

*Typical and traditional productions:  
Rural effect and agro-industrial problems*  
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## **Azalea and begonia production in the region of Ghent: a divergent development**

### **ABSTRACT**

*Since the end of the 19th century the region of Ghent (Belgium) developed a very important centre of ornamental production. Especially for azalea and begonia production Ghent plays an important role on the international scene. This paper considers the development of this sector and its economic weight for Belgium over the last two centuries. A particular evidence will be given to the divergent development of azalea and begonia production during the period 1980-1995 and to the development of these sectors for the next future.*

### **INTRODUCTION**

Since the end of the 19th century the region of Ghent (Belgium) became an important production centre of ornamental plants. The organisation of the Florales every five years made the region world-wide known for its ornamental plant production. Especially for azaleas and begonia tubers Ghent is playing an important part at the international scene. Moreover the production area of these two productions is limited to a number of villages in the neighbourhood of Ghent; especially the village of Lochristi is very important. In this paper the importance of both productions in the horticultural industry in Belgium as well as the regional aspects of these productions will be analyzed. Also the divergent development of both productions during the last fifteen years is investigated.

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## 1. REGIONAL CONCENTRATION OF AZALEA AND BEGONIA PRODUCTION

The question arises why both productions developed in the same region since the second half of the 19th century. Which elements contributed to the development of the 'centre function' of ornamental plant cultivation in this region? In Dutch research some determinants of the 'centre function' of a horticultural region are determined [2]. In this paper some of the variables are regrouped into three main groups of determinants. The underlying physical, socio-economic and historical factors of the regional development of both productions were investigated.

### 1.1. Physical elements

Important physical factors for the development of a production are the climate, the soil, the water and other environmental factors. Following physical elements that favoured the developments in the region of Ghent can be mentioned [4,12]:

- \* the climate is a temperate maritime climate, convenient for cultivation of azaleas and tuberous begonias. However due to the frost greenhouses are needed during wintertime;
- \* azaleas and tuberous begonias need a permeable soil. Especially in the region of the Flemish Valley in the North-East of Ghent (Lochristi) with Pleistocene sediments, a convenient subsoil is available;
- \* during summertime the light sandy soil, which is drying out frequently, needs to be watered. In the region of Lochristi enough of high quality groundwater is available;
- \* azaleas were produced on a substrate of leaf and woodland soil. This substrate used to be available in the region. At present this substrate is not available anymore and must be supplied, it is more and more replaced by peat.

### 1.2. Economic and social elements

In addition to physical circumstances also economic and social elements are a critical success factor for introduction of new crops:

- \* in the neighbourhood of big towns, often horticultural activities occur. The vicinity of a city is not only attractive for commercialisation of horticultural products but often a good road infrastructure is available permitting to transport the base materials as well as the final products;
- \* horticultural cultivations (also azaleas and begonias) can give a high added value per unit of area, this permitted the many small farms in the region of Ghent to obtain a good income on a limited area;
- \* azalea and begonia production is very labour intensive. In the region of Ghent a sufficient quantity of labour forces were available;
- ?? at the end of the 18th century and the beginning of the 19th century a centre of ornamental plant production developed in Ghent. Originally these holdings were situated on the outskirts of the town, but as a consequence of the growing urbanisation and industrialisation they moved to the surrounding rural areas[8].

### 1.3. Historical elements

*Azalea indica simsii* is originating from China and Japan. *Begonia tuberhybrida* found its origin in the Antilles. The introduction of these new ornamental plants in the region of Ghent took a certain time. Already in 1819 the first azaleas were on exhibition in Ghent (Royal Society of Agriculture and Botany). In the first half of the 19th century cultivation of 'Camellia' was the speciality of the region. In those days some important nurserymen left their mark on the development of ornamental plant production in Ghent. One of the most famous was Louis Van Houtte, considered as the founder of the regional production centre[11]. In 1839 already Louis Van Houtte reported 97 different varieties of azaleas and showed some hybrid varieties of tuberous begonias at an exhibition in Lille. The first hybrid varieties were created some years before in England. Stimulated by Van Houtte some nursery growers specialized in production of tuberous begonias, allowing this cultivation to become a speciality of Ghent at the end of the 19th century[4]. Also the production of azaleas extended, pushing out gradually the cultivation of 'Camellia';

- \* horticultural production holdings as well as supply companies were present in the region, being a good breeding ground for the introduction of innovations. The new cultivations were introduced by a pioneer, who supported further developments;
- \* breeding activities (mainly by Van Houtte) resulted in the development of various new forms and colours, being very attractive for new customers;
- \* at the great horticultural holding of Van Houtte a lot of young nurserymen were trained. Van Houtte also founded a horticultural college, where young men were educated to skilled and competent nursery growers. A lot of them also started up a horticultural holding;
- ?? Van Houtte was not only a producer but also an international trader. The introduced innovations were commercialized readily and obtained an important place at the international market.

There can be concluded that the most important historical aspect was the introduction of an innovation in a suitable breeding ground. Also in other economic sectors the introduction of innovations is considered as the driving force for development of small and medium-sized companies in a region [9]. It is beyond doubt that Van Houtte had the greatest merit in this process, but there were also other growers and merchants that played a role.

### 1.4. Further development of the 'centre function'

As a consequence of the introduction of azaleas, begonias and other ornamental plants, the horticultural centre of Ghent developed further and obtained a real 'centre function'. The number of supply companies, trading companies, transport concerns, etc. increased offering a better framework for further development of horticulture. Because of the growing economic importance of the horticultural industry also important initiatives were taken by the government.

Research institutes, with a world-wide repute in technological and breeding research of azaleas and begonias, were founded. Also the development of education and extension services was continuing. There were also some important horticultural holdings with a lot of economic power. These holdings were not only important for production, but they also had a strong position on the international market. Associations of growers defending the common interests were founded quite early. The development of the centre offered a better framework for starting companies.

## **2. IMPORTANCE OF AZALEA AND BEGONIA PRODUCTION**

### **2.1. Production value, export and import**

In table 1 the official data of production value, export and import of azaleas and begonias are represented. In 1980 the production value of azaleas was amounting to 1,082 milliard Belgian francs (BF), representing 13 percent of the total production value of ornamental plants. The production value grew to 3,6 milliard BF in 1995; azaleas represented 21 percent of the total production value of ornamental plants (100 BF = 2,5 ECU in 1995). The production value of begonia tubers increased from 184 million BF in 1980 to 340 million BF in 1995.

Own estimations of the production value of both productions were made based on the development of the area and the production value per unit of area, as collected in the Farm Accountancy Data Network of the Agricultural Economics Institute (A.E.I.). Until 1988 the estimations were quite similar to the official data. Since 1989 however a deviation was found. According to own estimations the production value of azaleas in 1995 would amount to 2,5 milliard BF, corresponding to 40 or 45 million pieces. The area of azaleas increased, however because of the decreasing prices the value of production stabilized. The production value of begonia tubers was estimated at about 200 million BF in 1995, which is significantly lower than the official data. This decrease of the production value is a consequence of the declining area and the stabilizing prices during that period. According to own estimations the number of begonia tubers decreased from 55 million in the middle of the eighties to less than 35 million in 1995.

Azaleas and begonias are important export products. The export of azaleas increased from 779 million BF in 1980 to 1,705 milliard BF in 1995. A comparison of the export value of 1995 with the official production value shows that the export value is not reaching the half of the production value. This is an indication that the official production values are probably too high. On the other hand since the internal borders disappeared in Europe in 1993, export data became less accurate. There can be assumed that the real export data will be higher than the official data; in 1995 the export value would fluctuate around 2 milliard BF. The import of azaleas in Belgium is neglectible.

From the total production of azaleas only 30 percent are brought to flower by the producer, the other percentage is sold before flowering to mainly foreign customers. 40 percent of the azaleas are sold by a wholesaler-exporter, 40 percent are exported directly and about 20 percent are sold by (mainly Dutch) auctions. Belgian azaleas are exported to almost every country of the European Community; the most important customers are France and Italy [5]. Also begonia tubers are an important export product; more than 85 percent of the production is exported. The begonia tubers are sold to only five wholesaler-exporters, who are responsible for further commercialisation

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[3]. In the international trade statistics no data on begonia tubers are available, only a general value for bulbous and tuberous plants is mentioned. In general there is accepted that the main part of this value for Belgium is consisting of begonia tubers, however these data do not seem to be very representative for the sector.

### **2.2. Number of holdings**

In 1995, according to the classification scheme of horticultural holdings, set up by the A.E.I. [13], 374 holdings are specialized in cultivation of azaleas in Belgium. 84 holdings are specialized in cultivation of begonia tubers. These holdings are highly specialized since at the average holding with azalea production more than 97 percent of the standard gross margin (S.G.M.) is originating from azaleas. At the average specialized holding with begonia production more than 93 percent of the S.G.M. is originating from begonias. There are also 64 non-specialized holdings with cultivation of azaleas, representing only 5 percent of the total area of azaleas. 26 holdings are cultivating tuberous begonias without being specialized; at these holdings 10 percent of the total area of tuberous begonias can be found. From these data there can be concluded that azaleas and begonias are mainly cultivated at specialized holdings.

In 1980 still 435 holdings were specialized in azalea cultivation, so the number of holdings decreased by 14 percent during the last fifteen years. This decline is limited compared to the decrease of 27 percent of the total number of holdings cultivating ornamental plants during the same period. In 1980 there were still 246 holdings specialized in tuberous begonia production, so the number of holdings decreased by 70 percent in a period of 15 years.

The holdings with cultivation of azaleas and tuberous begonias are concentrated in a small region. In 1980 only in 23 villages in Belgium azaleas were cultivated; in 1995 this number increased slightly to 29 villages. In 1980 specialized holdings cultivating begonias are only situated in 22 villages; in 1995 they can be found in only 15 villages. All these villages are located in the region of Ghent.

The data represented in table 2 prove that cultivation of azaleas and begonias is strongly concentrated. The most important village is Lochristi, representing more than half of the total number of holdings cultivating azaleas or begonias. Together with five surrounding villages (Ghent, Evergem, Destelbergen, Laarne and Lokeren) Lochristi is representing 87 percent of the total number of holdings with production of azaleas or begonias. During the studied period this situation did not change significantly.

### **2.3. Area**

Azaleas are cultivated partly in greenhouses and partly in the open air. In table 3 the area of azaleas under glass and in the open air is represented for 1980 and 1995. In 1980 the area in the open air was amounting to 180 hectare and the area under glass represented 102 hectare. The ratio open air/glass was amounting to 1,76. During the studied period a continuous increase of the area could be observed, however the area under glass grew faster than the area in the open air. In 1995 the area under glass was more than twice as much as in 1980 and amounted to 224 hectare. The area in the open air increased by the half and amounted to 267 hectare. During the studied period the

ratio open air/glass decreased to 1,19. The growing relative importance of the area under glass compared to the area in the open air can be attributed to technological changes. In 1980 the specialized holding cultivating azaleas had an average area of 2.223 m<sup>2</sup> azaleas under glass and 3.280 m<sup>2</sup> azaleas in the open air. During the studied period the dimension of the holdings increased in a large extent; in 1995 the average area under glass is amounting to 5.725 m<sup>2</sup> compared to an average area in the open air of 6.776 m<sup>2</sup> (data from the Accountancy Data Network). Nevertheless these holdings still are family holdings.

In 1980 the area of tuberous begonias was amounting to 194 hectares. However a continuous decrease of the area could be observed to only 128 hectares in 1995. Besides the area in the open air also an area under glass, representing some 10 percent of the area in the open air, is present. In these greenhouses the young plants are sowed and cultivated before planting in the open air. In summer time Gloxinias (Sinningias) are often cultivated in the greenhouses. In 1980 the holdings specialized in cultivating tuberous begonias had an average area of 0,64 hectares compared to 1,37 hectares in 1995.

#### **2.4. International situation**

For a long time Belgium is the most important producer of azaleas in Western Europe, although the relative importance is decreasing because of the growing competition of other countries. Germany, where azalea is traditionally combined with other ericas, is taking the second place with a production of about 35 million pieces [5]. Also Italy and the Netherlands are important producers with a production of about 7 million pieces [2,6]. In Switzerland and Denmark production of azaleas is having a certain importance. In spite of the growing competition Belgium is staying the most important exporter of azaleas.

Despite of the decreasing area, Belgium is staying the most important producer of begonia tubers. In the other Western European countries the production of begonia tubers is not important. However a production area in the north of the Netherlands arised quite recently. In the village of Spanbroek about ten holdings are situated, having a significant greater dimension than the Belgian holdings. The production capacity of this production area is estimated at 10 million pieces [10].

#### **2.5. Significance of azalea and begonia cultivation in Lochristi**

Cultivation of azaleas and begonias is concentrated in a limited region. As shown in tables 2 and 3 especially the village of Lochristi is very important. In this village more than half of the area and of the number of holdings is located. Lochristi is a village with about 18.000 inhabitants, with a total area of 6.000 hectares and is situated at ten kilometres from Ghent. The data in table 4 prove that Lochristi is an important agricultural and horticultural area, despite of the nearness of the city of Ghent. In 1980 the total number of agricultural and horticultural holdings was amounting to 844, of which about the half were cultivating ornamental plants. From these horticultural holdings 84 percent were specialized in the cultivation of azaleas or begonias. In 1995 the number of agricultural and horticultural holdings decreased to 605, of which 55 percent were cultivating ornamental plants. The number of specialized holdings cultivating azaleas or begonias decreased to 249, representing

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75 percent of the number of holdings with ornamental plant cultivation. This decrease is mainly caused by the sharp decline of the number of holdings cultivating begonias (see table 2).

As regards the employment, in 1980 1.018 labour forces were working permanently at the agricultural and horticultural holdings; 37 percent of them worked at a holding cultivating azaleas and 18 percent at a holding with cultivation of begonias. In 1995 the number of workers decreased to 975, representing 16 percent of the total employed population, which is higher than the national average of 3 percent. During the studied period the employment at the holdings cultivating azaleas increased to 485 labour units while the employment at the holdings with begonias decreased by 57 percent. Cultivation of begonias and especially azaleas is staying important for the employment in Lochristi, since at least ten percent of the employed population is working at holdings cultivating azaleas and begonias (inclusive of temporary labour units).

On the basis of the data on the area of azaleas and begonias in table 2, the production value of azaleas in Lochristi in 1995 can be estimated at 1,4 milliard BF; the production value of begonias is estimated at 90 million BF. Also the supply of base materials to these holdings is important. In Lochristi the intermediary consumption can be estimated at 500 million BF for azaleas and 27 million BF for begonias. The gross added values are estimated at 900 million BF and 63 million BF respectively, representing a total of almost 1 milliard BF. The net added value would amount to 670 million BF for cultivation of azaleas and 52 million BF for production of begonias.

At the village of Lochristi the value of machinery, buildings and greenhouses in 1995 can be estimated at 1,8 milliard BF for cultivation of azaleas and 87 million BF for cultivation of begonias.

There can be concluded that the holdings with cultivation of azaleas and begonias, which are important for direct as well as indirect (supply) employment, are playing an important part in the economic activities of Lochristi.

### **3. Divergent development of azalea and begonia production during the period 1980-1995**

For more than hundred years azaleas and begonias were cultivated in the same region. Good and bad times were alternating, but since 1980 a divergent development of azalea and begonia production can be observed. As mentioned before cultivation of azaleas extended during the period 1980-1995 while production of begonias was declining. On the basis of the economic results of both cultivations, observed in the Farm Accountancy Data Network of the A.E.I., an attempt was made to explain this divergent development.

#### **3.1. Profitability of the holdings**

The development of an activity is only possible if the profitability of this activity is sufficient. In the Farm Accountancy Data Network of the A.E.I. the profitability of different holdings is measured by remunerating each production factor at a normal cost and the assumption

is made that the manager of the holding is owner of the totality of the capital goods. This implies that an interest is applied in order to remunerate this capital. Also the labour of the manager and his family is remunerated at normal hourly wages. Profitability can be determined on the basis of the labour income per labour unit.

In figure 1 the evolution of the labour income per labour unit at holdings cultivating azaleas and begonias is represented for the period 1974-1995 (data before this period are not available). The income is compared to the comparable income, which is the average gross income earned in other socio-professional sectors in Belgium. Until 1977 the incomes obtained at holdings cultivating azaleas and begonias are both situated at the same level as the comparable income. Since 1978 a divergent evolution of the income is observed. From that year on holdings specialized in azalea production obtain a significant higher income than holdings with production of begonias.

The average income at holdings with cultivation of azaleas is situated at a higher level than the comparable income, with a boom from 1982 to 1988 when the average income is about 75 percent higher than the comparable income obtained in the other socio-professional sectors. Since 1989 a regression of the income is observed and in 1992 the income is even falling down under the level of the comparable income. There must be remarked that because of the familial nature of the holdings the available familial income, consisting of the remuneration for the labour and capital of the family was significantly higher than the obtained labour income per labour unit. As a consequence of the good income the necessary financial resources for new investments were available.

The situation was less favourable at the holdings with cultivation of begonias; during the studied period the labour income per labour unit never reached the comparable income. Due to the different development of profitability it is not surprising that production of azaleas extended while begonia production was declining.

### **3.2. Development of both sectors**

#### *3.2.1. Sector of tuberous begonias*

Cultivation of tuberous begonias is a very labour intensive activity. In 1980 the labour costs (paid and calculated costs) represented 71 percent of the total costs; the costs of land, buildings and machinery were representing 13 percent, the fuel costs represented 5 percent and the other costs, mainly composed of direct costs of the base material are representing 11 percent of the total costs. Fifteen years later the composition of the costs did not change significantly; the labour costs, representing 67 percent of the total costs, are still the most important costs, the fuel costs decreased to 3 percent of the total costs and the part of both other components was amounting to 15 percent.

The differences in profitability between the succeeding years are almost completely determined by price fluctuations of the begonia tubers fluctuating between 4 and 7 BF per tuber during the period from 1980 to 1995. Further fluctuations of the number of harvested tubers per m<sup>2</sup> ranging from 23 to 29 pieces dependent of the weather circumstances can be observed. Due to the fixed minimal distance between the plants and the fact that only one tuber per plant can be harvested, the possibilities to increase the number of harvested tubers per m<sup>2</sup> are limited. On the

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other hand possibilities of rise in prices are quite limited; in good years an average price of 7 to 8 BF per tuber seems to be a maximum. The only possibility to increase productivity is to cultivate a greater area of begonias per labour unit. When the labour productivity of the holdings is measured by calculating the cultivated area of begonias per hour of labour, there can be observed that when the area per hour of labour in the reference period 1978-1980 is compared to 100, this value fluctuates round 100 between 1980 and 1991. Only since 1992 a higher productivity is obtained at the holdings of the data network. After this year a fast and continuous increase is observed; in 1995 the area of tuberous begonias per hour is already 40 percent higher than at the reference period. This higher productivity is not reflected in the results because at that time period prices were relatively low and also a low productivity was obtained because of the bad weather conditions.

Due to the disappointing results at the holdings with cultivation of begonias it is not surprising that the area and the number of holdings is falling down. During last fifteen years the cultivation methods at most of these holdings hardly improved and the new investments stabilized at a low level (although there are exceptions!). In Belgium interest subsidies on new investments can be obtained from government. On the basis of the data delivered by the government for the period 1985 to 1992 [10] a global amount of 115 million BF was invested at specialized holdings with cultivation of begonias. During the last five years of that period the investments were limited to 46 million BF. At the investigated holdings the replacement value of the capital goods per labour unit was amounting to 1,1 million BF in 1980; in 1995 this amount increased to 3,4 million BF. Taking account of the inflation rate of 75 percent a real growth of 68 percent was obtained; however there must be noticed that the capital goods at the beginning of this period were limited.

In the future new investments in mechanisation and technology will be necessary in order to increase the labour productivity. Adapted cultivation methods (e.g. planting out in soil blocks) can reduce the frequency of planting out. Nevertheless despite of these modernisations the holdings still will be confronted with labour peaks. The availability of temporary workers will stay necessary, which can cause problems. In order to increase the labour productivity the average area of the holdings should increase to a minimum of 4 to 5 hectares. Since the market seems to offer limited possibilities of extension, the total production area should not increase in order to obtain profitable prices. As a consequence there can be expected that the decrease of the number of holdings will go on.

#### *3.2.2. Sector of azaleas*

Just like begonia production the production of azaleas is a labour intensive activity. In 1980 the part of the labour costs in the total costs was amounting to 56 percent; the costs of land, buildings and machinery represented 17 percent, the costs of fuel represented 7 percent and the other costs were constituting 20 percent of the total costs. Fifteen years later the composition of the costs changed considerably; the part of the labour costs decreased to 42 percent; the part of the costs of land, buildings and machinery however increased to 28 percent and the other costs increased to 25 percent of the total costs. The part of the fuel costs decreased to 5 percent. This indicates that during the considered period a lot of investments in mechanisation were done. This is also in accordance with the observed evolution of the replacement value per labour unit; in 1980

this value was amounting to 2,7 million BF while in 1995 the replacement value per labour unit increased to 9,3 million BF, according with an increase of the real value of 100 percent.

The favourable development of profitability of the holdings cultivating azaleas can partly be explained by the increase in prices obtained for the azaleas. During the period 1980 to 1988 prices of azaleas increased by 25 percent. The better results can not only be attributed to the higher prices but also to the increased productivity. If the productivity is measured by the number of produced azaleas per hour of labour, there can be observed that in comparison to the reference period 1978-1980 the productivity increased continuously and was almost doubled in 1989. Since 1989 the productivity is rather stabilizing. However the real increase in productivity is a little bit lower as indicated; there is a trend to produce smaller azaleas, and this allows to obtain a higher number of pieces per labour unit. Because of the increasing supply, since 1989 prices are declining, which is also reflected in the obtained economic results.

Contrary to the production of begonias the cultivation of azaleas developed considerably during the studied period. Following important elements contributing to this positive development can be mentioned [7,14]:

- \* due to the energy crisis in the beginning of the eighties the fuel costs at holdings with cultivation of ornamental plants increased significantly. However the consumption of energy at holdings with production of azaleas is limited to less than a quarter of the energy consumption at the average holding with cultivation of pot plants. Consequently the competitive position of the azalea was becoming more favourable compared to other pot plants;
- \* the energy crisis and the support measures of the government contributed to the fast replacement of the old glasshouses by new modern glasshouses permitting to make a more rational use of the production means;
- \* the classic cultivation method consisting of plantation of the azaleas in production beds was completely replaced by cultivation in pots;
- \* the engrafted azaleas were more and more replaced by cuttings permitting to reduce the cultivation period from 24 months to 18 months or less;
- \* as a consequence of the extension of the glass area compared to the area in the open air and due to the installation of cold stores the production could be spread over the year;
- \* the assortment of azaleas changed considerably permitting to spread the production over the year;
- \* the change to pot cultivation allowed a better mechanisation. Investments in new machinery and installations increased considerably; examples are installations for irrigation, mechanical soil mixture and cutting, internal transport,...
- ?? due to the growing mechanisation the dimension of the holdings increased involving a rather limited increase of the number of labour units.

Important investments were involved with the introduction of all these innovations. During the period 1985 to 1992 interest subsidies were delivered by the government on a total amount of investments of 2,6 milliard BF in the sector of azaleas. 1,8 milliard of these investments were done in the period from 1986 to 1989 [10]. In contrast with the sector of begonias data on investments are available since 1980. The total investments during the period 1980 to 1989 were

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amounting to 3,2 milliard BF. There can be concluded that most investments were done in the years with the best profitability; since 1990 the demand for investment subsidies and the total amount of investments is decreasing.

In previous research the traditional cultivation method was compared to modern cultivation in pots. At the holdings with the last mentioned production method the labour income per labour unit was more than 50 percent higher than at the traditional holdings [14]. So the good results of the holdings with cultivation of azaleas are not only due to the favourable marketing but are mainly due to the introduction of innovations allowing to improve the position of the sector. The sector of azaleas in 1995 can no longer be compared to the situation of the sector in 1980. The traditional cultivation method totally disappeared and was substituted by a completely new and more productive technology.

However these developments also had a negative effect. As a consequence of the extension of the production, not only in Belgium but also in the other European countries, the supply of azaleas increased. Because of the increasing supply since the end of the eighties the prices were under pressure, resulting in a decreasing profitability. The low profitability caused financial problems at some new holdings with high debts. However the financial position at most of the holdings was sufficient to bear the lower prices and as a reaction to the lower prices initially there was a trend to increase the production in order to reduce the cost price. At the moment the extension of the area seems to remain balanced.

## **4. EVOLUTION OF THE HOLDINGS**

As represented in table 2 the number of holdings specialized in cultivating begonias decreased significantly during the period 1980-1995. The number of holdings with production of azaleas decreased slightly, however a growth of the area can be observed. The question of what happened with all these holdings is arising. Did these holdings just stop due to the bad economic results or because the need for new investments was too high. Did they adapt to the situation or did they switch over to other cultivations? In order to find an answer to these questions a thorough analysis of the agricultural census of the National Institute of Statistics for 1980 and 1995 was done. The aim was to retrieve the individual holdings in the Census for both years in order to determine the situation in 1995 of the holdings producing in 1980 azaleas or begonias. In the same way the situation in 1980 of the holdings producing azaleas or begonias in 1995 was retrieved. During the analysis some difficulties were experienced because at some holdings the identification number in the census changed in the considered time period. However most of these problems could be solved by doing extra research.

First the situation of the holdings with production of azaleas in 1995 is analyzed. In this year there are 374 holdings specialized in cultivation of azaleas. In 1980 227 of these holdings were already specialized in azaleas production, 25 were specialized in begonia production, 23 cultivated ornamental plants and 3 of them were agricultural holdings. 96 holdings could not be retrieved in the census of 1980. Of the holdings that could not be retrieved the names and addresses were noted and presented to an expert of the sector [10]. 68 of these holdings, or 18 percent, did not exist in 1980 and were set up during the period 1980-1995, some of them started up as a second holding of an existing holding. 23 holdings were bought or taken over, 22 of these holdings were

already specialized in cultivating azaleas in 1980. Of 4 holdings no information was available. If the holdings that were taken over are included, 249 holdings, or 67 percent were already specialized in cultivation of azaleas in 1980; 26 were specialized in cultivation of begonias, 24 were cultivating other ornamental plants and 3 of them were agricultural holdings. As a result 53 holdings, or 14 percent switched over since 1980 to cultivation of azaleas. This is a quite limited part so we can not speak of a massive switch-over from existing agricultural and horticultural holdings to cultivation of azaleas.

At the holdings specialized in cultivation of begonias following evolutions were taking place. Of the 84 holdings in 1995 65 were already specialized in cultivation of begonias in 1980, 3 of them were specialized in cultivation of azaleas, 4 cultivated other ornamental plants and 2 were agricultural holdings. 10 holdings could not be retrieved in 1980. In the same way as for the holdings with cultivation of azaleas the names and addresses of these 10 holdings were presented to the expert. There was found that 7 of these holdings or 8 percent started up during the considered period, 2 holdings were taken over and of one holding no information was available. If the holdings that are taken over are included, 67 holdings, or 80 percent, were already specialized in cultivation of begonias in 1980. During the considered period 9 holdings, or 11 percent, switched over to cultivation of begonias. Since profitability of begonia cultivation was low during the studied period it is not surprising that less holdings started up or switched over to cultivation of begonias.

In a second analysis the situation in 1995 of the holdings cultivating azaleas or begonias in 1980 was investigated. In 1980 there were 435 holdings cultivating azaleas; 249, or 57 percent of them remained (of which 22 were taken over by another manager). 35 holdings, or 8 percent, switched over to other cultivations. 3 of these holdings changed to cultivation of begonias, 27 diversified to other ornamental plants and 5 specialized in agriculture. From the other 151 holdings, or 35 percent of the total in 1980, no trace could be found in the census of 1995. There can be assumed that most of these holdings stopped as a consequence of the retirement of the manager. An analysis proves that from these 151 holdings in 1980 at 40 holdings, or 9 percent, the manager was younger than 45 year; as in 1995 these managers are too young to be retired we can assume that these holdings stopped their activities (however some of them can still exist with a new identification number).

In 1980 there were still 246 holdings with begonia tuber production; this number decreased sharply to 84 in 1995. What happened with the other holdings? The analysis proves that 67, or 27 percent of these holdings were still specialized in cultivation of begonias in 1995 and that 26 holdings switched over to azaleas. Further 30 holdings switched over to other horticultural cultivations and 7 are now agricultural holdings. So the number of holdings that switched over to other cultivations almost equalizes the number that stayed in the sector, namely 63 holdings, or 26 percent. Further 116 or 47 percent of the holdings could not be retrieved in 1995. There can be assumed that most of these holdings stopped when the manager got retired. Only at 22 of these holdings, or 9 percent, the manager was younger than 45 years in 1980. There can be assumed that the managers of these holdings stopped their activities .

This analysis proves that a successful sector is stimulating the foundation of new holdings, also existing agricultural and horticultural holdings will more easily switch over to this sector. However it is a remarkable fact that in a small region, where some holdings are belonging to a successful (azalea) and others to a less successful (begonia) sector the switch over to the most

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successful sector is rather limited. A possible explanation can be that the financial position of the holdings cultivating begonias is too bad to do the necessary investments for switching over to cultivation of azaleas. Only a limited number of holdings seems to have the possibilities to switch over to the other more profitable sector. Although there can be expected that in a less profitable sector a lot of holdings where the manager is too young to retire have to stop their activities, in reality this does not seem to be the case. The part of the holdings that stopped their activities is almost equally in both sectors; moreover this part is staying quite limited (9 percent of the total number of holdings). In a less profitable sector the managers are flexible enough to adapt to changing situations; the structure of the holding is changing and the less profitable production is replaced by another activity. However as mentioned before only 14 percent of the holdings switched over to the more successful cultivation of azaleas, probably because of the lack of capital to do new investments. The same reason is valuable for the holdings with cultivation of azaleas that switched over to other sectors; probably the manager preferred to change to another sector because the investments needed for modernisation of azalea cultivation were too high.

It would be very interesting to analyze the reaction of the individual managers on the changing economic situation in his region; this could be an item for future research.

### **5. FUTURE DEVELOPMENTS IN THE SECTORS**

At present the extension of azalea cultivation seems to be limited; this is not surprising if the stagnation of profitability is taken into account. In the future the number of holdings cultivating azaleas will decrease probably because of the strong increase of the ageing population of managers. In 1995 almost the half of the farm managers (47 percent) are older than 50 years. Of these managers 35 percent declare to have a successor and 49 percent declare not to have a successor. The other 16 percent do not know yet if they will be succeeded. The succession of a holding is dependent of the economic situation at the moment of succession, so the mentioned data can still change. Also the number of new starting holdings or holdings that switch over to other cultivations will be strongly determined by the economic situation of that moment. The development of consumption of azaleas will be an important factor influencing profitability. For that reason in the future sales promotion will stay a priority. On the basis of the actual situation there can be expected that the number of holdings with cultivation of azaleas will decrease. The remaining holdings will probably extend, resulting in an unchanged production. At the holdings with cultivation of begonias at present 56 percent of the managers are older than 50 years. Only 6 percent of these holdings declare to have a successor, at 79 percent of the holdings no successor is available and at the resting 15 percent the manager does not know yet if he will be succeeded. As a consequence of the bad economic results a further decline of the number of holdings with cultivation of begonias can be expected. However it seems that cultivation of begonias will not disappear completely, at the moment there are a limited number of holdings with a significantly higher economic dimension than the average holding. In the future some of them can evolve to a greater dimension necessary to cultivate tuberous begonias at a profitable way. That there still are possibilities for begonia tuber production is proved by the recent development of a new production centre in the north of the Netherlands.

## **6. CONCLUSION**

The example of azalea and begonia production proves that traditional cultivations, existing simultaneously in a limited production area during more than a century, can develop at a divergent way in a short time period. Under pressure of economic circumstances it can be necessary to replace the traditional cultivation methods by adapted and more dynamic methods. Even negative circumstances like the energy crisis can constitute a motivation to introduce innovations, as observed in the sector of azaleas. In the sector of begonias the managers preferred to switch over to other more profitable cultivations. Contrary to the expectations the change to the more profitable sector of azaleas was limited. Most of the holdings with cultivation of begonias preferred to switch over to other ornamental cultivations. Probably the necessary investments to change to the sector of azaleas were too high. It is a remarkable fact that despite of the low profitability of the sector of begonias, the number of holdings that stopped their activities before retirement of the farm manager was quite limited. Moreover the part of the managers that stopped before retirement was completely comparable with that observed in the sector of azaleas. This proves that in general the managers of a less profitable sector are flexible enough to assure the continuity of their activities.

The consequences for the region itself are quite limited, the crisis did not result in a faster decrease of the number of holdings than at normal conditions. Moreover the decrease of the employment in the sector of begonias is more than compensated by the growth of the sector of azalea production. Also some holdings that used to cultivate begonias diversified to cultivation of ornamental plants. As a consequence the 'centre function' of the region did not change. This example proves clearly that even a cultivation with a tradition of more than one century needs to adapt to changing circumstances.

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Tab. 1. Official production values, export and import of azaleas and begonias for the period 1980-1995 (in million BF)

	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>
<u>Azalea</u>				
Production value	1,082	1,938	3,179	3,600
Export	779	1,453	1,843	1,705
Import	5	34	21	36
<u>Begonia</u>				
Production value	184	297	209	340
Export (bulbs and tubers)	310	462	401	365
Import (bulbs and tubers)	167	190	206	151
Source : Ministry of Agriculture				

Tab. 2. Number of specialized azalea and begonia holdings in the most important Belgian villages in 1980 and 1995

<u>1980</u>	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>
	<u>azalea</u>		<u>begonia</u>	
	<u>holdings</u>		<u>holdings</u>	
Lochristi	244	56%	115	47%
Total 6 most important villages	384	84%	207	84%
Total Belgium	435	100%	246	100%
<u>1995</u>				
Lochristi	204	55%	45	53%
Total 6 most important villages	326	87%	73	87%
Total Belgium	374	100%	84	100%
Source : National Institute of Statistics - A.E.I.				

Tab. 3. Area of azaleas and begonias in the most important Belgian villages in 1980 and 1995

*Dirk Van Lierde*

(hectares)

<u>1980</u>	<u>azalea</u>	<u>azalea</u>	<u>percent</u>	<u>begonia</u>	<u>percent</u>
	<u>glass</u>	<u>open air</u>		<u>open air</u>	
	(a)	(b)	(a)+(b)		
Lochristi	60	106	59%	91	47%
Total 6 most important villages	90	156	87%	162	84%
Total Belgium	102	180	100%	194	100%
<u>1995</u>					
Lochristi	129	150	57%	57	45%
Total 6 most important villages	194	239	88%	112	88%
Total Belgium	224	267	100%	128	100%
Source : National Institute of Statistics - A.E.I.					

Tab. 4. Importance of azalea and begonia production in Lochristi

	<u>1980</u>	<u>1995</u>
Number of inhabitants	15800	18200
Number of agricultural and horticultural holdings	844	605
Number of ornamental plant holdings	428	333
Number of azalea and begonia holdings	359	249
Employment on agric. & hort. holdings (number of persons)	1018	975
Employment on azalea holdings (number of persons)	378	485
Employment on begonia holdings (number of persons)	179	77
Source : National Institute of Statistics - A.E.I.		

Tab. 5. Evolution of azalea and begonia holdings existing in 1995 compared to their situation in

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1980, and of holdings existing in 1980 with their situation in 1995

	<u>Type of holding in 1995</u>			
	<u>begonia holdings</u>	%	<u>azalea holdings</u>	%
<u>Type in 1980</u>				
begonia	67	80%	26	7%
azalea	3	4%	249	67%
ornamental plants	4	5%	24	6%
agricultural holdings	2	2%	3	1%
new holdings	7	7%	68	18%
unknown	1	1%	4	1%
<u>Total</u>	84	100%	374	100%
	<u>Type of holding in 1980</u>			
	<u>begonia holdings</u>	%	<u>azalea holdings</u>	%
<u>Type in 1995</u>				
begonia	67	27%	3	1%
azalea	26	11%	249	57%
ornamental plants	30	12%	27	6%
agricultural holdings	7	3%	5	1%
not existing in 1995 :	116	47%	151	35%
<i>age in 1980 &gt;= 45 years</i>	94	38%	111	26%
<i>age in 1980 &lt; 45 years</i>	22	9%	40	9%
<u>Total</u>	246	100%	435	100%
Source : National Institute of Statistics - A.E.I.				

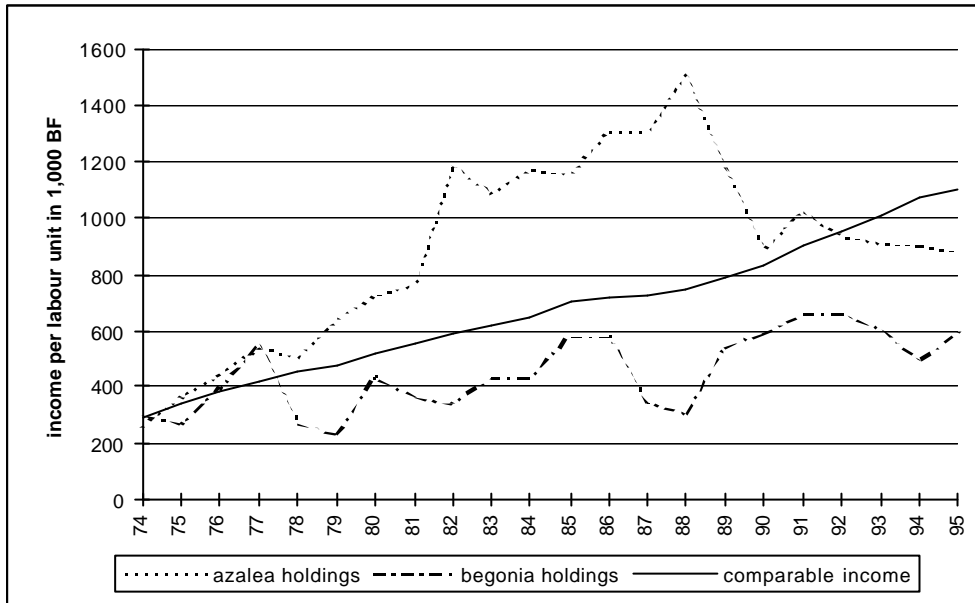


Fig. 1. Evolution of the income per labour unit on azalea and begonia holdings, and the comparable income at the period 1974-1995

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