

STORAGE AND DISTRIBUTION OF WEED MANAGEMENT DATA*

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Abstract

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Research is necessary for new weed control strategies; however without the transformation and dissemination of these research findings, facts will not reach the small scale farmer. In that respect, several points should be emphasized: 1) the transfer and distribution of data stores: training courses, workshops, symposia, conferences, field days and demonstration experiments, (weed) societies, personal contacts, advice; mass-media, pamphlets, newsletters, journal, paper series, abstracts, annotated bibliographies, monographs, review articles, brochures and books. These should be chosen according to the respective target groups; the farmer

being the final and only target for information transfer, while the scientist and technical extension staff form the intermediate target groups. 2) The techniques for storages and retrieval of data should be chosen according to local needs and possibilities, 3) the cooperation between institutions and responsible individuals must be identified such as the case with FAO playing a coordinating role.

Additional key words: computerized data, control strategies, data dissemination, data storage techniques, weeds.

The Problem

Agriculture and, together with it, weed control, has to be adapted continuously to the changing and developing socio-economic systems which it is part of. In this respect, one of the determining factors is the rapidly increasing human population in most parts of the world. Along with this goes the urbanization. Food production has to be increased far beyond subsistence. This is only possible by introduction of scientific knowledge and appropriate modern technologies in a systems approach.

Urbanization, alphabetization, industrialization highly affect the labor force available for weed control, which often is one of the limiting factor in a crop production system. In shifting cultivation, reduction of the fallow periods may drastically increase weed problems, e.g. *Striga* in sorghum and millet production. The introduction of new appropriate weed control strategies is necessary. In order to achieve this, not only research is necessary but also the transformation and dissemination of research findings. At present, the latter is one of the greatest handicaps in adapting crop production systems to the requirements of modern societies. Often, knowledge and know how are available somewhere but not where they are needed. This problem is not as serious in highly industrialized countries as it is in Third World countries. In case we do not find a proper solution soon, the inadequate possibilities of transfer and dissemination of information from the scientific level through extension to the farmer may be the main obstacle in sufficiently improving food production in many Third World countries and we will never overcome the situation of surplus production in developed (industrialized) cropping systems and insufficient

production in traditional ones.

The Target Groups

The farmer is the final and only target of our information transfer. All other steps are intermediate ones. We have to bare this in mind if, in the following, we consider separately the different steps of information transfer and the respective techniques available. Intermediate target groups are scientists and technical resp. extension staff.

It is out of question, that the information has to be adapted to the respective target group and that the different groups may never talk to themselves only.

At the scientific level, it is important to guarantee a rapid exchange of information so that research programs can be planned according to the latest status of scientific knowledge and duplication of work can be avoided as much as possible. At the extension level, one should not be confronted too much with detailed research methods and very theoretical and specific research results but rather with reviews of relevant developments in the respective disciplines given by qualified scientists who know of the needs of extensionists and advisory staff. The information flow from the scientist to the advisory staff may be somewhat slower than at the research level. From those reviews concepts have to be developed which might need some on farm-experimentation or which can be recommended directly to the farmer. The development of concepts-of management strategies in the case of weeds-requires a thorough knowledge of the respective ecological and socio-economical situations. The transfer of new concepts to the farmer may be slow but must be convincing. The farmer adopts new ideas usually rather quickly, sometimes too quickly, if one is able to convince him of the

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advantage of the new concept. Of all the information available at the scientific level, only very little needs to reach the farmer. Most of it has to be sorted out, re-arranged, condensed to concepts and made acceptable on its way from the scientist to the farmer and this is one of the most difficult parts of our task.

Storage, Transfer and Dissemination of Information

1. **Storage, Documentation.** There are basically 10 possibilities to store information each one having a different accessibility:

- Unpublished reports aiming to inform the institution for which the information has been gathered; no or very limited distribution; hardly accessible for interested «outsiders»; may contain valuable information; the results of many weed control experiments are stored this way only; documentation centres should try to get access to as much of this information as possible.
- (Annual) reports of local research stations with very limited distribution and accessibility only; if one knows of the existence of such reports, the information may be used; may contain valuable information; the results of many weed control experiments are stored this way only; documentation centres have access to a limited number of such reports only.
- (Annual) reports of International Agricultural Research Centres with fairly good distribution and accessibility; contain very valuable information; the results of many experiments on weed problems are stored this way; documentation centres have access to such reports.
- Series issued by different institutions; they often contain reviews or extensive reports (6, 8, 9, 16, 24, 29, 30, 31).
- Proceedings of expert consultation workshops, symposia and conferences are an excellent source of information; they may be region and topic specific and their publication usually doesn't take too long; sometimes their accessibility is somewhat limited; of special interest to countries of the Near East are in the field of weeds (3, 4, 5, 23).
- Journals contain a lot of information; depending on the target groups, those journals may be of more scientific or of more technical content, more or less subject specific, and more or less region specific; publication of results often is somewhat slow; they serve as basis for further reproduction to a high extent; they are accessible and documentation centres use them as a major source of their information; of special interest are for the Near East in the field of weeds (1, 25, 26, 27, 28).
- Weed Abstracts, containing abstracts of most of the publications on weed problems.
- Documentation centres, replacing abstracting journals slowly; highly efficient but not everywhere available so far.
- Individual documentation of relevant information; reprints, microfilms; using conventional methods such as cards and punch cards or modern ones such as personal computer for documentation.
- Books on weeds and their control are hardly available with

special emphasis on the problems of the Near East (e.g. 2, 6, 8, 9, 11, 20, 30, 31) but quite a few which contain useful information relevant to the area under consideration (e.g. 10, 14, 15, 19, 32).

2. **Dissemination.** There are many ways of bringing information to the respective target groups: (weed) societies; training courses, workshops, symposia, conferences, field days, demonstration experiments; personal contact, advice; radio and television; pamphlets, newsletters, journals, series, abstracts, annotated bibliographies, monographs, reviews, brochures, and books.

Each one of those has advantages and disadvantages. Normally, a combination of different means is the best solution. It is important, however, to coordinate different approaches properly. (Weed) societies as well as national and international institutions have to play an important role in helping to provide the necessary tools and in coordinating the possible approaches.

Let me try to demonstrate such an approach for the Near East. The result of this effort will be very incomplete but it could be a start. Everybody who has a suggestion could contribute by writing to the author. So we could gradually improve our concept.

Training courses, workshops, symposia and conferences are offered in the area from time to time. This shall not be discussed in more details here. Many countries have good rural radio and tv programs. They could offer information on weed problems, but according to my knowledge they hardly do so up until now.

Pamphlets, brochures and books are available to a limited extent. It is often not known what is available and there are language problems in many cases.

FAO is stimulating and (co)organizing training courses, workshops, symposia and the publication of proceedings and other brochures and books on specific aspects of weeds and their control. Presently, a book on weeds of fruit trees and vineyards is being prepared for the West Mediterranean by Moreira on behalf of FAO. The German Agency for Technical Cooperation (GTZ) has quite some bilateral programs underway in the area under consideration. These activities which are conducted partly in cooperation with the University of Hohenheim, FR Germany, include also weeds to some extent. Much of the results of this work is published. Most of it is still available (4, 5, 6, 7, 8, 9, 12, 13, 16, 17, 18, 21, 22, 29, 33, 34). As far as GTZ publications are concerned, they can be requested from this institution. The French weed group at Montpellier has extensive experience, especially in Northern and Western Africa, also the British (producing Weed Abstracts, Tropical Pest Management and having special experiences in the field of parasitic weeds). The International Plant Protection Center (IPPC) at Oregon, USA, is offering very useful information (short courses, newsletters, brochures, books) on weeds and their control. Much of this information is relevant to the Mediterranean area, too. The European Weed Research is putting some emphasis on Mediterranean weed problems and conducted 3 symposia on

this subject so far. In Morocco, there is a Weed Science Society (Société Nationale de Malherbologie). The Arab institution ACSAD at Damascus, Syria, has conducted several weed courses in the past. The Technical Centre for Agricultural and Rural Co-operation (P.O.B. 380, 6700 AJ Wageningen, The Netherlands) is also producing and providing relevant literature.

Accessibility and Utilization of Stored Information

A lot of data are stored in the meantime but they are often not available where needed. It is not only that the information needed is not available to individual persons or group of persons but also that available information is difficult to handle. It is often quite time consuming to separate the data needed for a specific purpose from those not necessary. According to the amount and diversity of information (number of key words) which has to be available more or less quickly on request and according to the facilities, the documentation system has to be chosen basically from the following: books and journals; abstract journals; conventional card indexing; punch card indexing; personal computer; centralized documentation systems providing information on written request and/or distributing abstracts periodically, and online search; systems approach.

What will be said for indexing publications is of course valid for documentation of any other information such as results of experiments.

1. Books and Journals. Books and journals still are a primary source of information. Therefore, the publication of books and journals which meet the (local) requirements is highly important. This can be in connection with meetings (proceedings) or not. FAO is giving the publication of appropriate information high priority. In the field of weed control, FAO is looking for the specific regions and topics with a lack of published information. The discussions in connection with this paper could end up in recommendations for publications, workshops and symposia on weed problems in the area. Institutions interested in supporting such activities could select certain topics from those recommendations.

2. Conventional Card Indexing The conventional card indexing system is highly useful in the case of a limited number of key words (Figure 1). It needs one card for each key word of a publication, either with complete bibliographic citation or with complete citation only once and just the number of the relevant publications on the card with the key words. It is desirable but not necessary to have a brief abstract of each publication on the card with the bibliographic data. The advantage of this system is that the search for information is quick, easy and cheap. The disadvantage is that indexing is expensive in the case of high numbers of key words (Figure 1).

3. Punch Card Indexing. Punch cards are especially useful in the case of a relatively high number of key words. Only one card contains all the information. All the keywords are on this card. The relevant key words are punched out (Figure 2).

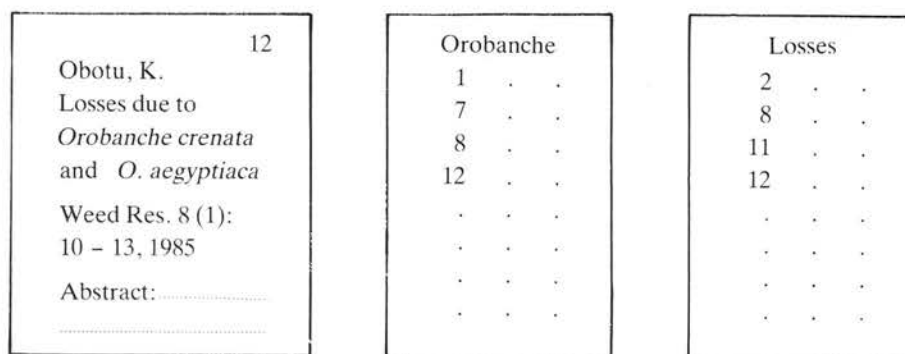


Figure 1: Conventional card indexing system (key words: Orobancha, losses, tomatoes, eggplants, Egypt)

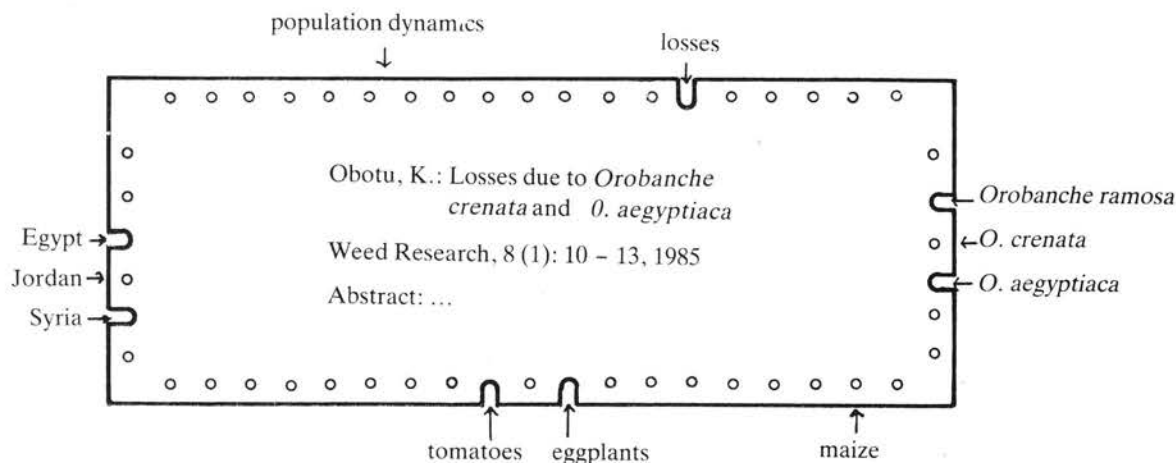


Figure 2. Punch card (key words: *Orobancha ramosa*, *O. aegyptiaca*, losses, tomatoes, eggplants, Egypt)

Searching for a specific information, the cards with the respective key words punched out can be sorted out with a needle. This is still the most efficient indexing system for individuals or small groups. Often it supplements successfully the possibilities provided by documentation centres which in many cases are not detailed or specific enough for individual needs.

There are other systems similar to this one. What has been said about the punch card system refers basically also to the other similar ones.

4. Personal Computer. If a personal computer is available anyway, it may also be used for literature documentation. Normally, however, it is more useful for storing and processing experimental results. In any case, the use of a personal computer for documentation purposes must be planned and organized very carefully. There is a tremendous misuse at many places in this respect. Often data are being properly stored but hardly anybody is making use of them. In respect to documentation, the personal computer does not have an unquestionable advantage over more conventional documentation systems. This is different, where the processing of experimental results, office organization and documentation of literature as a whole are consequently computer-based.

5. Centralized Documentation Systems. Centralized documentation systems are basically limited to «high input/high output» situation. Their operation requires capital, solid infrastructures, high numbers of users and science-based agricultural and industrial production systems. They are usually not sufficient as the only source of information but have to be supplemented by individually based information systems. In future we will depend more and more on such centralized systems. In the long run, they will replace at least in part scientific and to some extent also technical and extension journals. There is no need, however, to speed up this process too rapidly for it still has many weaknesses.

A cooperation between nations is necessary. International institutions could play a role in this process. To some extent, this takes place already now when programs of scientific or technical cooperation are conducted between nations/institutions where such a service is available and those nations/institutions where it does not yet exist but where the information is needed. From this type of cooperation, all partners involved could benefit and the gradual introduction of the new system would be facilitated. Just an example from my own experience. We have joint research programs with

Cukurova University at Adana, Turkey. The online search for relevant publications on weed problems is done through our university which is directly connected with such documentation centres. The specific literature for the Cukurova area is hardly available through the documentation centres but it is available locally and a research program can be based on a sound information background.

Type of Information Needed

There is mainly a deficiency of information on local regional problems at all levels but especially at the farmer and advisory level. Often there exists relevant information somewhere else which could easily be adapted to local requirements. In order not to miss the target this has to be defined carefully; e. g.:

i) Increasing labour shortage requires the introduction of less time consuming technologies (e.g. herbicides); weed identification and the knowledge of the appropriate technologies become more important than before and the respective information has to be made available: e.g. on the weeds of the area, on relevant control measures, on site specific weed management strategies.

ii) Reduction of the fallow periods in sorghum shifting cultivation systems may lead to severe Striga problems; information on Striga and its control has to be made available for further site specific research and/or to extensionists resp. farmers. The same is true for reduction of the number of fallow periods in wheat fallow cropping systems, where we might run into a wild oats problem.

iii) Introduction of new varieties or new crops may create new or enhance dramatically already existing weed problems, such as Orobanche with increasing vegetable production; information on the interrelationships between the respective production systems and their weeds as well as on possible strategies of control has to be made available for further site specific research and/or to extensionists resp. farmers.

iv) Changes in the production systems due to the availability of new technologies, e.g. changes in type and intensity of soil cultivation may be desirable. This may interfere with the weeds severely positively and negatively. On the other hand, new strategies of weed control will make a re-evaluation of the importance of soil cultivation necessary. Site specific information on interrelationships between production systems and weeds has to be made available locally.

الملخص

كوخ، و. 1986. تخزين وتوزيع المعلومات عن تحسين مكافحة الأعشاب الضارة. مجلة وقاية النبات العربية 4: 76 - 81. ان البحوث ضرورية لمكافحة الأعشاب بطرق جديدة، ولكن عدم تحويل نتائج البحوث وتوزيعها فإن الفلاح الصغير لا يستطيع الاستفادة منها. ولهذا السبب يجب التشديد على النقاط التالية: 1) نقل وتوزيع المعلومات من خلال دروس تدريبية، حلقات دراسية حرة، اجتماعات، مؤتمرات، رحلات

حقلية وتجارب ايضاح، الجمعيات المتخصصة (للأعشاب)، اتصالات شخصية، ارشادات، الاعلام العام والخاص، منشورات، نشرات اخبارية، مجلات، أوراق علمية، ملخصات، مراجع، دراسات متخصصة، مراجعة بحوث، بحوث، بحوث موجزة وكتب. وتختار كلها حسب الأهداف

المسوق.

كلمات مفتاحية: المعلومات في الحاسوب (الكومبيوتر)، الطرق الاستراتيجية للمكافحة، توزيع المعلومات، خزن المعلومات بالطرق التقنية، الأعشاب.

المرجوة، بحيث أن المزارع هو الهدف الوحيد الذي تمهه تلك النتائج. أما العلماء والمرشدون التقنيون فهم وسطاء في هذا المجال. (2) يجب اختيار تقنيات لتخزين المعلومات والحصول عليها حسب الحاجة والامكانيات. (3) التعاون بين المؤسسات والأفراد المسؤولين، كما هي الحال في الفاو التي تلعب دور

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