

Distance related factors and location choice in horticulture.

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Introduction

Due to external (eg. urbanisation) as well as internal (eg. possibilities for expansion) circumstances, relocation of horticultural holdings is a topical subject of concern for many growers in the Netherlands. Spatial distribution of horticultural holdings is changing under influence of the individual location decisions of growers.

In Neo-Classical location theories, of which the theory of Von Thünen (1826-1876) is a well known example, distance is a determining factor. Distance to the suppliers of goods and people (cities) and the distance to the market for horticultural products are, according to this theory, determinant for the location of horticultural production. According to the theory of von Thünen, horticultural production takes place nearby the cities. In the 19th century cities acted as a market of horticultural products and supplier of labour and dung. According to Bruurs (1981) the spatial pattern of the location of dutch horticultural production more or less corresponds with this theory, but he also states that von Thünens theory has no explanatory power any more. Nowadays transport costs have become relatively cheap due to technological developments regarding transport facilities. Those developments have also enlarged the action radius of a grower. In the past, horticultural products were sold within a radius of a few dozens km.. Since, dutch horticultural products are sold all over the world, distances seem to have become less important. However the vicinity of the auction, supplying industries and firms, information and knowledge still has important advantages. From a research of Voskuilen (1990) it appears that growers valued the vicinity of the auction as an important location factor, because of the lower transport costs and the possibilities for personal contacts with traders and exporters. The vicinity of supplying industries will reduce the costs of the means of production and in case of a technical failure the distance to the supplier plays an important role because of the rapidity in which the failure can be corrected. (Cardol, 1983; Groenewegen, 1975). To keep his knowledge level up to date, a grower has to gather information. Informal face to face contacts with colleagues and participation in 'study clubs' contribute for an important part to the knowledge level of a grower (Maas, 1984). A location nearby those information sources will save a grower a lot of time.

In conclusion it appears that the importance of the factor distance is liable to changes during time. Distance to the market became less important, but on the other hand distance to information and knowledge became more important.

In this paper, the relevance for growers of the different distance related location factors will be examined. Attention will be paid to the distance to the different links of the network a horticultural holding is part of. Because in the Netherlands horticultural holdings are still family businesses, we will also examine the importance of the distance to existing social contacts (family, friends etc.). Further we will examine the relation between some firm, personal, and family characteristics on one hand and the role the different distance related factors play in their location decision on the other hand.

Materials and methods

The results presented in this paper are based on a survey among growers in the Westland, Dutch most important horticultural production centre with more than 3000 horticultural holdings. The Westland was chosen as the research area because most growers with spatial problems could be expected in this production centre. In a preliminary examination we sent a short questionnaire to 1000 growers in this production centre to trace growers who are considering or once have considered a relocation of their horticultural holding.

About 440 growers sent back this questionnaire and from those 440 growers 110 are considering or have considered a relocation of their horticultural holding in the past. For the main survey we visited 73 growers who answered in the preliminary examination that they consider or once have considered relocation of their firm.

In the main survey the respondents were asked to indicate which role a number of location factors have in the choice of a new location. They were asked to indicate on a five points scale the importance those factors have in their choice of a new location. The survey contained 37 location factors of which 11 distance related location factors are discussed in this paper.

Figure 1 shows the different groups of variables studied in this paper. Three groups of distance related location factors can be distinguished, namely the distance to social factors, market factors and knowledge factors. As distance to social factors we examined the distance to the present place of residence and the presence of acquaintances in the new location. In the second group, the distance to market factors, we examined the importance of the presence of supplying industries and firms, presence of a good supply of labour and the distance to the auction as well as the vicinity of a city (supplier of labour, goods?). And the third group, the distance to knowledge factors, contains the presence of horticultural education, the presence of growers with the same cropping plan, the presence of study clubs, the presence of an extension service and the presence of knowledge exchange.

To examine the influence of firm, personal and family characteristics on the role the different distance factors have in the location decision many of those characteristics were measured in the survey. In this paper only the influence of a few of those characteristics will be discussed.

As firm characteristics we will discuss the influence of the kind of crops the respondent grows, on how many m² he grows his crops and how his financial position is.

As personal characteristics we restricted us to the age and the value orientation of the respondents. According to Gasson (1973) values can be instrumental, social, expressive

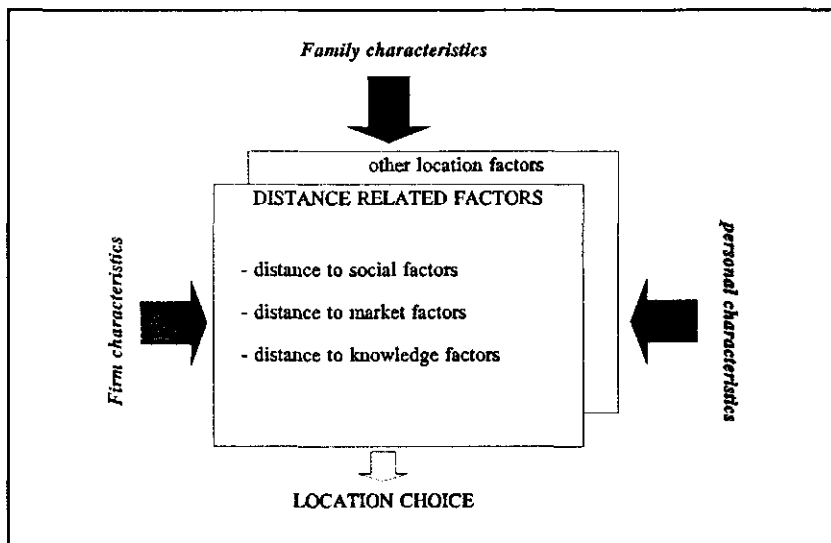


Figure 1. Examined relations in this study

and intrinsic orientated. An instrumental orientation implies that farming is viewed as a means of obtaining income and security with pleasant working conditions. Examples of instrumental goals are making maximum income, expanding the business. Farmers with a predominantly social orientation are farming for the sake of interpersonal relationships in work, e.g. gaining recognition, prestige as a farmer or belonging to the farmers community. Expressive values suggest that farming is a mean of self-expression or personal fulfilment. Examples of expressive goals are feeling pride of ownership and exercising special abilities. An intrinsic orientation means that farming is valued as an activity in its own right. Examples of intrinsic goals are independence and enjoyment of work tasks (Gasson, 1973). To measure the goals and value orientation of the growers we made use of a measurement technique developed and described by Ziggers (1993). With a few adjustments, Ziggers' situation sketches could be used for our research population.

The instrumental value orientation is not examined in this paper because of (multi) collinearity with the other value orientations.

As *family characteristics* we only discuss in this paper whether the grower has a successor for his firm or not.

The percentages of respondents indicating a particular location factor important or very important are computed, in order to get insight in the importance of the 11 distance related location factors. A principal component analysis was executed to analyze the relations between the firm, personal and family characteristics on one hand and how the different location factors are weighed by the growers on the other hand. Eight aspects are extracted using the criterion of minimum eigenvalue of 1. This principal component analysis was computed by SAS. The firm characteristic "cropping plan" is not included in the principal component analysis because of its nominal scale level. How growers with dif-

ferent cropping plans (vegetables, cut flowers and potplants) indicate the distance related location factors is given in percentages of growers indicating certain location factors as important or very important.

Results

Relative importance of distance related location factors

Table 1 shows the rank numbers of the 11 distance related location factors on a ranking list of all 37 in the survey examined location factors. This ranking list is based on the mean scores of the different location factors on a five-point scale.

Looking at all 37 examined location factors the distance related location factors are relatively less important. For example, the infrastructure and climate of a new location are more often indicated as important location factors. The most important distance related factor is the presence of a good supply of labour, which only ranks number eight. Most distance related factors are even found in the second half of the ranking list.

Importance of distance related factors

Figure 2 shows for the eleven distance related location factors the percentage of respondents who indicated the particular factor of being important or very important (4 or respectively 5 on the 5- points scale).

Distance to the social factors have been indicated least often as important factors. However, when the respondents were asked to which location they do not want to relocate in advance and for which reason, the location factor distance to the present place of residence, the Westland, was the most often mentioned reason. For example, 68% of the respondents who do not want to relocate to Emmen, mentioned the distance (240 km) to the Westland as the most important reason. With the distance to the Westland those respondents meant on one hand the distance to the Westland as main production centre with auctions, a lot of supplying industries and knowledge. On the other hand the respondents meant the distance to family and friends. Therefore, the role the distance to social factors

Table 1. Ranking numbers of the to distance related location factors in the top 37 and the mean scores

	rank number	mean score
supply of labour	8	3.96
knowledge exchange	17	3.64
supplying industry	18	3.60
study clubs	19	3.56
auction	21	3.45
Horticultural education	23	3.37
extension service	27	3.27
grow. with same crops	31	2.86
present residence	32	2.81
city	34	2.63
acquaintances	35	2.62

5 = very important
1 = not important

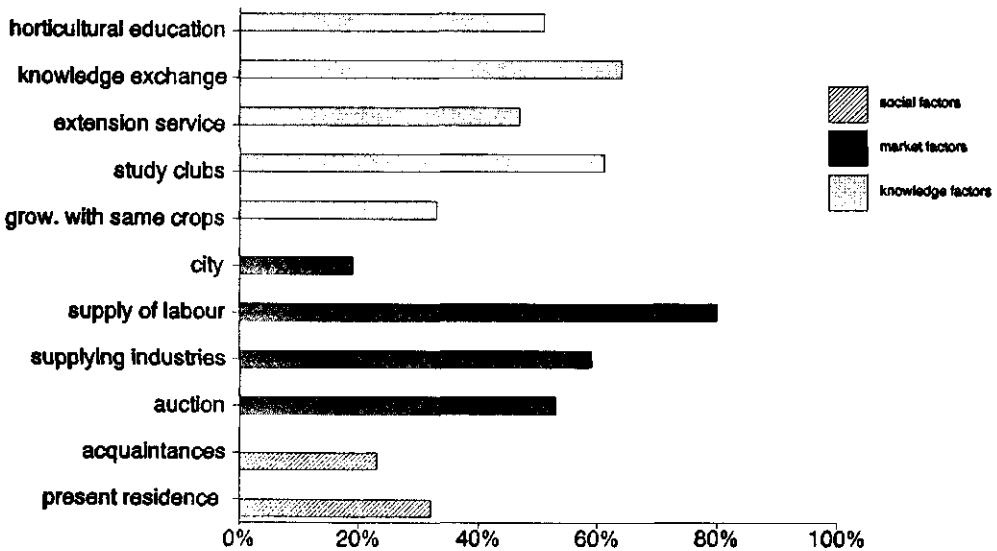


Figure 2. % of respondents indicating factor important or very important

plays in the location decision certainly should not be underestimated. Especially when relocation refers to relocation in an other part of the country.

Notable is the high score of the presence of a supply of labour. 80% of the respondents indicated this factor important or very important. The fact the supply of labour is indicated by that number of growers as an important factor reflects one of the problems dutch horticulture is confronted with.

The vicinity of a bigger city, which factor in von Thünens theory was determinant for the location of horticultural production, was only indicated important by 19% of the respondents. During the interviews it was noticed that for some growers who prefer a location nearby a bigger city, the city acts as a place for leisure activities and for others the city acts as a supplier of labour. The city has lost his function as direct market where growers sell their products. Nowadays the auction is the place where growers meet the buyers of their products. And as Figure 2 shows, the distance to this market (the auction) is indicated (very) important by 53% of the respondents.

The distance to knowledge is for many growers an important location factor. The presence of intensive knowledge exchange is indicated important by 64% of the respondents and the presence of study clubs by 61%. The presence of growers with the same crops is not for all growers a necessary condition for intensive knowledge exchange (Figure 2). The presence of study clubs and extension services seem to be a more important factor related to knowledge exchange

Relation of firm, personal and family characteristics on the importance of distance factors.

The factor pattern resulting from the principal component analysis after VARIMAX rotation is presented in Table 2. 72% of total variance is explained by the 8 extracted aspects with a eigen value > 1. A short interpretation of the eight extracted aspects is given.

Table 2. Factor pattern

Variable	H2	asp1	asp2	asp3	asp4	asp5	asp6	asp7	asp8
<i>knowledge factors</i>									
grow. with same crops	0.74	0.50	0.11	0.28	-0.14	0.52	0.06	0.19	-0.26
study clubs	0.76	0.77	-0.12	-0.07	0.02	-0.03	0.28	0.15	-0.21
extension service	0.77	0.83	-0.05	0.02	0.16	-0.18	0.04	-0.15	-0.02
knowledge exchange	0.80	0.84	-0.07	-0.02	-0.22	0.08	0.01	0.12	-0.14
horticult. education	0.64	0.28	-0.12	0.08	6.24	-0.02	0.68	0.12	-0.07
<i>market factors</i>									
auktion	0.78	-0.17	-0.16	-0.28	0.75	-0.14	-0.11	0.19	-0.16
supplying industry	0.70	0.23	-0.14	0.32	0.68	0.02	0.12	-0.23	-0.01
supply of labour	0.71	0.13	0.01	0.06	0.36	-0.09	-0.21	-0.29	-0.65
city	0.57	-0.10	0.07	-0.10	-0.18	0.02	0.69	-0.19	-0.02
<i>social factors</i>									
present residence	0.72	0.11	0.21	0.05	0.36	0.56	0.37	0.18	0.22
acquaintances	0.59	0.66	-0.01	-0.02	0.16	0.24	-0.16	-0.13	0.17
<i>characteristics</i>									
growing area	0.76	-0.01	-0.08	0.13	0.01	-0.06	-0.04	0.85	-0.08
% net worth	0.50	-0.13	-0.37	0.38	0.00	-0.06	0.20	-0.37	-0.11
probl. getting labour	0.74	-0.11	-0.12	-0.06	0.05	-0.10	-0.21	-0.25	0.77
age of grower	0.84	0.22	-0.84	0.08	0.09	0.02	0.01	0.16	0.23
intrinsic values	0.81	-0.14	0.07	0.81	0.13	-0.23	-0.24	0.01	-0.04
social values	0.69	-0.10	0.15	-0.75	0.12	-0.19	-0.11	-0.17	0.04

Aspect 1

The distance to knowledge factors shows only a little correlation with the firm, personal and family characteristics. Those factors seem to be indicated a little more often as important by older growers. This aspect also shows that growers who indicate the presence of knowledge factors important, also often indicate the presence of acquaintances in a new location as an important location factor. The acquaintances of growers are often colleague growers with whom information exchange takes place. So, the presence of acquaintances is not only seen as a social factor but presence of acquaintances might be also important for knowledge exchange.

Aspect 2

This aspect shows a correlation between age and the preference of a location in the vicinity of the present place of residence. Growers without a successor for their firm, mainly younger growers, seem to indicate the distance to present place of residence more often as an important location factor. Those growers have often a lower % net worth. During the interviews it was noticed that younger growers, who were often unmarried yet,

prefer a location within the Westland because they don't want to lose the contacts with their friends.

Aspect 3

Intrinsic orientated growers who have a good financial position and do not prefer social value orientations indicate the presence of supplying industries and the presence of growers with the same production plan more often as an important location factor. The distance to the auction seems to be often less important for those growers.

Aspect 4

This aspect has positive loadings on the distance to market factors, namely distance to the auction, presence of supplying industries and presence of a good supply of labour as well as distance to the present place of residence. An intensive knowledge exchange seems to be less important for those growers. There is no clear correlation in this aspect with firm, personal or family characteristics, apparently the distance to market factors is indicated important by very different types of growers.

Aspect 5

Growers who appreciate the expressive value orientations seem to prefer a location in the vicinity of their present habitat and seem to appreciate the presence of growers with the same cropping plan and acquaintances.

The presence of growers with the same cropping plan is correlated partly with knowledge factors in aspect 1 and partly with more social factors in aspect 5. So, the presence of growers with the same cropping plan is not only appreciated for knowledge exchange but also for social contacts. Many growers have friends with the same cropping plan.

Aspect 6

The vicinity of a bigger city and the presence of horticultural education seem to be indicated more important by growers with a relative good financial position and growers who have problems with finding enough workers. Those growers may consider the city as an important supplier of labour and the presence of horticultural education as a source for skilled workers. Those growers have less often an intrinsic value orientation.

Aspect 7

Growers with a larger growing area and a less good financial position seem to prefer more often a location nearby the auction and indicate more often the presence of growers with the same cropping plan as an important location factor. Presence of supplying industries seem to be indicated as less important by those growers. This aspect also shows that growers with a larger growing area have more often problems with finding enough good workers, but they seem to indicate the presence of a good supply of labour less important, when choosing a new location.

Aspect 8

Growers who indicate that they have problems with finding enough workers of good quality, often prefer a location with a good supply of labour (inverse of aspect 8). The distance to the present place of residence is for those growers, often younger growers, of less

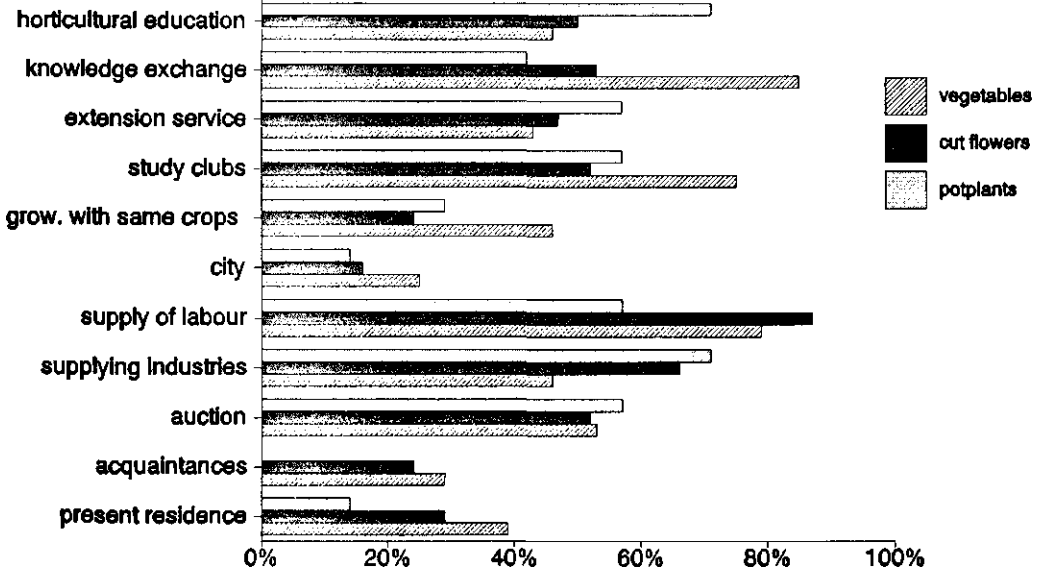


Figure 3. The importance of the distance factors in relation with the cropping plan

importance. On the other hand the presence of growers with the same cropping plan and the presence of study clubs are more often indicated as important.

In the discussion of this paper we will discuss some relevant relations found in the eight aspects interpreted in this paragraph.

Effect of the cropping plan

We distinguished three types of cropping plans, namely vegetables (28 resp. in survey) cut flowers (38 in survey) and potplants(7 in survey). Figure 3 shows the percentage of vegetable, cut flower and potplant growers who indicated the different distance factors as important or very important. The presence of knowledge factors like presence of intensive information exchange, study clubs and growers with the same crop is more often indicated important by vegetable growers (respectively 85%, 75% and 46%) than by cut flower(respectively 53%, 52% and 24%) and potplant growers (respectively 42%, 57% and 29%).

Vegetable growers seem to appreciate knowledge exchange with colleague growers more than cut flower and potplant growers, because the factors presence of growers with the same crop, study clubs and intensive knowledge exchange are indicated important by a much higher percentage of vegetable growers than cut flower and potplant growers. Potplant growers at the contrary seem to appreciate the presence of extension services to gather information from. This difference between vegetable growers on one hand and cut flower and potplant growers on the other hand could be explained by the way growers look at their colleague growers. Especially, cut flower and potplant growers consider other growers with the same crop more as a competitor than as a colleague with whom

one should exchange information. This difference is partly due to the way in which the different crops are sold on the auction.

The presence of horticultural education is often indicated as an important location factor by potplant growers. This preference for a location in the vicinity of a school for horticultural education may have two reasons. First, the seven potplant growers in the survey may have children who want to go to a school for horticultural education. Another reason could be that potplant growers contract more skilled workers and a school for horticultural education is an important supplier of skilled workers.

Another difference we can derive from Figure 3 is the relative low percentage of potplant growers who indicate the supply of employees as important: 57% against 87% of the cut flower growers and 79% of the vegetable growers. Potplant growers seem to have less problems with finding enough good workers.

Social factors seem to be less important for potplant growers. None of the potplant growers indicated the presence of acquaintances as an important factor and only 14% indicate the distance to the present location as an important location factor.

Discussion and conclusions

In the nineteenth century distance to the market was the most determining factor for the location of horticultural production. Cities acted as direct markets for horticultural products and as suppliers of dung and labour. Because horticultural products are perishable and voluminous, a location nearby the market was essential. For those reasons, horticultural production was located nearby cities. However, technological developments regarding transporting facilities made the transport of horticultural products over longer distances relatively cheap. Rodewijk (1988) stated that the vicinity of a city has lost its importance as a location factor for horticultural production. From our research it appears that the vicinity of a city is not for many growers an important location factor, but still some growers prefer a location nearby a city. However, the reason for this preference has changed. During the interviews respondents often mentioned the supply of labour and the function of the city as a place for leisure activities as reasons for their preference. Nevertheless, most growers see the expanding cities, nowadays, more often as a threat for their horticultural holdings, because of the competition for land. Urbanisation is one of the most important reasons growers have to relocate their firm.

Nowadays the auction has taken over the function of market place where supply and demand of horticultural products is brought together. In the survey the distance to the auction is indicated as a relative important distance related location factor. It seems to be an important location factor for very different types of growers (Aspect 4). However, growers with social value orientations (are not intrinsic orientated) seem to have more often a preference for a location in the vicinity of the auction (inverse of aspect 3). Those growers might be more involved in the social system surrounding the auction.

The auction has not only the function of selling horticultural products, but it is also a source of information for growers and a meeting point of producers and buyers of horticultural products. However, the auction as institution of trade is liable to changes (tele-auction), which may have its influence on the importance of the vicinity of an auction as location factor in future.

The last decades much attention was paid to the advantages of a location in or nearby a spatial concentration of horticulture together with related activities, such as supplying industries, research stations and auctions. Those advantages are called the centre function of a production centre. From research of Verhaegh (1979) it appears that the average net returns of horticultural holdings which are located outside the large production centres are low in comparison with the average net returns of horticultural holdings located in a production centre. Verhaegh (1979) stated that the regional differences in yield are not caused by regional differences in soil, climate, water, technical or economical factors, but they are mainly caused by human factors. The intensive information exchange between growers in a production centre has been often mentioned in literature as an important cause of the higher production level and better quality of the products in those production centres (Soomer, 1987; Maas, 1984; Groenewegen, 1975; Zandsteeg, 1978; Verhaegh, 1979). For large horticultural holdings those regional differences between net returns do not exist (De Haan & Stein, 1975). This difference between small and large firms may be explained by the way small and large firms are managed. Owners of small firms often have to do all management tasks and all operational tasks. For larger firms, at the contrary, management tasks and operational task are often split up over different persons. So it will give no problems when one of those persons leaves the firm for a whole day to gather information. For smaller firms with only one manager this will give some more difficulties. For those firms location in the vicinity of knowledge factors is essential (Vijverberg, 1992). However in our research no relation is found between the size of the firm and the importance of the distance to knowledge factors (Aspect 1).

Gathering information to keep his knowledge level up to date is and will be in the future an important task for a grower. Our results show that the distance to knowledge factors are still important for growers, especially for vegetable growers. A noticeable difference seems to exist in the way vegetable growers on one hand and cut flower and potplant growers on the other hand gather their information. Growers with the same cropping plan are for vegetable growers colleagues with whom information is exchanged. A grower with the same crops is for a potplant grower more a competitor than a colleague. Potplant growers get their information more often from extension or advisory services. Our results also show that the presence of growers with the same crop is not always seen as a condition for intensive knowledge exchange. The presence of study clubs for vegetable growers and the presence of extension services for cut flower and potplant growers seem to be important conditions for intensive knowledge exchange.

Noticeable is the fact that the distance to knowledge factors plays for younger growers a less important role in comparison with the older growers. This indicates that this factor may become less important in the future. Different developments have enabled the growers to get their information over longer distances. And the developments regarding information technology are still going on at a quick rate. Younger growers are better capable to use modern information technology for information gathering and they are more willing to travel for information gathering. This findings agree more or less with the prognoses given by Alleblas (1992) that the geographical scale of the centre function will become larger in future.

Labour is an important production factor for horticulture. In our survey the presence of a good supply of labour scores as most important distance related location factor. A lot of respondents told they had problems with finding enough workers of good quality. So, it is

not only the presence of a good quantity of workers, but possibly more important, the quality of the available workers. During the survey respondents mentioned two aspects concerning the quality of workers. For unskilled work a good motivation of the worker is important and his skills are less important and for skilled work the skills of the worker are important. For this last group of qualitative good workers horticultural education seems to be indispensable. This may explain the relative high score for the presence of horticultural education, especially for potplant growers.

In conclusion it appears that the distance related location factors are still important. Most distance related factors have an average score on the five point scale higher than three. But besides distance related location factors, growers indicate other location factors like infrastructure, water quality, climate factors etc. as important or even more important. This certainly is not surprising, because before a certain location could be attractive for horticultural holdings some basic conditions for horticultural production have to be fulfilled.

The vicinity of the different links of the network seems to have important advantages, which in the past have resulted in a concentration of horticultural production. Distance related factors still seem to be important keep factors for growers in the Westland. But other factors which represent the disadvantages of a location in the Westland will play the role of push factors, like the bad infrastructure, bad water quality or the problems of getting enough workers. Push factors will stimulate the relocation of growers from the Westland to relocate in other regions in the Netherlands or even in other countries. Some growers will weigh the keep factors more important in their decision and they may decide to relocate within the Westland. Others will weigh the push factors more important and may decide to leave the Westland and relocate in a other region.

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