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ARIJ Newsletter

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ARIJ in Palestine's Time of Transition -Five Years of Working Toward Sustainable Development:

This newsletter comes to commemorate the fifth anniversary of ARIJ. Much has happened in the last five years to influence ARIJ's work. At the political level, these five years witnessed the third year of the Intifada, the Gulf war, the beginning of the peace process with the "Oslo agreement," the "Cairo Agreement," the return of the PLO leadership to Gaza and Jericho, and now the beginning of the implementation of the interim agreement in light of "Taba agreement."

ARIJ as an institution has seen important growth during this period. Starting with one employee back in 1990, the institution now enjoys the services of 30 staff members. As would be expected in such times of transition, ARIJ has had to adapt its programs to meet the urgent needs of the Palestinian community. While its primary focus is still sustainable development, the institution has worked to promote the peace process by working closely with the Palestinian leadership providing background information and data, and by assisting in the drafting of position papers related to the environment and other issues. It is now clear that ARIJ is filling a badly needed niche in this regard.

However, recognizing the need for constant upgrading of the level of staff training in these fast changing times, ARIJ has been working to build its institutional capacity. To this effect a delegation from the board of ARIJ visited Jordan from 16/5/95-18/5/95 and signed an agreement with University of Jordan to work together in the field of agricultural research. This important agreement will allow exchanges of information, research and training between these two institutions, drawing on the obvious commonalities of experience. Similar relationships are being developed with various other institutions including: McMaster University and Mohawk College in Canada; Agropolis in Montpellier France; the Universities of Birmingham and Durham in the United Kingdom; the Universities of Karlsruhe and Bern in Germany; and institutes in Austria.

In the same light, ARIJ is developing cooperative relationships with the local municipalities throughout the West Bank, whereby there are exchanges of information and analysis on different environment and natural resources components in each district.

Visitors and Visits:

The institute received visitors from a variety of institutions throughout the year, representing a variety of interests and projects. Some of the visits were intended to collect information, while others were to investigate the possibility of joint projects. Among the most important was a visit by the Palestinian National Authority Minister for Trade, Economics and Industry, Ahmad Qrei (Abu Ala), who visited the institute in late 1994. After touring the institute, he expressed interest in closer cooperation with ARIJ in working toward sustainable development in Palestine.

Other visitors to the institute included: representatives of the Middle East Council of Churches; representatives of the European Economic Community; the Norwegian special advisors to the Palestinian Ministry of Planning; the Canadian Ambassador; the British Vice Consul; Roderic Dutton from Codel Geographic Society in the United Kingdom; representatives of the Society for Austro-Arab Relations and the Austrian Director-General for their Environmental Management division; representatives of Global Change, from Germany; a representative of the Embassy of South Africa; representatives from the French Space Agency (CNES) and Scot Conseil; a delegation from the Red Cross; a delegation from the Center for International Cooperation, from Virginia in the United States; Professor Caponera from Italy; the Consul-General for the United States of America; representatives of the European Investment Bank.

Rainfed Unit:

This year the Rainfed Unit expanded its scope of types of work, while maintaining the implementation side of the work that so characterized the unit in years past. The unit continued with demonstrations and experiments in field crops and forages, but at the same expanded on work done in the area of integrated pest management, while adding to its list the collection and categorization of wild flora, as the first step in a broader project for the promotion of biodiversity in Palestine.

Agricultural demonstrations and experiments:

With the support from the institute's continuing relationship with the Pax World Foundation in Washington, the unit continued working with the program to improve field crops and forages under rainfed conditions. In 1994/95 growing season the experiments and demonstrations were continued in the village of Al-Thahiryra (South of Hebron District) and extended to Za'tara village (South-East of Bethlehem District).

While ARIJ benefited from the research and demonstration results carried out in farmer's fields, ten large agricultural families benefited from this program. This was not only because ARIJ supported 35% of production costs, but also because of yield increases as a result of applying improved agricultural practices on their land. As the rainfall for 1994/95 was normal, the results were quite good. The high-yielding and disease-resistant varieties of wheat and chickpeas and bird-resistant sorghum, identified by ARIJ staff as having good potential based on results of previous years, gave significantly higher yields than local varieties and those cultivated using more conventional methods locally. All crops in the demonstrations were grown using technics such as using an earlier planting date, drilling to provide better spacing for seeds, crop rotation, better pest (weed) control, adequate fertilizer inputs, and mechanization of land cultivation and harvest.

Wheat demonstrations in Al-Thahiryra produced 3,200 kg/ha grain yield, exceeding normal wheat production in this area by 1,700 kg/ha. In Za'tara, the grain yield was 2,400 kg/ha and exceeded the normal local wheat production by 1,100 kg/ha. The grain yields of chickpeas and sorghum gave the same results as for wheat in terms

of comparability to local production. The effects of the application of different types and levels of fertilizer were tested on each of the different varieties of wheat using a Factorial Experiment under a Randomized Complete Block Design, to select the most productive combination of fertilizers.

ARIJ has also worked on classifying the land races of local chickpeas from Al-Thahiryia either as Desi or Kabouli. Growth and yield potentialities for both types were tested under a Randomized Complete Block Design along with other chickpea varieties in the 1994/95 growing season. The experiment results revealed that grain yield for both was not significantly different from the high-yielding and disease resistant varieties. Further experiments and field trials will be applied to improve their uniformity, yield potential and to evaluate their resistance to *Ascochyta* blight.

Scientific reports and articles about the activities and the results of the experiments and demonstrations from the 1994/95 growing season will be developed by the end of 1995. Support has been promised for this work in the coming years by the Arab Fund for Development.

Biodiversity:

Because of its importance as an environmental indicator, its use in environmental impact assessments, and its importance in terms of preventing desertification, the unit has in the last year focused on the categorization and preservation of plant biodiversity. An inventory for biodiversity in Palestine has been created with a computerized database constructed using Fox-Pro software. Each single plant has a separate descriptive sheet, including: taxonomy, morphological and physiological characteristics, habitat, location and date of spotting, chemical constituents and economical values, and a photograph showing the plant. So far, about 340 wild plants belonging to different families have been entered. This will be fed into the GIS system as part of the overall environmental database for the West Bank and, it is hoped, will be an important component in an ICARDA regional project to promote biodiversity in the Middle East Fertile Crescent. As a next step, an herbarium will be established, along with activities in seed collection and conservation of genetic resources in the 1995/96 growing season.

ARIJ was privileged to receive two representatives from the biodiversity and genetic resources staff at ICARDA in August of 1995. Their visit was fruitful, resulting not only in commitment to include ARIJ in regional biodiversity activities, but also in great interest in using the institute's GIS and data base system as a model for regional applications of GIS in the biodiversity program.

Under the auspices of the Deputy-Minister of the Palestinian Agriculture Ministry, Dr. Azzam Tubeileh, a workshop was held on 22/9/95 at ARIJ on "Biodiversity in Palestine," with the aim of garnering Palestinian government support and a national consensus about the importance of developing a program to promote biodiversity. Institutions which participated included the Palestinian Ministry of Agriculture, Universities, and Palestinian NGOs. The meeting resulted in the

formation of the National Palestinian Committee for Biodiversity (NPCB). Dr. Azzam Tubeileh, will serve as chairman of the committee, and ARIJ director, Dr. Jad Isaac, will serve as the committee secretary, with the rest of the membership made up of five specialists from different institutions.

ARIJ has developed close relationships with ICARDA, IPGRI, FAO, and University of Birmingham in the United Kingdom. These will be important contacts in providing training for Palestinian botanists in the preservation of plant genetic resources, the conservation of biodiversity more broadly, identification of threatened lands and plant species, and the development of Palestinian seed gene banks.

Integrated Pest Management (IPM);

As follow up to the book *Pesticide Usage in the West Bank and Gaza*, published by ARIJ in early 1995, a computerized database is being developed containing the quantities of different types and groups of pesticides used in Palestine, for different crops under different cropping patterns. The database should be ready by the end of December 1995.

A project has also been undertaken to study the effect of pesticides on farmers and people living near sprayed areas, through measuring Acetylcholinesterase (ACHE) levels in blood. ARIJ staff will start soon using special test kits to measure ACHE levels in the blood of Palestinian farmers in the Jordan Valley for different cropping patterns. The advantage of these kits is that those tested can know immediately their level of risk and exposure. It is expected that the results will show a high level of exposure for Jordan Valley farmers, as large quantities of chemical pest controls are used on vegetables and fruit trees, often without proper attention to safety procedures.

Nutrition and Health:

While from the period of 1967-1987, the Israeli Bureau of Statistics made estimates for the Palestinian food balance, these estimates were often inaccurate, and no nutritional food balance has been established since the 1988 for the West Bank and Gaza. The food balance is very important in making overall estimates of the nutritional status of the population. Noting this information gap, ARIJ has begun working with the European Economic Community Med-Campus project to develop a program for maintaining nutritional data on the West Bank and Gaza. ARIJ was represented at the organizational conference on this subject in Crete in May 1995, and presented a paper on the nutritional status in Palestine at the follow up conference in Cyprus in July 1995. ARIJ staff members have since attended follow up meetings and workshops on the subject.

The Environment Research Unit:

This year marked the continuation of the project started in July 1994 to establish a Palestinian Environmental Information System for the West Bank. Progress so far has been made in creating environmental profiles for the Districts of Bethlehem

and Jericho, with the profile for the Hebron district under publication. The next profiles to be written will be on Jerusalem, Ramallah, Nablus, Jenin and Tulkarem.

In each of the profiles there is a wide range of information, including information on: physical features in each district, water resources, land use, agriculture, industry, social and physical infrastructure, population, estimates of sources of solid waste and toxic waste, estimates of other kinds of pollutants. Information on flora and fauna throughout the West Bank is being collected and will be incorporated into a final profile for the entire West Bank, to be completed in the middle of the coming year.

The institute was visited for one week, at the end of March 1995, by Dr. Rudolf Orthopher, the director of the Austrian environmental database project, who is serving through the funding organization, the Society for Austro-Arab Relations, as an advisor to ARIJ on the database project. He and ARIJ staff worked together in developing a system of information management allowing expansion, development and maintenance of the database as the amount of information in it expands through the years.

Already, ARIJ is using the design of the database and the information within it in aiding the development of other projects in Palestine. Among other things, the institute participated in meetings sponsored by UNDP to design a Palestine Human Development Report, and contributed to a Birzeit University symposium on "A Strategy for Water Sector Capacity Building in Palestine." The institute has also been supplying the Palestine Authority Ministry of Planning with important background information as they try to develop policies and plans to rehabilitate the West Bank after 27 years of occupation.

The unit was also responsible, with the help of special advisors Jonathan Kuttab and HibeH Hussein, for the publication of a proposed environmental legislation, a symposium on which was held at Tantur in Jerusalem on September 1, 1995. This legislation will hopefully be the first step in the development of a comprehensive strategy for environmental protection and rehabilitation.

Among other issues that are to be undertaken by the unit is a project to monitor air quality in the West Bank, which is to be funded by the British government. The unit will use mobile ambient air quality monitors to test air quality in different locations, thereby developing important baseline data on pollution and sources, providing information needed for the development of policy. This will be combined with an already underway project to model transportation, and thus auto-produced pollution, and the production of greenhouse gases in West Bank.

The Water Research Unit:

The water research unit at ARIJ has worked over the last year on three simultaneous projects: continuing to collect and analyze important information on irrigated farming; providing the information to all units about water resources, irrigation and climate; and modeling the quality, quantity and value of available

water resources throughout the West Bank. All three have been important in developing recommendations about policy and planning of this regions scarce water resources. Three ongoing and simultaneous projects have allowed the compilation and analysis of this information.

The irrigated agricultural project, supported by IDRC-Canada, has led to the collection of in depth data about irrigated farming practices, and the quality and quantity irrigation water resources in the West Bank. Surveys have now been completed of farmers in the districts of Jenin, Tulkarem and Jericho, leading to estimates of the extent to which different kinds of irrigation technics are used in the West Bank and the kinds of agricultural practices generally used in this type of agriculture. Water resources have also been tested from all of the groundwater wells used by Palestinians in the West Bank, as well as 37 major springs used for both domestic and irrigation purposes. Information collected now includes: the coordinates and elevation of water sources; the depth of groundwater wells; infrastructure feeding the well or taking water from it; and usage data such as discharge, pumping quota and rate, pump type, water usage, and cost per cubic meter produced and used. Chemical analysis has been done using the Al Quds University laboratories, Abu Deis campus, on 225 wells and 25 springs to determine their quality. In addition, information was brought from the Central Laboratory of the Municipal Department of Agriculture in the district of Nablus on the quality of 80 wells and springs (sampled from 1981-1994). All this information was modelled, using the software Ground Water for Windows, developed by the United Nations, to show to differentiation in West Bank water quality depending on well type, depth and location.

Climatological data has been collected through the ARIJ meteorological station in Bethlehem, and readings are now taken and reported regularly. Information has also been purchased from the Israeli Meteorological service, representing five stations (four within the West Bank and one in Israel). These have allowed for information about rainfall, temperature, and wind throughout the West Bank, all important variables in environmental analysis.

As well as being used in reports on the water situation in Palestine, this information has been compiled region-by-region for use in the district volumnes of the West Bank Environmental Profile.

The unit has sent two of its members to training courses in the last year: Walid Sabbah, the unit director, participated in a six week training course entitled "Hydrogeology of Groundwater Modelling," which was held in Oman (Ministry of Water Resources) and Holland (IHE-Delft) in the period 1/4/95-12/5/95.

Mohammed Musallam participated in a training in Tunesia on "Greenhouses and Irrigation technology" from 11/9/95-6/10/95.

GIS and Land Use Unit:

This unit has remained very much the hub of ARIJ's work. Using the geographic information systems software of ARC Info and PAMAP, the unit has provided the essential database and mapping capacity for demonstration and analysis. It is now possible to overlay all new information on base-maps taken from the 1942 British Survey, which includes records of built up areas, water sources, roads and topography, among other things. Regional maps are now being done on issues ranging from geography to soils, to built up areas and agriculture.

Already incorporated into the GIS system is the FoxPro data management system and Ground Water for Windows. The unit is in the process of analyzing aerial photographs of the West Bank, and intends to use satellite photographs, provided by SPOT Conseil and CNES (the French Space Agency), improving the sophistication of its analysis.

The unit will be presenting the applications of GIS in the promotion of biodiversity in the Fertile Crescent to an organizational conference on regional biodiversity, to be held by ICARDA in Izmir Turkey in late October. ARIJ's system will be demonstrated as a potential GIS model for other countries and institutions participating in this regional program. ARIJ will also be hosting a workshop sponsored by CNES and SCOT Conseil on the applications of GIS and satellite photographs, and has already presented at local conferences on the applications of GIS in different sectors in Palestine.

Computing Center:

Another important hub of the institute has been the computing center, which has networked the entire ARIJ staff, including among other things the interlinking of different data bases, for instance Fox-Pro and GWW with the ARC Info GIS system, and vastly improving the ability of ARIJ to include scanned images in its papers and analysis. The institute has ordered a Sun Machine and the center will be asked to install the ERDAS program to the GIS system, for the analysis of satellite images, putting ARIJ at the cutting edge of image processing and environmental analysis. The computing center has also succeeded in providing all interested staff with personalized email accounts, improving communication links and contacts with outside institutions.

Library and Information Center:

The ARIJ library and environmental information center has continued to grow, with the addition of new periodicals and books thanks to grants from the British Council and a periodical line item in the West Bank Environmental Information System project, funded by the Society for Austro-Arab Relations (SAAR). As well as providing an important resource for staff, frequently visitors from the Palestinian

community and others researching natural resources and environment in Palestine use this center.

Staff:

One of the greatest difficulties for ARIJ has been staff turnover. In these times of transition, newly formed Palestinian government ministries and international NGOs have drawn from the institution's talented staff as they set up. These institutions have been able to pay better salaries among other things. Staff have also left ARIJ because of the ongoing difficulties of moving from the northern to southern West Bank. This has obviously been difficult, but those who have left remain friends and important contacts in these institutions, and ARIJ has been fortunate in being able to replace those who have left with a highly qualified team. Recognizing the importance of competing for the best staff possible, the ARIJ board adopted a new salary scale in October 1995, awarding an average raise of 15% on the salaries of all institute employees.

Among those who left: **Ibrahim Dajani** and **Ahmad Hammad** left to join the ministry of planning; **Suheil Tafesh** joined the UNRWA; **Abdul Latif Mohammad** left to join the Palestine Agricultural Relief Committee (PARC), because of his difficulty in coming to ARIJ each day from his home in Ramallah; **Anan Jayyousi** left to Birzeit University because of transportation problems; **Sana Bandak** left to one of the local Banks; **Ghadeer Sababa** and **Linda Qassis** left after marriage; **Basema Tahruri** joined in for six months and left to the Palestinian Water Authority; **Abeer Istanbuli** joined for almost a year and left to work with a developing medical clinic in Ramallah.

New staff includes:

Bader Abu Zahra

MSc Environmental Sanitation

Isam Ishaq

Masters in Communications Science

Rubina Basous

BSc Biology

Rita Sammour

BSc Chemistry

Sara Carney

MSc Environment

Nisreen Mansour

Secretarial Diploma

Amal Abu Aita

Secretarial Diploma

Miriam Abdallah

Maintenance

ARIJ is also fortunate to have back **Leonardo Hosh**, who was on two years leave to complete a Masters' degree in International Agriculture and Development at the University of California, Davis.

Recognizing the need to have increasingly experienced staff, ARIJ is pleased to announced the departure of three more members **on study leave:**

Osama Ayyash will be pursuing a Masters at CIHEAM in Montpellier, France.

Taghreed Lahham will be pursuing a Masters in Chemistry at IHE University in Deft, Holland.

Youssef Abu Assad will be pursuing a Masters in Water Resources Management at the same university

Publications:

1. "Core Issues of the Palestinian-Israeli Water Dispute," Isaac, Jad. In Spillmann, Kurt R; Bachler, Gunther (Eds.): *Environmental Crisis: Regional Conflicts and Ways of Cooperation*. Proceedings of a International Conference at Centro Stefano Franscini, Ascona/Switzerland, 2-7/10/94. ENCOP Occasional Paper, No. 14. Swiss Federal Institute of Technology/Swiss Peace Foundation: Zurich/Berne.
2. **Pesticide Usage in the West Bank**, Saleh, Azzam; Neiroukh, Faten; Ayyash, Osama; Gasteyer, Stephen. ARIJ publication 2/95.
3. "The Palestinian Environmental Dilemma:" presented by Dr. Hasan Dweik, of Al Quds University - Abu Deis, at a conference of Eco- Peace, Egypt, 6/2/1995.
4. **"The Issue of Biodiversity in Palestine"**, Isaac, Jad; Gasteyer, Stephen. Presented at the workshop: Dryland Biodiversity Conservation through Natural Resources Management. Sponsored and organized by UNEP, ACSAD, ICARDA, IPGRI, Amman 5-9/2/1995.
5. **"A Sober Approach to the Water Crisis in the Middle East"**, presented to the International symposium "The Future of the Mediterranean Area after the Peace Process," UNESCO, Paris, 18- 20/2/95.
6. "Palestinian/Jordanian Cooperation in the Field of the Environment," Isaac, Jad. In *Al-Nadwah*, a bulletin published by the World Affairs Council- Amman; Volume VI - Issue No. 2, Shawwal, 1415/, 3/95.
7. *West Bank Environmental Profile: Volume 1; District of Bethlehem*, ARIJ, 6/95.
8. "Assessment of water resources using Ground Water for Windows (GWW) software: Groundwater quality in the Arab Development Society Project- Jericho as a case study." Presented and submitted to the Second Palestinian Conference on Chemistry and Applied Chemistry which was held in the College of Science and Technology, Abu Deis University, 23-24/6/95.

9. "Toward a Palestinian Water Policy," Sabbah, Walid; Isaac, Jad. Presented and submitted to the seminar on "Options and Strategies for Freshwater Development and Utilization in selected Arab Countries." Amman 26-28/6/1995.
10. **"The Nutritional Status in Palestine,"** Isaac, Jad; Kharoub, Jrasmus; Mourad, Helen; Hrimat, Nader. Presented at the seminar: Food and Nutrition policies in Mediterranean Countries. Cyprus, 3- 7/7/95.
11. "Drylands Biodiversity: A Case Study from the Near East," Peacock, John; Christiansen, Scott; Isaac, Jad; Taimeh, Awni Y.; Valkoun, Jan. Presented to the international workshop: "Combatting Global Warming by Combatting Land Degradation," United Nations Environment Programme, Nairobi, 4-8/9/95
12. "Applications of GIS in Water Resources Management," Owewi, Maher; Isaac, Jad; Sabbah, Walid. Presented to the symposium on "Strategy for Water Sector Capacity Building in Palestine," held 6- 7/9/95 at Birzeit University.
13. "Challenges for Integrated Water Resources and Development Management Policy," Isaac, Jad; Abu Zahra, Badir; presented to the Symposium on "A Strategy for Water Sector Capacity Building in Palestine," Birzeit University 6-7/9/95.
14. "A Study of Palestinian Water Supply and Demand," Isaac, Jad, et al., presented to the Birzeit symposium (see above).
15. *West Bank Environmental Profile: Volume 2; District of Jericho*, ARIJ, 10/95