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MAINSTREAMING GENDER DIMENSIONS IN WATER MANAGEMENT FOR FOOD SECURITY AND FOOD SAFETY

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Abstract - Gender equality in rural areas is set to become a major point on rural development agenda. Without the presence and input of women, agriculture worldwide would not exist. Women in Cyprus have traditionally played an important role in agriculture where most farms are family run. Women working in agriculture comprise 3% of the working population of the country and are mainly involved in the growing of field crops and livestock rearing. Family farm is the typical production unit in Cypriot agriculture, with the farm family being the main labour source. Rural women account for 16,5% of the total population and constitute substantial and integral part of the country's labour force. They account for 15% of the total female or 6% of national labour force and are employed in all types of agricultural activities, and some of them have important competencies and responsibilities. It is important to note that the agricultural sector accounts for 3,6% of the GDP, and constitutes a significant part of the Cypriot economy. Women, have a significant role to play and the need to support and raise women's profile in the decision-making process is clear. Throughout the twentieth century, there has been an increasing trend towards the use of stored and processed foods. Initially, this was a response to industrialisation and the need to provide food for large number of people living in cities. More recently, the consumer has come to expect access to a wide variety of foodstuffs throughout the year, without the restrictions imposed by seasonal and regional availability, and there is increasing reliance on convenience and fast foods. The processes involved in producing and storing foods frequently require the addition of chemicals (either natural or man-made) to improve the safety (microbiological safety) or to preserve the nutritional quality. An additional benefit is increased palatability and attractiveness of foodstuffs to the consumer. Clearly the safety of such chemicals has to be assured and their use controlled in order to avoid harmful effects.

AGRICULTURE IN CYPRUS

The agricultural sector exhibited an increase in 2002 compared to the previous year. This is attributed to the favourable weather conditions, which resulted in an increase of the volume of the crop production, mainly for cereals that increased by 11,3%. The value of livestock production maintained the upward trend of recent years, with an increase of 3,2% for 2002 (Agricultural statistics, 2002).

The total gross output of the broad agricultural sector increased by 0,3% at current prices and reached £376,4mn. in 2002 compared to £375,2mn. in 2001. In real values, gross output increased by 3,1% compared to an increase of 8,0% recorded for 2001. In real terms, crop production increased by 6,5%, livestock production recorded an increase of 3,9% and ancillary production increased by 0,3%, while forestry production and the hunting sub-sector recorded a decrease of 7,8% and 53,9% respectively (Agricultural statistics, 2002).

Employment in the agricultural sector recorded a marginal decrease to 23.000 persons in 2002 compared to 23.400 in 2001. This decrease is attributed to the decreased demand for labour for agricultural activities. The share of employment in agriculture in relation to the total labour force was 6,9% in 2002, compared to 7,1% in 2001, 7,4% in 2000 and 8% in 1998 (Agricultural statistics, 2002).

Cultivated Areas

The total Agricultural land covers an area of about 200.000 hectares (Agricultural Statistics, 2002). From these, 93.300 hectares represent temporary crops (46,7%) and 39.400 hectares permanent

crops (19,7%). The remaining hectares represent fallow, uncultivated, grazing, forest and scrub or deserted land as illustrated in Table1. From 1985 to 2002, the Agricultural land decreased more than 6% mainly due to urban development.

Table 1. Agricultural Land, 2002

| Land use | Irrigable area (*1000 hectares) | Total area (*1000 hectares) |
|-------------------------|------------------------------------|--------------------------------|
| Crops types | 35,1 | 132,7 |
| <i>Temporary crops</i> | 19,1 | 93,3 |
| Cereals | 4,1 | 59,2 |
| Legumes | 0,6 | 0,8 |
| Industrial Crops | 0,4 | 0,4 |
| Fodder crops | 4,3 | 23,2 |
| Vegetables and melons | 9,7 | 9,7 |
| <i>Permanent Crops</i> | 16 | 39,4 |
| Vines | 2,3 | 15,1 |
| Citrus | 5,5 | 5,5 |
| Fresh fruit | 3,6 | 3,6 |
| Nuts | 1,2 | 4,2 |
| Olives and Carobs | 3,4 | 11,0 |
| Fallow land | 1,7 | 6,5 |
| Grazing land | 0 | 0,8 |
| Uncultivated land | 1,6 | 48,9 |
| Scrub and deserted land | 0 | 7,0 |
| Total | 38,4 | 195,9 |

Source: Agricultural Statistics, Series II, Report No 34, Statistical Service

Types of Crops Cultivated

The main temporary crops are cereals with 61% of the total area under temporary crops, followed by fodder crops with 27,4% and vegetables with 10,5%. The main permanent crops are grapes with 44,1% of the total area under permanent crops, followed by olives and carobs with 24,5%, citrus with 13,1%, nuts with 9,4% and fruits with 8,7%.

Irrigated Agriculture

Irrigated land accounts for 38.400 hectares or 19,6% of the total agricultural land. Of this, 51% is irrigated from water pumped from boreholes, 39,2% from dams, 6,3% from rivers and 3,5% from springs.

Irrigated Crops (Permanent, Annual)

The percentage of water demand for permanent and annual crops is 59% and 41%, respectively (Fig. 1). This accounts for 95,8 MCM/year and 65,5 MCM/year respectively.

Types of Irrigated Crops

The irrigation water demand of 174,4 million m³ is distributed as presented in Table 2, where the irrigated area by crop, the water use by crop and the value of production for the irrigated crops (producer's price) are given.

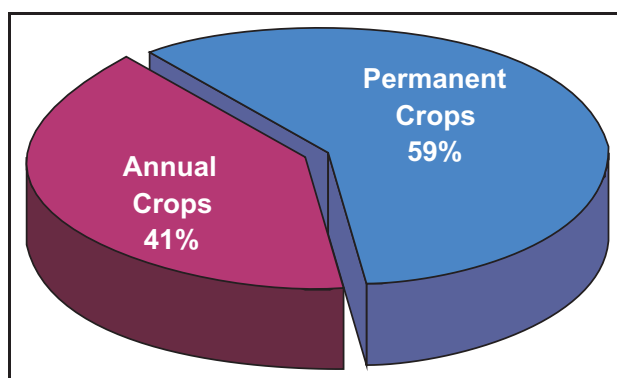


Fig. 1. Distribution of water demand for permanent and annual crops

Table 2. Distribution of the irrigated areas by crop

| | Total irrigated area (ha) | Area % | Water use by crop % | Value of production (producer's price) % |
|-----------------------|------------------------------|-----------|---------------------------|--|
| Potatoes | 10.560 | 30 | 19 | 31 |
| Citrus | 8.448 | 24 | 31 | 11 |
| Deciduous | 4.224 | 12 | 16 | 14 |
| Olives | 1.056 | 3 | 2 | 5 |
| Table Grapes | 2.112 | 6 | 3 | 3 |
| Bananas, Avocado etc. | 352 | 1 | 3 | 3 |
| Annual Crops | 2.464 | 7 | 5 | 2 |
| Greenhouses | 352 | 1 | 1 | 10 |
| Vegetables | 4.576 | 13 | 11 | 16 |
| Clover etc. | 1.056 | 3 | 9 | 5 |

The area under protected cultivation (with approximately 90% cultivated with flowers), represents only the 1% of the total area, yet, uses the lowest quantity of water and gives the highest return/income compared to the rest of the irrigated cultivations. The greenhouse cultivations represent the most profitable crops per volume of water (m^3). This is a very important consideration in countries like Cyprus or Mediterranean region since the water is the limiting factor in agricultural production (Chimonidou, 2000).

WOMEN IN AGRICULTURE

Women have traditionally played an important role in agriculture in Cyprus where farms for the most part are family run. Labour provided by family members accounts for 80% of the total compared to 93% in EU-15 in 1997. Women are involved principally in the growing of field crops and livestock rearing. Women working in agriculture made up to 3% of the working population of the country. The female workforce, whether made up of family members or employees, represented over a third of the total population working on farms (Fig. 2).

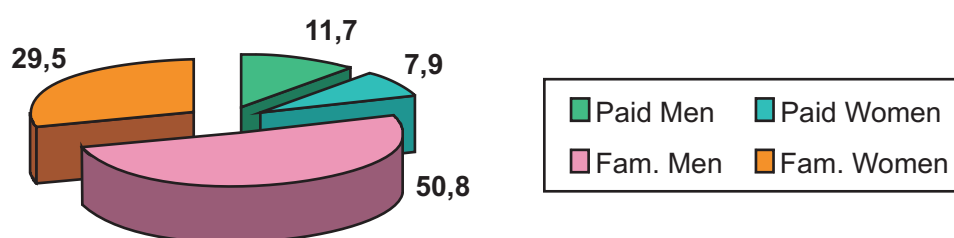


Fig. 2. Distribution of paid and family labour in Cyprus (number of persons)

The family farm is the typical production unit in Cypriot agriculture, with the farm family being the main agricultural labour source. Out of a total number of 27.552 (Agricultural Statistics, 2001) engaged in agriculture (8,9% of the total economically active population), 77,5% are farmers or members of the farm family (Census of Population, 2001). Rural women account for 16,5% of the total population and constitute substantial and integral part of the country's labour force. They account for 15% of the total female or 6% of national labour force (Aristotelous, 1994).

Table 3. Employment in agriculture by category, sex and sub-sector, 1996-2001

| Sub-Sector | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| Crop and livestock production | 27.086 | 24.590 | 24.440 | 23.928 | 23.533 | 22.977 |
| Holders and family members | 21.075 | 19.932 | 19.670 | 19.218 | 18.967 | 18.512 |
| Males | 12.844 | 12.596 | 12.437 | 12.150 | 11.996 | 11.707 |
| Females | 8.231 | 7.336 | 7.233 | 7.068 | 6.971 | 6.805 |
| Employees | 6.011 | 4.658 | 4.770 | 4.710 | 4.566 | 4.465 |
| Males | 3.286 | 2.750 | 2.845 | 2.813 | 2.707 | 2.650 |
| Females | 2.725 | 1.908 | 1.925 | 1.897 | 1.859 | 1.815 |
| Forestry | 447 | 440 | 446 | 426 | 433 | 423 |
| Holders and family members | 105 | 85 | 86 | 82 | 84 | 83 |
| Males | 65 | 55 | 57 | 54 | 54 | 53 |
| Females | 40 | 30 | 29 | 28 | 30 | 30 |
| Employees | 342 | 355 | 360 | 344 | 349 | 340 |
| Males | 288 | 299 | 302 | 284 | 288 | 280 |
| Females | 54 | 56 | 58 | 60 | 61 | 60 |
| Total | 27.533 | 25.030 | 24.886 | 24.354 | 23.966 | 23.400 |
| Holders and family members | 21.180 | 20.017 | 19.756 | 19.300 | 19.051 | 18.595 |
| Males | 12.909 | 12.651 | 12.494 | 12.204 | 12.050 | 11.760 |
| Females | 8.271 | 7.366 | 7.262 | 7.096 | 7.001 | 6.835 |
| Employees | 6.353 | 5.013 | 5.130 | 5.054 | 4.915 | 4.805 |
| Males | 3.574 | 3.049 | 3.147 | 3.097 | 2.995 | 2.930 |
| Females | 2.779 | 1.964 | 1.983 | 1.957 | 1.920 | 1.875 |

The Role of Women in the Family Farm of the Mountain Region

The Mountain zone extends over the higher slopes of the Troodos massif. It comprises 66 communities with a total population of 18.529 or 3,2% of the country's population (Census of Agriculture, 1994). This population, however, is constantly declining. About 5,500 small size agricultural holdings operate in the zone with a total cultivated land of around 12,000 ha.

Despite women's important contribution to family farming and rural life, their work is generally undervalued. Usually, in using the concept of labour for statistical purposes, the significant portion of women's work necessary for housekeeping, household maintenance and children's care is ignored. Moreover, female labour used for a wide variety of tasks in the sphere of production is neglected, not recognised or merely considered "complementary" to male family members work.

Involvement of Women and Type of Farm Activities

In general, women do not participate in decision-making related to farm production activities. Only few women (8,3%) decide themselves on farm improvements such as buying new machineries. Even fewer were those deciding on crop cultivation and on-farm investments. However, 40% of them stated that they have equal responsibility in the management of the farm budget. A possible explanation is that budget decisions are treated as a major issue that concerns the entire family.

The major objective of a recent study was to present an empirical analysis of the position of women in the rural society and their contribution to agricultural activities in the mountain region of Cyprus (Antoniades and Papayiannis, 2001).

The involvement of women in the farm operations was closely related to the farm size. Women operating on bigger size farms had much greater participation in carrying out the various farm operations than those operating on smaller size farms.

Women are involved in farm operations, mainly harvesting, rather than in farm administration or management, with no significant regional differences in this respect. Further analysis of the data showed that the willingness of rural women to undertake field-works was associated with age, with younger women rejecting or ready to abandon it. About 58% of the respondents under 44 years old are not involved in field-work as against 13,6% of those over 63 years. Younger women in all regions were more willing to get involved in farm administrative/management tasks.

The vast majority (89,3%) of the respondents were running some kind of non-agricultural enterprise, with only minor differences among regions. As regards the type of women's non-agricultural enterprise, 62,6% have developed cottage agro-industries, 29,0% handicraft and 8,4% agro-tourism activities. Almost 84% stated that they were entirely responsible for the management of these enterprises. For the remaining 16%, the responsibility lies with their husbands or children. These kinds of activities involve the professionalization of occupations in the informal economy with which women have always been engaged and through which have played an important part in establishing heterogeneity in European agriculture and the conservation of the cultural heritage, which modernisation has today eroded to an incredible degree. Women have considerable ability in converting these local resources into marketable commodities, as well as facility in building interpersonal relationships and professionalizing the role of the housewife.

They have an anthropocentric approach to country life and are more sensitive than men to the issues of diet and environment (Fonter et al., 1994). On the other hand, the professionalization of these occupations contributes to change in the structure of relations and transforms the women of the household from an unpaid accessory into co-manager of the family business (Bock, 1994).

The existence and running of non-agricultural enterprises was affected by the farm size. Rural women on smaller size farms run non-agricultural enterprise at a higher percentage compared to those on larger farms. Naturally, women farming of small area have lower farm income and, by developing other activities parallel to farming activities, aim to earn supplementary income. The motives of rural women for the development and management of small businesses was related to family financing and, to a lesser extent, to personal or professional fulfilment (Antoniades and Papayiannis, 2001).

Recommendations

Based on the findings of this study (Antoniades and Papayiannis, 2001), some policy considerations that may improve women's position in the family farm and promote their integration into the rural society of the mountain region include:

1. Improvement of the professional and social status of women by providing them with individual entitlements to income through taxation incentives and to social security schemes.
2. Establishment of associations networks for farm-women to improve their representation in rural development and in decision-making. Networks are required for better communication, share of information, advice and guide inter and intra-regionally.
3. Representation at the decision-making levels so as to break their social exclusion.
4. Acceptance of women's participation in the planning processes for local development programmes and initiative actions.
5. Restructuring of the vocational training in the rural areas to incorporate courses, advice and information on market oriented skills, relevant to women response to labour demand on on-farm work and off-farm activities.
6. Shift of agricultural training from the traditional form of home economics to farming techniques, production of new products (cut flowers, pot plants, dry flowers, organic farming), farm management, farm administration, investments, planning and other important for the rural life actions.

FOOD SECURITY AND FOOD SAFETY

Throughout the twentieth century, there has been an increasing trend towards the use of stored and processed foods. Initially, this was a response to industrialization and the need to provide food for large number of people living in cities. More recently, the consumer has come to expect access to a wide variety of foodstuffs throughout the year, without the restrictions imposed by seasonal and regional availability, and there is increasing reliance on convenience and fast foods. The processes involved in producing and storing foods frequently require the addition of chemicals (either natural or man-made) to improve the safety (microbiological safety) or to preserve the nutritional quality. An additional benefit is increased palatability and attractiveness of foodstuffs to the consumer. Clearly the safety of such chemicals has to be assured and their use controlled in order to avoid harmful effects (Renwick et al., 2003).

In recent years, the control over the safety and quality of food produced has become tighter and tighter. Food safety management systems such as Hazard Analysis Critical Control Points (HACCP) and the prerequisite systems Good Manufacturing Practice (GMP) and Good Hygiene Practice (GHP) have provided the professional players in the food supply chain with excellent tools, provided they are used for design and implementation of a specific food manufacturing process in a proper and diligent way. Globally, both with governments and food professionals, there is a good buy-in for HACCP and food safety management systems that are based on comparable principles. Notably, HACCP and its prerequisite systems are very specific to the food production facility that they have been developed for.

The Hazard Analysis Critical Control Point (HACCP) concept permits a systematic approach to the identification of hazards and an assessment of the likelihood of their occurrence during the manufacture, distribution and use of a food product, and defines measures for their control. The resulting HACCP plan can be integrated in a more general Quality and Safety assurance plan. In its simplest form, HACCP consists of seven principles (Van Schothorst, 2004):

- Identification of hazards and assessment of their severity and probability of occurrence (hazard analysis).
- Determination of critical control points required to control identified hazards.
- Specification of critical limits that assure that an operation is under control at a particular critical control point.
- Establishment and implementation of monitoring systems.
- Execution of corrective actions when critical limits are not met.
- Verification of the system.
- Record keeping.

The value of defining procedures for establishing safe levels of chemicals in food was soon recognized. In addition to the potential health benefits, the harmonization of procedures for food standards has economic benefits in terms of removing barriers to international trade, which was also an important issue for the FAO in the 1950s. In 1960, the first FAO Regional Conference for Europe recorded “the desirability of international agreement on minimum food standards and related questions (including labelling requirements, methods of analysis, etc.) ... as important means of protecting the consumer's health, of ensuring quality and of reducing trade barriers, particularly in the rapidly integrating market of Europe”. Over the following year, the FAO entered into discussions with the WHO, the Economic Commission for Europe (ECE), the Organisation for Economic Co-operation and Development (OECD) and the Council of the *Codex Alimentarius Europæus* resulting in international consensus and establishment of the Codex Alimentarius Commission in 1961 (Benford Diane, 2000; Gorris, 2005).

The Acceptable Daily Intake (ADI) concept was adopted by the joint FAO/WHO Meeting on Pesticide Residues (JMPR), an independent scientific expert committee like the JECFA, and similar approaches were taken by other bodies, and for other types of chemical. In the United States, the FDA also adopted the ADI approach, and related methods are used by the US Environmental Protection Agency (EPA) for contaminants, although the term ADI is replaced in EPA assessments by Reference Dose (RfD).

Food Additives and Contaminants

Regulatory authorities distinguish additives and residues from contaminants. Additives are added intentionally in order to produce some desired technical effect on the food, are approved onto a “positive list” and can readily be controlled. Similarly, pesticides and veterinary products have benefits in food production, and it is possible to control the amount of residue that persists from the crop or animal into the food we consume. In contrast, chemical contaminants are unwanted, but may be unavoidable. Therefore, the levels of contaminants that are not expected to produce harmful effects are designated as tolerable (i.e. permissible) rather than acceptable.

The risk assessment / risk management process is viewed as a number of separate steps, as illustrated in Fig. 3.

For food additives, the first two steps of hazard identification and hazard characterisation culminate in determination of the ADI. Derivation of the ADI is based upon scientific understanding of the toxicity of a food additive based on data from studies in animals and humans with the incorporation of a safety factor. The use of the safety factor illustrates the precautionary approach taken to food safety. When first introduced, the safety factor did not have a clear scientific rationale. However, there are no known incidences of public health problems arising from food additives used within the ADI, and recent studies have provided scientific support for its value. The ADI is therefore considered a valuable regulatory tool. The subsequent stages of the risk assessment and risk management processes take into account possible intake levels in different types of food in order to establish permissible use levels and apply them under national regulations.

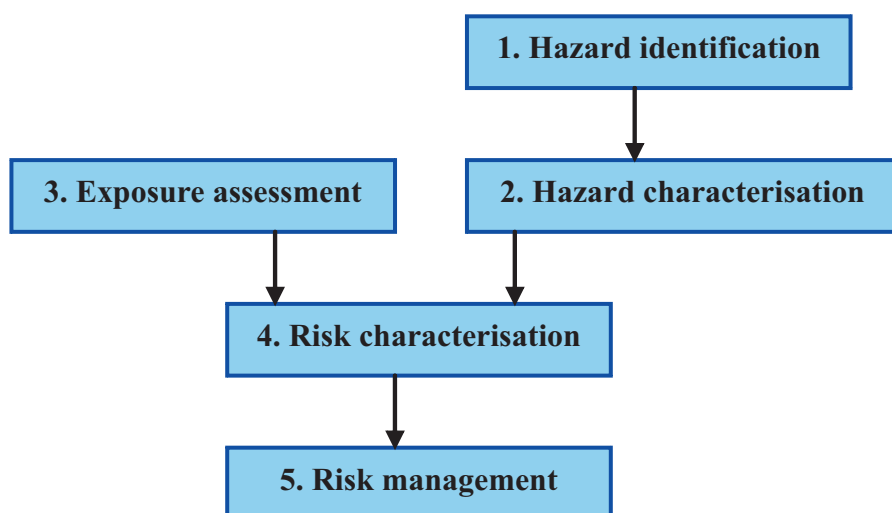


Fig. 3. The risk assessment / risk management process

Pesticides and Veterinary Drugs

The approach for residues of pesticides and veterinary drugs in food is similar to that for food additives. However, since pesticides are designed to be toxic to the pest species and veterinary drugs are intended to have pharmacological activity, it is also likely that they will be more toxic to mammalian species than most food additives. However, they are considered to be a necessary component of safe food production and therefore they are allocated an ADI rather than a tolerable intake. For pesticides residues, a Maximum Residue Level (MRL) is established by national regulatory agencies based upon the recommendations of JMPR and Good Agricultural Practices, which are designed to ensure that pesticide residues in foods are maintained as low as is practicably possible. During the approval process the potential intake of residues can be compared with the ADI, taking into account the maximum accounts of relevant foods that a person would eat in a day. For residues of veterinary medicine and livestock feed additives, an MRL is derived by back-calculation from the ADI taking into account the maximum amounts of meat and dairy products that would be consumed per day.

CONCLUDING REMARKS

It is evident from the above, that women play an important role not only in terms of work force in agriculture, in water management, but also in family management in their capacity as householders and mothers and this is even more powerful in societies like the ones in Mediterranean countries. They are important players in food preparation and moreover in developing good dietician awareness for the whole family and especially for their children. Women have an anthropocentric approach to country life and are more sensitive than men to issues of diet and environment.

Despite women's important contribution to family farming and rural life, their work is generally undervalued. Usually, the significant portion of women's work necessary for housekeeping, household maintenance and children's care is ignored. Women have a significant role to play and the need to support and raise women's profile in the decision-making process in all sectors involved is nowadays more than clear.

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