Gen. Tech. Rep. PSW-101 Berkeley, CA. Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1987.

Using High Technology in Fire Management: Report of Futuring Group 4[1]

TRENDS IDENTIFIED

Use of Artificial Intelligence (AI) Techniques

1. Using knowledge-based (expert) systems as aids in decision making for all aspects of fire business.

2. Using AI as a programming paradigm.

3. Increasing emphasis on more automated data analysis and reduction.

User Problems in Technology Implementation

4. A growing gap between research and "on the ground" users.

5. Expense of "high tech" causing lethargy in implementation.

6. Time lag in technology transfer.

7. The "vision" of research differs from the "vision" of users.

8. Sophisticated hardware and software creating a hardware gap as well as a user learning gap.

9. User friendliness of software increasing.

10. Costs of systems and software decreasing rapidly.

11. Easily available and spatially registered natural resource data (Geographic Information Systems) are increasing.

12. Graphics and image data are simplifying computer output.

13. Implementation of "high tech" is putting 21st century technology into 19th century management structure.

14. Using computer prediction as a tool, not as an answer. The user needs to know where the answers come from for effective use.

15. Moving data anywhere, anytime. Information is readily available.

16. The public wanting to know what has happened and what is predicted in prescribed and wild fires.

17. Dissimilar tools (software, hardware) makes coordination among agencies and even within agencies difficult. Need for common vocabulary, syntax, and grammar in the knowledge representation.

VISIONS AND STRATEGIES

The above trends led to the following Visions and Strategies for implementation.

Availability of Information

Fire managers would casually rely on their Decoder Watches to facilitate decision making regarding Initial Attack, Escaped, and Prescribed fires. Information available would include fire behavior, climatology, fire effects, resource objectives, and expected cost/benefit analysis. This information would also be available on sophisticated graphics displays.

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Strategies

- Generate data bases and programs
- Finish FFAST. a real-time infrared fire location and monitoring system.
- Specify a delivery system and display system.
- "Buy it" (commit to the system).
- "Sell it" (transfer the technology).

Understanding by Users

Users would understand the assumptions, reasoning, strengths, and weaknesses of the programs/systems they use. They would integrate the results of the systems with their own skills and judgment.

Strategies

- Develop self-explaining layered programs. (A program in which the answer supplied by the user at one step automatically directs him to the next step. Instructions are supplied at each step).
- Develop proper training methods for delivery of products generated in this format.
- Develop a process for knowledge acquisition from preretirement personnel (debriefing).

Portability of Data Base

Knowledge would be portable from one system to another, by adoption of a common rule syntax-knowledge representation. An agreed-upon Knowledge base shell (a generally proprietary program that utilizes the knowledge of subject matter experts) would be characterized by portability (runs on different hardware easily), expandability (easily modified and added to), and public domain (very low cost and easy availability).

Strategy

- Form an interested interagency, international, and university group, supported by committed top level decision makers, to quickly select a knowledge representation.

Geographic Information Systems

1. All Government agencies and the public would have access to current natural and human resource data, which are spatially registered and integrated. These data would be readily available to all locations at resolutions appropriate for all levels of wildland decision making and research.

Strategies

- Make a long-term commitment to delivery and upkeep of a natural resources database (see preceding vision as well).
- Discourage turf disputes--deal with the land and its characteristics.

2. Research, development, and users would be closely coupled in the technology transfer process. Technology transfer would be integral to the research planning process, and would take into account the political, economic, and operational constraints on the user.

Strategies

- Technology transfer an integral and funded part of the research process. Development is recognized as necessary.
- Encouraged users to seek research.
- Effective technology transfer should be recognized as a researchable problem.

CONCLUDING REMARKS

Many of the strategies require funding. Of greater importance, however, is a long-term serious commitment throughout the user community to foster, accept, and take advantage of new technology. Funding without this support, or commitment without the funding, would not work.