) examples of research needs are:*

- *Exploration and inventory of species' distributions and patterns of spatial genetic structure within species;*
- *Development of more efficient methods of evaluating genetic variation for adaptive traits;*
- *Evaluation of the relative utility of various types of genetic data in the development of sampling strategies for conservation;*
- *Analysis of the impacts of sociopolitical structures on the effectiveness of programs for the conservation of genetic resources;*
- *Analysis of factors influencing population viability;*
- *Analysis of the effects of habitat fragmentation, forest management practices, and environmental change on genetic resources. (Rec. no. 4)*

Improving our understanding of the relationships between various molecular markers and adaptive traits is important not only to PVA but a compelling issue in its own right. Knowledge of these relationships is critical to effective strategies for sampling and monitoring genetic diversity.

Finally, research is required on conservation management systems—what systems have been tried, what systems seem to work, what alternative systems exist, what are the impacts of social and political structures on management systems? Social scientists must participate in the research program.