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Control of virus and virus-like diseases of fruit crops UNDP-FAO-RAB/88/025: Present situation and future prospects of the grapevine, citrus and stone fruit networks

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SUMMARY - A general view on the activities and results of the project is given. The project's major objective is the development of national capacities for production, maintenance and distribution of virus-free crop planting material by the establishment of regional repositories of virus-free fruit crops, the monitoring of virus diseases and the training of plant quarantine personnel. Expert technical advice and technology transfer are to be provided and complemented by training and provision of necessary supplies. Lack of funds prevented the initiation of any significant activities and the objective to harmonize the regulations for plant material registration and certification never materialized. MNCC can become a complementary part of it, including countries (Turkey) not in the Project.

Key words: fruit crops, certification, quarantine, projects, Mediterranean countries

RESUME *- Une vue générale sur les activités et les résultats du projet est donnée. L'objectif majeur du projet est le développement des capacités nationales pour produire, maintenir et distribuer du matériel végétal indemne de virus à travers l'établissement d'un répertoire régional des cultures fruitières indemnes de virus .*
Le monitorage des maladies virales, la formation des experts conseillers techniques et le transfert technologique doivent être prévus et complétés par la fourniture du nécessaire requis.
Le manque de fonds prévoyant l'initiation des activités significatives et les objectifs pour harmoniser la régulation des enregistrements du matériel végétal et la certification n'ont jamais été concrétisés. Le MNCC peut devenir une part complémentaire à celui-ci, incluant les pays non membres du projet (Turquie).

Mots-clés: *culture fruitière, certification, quarantaine, projets, Pays Méditerranéens*

Background and project characteristics

Fruit crop sanitation programmes have been established during the last few decades in developed countries and have provided the basis for flourishing fruit crop industries.

The need for fruit crop sanitation and improvement was lately recognised by various governments in Mediterranean and Near East countries with initiatives taken in some Institutions and Universities. However technical and financial support as well as coordination are required in order to put these programmes into effective operation.

In response to the request of FAO expert consultation (September 1985) and to the 18th FAO Regional Conference for the Near East (Istanbul, March 1986), UNDP and FAO accepted the respective roles in funding and technically supporting a Regional Project on the control of virus and virus-like diseases. All the more the FAO is executing a number of UNDP Projects on virus and virus-like diseases such as Citrus production (SYR/85/001), Control of greening disease of Citrus (KEN/784/013). Being the same executing agency, the FAO will co-ordinate the activities of this Project with other on-going and newly established projects.

It was also agreed by the Project member countries to fund their national programme on sanitation of fruit crops of particular interest and to assign basic staff and requirement for starting national activities.

UNDP contribution to the Project was initially 1,634,000 US dollars and was reduced to 1,345,611. The Project started in April 1991 for a duration of 4 years (1995) and extended till 1996 because many countries were not prepared to start activities on fruit crop sanitation, since the minimum requirements were not available.

The project major objective is institution building through networking in order to develop national capabilities for production, maintenance, and distribution of virus-free planting materials of vegetatively propagated crops. The project seeks to establish regional repositories of virus-free fruit crops, monitor the spread of virus diseases and strengthen national as well as regional capabilities of plant quarantine personnel in the detection of destructive diseases. Expert technical advice and technology transfer are to be provided and complemented by training and provision of necessary supplies.

The expected results are:

- the improvement of citrus, grapevine, and stone fruit quantity and quality per unit area through the control of virus and virus-like diseases;
- ameliorating the sustainability of the fruit crop sector and increasing local fruit production necessary for the well-being of people and countries in terms of availability of fruit products and by-products;
- generating employment; raising incomes and level of nutrition;

- increasing exports and subsequent improvement of balance of payments, and reducing dependency on imports.

The short-term objectives of the project can therefore be summarised as follows:

- development of a regional system of networks on fruit crop improvement through the control of virus and virus-like diseases;
- strengthening capabilities of participating countries in undertaking programmes of production and maintenance of healthy (virus-free) planting material;
- transfer of technology to participating countries;
- creation of awareness about the threat of devastating fruit crop virus and virus-like diseases currently of limited distribution in the region.

At the end of the project, each member country would have established operational programmes for the production, maintenance and distribution of healthy (virus-free) fruit crop planting material. Regional repositories of fruit crop genetic materials would have been set up, with duplicates in institutions of developed countries, to maintain healthy planting material and make it available to participating countries when needed.

Organisation, management and linkages

The FAO was designated as the executing agency. The project activities are coordinated at the regional level by the regional project coordinator stationed in the project coordination unit in Tunisia and at national levels by the national coordinator in each country.

The project is dealing with three different groups of fruit crops, namely citrus, grapes and stone fruits. Because of the diversity of the virus disease problems affecting the three groups of fruit trees and the different interest member countries may have in one group or another, a regional network has been set up for each group (the grapevine network based in Tunis, the citrus network in Cairo and the stone fruit network in Rabat).

The regional coordinator is responsible for coordination among the three networks as well as for establishing technical linkages between the networks and advanced European centres in Spain, France and Italy. The national coordinators' responsibilities are to liaise the national programmes and the regional project coordinator and manage the project's day-to-day operations including planning, programming and implementing of project activities in their respective countries.

Establishment and activities of the network

Although the initiation of activities has been considerably delayed, the regional coordinator for the three networks as well as the national coordinators have been appointed and the regional networks are

now fully operational. The grapevine network was set up and based in Tunis and coordination is already well established among the member countries' institutions and the specialised institutions of the developed countries in the Mediterranean region. The citrus network, based in Cairo and comprising the largest number of countries has begun its activities in 1993. Although operational, it is facing some technical problems. The stone fruit network, set up in 1994 in Rabat, has experienced considerable delays in becoming fully operational due to the appointment of its coordinator only some three years after the beginning of the project implementation.

The **grapevine network** including Algeria, Morocco, Syria and Tunisia, has laid the bases for cooperation among its member countries as well as with specialised institutions of developed countries in the Mediterranean basin.

The network activities focus on:

- clonal and sanitary selection with two phases; the first concerns a pomological and sanitary selection of wine grape varieties. The second phase consists of specific clonal and sanitary selection. The scheme of certification was adopted by all member countries;
- establishment of mother vine stands of American rootstocks selected in Tunisia;
- improvement of Tunisian varieties through the varietal and sanitary control of wine and table varieties;
- standardisation of selection and indexing methods.

The network has demonstrated the mutual benefits that can be gained from cooperation among the four countries and encouraged them to sustain the network's activities with future emphasis on:

- maintenance of healthy selected grapevine material through the establishment of repositories of healthy clones to be kept in triplicates in the four countries, a repository of an insect-proof greenhouse and of a germplasm bank to serve the four countries;
- standardization of selection techniques and indexing methods;
- greater use of the training facilities available in each country for the benefit of the other countries;
- strengthening their linkages with specialised institutions in the Mediterranean region.

The network organised three workshops, the first one in 1993 on "Clonal and sanitary selection", the 2nd on "Ampelography" and the 3rd on "Programming by objectives" in 1994.

The **stone fruit network** was created during a meeting held in Rabat (Morocco) in October 1994. A scheme of certification was adopted by all member countries.

This Network, although recently created, will progress rapidly in the coming years. Good linkages have been established with member countries and European Institutions (IAM Bari, University of

Bari, INRA Bordeaux etc.). Possibilities of extending this network to other countries are presently discussed with the concerned authorities.

The **citrus network** has a membership of Algeria, Egypt, Libya, Morocco, Syria and Tunisia with headquarters in Cairo. However, due to communication difficulties between the network coordinator and the network member countries, the network did not become fully operational until 1993. Even then, the network operation was curtailed due to insufficient resources for coordination. Lack of funds also prevented the initiation of any significant activities and therefore, the production of tangible results even in the host country.

The network has contributed to raising awareness on the threats of virus and virus-like diseases through training of quarantine personnel. However, some of these outputs were financed from resources outside the project budget. The objective to harmonise the regulations for plant material registration and certification among the project countries was not achieved as the planned consultancies for preparing the protocol for registration and certification never materialised. The most important project activity in Egypt was the establishment and application of standardised techniques for the detection of viruses. Application of these techniques resulted in the production of virus-free plants.

Training

Training has received a large share of the project resources. Since 1992, the national staff of institutions of many member countries has been involved in a number of research and training activities. These training activities are directed primarily toward improving the research capabilities of national programmes. The training programme included long-term training as well as short-term specialised training.

- A course on the protection and sanitation of Mediterranean fruit crops was organised in Bari, Italy, for participants from Egypt, Morocco and Tunisia. Two short courses on grapevine viruses were held in 1993. The first course was on thermotherapy and was attended by one participant each from Algeria, Morocco and Tunisia. The second course was on electrophoresis and was attended by one participant from Algeria.
- The project organised three training courses in Morocco (Rabat) in collaboration with DPVCTR, INRA, DAR and SODEA:
    - The first was on Tristeza diagnosis by ELISA technique (13-17 July 1992); it was attended by two participants from Egypt, one from Tunisia, one from Algeria and thirteen from Morocco as follows: seven from DPVCTRF, two from INRA, one from SODEA and three from DAR. This training was supervised by Dr Mariano Cambra IVIA, Spain and Dr Stephen M. Garnsey, USDA ARS, Florida USA.

- The second and third training courses were on citrus certification; the first course lasted 13 days (11/07/93 to 27/07/93) and was mainly on various indexing techniques including biological, serological and biochemical techniques while the second course was organised for one week and focused on shoot-tip grafting topics.

These two courses were attended by more than 20 participants, two from Algeria, four from Tunisia and twelve from Morocco.

- In 1994, the Project organised the following training courses:
  - Training on woody indexing of grapevine, IAM Bari 23 May - 5 June 1994 (15 days): three participants from Tunisia and one from Algeria.
  - Training course on protection and sanitation of grapevine, IAM Bari, 23 May -2 July 1994 (1 month and a half): four participants from Tunisia; the cost of these last two trainees was covered by the Tunisian programme.
  - Training course on Plant Virus Diagnosis, ADANA, University of Çukurova, Turkey, 15-30 October 1994 (15 days): two participants from Tunisia. The cost of this training course was covered by the Tunisian programme and by the CIHEAM, IAM-Bari, based on an agreement with this Institute.
  - Study tour on certification of citrus (ELISA, electrophoresis, biological indexing and shoot-tip grafting); ADANA, Turkey, 25 July-5 August 1994 (10 days). Three trainees from Egypt and two trainees from Syria.
  - Training on the management of repositories and foundation blocks at IAM-Bari (12 days): one trainee from Tunisia.
  - Training on citrus and grapevine diseases and their detection by ELISA and electrophoresis techniques, Tunis, Tunisia, 18-30 December 1994 (12 days): four trainees two from Iraq and two from Syria.
  - Study tour on grapevine certification, IAM-Bari, 14-26 May 1994 (5 days) by Mrs C. Cherif. The cost of this study tour shared with CIHEAM.
  - Study tour to participate in the meeting of the "Groupe d'experts de l' Office International de la Vigne et du Vin", Paris (France) November - 2 December 1994: one participant (Tunisia)
  - Workshop on identification, classification and conservation number of grapevine varieties; Tunis 24 June-1st July 1994 (6 days); twenty-seven participants, two from Algeria, two from Morocco, one (consultant) from France, two from Syria, twenty from Tunisia; the cost of Tunisian participants was covered by the national programme.

- Training on PAGE technique (electrophoresis) and biological indexing; INRA Corsica and CIRAD Montpellier, France; 3rd to 14th October 1994: two trainees from Tunisia. The cost of this training course was covered by the Tunisian programme and the French cooperation.
- Training on sanitation and shoot tip grafting, CIRAD Montpellier, France PAGE technique (electrophoresis) and biological indexing INRA, Corsica and CIRAD Montpellier France; 3rd 14th October 1994: two trainees from Tunisia. The cost of this training course was covered by the Tunisian programme and the French cooperation.

Project assessment

Factors affecting the project performance

The major factors which contributed to the success of the regional grapevine network were the limited number of the member countries (three of them in the Maghreb region) and French being the dominant technical language of the three countries.

On the other hand, many factors delayed the development of the citrus and stone fruit networks.

The project management framework had great complexity requiring the coordination of 3 networks and 6 national programmes. Disparities in the experiences and technical capabilities of the member country institutions were substantial. Delays occurred in nominating the regional coordinators as well as assigning the national coordinators. Communication was poor between the network coordinators and the member countries, and difficulties were encountered in establishing contacts with national coordinators in some member countries (Egypt, Libya, Iraq). Information on the extent and distribution of citrus and stone fruit diseases in the member countries was scant.

Articulated programme of work and timetable for implementing the project activities were lacking. The project modest output and limited impact were primarily due to the short life span, inadequate funds and difficulties encountered in establishing the regional and national bodies for the formulation and harmonization of legislation and for the certification of planting material.

Equally important, the project document failed to account for or to provide the means for any research activities or for effective mechanisms to achieve project objectives or to monitor its implementation.

Effects and impact

The project has succeeded in establishing the base for cooperation between the member countries of the grapevine network. The national teams of the three countries have shown a desire as well as the ability to communicate with each other and to cooperate in addressing the major technical issues of the field. Good linkages with specialised institutions of developed countries in France and Italy were also established and consolidated.

The training programme carried out by the network was successful. It has improved the technical knowledge and practical experience of the staff and increased the capacity of the relevant institutions of the member countries for the production, maintenance and distribution of virus-free grapevine planting materials.

The diagnosis and indexing techniques which were developed or adapted by the network technicians were very effective in the isolation and selection of healthy rootstock and mother plant material from local and foreign genetic material for propagation and distribution to the grapevine producers in the three countries. Programmes for planting the infected orchards with healthy plants are being designed and gradually implemented in various grapevine-producing region in the three countries.

For the above reasons, the citrus and stone fruit networks were not equally successful in delivering the intended outputs. In particular they were not instrumental in stimulating regional cooperation which was considered a major objective of the project. More effort and dedication on the part of the network member countries as well as UNDP and the FAO are required to make these networks fully operational. Inadequate budget for travel and visits of the network regional coordinators, slack response of and poor communication among the network members, lack of information on the extent and distribution of diseases in the region, absence of a well articulated work plan, too much delay in assigning the regional and national coordinators and lack of strong leadership are the main constraints that prevent these two networks from becoming fully operational.

However, it now seems that the management of the citrus network (in Egypt) and the attitude of the concerned institutions of the network member countries is gradually improving. An organisational model was formulated for the citrus network and national and regional programmes were established, but there will be no opportunity to "tune" the model in the short life time of the project. Given these circumstances, a minimum of five more years are needed for the two networks to produce tangible results.

Conclusions and recommendations

In conclusion, the project delivery as a whole was relatively modest. While the grapevine network was successful in laying the foundation for future cooperation among its member countries and with other country institutions in the Mediterranean region for the production, maintenance of healthy and virus-free plant material, the other two networks have only recently initiated their activities, but very few results would be expected in the remaining period of the project.

The sustainability of the gained momentum in the grapevine network as well as the success of the other two networks in achieving their objectives will depend on the alleviation of common constraints, especially those related to coordination and funding. As the project is now approaching its final year, consideration may be given to extending it for a period of at least five years in order not to waste the time and resources which have been invested.

The failure of the project to make provision for or to allocate resources to research was a major deficiency in the project document as this precluded delivery of tangible benefit through the networks. An extension or related future project should therefore include research (adaptive as well as applied) and extension components.