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**Impact of EurepGAP Standard in Kenya:
Comparing Smallholders to Large-scale Vegetable Producers**

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Abstract

As the export of fresh fruits and vegetables from Kenya targets almost exclusively the European market stricter regulations, e.g. export standards introduced by the food industry, like EurepGAP, present a challenge for Kenyan horticulture. These standards have become more important in Europe and influence producer decisions in a developing country like Kenya. To address these issues a study has been conducted that investigates investments necessary for meeting the standard and the process of compliance of small to large-scale Kenyan vegetable export farmers. The objectives of this paper are: (1) to compare the economic performance of different types of certified farms and (2) to assess the costs of compliance with the EurepGAP standard.

The study applies the concept of typical farm models to examine the impact of EurepGAP standard on three types of EurepGAP certified farms. The first model refers to small-scale farms, which are normally organised in groups. The second model describes the large-scale farms contracted by an exporter company, which mainly produce for this company. Finally, the third model incorporates the farms that an exporter company owns itself. As these farm types are very different in many dimensions like the organisation of the farm, the structure of decision-making and especially the degree of vertical integration of the supply chain, it is necessary to differentiate them. The impact of EurepGAP standards on these three types of farms is analysed based on interviews of 18 large- and medium-scale private farms, 8 exporter owned farms and 46 smallholder farms in Kenya.

Background

The export of fresh fruits and vegetables from Kenya targets almost exclusively the European market, thus stricter regulations, like EurepGAP¹, present a challenge for the Kenyan horticulture sector. EurepGAP is a private standard that emerged from an initiative of UK retailers recognizing that the existing quality assurance system was not sufficient to satisfy consumer demand for food safety. "EurepGAP is an international quality system scheme that guarantees a safe production process for fresh fruits and vegetable products."; its "principles are based on not only food safety but also on environmental protection, occupational health, safety and welfare [...]"(GALDOS, 2004, p.19). Since March 2001, the German Foodplus GmbH acts as the global body and serves as the legal owner of EurepGAP. Currently, EurepGAP is limited to

¹ Euro-Retailer Produce Working Group for Good Agricultural Practice.

the production of fresh fruit and vegetable produce and flowers but is supposed to be extended on other agricultural products in the nearer future.

As EurepGAP has gained in importance in many European markets, it is expected to become an important international standard and more and more retailers comply with it (WILL, 2003). This will force Kenyan export producers to adopt these standards as the European market is vital for their business development (OKADO, without year).

This paper investigates the adjustment costs of Kenyan vegetable farms to adopt EurepGAP standard comparing three types of farms: contracted large-scale producers, large-scale exporter-owned and small-scale farms. The objectives are twofold: (1) to assess the economic performance of the three different types of certified farms, and (2) to compare their costs of compliance with the EurepGAP standard.

Survey design and data

The study is part of a larger project that deals with the poverty impact of EurepGAP on Kenyan horticulture export producers. In this paper the economic performance of different sizes of EurepGAP certified farms with different links to the exporter company is compared (the sample is described in table 1). The smallholders are randomly sampled, while the large-scale farms are visited on the bases of their willingness to participate. The latter type of farms are linked to the seven biggest exporter-companies.

Initial meetings with representatives of exporter-companies aimed at creating a general understanding of the system of vegetable export production in Kenya and to introduce this survey. Additionally, these meetings served to discuss tendencies of the future policies concerning the composition of suppliers of the different farm types. Finally, representative of the exporter-companies were asked to identify some of their large producers to participate in this study. Data was collected by a single visit at both types of large-scale farms (December 2005 – February 2006) whereas data from smallholders were collected in multiple visits (September 2005 – August 2006).

Table 1: Farm categories and numbers of EurepGAP certified farms.

Farm category	Smallholder farms	Large-scale contracted farms	Exporter-owned farms
Farm-size	< 5 acres	> 5 acres	> 5 acres
Number of EurepGAP certified farms in Kenya ^a	201 (organized in 10 farmer groups → option 2 ^b)	34	(option 1 ^b)
Number of farms in sample	46	18	8

^a According to e-mail contact with Foodplus, June 2006.

^b Under option 1 individual farmers apply for certification and under option 2 a group of farmers applies for a group certificate.

The different types of farms supply the export and domestic market to different degrees following various supply chains (Fig. 1). Produce is supplied to the European market mainly through exporter companies while the domestic market can be accessed through various channels depending on the distance to the targeted market. These channels vary from direct supply to the local rural market to the supply of the urban markets including up to 5 intermediaries (MINOT/NGIGI, 2003).

One of the major differences between the two categories of large-scale farms is the place where these farms are located. The contracted farms are closer to Nairobi but they are also more widely distributed across the vegetable production area². The exporter-owned farms are concentrated in four different locations that are best suitable for vegetable production while most

² The main area of export vegetable production is the south-eastern part of the Rift Valley Province, the western part of the Eastern Province and the Central Province.

of the contracted farms are located in places that are less attractive with poorer irrigation possibilities and thus higher vulnerability to droughts.

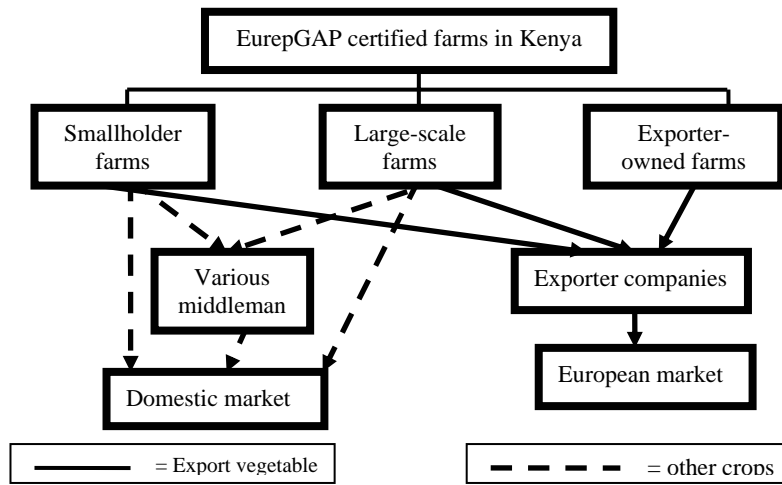


Figure 1: Supply chains of EurepGAP certified farms in Kenya.

Identification and description of typical farms

Identification of the typical farms

The collected farm data is used to create three typical farm models for EurepGAP certified farms in Kenya. According to HEMME (2000), the factors that have to be considered are: land size, use of the land, employees and wages, machinery and buildings, crops and crop types, marketing channels and supply chains.

In this study, the first farm type represents the exporter-owned farms, the second one represents the contracted large-scale farms and the third one represents the smallholder farms. In order to make sure that the farm that results from the process can be considered typical, extreme values were excluded. For the remaining farms, if data on indicators derived from the sample were approximately normally distributed, the mean values were used while for data with a different distribution the median was used to derive indicators.

Staff members of the International Centre of Insect Physiology and Ecology (ICIPE) then validate these farm models; additionally other horticultural experts from Nairobi discuss the farm models and adjust them. As this process is currently ongoing, all results presented in this paper are preliminary.

The exporter-owned farm³

A typical exporter-owned farm has been in vegetable production since the mid nineties; it is located within a radius of 160 km from Nairobi. This farm owns 157 acres and additionally rents 93 acres for farming. About 98% of this area is under export vegetables production while the rest is allocated to other export crops like flowers and or fruits. The value of the farmland is 35 million KSh⁴ and the value of buildings on the farm adds up to 11.5 million KSh. The machinery on the farms has a total value of 7.5 million KSh and includes tractors, spray equipment and irrigation systems. Sixteen percent of the farms own more sophisticated machinery like pivots or boom spray units.

Their planting program usually includes a wide range of export vegetables including speciality vegetables with a higher economic value, e.g. yellow beans, but also widespread crops

³ All results given in this paper are preliminary as the study is still in process.

⁴ 1 US\$ = 71 Kenyan Shilling (11.14.2006).

with lower revenues per acre like peas and beans⁵. The typical exporter-owned farm does not specialise in any of these crops but tends to diversify and plant smaller areas in order to guarantee an own-produced constant minimum supply. Thus market changes or unfavourable climatic conditions that lead to a lower production on the farms contracted by the exporter company do not cause a major problem with the supply.

The composition of the crop portfolio of the typical farm is shown in table 2. The results show that due to high labour input to harvesting labour costs are the major cost items for all crop types with the exception of other major export vegetables, which are less labour intensive. However the cost of seeds for this crop category is the highest since it includes a broccoli variety which seed is relatively expensive compared to other crops.

Table 2: Cost structure of a typical exporter-owned farm [all values given in KSh/ acre and year].

Crop	Number of farms	Acres	Seed	Labour	Fertilizer	Chemicals	Irrigation
Peas	5	30	45,965	112,778	81,775	19,850	46,400
Beans	6	62	49,019	123,512	54,296	31,325	21,943
Other major export vegetables ^a	4	87	124,126	26,261	38,586	31,325	21,943
Other minor export vegetables ^b	4	68	51,271	109,809	124,126	26,261	38,586
Domestic crops	0	--	--	--	--	--	--

^a including: Baby corn, Chilly and Broccoli.

^b including: Onions, Lettuce, Carrots, Egg-plant, Baby leeks, Sweet corn, Okra, Baby courgettes and Leeks.

The typical exporter-owned farm operates on a highly administrative level. Usually, there are five steps in the internal farm hierarchy of the totally 340 workers out of which 50% are permanently employed. The manager is the first link to the exporter company and is responsible for the on-farm realisation of the targets set by the exporter company. The management assistants are responsible for the administrative work including accounts. Some general supervisors are in charge of the field-work including record keeping, training and monitoring of the correct application of working standards set in the EurepGAP protocol. The field supervisors are responsible for smaller groups of workers and supervise them while performing crop management tasks in the field.

The exporter-owned farm was EurepGAP certified in 2003. In order to achieve certification they had to invest in buildings, protection kits and had to meet the registration and audit fees. Furthermore, they face additional recurring costs for the analysis of water and soil, maintenance of infrastructure and additional workers mainly for more labour intensive production flows.

Additionally to the EurepGAP certificate, the exporter-owned farm holds other certificates like Tesco Nature's Choice (TNC), British Retailer Consortium (BRC) and National Environment Management Authority (NEMA)⁶ that were issued in the same year as the EurepGAP certificate. This leads to attribution problems as the regulations of EurepGAP and other standards overlap in many areas. This may lead to an underestimation of the costs directly linked to EurepGAP. Other less widespread standards are Ethical Trade Initiative (ETI), Fair-trade and Field to Fork. The most challenging criteria in the implementation process of EurepGAP have been the record keeping requirements.

⁵ The former require more attention and a higher level of specialization in production.

⁶ This certificate is mandatory for Kenyan large-scale farms.

The contracted large-scale farm

The typical contracted large-scale farm has been producing vegetables since 1999 and it is situated about 117 km from Nairobi. Typically the farm owns 150 acres with a total value of 20 million KSh, and produces on 65.75 acres. Of this area 54% is dedicated to export vegetables, 33% to domestic crops and 13% to other export crops like flowers or fruits. The farm buildings and machinery have a value of 3.7 million and 4 million KSh, respectively. The farm owner has other sources of income, which include businesses from real property investments, a private flight company and other farm activities like dairy farming. The farm is exclusively linked to one exporter for the marketing of the export vegetables with which it has a written contract.

The inputs that are permitted for use on areas under export vegetable production are agreed on in the contracts with the exporter company. The seeds are purchased on credit from the exporter while the rest is purchased at local wholesale markets.

The export vegetable program includes less different crops than that of the exporter-owned farms. A typical large-scale contracted farm either plants beans or peas and in some cases one or two additional export crops. This depends very much on the size of the farm; the bigger the farm the more crops they are allowed to plant. The rejection rate of export vegetables is approximated at 17% of total production due to different quality problems. The rejected produce normally is not sold through other channels but discarded, as there is no other market available.

The contracted farm produces a variety of domestic vegetables like cabbage, maize or local beans in addition to export vegetables. These crops have to be planted as rotation crops for the export vegetable fields. The rotation program is agreed upon with the agronomist of the exporter company. The domestic crops are sold to middleman and the other export crops like fruits or flowers are marketed directly to Europe.

The annual cost structure of the typical contracted large-scale farm is shown in table 3. The figure for the labour costs of pea production is overestimated since, during the survey period, the crop had recently been integrated in the planting portfolio. In the long run a change in the performance or a dropout of peas can be expected. Furthermore, the costs for the groups of other export crops and domestic vegetables are much lower than for the export vegetables although the composition of the cost categories remains similar.

Table 3: Cost structure of a typical contracted large-scale farms [all values given in KSh/acre and year].

Crop	Number of farms	Acres	Seed	Labour	Fertilizer	Chemicals	Irrigation
Peas	7	7	27,917	200,666	21,689	11,387	23,534
Beans	13	24	79,969	128,938	38,527	18,207	25,220
Other major export vegetable ^a	11	1	50,525	57,449	12,294	20,479	34,484
Other minor export vegetables ^b	5	3	26,593	81,012	7,178	8,696	11,514
Other export crops	5	9	1,934	24,478	2,795	1,203	4,635
Domestic crops	5	22	7,331	14,808	6,509	4,352	15,486

^a including: Baby corn, Chilly and Broccoli.

^b including: Tomatoes, Spinach, Lettuce, Cauliflower, Courgettes, Mangetout, Rucola and Baby leeks.

The farm operates on a less administrative level with four levels in the internal hierarchy. A manager is responsible for all of the administration work and the organisation of the 70 workers out of which 68% are permanently employed. The level of management assistants is missing while the remaining structure is similar to the organisation on the exporter-owned farm.

The farm faces the same types of investments and recurring costs linked to EurepGAP certification as the exporter-owned farm but was certified later, i.e. in 2005. Some of the farms already have the mandatory NEMA certificate but in most cases EurepGAP is the only standard the farms are certified for. Nevertheless, the farms are planning to implement further standards

like TNC because the exporter companies would like them to do so. The most challenging requirements for these farms have been the record keeping, i.e. documentation demands for traceability of produce and chemical application, as well as teaching their workers on the personal hygiene regulations.

The contracted smallholder farm

The typical smallholder farm started export vegetable production in 1991. The farm owns 1.97 acres and cultivates 2.41 acres. Thus, the farm rents in 0.44 acres for its production. The export crops are planted on 48% of the total cultivable area and the domestic crops on 52%. The total value of the farm machinery is 25,221 KSh and includes mainly hand-operated equipment. The farm is member of a farmer group. The group is certified under option 2 and is linked to one exporter company with which they have a written contract that specifies all inputs the farmers are allowed to use in export production. Besides the agreement on inputs, also the price, quantity, quality and the timing of the delivery of the produce are included in the written contract. The exporter provides the farms with seeds on credit and technical advice while other inputs are purchased locally.

The cropping program of the smallholder farms is given in table 4. The major share of smallholders produces beans for export. Peas are produced by a smaller number of farmers. The rejection rate of export vegetable crops is estimated at about 20%. According to validation by experts this value may give the lower end and constitute a rate achieved by a farmer group who had successfully been in export production for a long period of time and received intensive training in crop production. Additionally to export vegetables, the typical smallholder farm plants two domestic crops, e.g. maize and potatoes. The domestic crops and non-vegetable export crops are marketed individually through middleman or directly on local markets.

Table 4: Smallholder farms' cropping program.

Crops	Number of farms	Acres
Export vegetables ^a	46	1.16
Domestic crops ^b	40	0.88
Other export crops ^c	23	0.37

^a French beans is the only export crop for 90% of the farms. Other export crops for this groups are peas and baby corn.

^b including: Maize, Fruits, Sweet potatoes, Local beans and Irish potatoes.

^c including: Tea and Coffee.

In order to reach certification, the smallholder farm had to invest mainly in infrastructure and protective clothes. Additionally the farmer faces increased labour demand for record keeping and change in use of some inputs (such as shift to more expensive pesticides). The smallholder farm receives external support for the certification from NGO's, governmental organisations and exporter companies. The supports defray 16% of the total investments in infrastructure; the exporter company pays the analysis, registration and audit fees. The remaining 84% of the investment costs are covered either through credit or own financial resources. The most challenging criteria for the smallholder is to cover the costs necessary for building the infrastructure.

Profitability and adjustment costs of the typical farms

Considering the costs of each farm type given in the previous section's tables, the annual net revenue⁷ to export crops per cultivated acre of each farm type is presented below (Fig 2). The

⁷ Data for smallholder farms are available for two cropping season. As certified smallholder farms typically produce three times in a year, the annual net revenue was adjusted accordingly.

net revenue is defined as gross income less direct and indirect variable costs. Family labour, which is important for smallholder production, is valued at its opportunity costs, the wage rate at the nearest village and is also deducted.

The difference in the net revenues can be attributed to economies of scope and scale. An example for the former effect is, that the bigger the farm the more different crops they plant and the more likely they focus on more profitable crops such as baby varieties that are also more risky due to their sensitivity towards production practices. The latter originates e.g. in the fact that large farms purchase inputs in bulk and thus face lower per unit costs than smaller farms, which use smaller amounts of inputs.

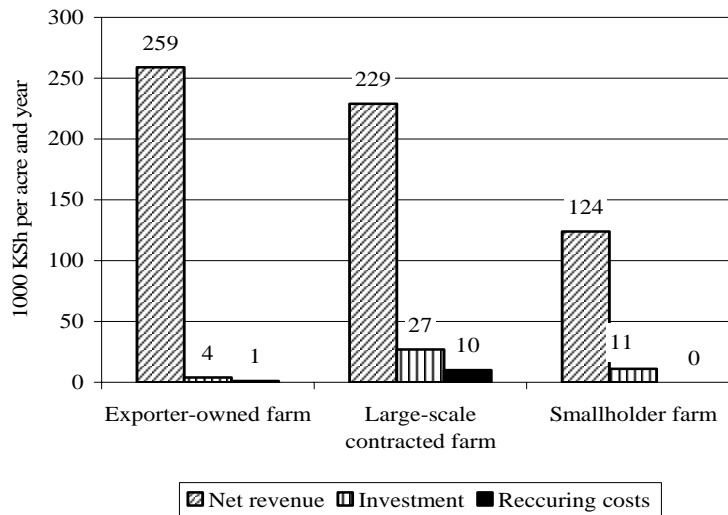


Figure 2: Net revenues of export vegetables; investment and recurrent costs due to EurepGAP for the three farm types.

The three different farm types face different levels of investment cost per acre. In absolute terms, these are highest per acre for large-scale contracted farms, followed by smallholders followed by exporter-owned farms. Partly, this can be explained by the external support, the smallholders receive, which lower their own investments. More likely the large-scale contracted farm invests in buildings and machinery of higher value, e.g. a cooled grading hall instead of an open air wooden grading shed whereas the exporter-owned farm does not face large investments since it operated on a level similar to EurepGAP requirements before. The exporter-owned farm acquired different certificates in the same year and thus the figures presented may underestimate the investments directly linked to EurepGAP. The non-financial costs (e.g. time spent for gathering information, time spent on training etc.) linked to EurepGAP implementation are excluded from the investment calculation for all farm types, which results in an underestimation of the total investment requirements of EurepGAP.

Considering only the different levels of investment costs that the typical farms face, it seems reasonable to assume that the smallholder farm faces a bigger challenge than the large-scale contracted and exporter-owned farm. But taking the net revenues, which contribute to paying for EurepGAP investment costs, into account, the judgement has to be revised. The share of the net revenues that the large-scale contracted farm has to meet in order to cover EurepGAP related investment costs is only slightly higher than the one of the smallholder farm.

The expectations related to certification differ between the farm types and to some degree reflect the production standard prior to certification. The typical contracted large-scale farm mainly expected improvements in marketing with the possibility of exporting directly to Europe and a price premium for their produce; whereas the typical exporter-owned farm manager

expected management improvements and better-trained workers. These different expectations are reflected by the stated realised benefits. While the typical exporter-owned farm stated slightly improved quality of produce with no changes in rejects, field loss or value and amount of production, the contracted farm claimed higher production levels, better quality and reduction in field loss and reduced costs of production.

The costs of meeting market demand through production of smallholders and large-contracted farms are also influenced by this monitoring and negotiation time. The contract of the large-scale farm is fixed for 12 months. The price paid for the produce and the acreage to be planted (the quantity to be delivered) is set through negotiations between the two parties. This is not the case for the smallholder groups as the exporter sets the price and thus mostly dictates the contract conditions. In the case of smallholder production, the effort of establishing a reliable group of farmers for certification under option 2 is the biggest challenge. The monitoring of smallholder groups is more difficult since the farms are much more scattered than the large-scale farms. The exporter typically spends 3 hours per week on each large-scale farm to monitor their production. In the case of the smallholder groups a technical staff member of the exporter is permanently based in the group's location to ensure close monitoring throughout the production period. This leads to an average time of 2.8 hours spend on each farm of a growers group. Considering the monitoring time per acre under production, the gap is even bigger. On the large-scale contracted farm with 66 acres, each acre is monitored about 3 minutes per week while on a smallholder farm with 2.41 acres each acre is monitored about 1 hour per week. Thus, areas cultivated by a smallholder group require much higher effort to monitor than the same production area cultivated by a single large-scale farmer. This also means higher monitoring costs and a lower possible net revenue for the exporter company. Nevertheless, most exporter companies stated that they are not planning to drop the smallholder groups producing for them as the combination of supply from all the three types of farms spreads the risk of production failure due to climatic problems as the production areas are far spread. Furthermore, the smallholders are sometimes used for marketing advantages; their inclusion is taken to show corporate social responsibility and pro-poor company policies.

Conclusions

As the results show, the contracted large-scale and smallholder farms face higher investment costs per acre to meet the requirements of EurepGAP standard than the exporter-owned farm. The typical exporter-owned farm followed the specification of the EurepGAP standard even before certification and thus had to invest less and was able to implement the standard fast and at lower costs. As these farms also hold other certificates that were implemented in the same period as EurepGAP, the latter did not require much additional investment; thus exporter-owned farms were able to meet further standards at lower incremental costs. This process has also started for the large-scale contracted farms since most of them have already applied for other certificates. So far, the analysis shows that the Kenyan export vegetable producers are well able to cope with the EurepGAP standard, as the investments are relatively low compared to the net revenues these farms generate. However, the question whether smallholders will remain at constant numbers in export production can not yet be answered since the smallholders included in this survey are the early adopters. It is not clear whether these represent the whole group of export vegetable producers in Kenya.

Economies of scale seem to play a central role for EurepGAP certified farms. The monitoring costs the exporter company has to bear are significantly higher for the smallholder groups compared to the large-scale contracted farms. Nevertheless, exporter-companies are not likely to drop all of their smallholder group suppliers although the standards increase the costs of dealing with them. The reasons for this are the spreading of risk by distributing production across a bigger area and thus reducing losses due to poor climatic conditions.

Further analysis will incorporate a more differentiated comparison of the cost structure, including a sensitivity analysis, for the different farm types in order to investigate reasons for the performance difference to a greater extent. The challenges the farms faced in the process of compliance with the standard will be analysed in more detail for deriving further indicators of their production practice before certification and thus producing additional evidence in explaining the differences in the certification investments.

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References

- Asfaw, S. (2006)**, Economic Impact of Food Safety Standards on Smallholder Fresh Export Produce in Kenya: Linking Contract Farming, Farmer Health and Rural Poverty. Ongoing PhD thesis, Development and Agricultural Economics, University of Hannover.
- Galdos, A.E.B.L. (2004)**, Implementation of EUREPGAP Standards in the Agro – Export Sector of Peru: A Case Study. Master thesis, Institute of Agricultural Economics, University of Göttingen.
- Hemme, T. (2000)**, Ein Konzept zur international vergleichenden Analyse von Politik- und Technikfolgen in der Landwirtschaft. Federal Agricultural Research Centre (FAL), Landbauforschung Völkerode, Spezial Issue 215, Braunschweig.
- Minot, N. / Ngigi, M. (2003)**, Are horticultural exports a replicable success story? Evidence from Kenya and Côte d'Ivoire, Conferences Paper No.7, presented at the InWEnt, IFPRI, NEPAD, CTA conference "Successes in African Agriculture", Pretoria, December 2003.
- Okado, M. (without year)**, Background paper on Kenyan off-season and specialty fresh vegetables and fruits – Lessons of experience from the Kenyan horticultural industry, United Nations Conference on trade and development. Downloadable under: www.unctad.org/infocomm/diversification/nairobi/Keny0901.doc
- Varian, H.R. (2001)**, Grundzüge der Mikroökonomik, 5th Edition, Springer, Munich / Vienna, 2001.
- Will, M. (2003)** Food Quality and Safety Standards as required by EU Law and the Private Industry – With special references to the MEDA countries' exports of fresh and processed fruit & vegetable, herbs & spices. GTZ Division 45 – Agriculture, Fisheries and Food, Eschborn.