

ANALYSIS OF FACTORS DETERMINING THE LOCATION OF HORTICULTURAL HOLDINGS

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Abstract

In this article we give a review of the web of factors, which influences the location decision of a market gardener. Three theoretical approaches will be described. None of the approaches gives a complete explanation of the location decision of a market gardener, but each emphasises a certain part of the decision. The location factors can be divided into five groups namely: physical, economic, social, political and personal factors. We will show how these five factors are related to the three theoretical approaches. We will also show that the so called "agglomeration effect", which is often mentioned as a success factor of the Dutch horticultural production centres, can be explained in terms of those five factors.

1. Introduction

Market gardeners are faced with essential location problems. Decisions regarding relocation are for many market gardeners a topical subject of concern, because of the progressing urbanisation and the lack of space for expansion in the traditional production centres. The location decision is an important strategic decision, which will influence the management for a longer period. A particularity of the location decision in horticulture is the fact that most holdings are family businesses. This means, the entrepreneur has to take into account the wishes of the other family members, when making decisions. Because of the topicality, the complexity and the importance of the location decision for the market gardener we started to develop a systematic framework in which the location decision of a market gardener is analyzed. This framework will be the starting point for the development of a decision support system (DSS) for strategic decisions regarding the location.

In the second paragraph of this paper we will give a short review of the theoretical approaches of the location of economic activities. In the third paragraph we give a review of the different location factors, which according to literature influence the location decision of the market gardener. The purpose of this review is to get some insight in the web of factors, which influence the location decision of a market gardener. In the fourth paragraph a projection is made of the location factors on a location in a production centre.

2. Theoretical approaches of the location of economic activities

Location theories can be divided into three main approaches namely the neo classical, behavioral and the structuralist approach. The neo classical approach dates from the 19th century and its main characteristics are the assumption that an entrepreneur acts like a Homo Economicus, having complete knowledge about all relevant information and being able to use it in a rational way to reach his goal of profit maximization. Transport costs were assumed to be a predominant factor which explains the spatial patterns of economic activities (Healey, 1990). A famous neo classical theory is Von Thünen's

model of land use "Der Isolierter Staat". His model, developed in 1826, describes the relation between land use and distance from the market.

The behavioral approach highlights the satisficing behaviour of the decision maker and rejects the existence of a Homo Economicus assumed in the neo classical approach. According to the behavioralists, decision making behaviour is a reflection of a wide range of goals an entrepreneur strives after, the knowledge level of the entrepreneur and his aversion to risk and uncertainties.

According to the structuralist approach land use patterns are a product of the overall structure of the economic system in which individual decision-makers operate. Structuralists in this way thus adopt a more holistic approach than behavioralists and argue that behaviour is constrained by wider social, political, and economic processes. Structuralists see for example class and culture as the main determinants of behaviour in stead of individual values and ideas of the decision maker (Healey, 1990).

3. Factors influencing the location decision of market gardeners

Each of the theoretical approaches mentioned above emphasises a certain part of the location problem. Figure 1 shows the factors emphasised by the three approaches. In this paragraph we will give an overview of those factors and how they influence the location decision of a market gardener.

Physical factors are not emphasised separately by one of those theoretical approaches. Nevertheless, physical factors certainly should be taken into account, because their important role as production factor in agricultural production.

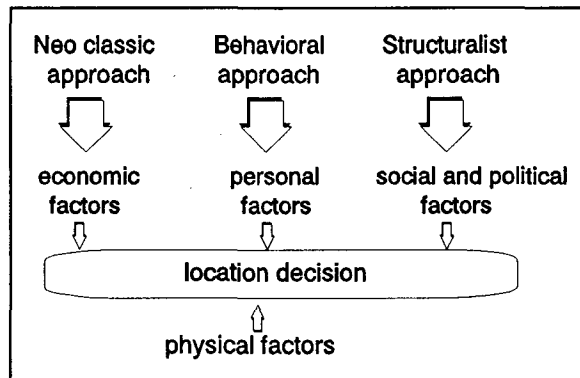


Figure 1: The location factors emphasised by the theoretical approaches.

3.1 Physical factors

Physical factors are essential production factors for horticultural production. But due to technological development a market gardener is more and more able to influence the physical factors, especially in glasshouse industries. The market gardener is able to control the glasshouse climate. However, the influence of the outdoor climate on the production process should not be underestimated (Groenewegen, 1975). Light intensity is one of the most restrictive factors for horticultural production (Kronenberg, 1984).

Although it is possible to supply crops with artificial assimilation light, in most cases it is too expensive. Another climatological aspect, which can be controlled by the market gardener is the glasshouse temperature. But low outdoor temperatures will increase the heating costs. High temperatures in summer might damage the crops. Regarding the temperature differences, a moderate sea-climate has the most advantages for glasshouse industries (Kronenberg, 1984).

In the 19th century soil condition was one of the most important location factors. Soil condition influences both the amount of yield and date of harvest (Jacobs, 1953). The introduction of artificial fertilizers, however, gave the market gardener possibilities to use soil of less quality for horticultural production (Rodewijk, 1988). A next step in decreasing the importance of soil condition was the introduction of hydroponic cultivation. According to Rodewijk (1988) soil condition is not a location factor of importance for the Dutch glasshouse industries any more, because of the increasing importance of these substrates. Voskuilen (1990) on the other hand concluded from his survey among market gardeners in the region Aalsmeer, that soil condition is still an important location factor. The market gardeners involved in his survey largely were no substrate growers. Both, Voskuilen and Rodewijk, agreed with the importance of the soil as the fundament on which the glasshouse will be built and in this way it will influence the building costs of the glasshouse.

Water quality is a physical factor which becomes more and more important due to technological developments, like the switch-over to substrate cultivation and the recirculation of drain water (Bakker, 1991). Getting enough water of good quality is a problem in most production centres in the Netherlands, though some solutions for this water problem have been developed, all with a different price tag.

3.2 Economic factors

The transport costs play an eminent role in the neo classical theories. In the 19th century, when Von Thünen developed his theory, a substantial part of the production costs were transport costs. According to Von Thünen horticultural production is therefore located nearby the market. However, due to technological developments regarding transport facilities, transport has become relatively cheaper and the distance to the market has become less important. But still market gardeners appreciate the proximity of an auction, supplying industries and "information sources", which will save the market gardener transport costs and a lot of time. Most market gardeners sell their products at an auction. According to Voskuilen (1990) market gardeners valued the proximity of the auction as an important location factor, because of the lower transport costs and the possibilities for personal contacts with traders and exporters. Cooperative transport can reduce the transport costs for market gardeners who are not located near an auction. The price-making also differs from auction to auction. A large auction will give the highest prices and the lowest costs (Cardol, 1983). Introduction of "Tele-Auction" will reduce those price differences between auctions (Gaasbeek et al, 1991). Proximity 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 market gardener 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 market gardener (Maas, 1984). A location nearby those information sources will save a market gardener a lot of time. The introduction of information technology might enable the market gardener from outside the centre to get his information more easily.

Another important economic factor mentioned in literature is the parcel size and form. Besseling (1991) shows that the economic profit increases with expansion of the size of business. Because of technological developments and smaller margins between selling

price and cost price a market gardener is more and more looking for possibilities for expansion (Rodewijk, 1988). Another aspect of parcelation is the form of the parcel. An unfavourable length-breadth ratio of the parcel will restrain a market gardener from optimal management. The best form is a glasshouse with a 1:1 length-breadth ratio because of an efficient use of space and, more important, lower energy costs (Rodewijk, 1988).

Finally, the labour costs, land prices and infrastructural facilities differ from region to region and also influence the location decision of a market gardener. The labour costs and land prices are high in a production centre, because of the high competition for hiring labour and land. Existence of good infrastructural facilities, adapted to the needs of horticultural production, will have important economic advantages (Ossinga, 1990)

3.3 Social factors

The social environment in which an entrepreneur operates can have an important influence on his entrepreneurship. First of all the openness for information exchange in a region. Daily informal face to face contacts between market gardeners and intensive participation in "study clubs" contribute for a important part to the knowledge level of a market gardener (Maas, 1984). Another social factor is the group cohesion, which exists in a production centre. This group cohesion results in the intensive information exchange and a sane form of competition and performance motivation between the market gardeners. The social control benefits the product quality and quantity. Firstly a market gardener does not dare to produce a product of bad quality, because it will reduce the status of the whole complex. Secondly he won't be inferior to his colleague growers; he wants to belong to the best. (Soomer, 1987).

The image of a region, concerning living conditions and entrepreneurship, is another social aspect which can influence the attitude of a farmer and his family towards that region. Especially for farmers and market gardeners who run family businesses, social factors seem to be important. In family businesses decision processes may involve all members of the family, who may not share the same objectives. For example, the son may argue for development of the business, while the father favours consolidation and the mother is more concerned with maintaining family harmony (Gasson, 1988). Research of Voskuilen (1990) showed that living conditions of the new location and distance to family and friends play an important role for many market gardeners. From a research of the University of Groningen it appears that the wife and children of a market gardener have important influence on the location decision (Anonymous, 1992).

3.4 Political factors

In the structuralist approach attention is paid to the political system in which an entrepreneur operates. National as well as regional politics can have great influence on the location of horticultural production.

National government policies can influence horticultural production in several ways. First of all we want to mention the policies concerning town and country planning, which may exclude regions for horticultural production. Secondly, legislation concerning environmental care may influence production manner. For example the obligation to produce crops in a closed system will have consequences for the production system. The national politics also influence production costs (e.g. labour, energy price) but on the other side they can stimulate production or investments by giving subsidies.

Regional policies have more influence on the diversity of regional attractiveness for horticultural production. The regional government can have a positive or negative attitude concerning glasshouse production. Voskuilen (1990) mentioned a quick and uncomplicated dispatch of inquiries for licences as an important task for regional

government. Also infrastructural facilities adapted to glasshouse industries are a responsibility of regional governments.

3.5 Personal factors

The role which the location factors play in decision making will differ from market gardener to market gardener depending on personal factors, like business goals, knowledge level and age. Research showed that profit maximalisation is not the only goal farmers strive after when making decisions (Maas, et. all. 1983). According to the behavioral literature an entrepreneur is not an optimizer but a satisficer. The range of goals and values is very divers. Gasson (1973) classified the goals and values of farmers in 4 groups ;

Instrumental (e.g. making a satisfactory income)

Expressive (e.g. pride of ownership)

Social (e.g. belonging to the farmers community)

Intrinsic (e.g. doing the work you like)

Spaan (1992) distinguished two broad groups of market gardeners concerning the organization of their business;

"*toppers*", they have a high level of specialisation with modern glasshouses and maximalisation of production has a high priority. "Toppers" are innovative and hungry for information to improve their production level.

"*real market gardeners*", they are not specialized in one product and often they are "soil growers". They don't want to make high costs and they don't insist upon modern technology. "Toppers" and "real market gardeners" will come to different decisions, because they stress different factors, according to Spaan.

Also age and knowledge level of the farmer will influence the decision making behaviour. Young farmers tend to be better educated than their older colleagues and are more likely to seek information, be innovative and have a more positive attitude towards the borrowing of capital and the taking of risk (Healey, 1990). Woldringh en Westerlaak (1974) concluded that younger people are more willing to migrate to other regions than older people.

4. Location in a production centre; agglomeration effects

Horticultural production in The Netherlands is mainly concentrated in production centres. Production centres arose historically nearby population centres and in regions with good physical circumstances. This spatial pattern of horticultural production in the 19th century corresponded with Von Thünen's model (Maas, 1984; Bruurs, 1981). Nowadays location of horticultural production can be described by those factors, but they don't have any explanatory power any more (Bruurs, 1981). The growth of the production areas can mainly be ascribed to the cumulative working of an increasingly important "centre function" which originates from spatial concentration of horticultural holdings (Cardol, 1988). The term centre function is a collective noun for several advantages of a location in or nearby a production centre. The spatial concentration of horticultural together with related activities, like supplying industries, however not only offers advantages it also has disadvantages for the businesses concerned, like a lack of space for expanding (Maas, 1984b). It is better to talk about the agglomeration effects of the spatial concentration, because this term also covers the disadvantages. The advantages and disadvantages of a location in a production centre has been described for a main part in the previous paragraphs. The agglomeration effects are a projection of the five groups of factors, described before, on a location in a production centre. Some factors work out negative others positive in a production centre (fig. 2)

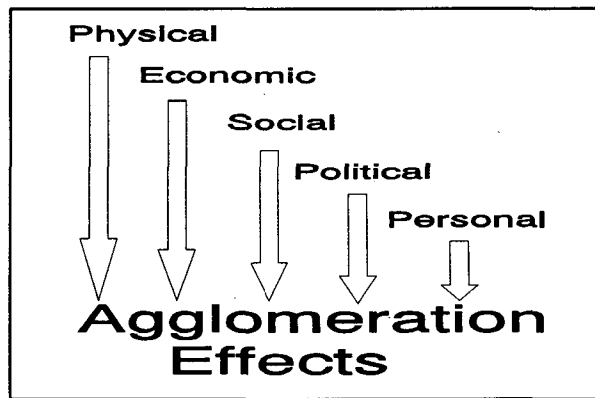


figure 2: the composition of the agglomeration effects.

5. Discussion and Conclusions

This review of location factors shows that the location decision is influenced by a complex of factors. None of the three theoretical approaches, mentioned in this paper covers all the relevant factors for the location decision. Each stresses some of them. The importance of the different factors has changed in time, due to technological and social or political developments. Physical factors, like climate and soil condition, and some economic factors, like transport cost, have become less determining for the location of horticultural production. But still we should not neglect climatological advantages and the advantages of the proximity of an auction, supplying industries and information sources. Other physical factors, like water quality and economic factors, like parcel size have become more important. Also the influence of political factors on horticultural production has increased in time. For example the legislation concerning environmental care and policies concerning town and country planning influence the way and the place of horticultural production more and more.

The social and personal factors are nearly influenced by technological and social or political developments. As long as horticultural holdings are family businesses, the wishes of all the family members should be taken into account. These wishes concern mostly social factors, like the distance to family and friends and image of a region. The influence of the factors will differ from market gardener to market gardener depending on personal factors. When analyzing the location decision it is important to take into account the differences in personal factors of market gardeners. His business goals and values and his entrepreneurship are important in assessing the importance of the other factors for his location decision. In a following inquiry much attention will be paid to the personal factors.

The success of horticultural holdings in a production centre is mainly due to social and personal factors. The group cohesion, the daily informal face to face contacts with other market gardeners and the social life which is tied up with horticulture are the important factors that cause the higher net returns in a production centre. However, the disadvantages of location in a production centre increase, especially in the older production centres. But still most market gardeners from inside a production centre are looking for a new location in the same production centre or very close to it. Is it because of the advantages being higher than the disadvantages or is it because of the existing social contacts? Further research will have to clear this and other questions.

References

- Anonymous, 1992. Belangrijke rol vrouw bij verkassen tuinder. Groenten en Fruit 16; pp12.
- Bakker, H. , Oosthoek, J., Ravensbergen, P., Scholten, R. and Wit, K. de, 1991. Projectvestigingen glastuinbouw; organisatie en inrichtings aspecten. Werkgroep Inrichtings eisen projectvestiging glastuinbouw; 41p.
- Besseling, P.A.M., 1991. Bedrijfsgrootte en schaafeffecten op glasgroente-bedrijven; 1975-1990. Landbouw-Economisch Instituut, Den Haag; publ. No.4.129.
- Bruurs, J.J.A.M. and Maas, J.H.M., 1981. Enkele aspecten van de tuinbouw in Nederland. Geografisch tijdschrift 15; p 253-270.
- Cardol, G., 1983. Locatie van glastuinbouw op drempel van nieuw Tijdperk. Landbouwkundig Tijdschrift 95, 9; p22-26.
- Cardol, G., 1988. Ruimte voor agribusiness-complexen Structuur, positie en dynamiek van het Noordlimburgse tuinbouwcomplex vanuit functioneel, geografisch en regionaal perspectief. Elinkwijk B.V., Utrecht, 306p.
- Gaasbeek, A.f. van and R.A. Rodewijk, 1991. Het westlandse glastuinbouwcomplex en zijn centrumfunctie; een kwalitatieve verkenning. Landbouw economisch instituut, Den Haag; Interne nota 387, 51p.
- Gasson, R., 1973. Goals and values of farmers. Journal of Agricultural Economics 24 p521-542.
- Gasson, R., et. al., 1988. The farm as a family business: a review Journal of Agricultural Economics 39; p1-41.
- Groenewegen, C.A.M. and W.F.S. Duffhues, 1975. Centrumfunctie 1,2 en 3. Vakblad voor de bloemisterij 30, 31; pp.12-13; 32; pp.18-19 en 33; pp.12-13.
- Healey, M.J. and Ilbery, B.W., 1990. Location and change: perspectives on economic geography. Oxford university Press, Oxford, 1990; 381p.
- Jacobs, J.M., 1953. Omstandigheden die de vestigingsplaats van Tuinbouw bepalen. Landbouwkundigtijdschrift 69; pp333-339.
- Kronenberg, H.G., 1984. Productie omstandigheden in de tuinbouw Landbouwuniversiteit, Wageningen.
- Maas, J.H.M., Cardol, G.,and Bleumink, P.H.M., 1983. De tuinbouwbedrijven in het Noord- Limburgse complex. Geografisch en planologisch instituut. Nijmegen, Vakgroep Economisch Geografie. publikatie no. 28.
- Maas, J.H.M., 1984. Landbouw en Ruimte. Van Gorcum, Assen 1984.
- Maas, J.H.M. and G. Cardol, 1984b. The agribusiness complex in its spatial context. Reprint from "A profile of Dutch Economic Geography" Van Gorcum, Assen; pp150-168.
- Ossinga, K.J., 1990. Vestigingsplaatsproblematiek in de glastuinbouw; een vergelijking van drie locaties. Landbouw universiteit wageningen, doctoraal scriptie; 83p.
- Rodewijk, R., 1988. Locatiedynamiek in de Nederlandse glastuinbouw. Economisch Geografisch Instituut, Amsterdam.
- Soomer, K.L.P. de, Defares, P.B. and Slijkerman, A.J.M., 1987. Centrumfunctie en sociale uitwisseling. Bedrijfsontwikkeling 18 - 5; pp166-171.
- Spaan, J.H. and Ploeg, J.D. van der, 1992. Toppers en Tuinders: bedrijfsstijlen in de glastuinbouw: een verkenning. Landbouwuniversiteit, Wageningen; 103p.
- Voskuilen, M.J. and Elk, L.M. van, 1990. Motieven van glastuinders voor vestiging in Regio Aalsmeer. Landbouw Economisch Instituut, Den Haag; 61p.
- Woldringh, C.I. and Westerlaak, J.M. van, 1974. Migratie tussen west en noord Nederland. Instituut voor toegepaste sociologie, Nijmegen.