

Analysis of Organic Supply Chains

- A theoretical framework

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Abstract

This working paper contains a new theoretical approach for analysing organic supply chains. It is structured at three levels:

- *The farm/firm/household level*
- *The supply chain*
- *The institutional frame*

The Working Paper is part of a research project under DARCOF II (Danish Research Centre for Organic Farming), examining the future development of organic foods in Denmark.

In continuation of this working paper the choice of data as well as methodological approach will be the next milestone of the research project.

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Preface

This Working paper is part of a research project under the DARCOF II programme running from June 2002 to June 2005, and is partly funded by DARCOF (Danish Research Centre for Organic Farming). It contains the theoretical foundation for analysing the future development of organic foods in Denmark, which methodologically will be centred around two supply chains:

- Organic vegetables
- Organic pork

The research project is at same time Paul Rye Kledal's ph.d. dissertation at FOI (Danish Research Institute of Food Economics) with senior researcher Mogen Lund, FOI, and professor Kostas Karatininis, FOI, as supervisors.

Danish Research Institute of Food Economics, December 2003

Johannes Christensen

1. Introduction

1.1. Background

At the turn of the century The Danish Research Institute of Food Economics was involved in a research project analyzing the growth potentials for organic farming in Denmark. Some of the more surprising results at that time were that the dairy production, one of the most important sectors behind the growth of organic farming in Denmark during the 90's, would cease to grow (Kledal, 2000 & 2001).

However, the results also showed that there was a potential for new areas of growth within organic pork and plant/vegetable production.

Organic pork and plant/vegetable production had so far been unexamined concerning various socio-economic aspects like farm types, production costs, market potentials, possible distribution channels as well as consumer preferences.

Organic pork and organic vegetables were therefore chosen as case studies for this research project examining the future supply of organic foods in Denmark in the first decade of a new millennium.

1.2. The aim of the research project/ dissertation

The aim of this research project is to analyze the future development of the Danish organic food sector with two agro-commodities as case studies:

- Organic vegetables
- Organic pork

Emphasis is placed on identifying the economic forces and changes within the chains in combination with the macro-social foundations, which sets the regulatory framework for the economic behaviour among individuals, firms and consumers along the network of the chosen chains.

By linking the research results of economic changes with the various social movements that are at stake in the consumption of organic food, the aim is to

1. identify and explain the diversification of the organic chain and provide useful supply strategies for further growth
2. contribute to a new methodological approach for future agro-food supply chain studies

1.3. The structure of the research project/dissertation

The theoretical approach adopted in this research project is structured around Williamson's four levels of social analysis (Williamson, 2000). The first level is focusing on how to optimize resource allocation, prices and quantities. The second level is about getting the governance structure right, dealing with contracts and transactions. The third level is about the institutional environment concerning formal rules, property rights, bureaucracy etc. The fourth and last level is the social embeddedness concerning formal institutions such as customs, traditions, norms and religion.

In this project only the first three levels of analysis will be employed leaving out Williamson's 'grand level' of informal institutions, norms, religions etc.

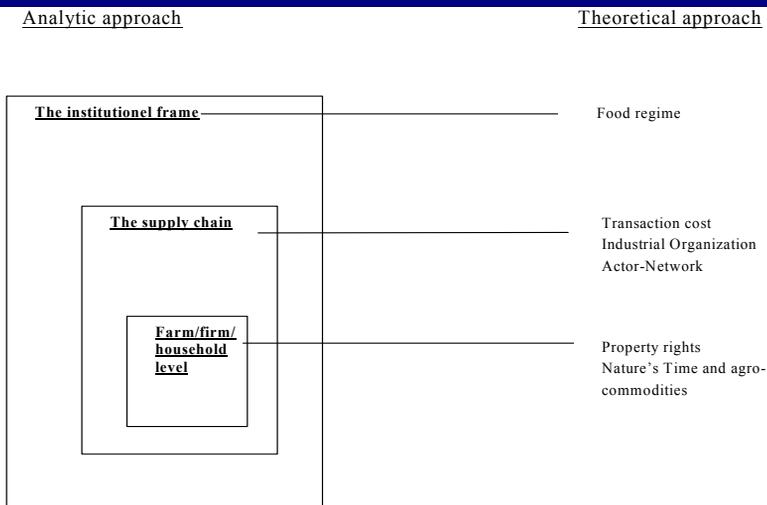
The focuspoint in the three level approach are:

- The farm/firm/household level
- The supply chain
- The institutional frame

Within each level different theory is applied.

The purpose of combining different analytic levels and different theoretical approaches into the case stories is first of all an attempt to overcome some of the barriers in social science of studying either structure or agency. Secondly, it is an attempt to reduce the deterministic interpretations of agency often inherent in theories looking at structure alone as well as the dangers of oversimplification or extrapolation of structural changes in society based on individualistic behavioural assumptions. Third, it is an attempt to 'catch the logic' and dynamic behaviour of the economic agents interacting within certain institutional settings, and thereby being able to say something valuable about future trends.

Figure 1. Analytic and theoretical approach



1.4. The firm/farm/household level

As figure 1 shows, each analytic level is structured around a certain set of theories. At the individual farm/firm/household level theories on ‘Property rights of the firm’ and ‘Nature’s Time’ lays the foundation for explaining agency behaviour. The two theories are also the foundation for a new organic production-consumption model presented in the end of chapter 1. The model describes the motives why some farmers will shift to organic production methods as well as why some consumers will shift to organic foods. The economic and social motives in the model for shifting to organic are based on mutual values and therefore also outline the drive behind the creation of the organic market.

From a property rights of the firm approach the private ownership of the farm gives the entrepreneur specific residual rights of control over the use and disposal of the different capital inputs. These rights of control automatic transform specific and residual rights over the net earnings - and hence power.

By shifting to organic production methods, the farmer gets *access* to a critical resource. This access gives the organic farmer the opportunity to specialize her human capital to the resource and make herself valuable and hence control over the critical

resource. This control over a critical resource (organic production methods) generates a source of power, but gives no new residual rights.

The choice of organic production are also motivated by a counter reaction to *alienation* or *exploitation* encountered by 'normal' competitive market exchanges. Counter-moves where emphasis on alternative *transaction processes* resting on trust, traceability and cooperation becomes an important part of the organic movement.

The drive behind the individual farmer to shift to organic production as a countervail and regain power is caused by the push from capital to shorten Production Time which in agriculture consists of Nature's Time and Labour Time. The purpose of shortening Production Time is to reduce the turnover time of capital investments.

The negative consequences from shortening Production Time by new technologies (pesticides, GMO), divisioning and specializing production will at some point lead to various constraints as well as diminishing residual rights of control and earnings for various farmers. Organic farming with its rules and regulation (often extending Nature's Time and Labour Time) gives access for some farmers to regain control (and hence power) over net earnings through the property right over the organic 'brand'.

In the household, Production Time (buying and transforming food commodities into a meal) is a constant trade-off between time for leisure (buying convenience food) and time for preparing food. Food manufacturing's appropriation of human and cultural capital (social habits of making and enjoying a meal) by either introducing time competitive convenience food, or substituting good raw materials with food 'make up', can eventually make the household feel alienated as well as exploited. The household loses its residual rights of control over net earnings (wage). Public food scares can at the same time reveal this loss of control and power, and create an awareness of alienation and exploitation. By shifting to organic foods the consumer can regain access to her human and cultural capital and hence a sense of control and power.

1.5. The supply chain

However farms, firms and households are not solitary islands. They are often bound in a social and economic network or a specific supply chain. The supply chain as a second analytic level is therefore applied.

For the theoretical analysis of the two supply chains three dimensions are applied:

Dimension	Theoretical approach
– The governance structure	Transaction cost theory
– The market structure	Industrial Organization
– The input-output structure	Actor-Network Theory

Within each dimension a theory is applied to explain different outcomes. The aim is to catch the dynamic interaction between various economic actors along the nodes of the supply chain. From the property rights literature we know that there are costs of defining, protecting and exchanging property rights. These costs are named transaction costs and when it comes to agriculture certain types of transaction costs follows with producing and distributing food. The type of transaction costs will influence the governance structure of the firms along the supply chain.

Often the agro-supply chain looks like an hourglass lying down with markets changing from oligopoly, to full competition, to bilateral oligopoly, to full competition. The literature on Industrial Organization can contribute with explanations on firm behaviour when markets are imperfect, and help explain the different types of costs protecting property rights along the supply chain.

To map out the input-output structure of the chosen supply chains the post-modern Actor Network theory is applied. The Actor Network Theory offers a radical view on heterogeneous organizations or networks, consisting of both human and non-human actors, and how the interactions between them depends on both the quality of the actors and the network context of interaction.

1.6. The institutional frame

Neither the farm/firm/household nor the whole supply chain is an entity flying alone by itself in space. It is part of an institutional setting or a society, which is the third and last level of analysis. To explain how the institutional frame also interacts with changes in the chain as well as individual firm behaviour, the theory on Food regimes from the political economy is applied. The main starting point is the argument that nation-states play a crucial role in regulating capital accumulation, which means regulating investments to build up capital assets. The theory sees differing ways in which capitalism is regulated as historically specific ‘regimes of accumulation’, and this is reflected in a certain historical mode of production and consumption.

The theory is applied to give perspective to the assumption that the growth success and the values of organic farming are born out of the crisis and the decay of the 'agricultural welfare state' in the second food regime during the 1970-80's. The mode of regulation in the third food regime, will be shaped by the outcome of the social conflict between a more *private* or a more *democratic* global regulated regime. The private regulation being pushed forward by transnational corporations, and the latter supported by various interest groups, NGO's and nations states. The type of regulation, could have an important impact on organic farming in the future. Either as a counter niche or as a more prosperous mainstream production regarding market share and economic importance.

2. The property rights perspective

Farm/firm/household level

Economic analysis generally recognizes four basic categories of property rights (Edwards-Jones, Davies & Hussain, 2000):

1. Private property, which is owned by individuals.
2. State property, owned on behalf of the citizens of a nation by the state.
3. Common property, which is managed collectively by a particular group.
4. Ownerless, or 'open access' assets, which are not owned by any group or individual.

Since the agricultural sector in general consists of firms, management, capital provision and labour, which are mostly owned and concentrated on one individual and his immediate family, the theoretical focus will be on (1): private property owned by individuals.

The capitalist system, which is based on private rights and their autonomous use, is generally the institutional frame for assumptions and analysis on property rights. Within this frame owners decide to offer their property, or certain uses of their property, at a certain quality, in certain amounts and at a certain price in the market. They hope to contract with buyers, who decide whether to accept the offer and who typically offer money in exchange. If buyers value that the price demanded by the suppliers on the goods supplied, the suppliers will probably make a profit. They may even be induced to expand the quantities offered in the future. If demand falls short, suppliers are disappointed and incur a loss. In this case, they will discontinue offering that particular good or service at the original conditions of supply. In this way, buyers influence over the long run what is being produced and supplied (consumer sovereignty) (Kasper & Streit, 1998).

In the economic literature the term property rights carries two distinct meanings (Barzel, 1997):

1. The economic property rights
2. The legal property rights

The economic rights can be defined as the end - they are what people ultimately seek. The legal property rights are the means to achieve or protect the end.

The way these rights are commonly bound together is the liquid how systems of exchange of private goods operate as they do. The usage rights, or consumption rights, provide the incentive to obtain a good and the disposal rights makes it possible to exchange a good (Coleman, 1994).

Within New Institutional Economics two branches for analytical approaches concerning property rights have developed (Smelser & Swedberg, 1994):

- i. The *institutional environment*, which is the set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution. Rules governing elections, property rights, and the right of a contract are examples.....
- ii. An *institutional arrangement* which is an arrangement between economic units that governs the ways in which these units can cooperate and/ or compete. It ...[can] provide a structure within which its members can cooperate ... or [it can] provide a mechanism that can effect a change in laws or property rights.

Where i) predominantly deals with background conditions going beyond property rights and including contract laws, norms customs, conventions etc., then ii) deals with the mechanisms of governance.

In this chapter - the analysis of property rights - will be centred on the *institutional arrangements*, whereas property rights in relation to the institutional environment will be discussed later within the frame of political economy theories (the outer ring) in chapter 3.

2.1. The economics of Property rights

The economics of property rights – as developed especially by Coase (1937; 1960) - was an early and influential dissent from orthodoxy. With Coase the object of study changed from how to reconcile firm *behaviour* with marginalist principles to how to reconcile firm *structure* with marginalist principles. He noted the apparent disparity between the marginalist notion that markets were efficient organizers of resources

with the existence of highly hierarchical, control structures within firms. If the Neo-classicals were at all right, it would seem at least somewhat peculiar to find “command economies” operating internally within capitalist firms. Why not use the price mechanism within firms as well? Coase gave himself the answer: “The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism” (Coase, 1937, p. 390).

Coase was challenged by Alchian and Demsetz (1972). What they essentially argued was that it was not that command structures minimized the costs of using the price mechanism, but rather that they minimized “monitoring costs”. As many of the firm’s processes involve team production, then there will necessarily be monitoring costs to assess individual efforts within a team. The firm will assign a central agent, or a residual claimant supervisor, who will have property rights over the output of the firm. When the supervisor is the residual claimant of the earnings of the team, he will be induced to maximize the value of the output of the team. To Alchian and Demsetz the behaviour of the firm was therefore not too different from the behaviour of the market (Barzel, 1997).

Coase’s primary distinction between transactions made within a firm and transactions made in the marketplace are in certain respects too simplistic. For example, many long-term contractual relationships (such as franchising) blur the line between the market and the firm. What Klein, Crawford & Alchian (1978) suggests is that it may be more useful to view the firm as a *nexus of contracts*. Some of these contracts would be with vendors of supplies or services that the firm uses as inputs. Others would be employment contracts with individuals who provide labor services to the firm and some would be loan agreements with bondholders, banks, suppliers of capital, and some again contracts of sale entered into with purchasers of the firm’s products. The pertinent economic question we then are faced with, according to Klein; Crawford & Alchian, is: “What kinds of contracts are used for what kinds of activities and why?”

One way to ‘economize’ on these questions raised above would be to focus on the costs of contracting or using the price mechanism: *the transaction costs*. Transaction cost refers to the cost of providing some good or service through the market rather than having it provided from within the firm.

The most efficient governance (organizational) structure is the one that minimizes transaction costs. *Ex ante* costs involve searching for and evaluating business partners

(searching costs) and the costs of drafting, negotiating, and safeguarding an agreement (contract costs). *Ex post* costs include enforcing agreements, and negotiation to correct misalignments and mechanisms associated with solving disputes between the parties (monitoring costs) (Halldórson, Skjøtt-Larsen, Kotzab; 2003).

Transaction costs are therefore closely related to the concept of property rights and can in this respect be categorized in the following three groupings:

Categorization of transaction costs

- the costs of determining and defining property rights
- the costs of exchanging property rights
- the costs of protecting property rights

These categorizations are connected to the famous ‘Coase theorem’ (Coase, 1960) stating that:

1. If transactions costs are zero, allocation of property rights are irrelevant, and one should simply let the bargaining process allocate the property.
2. If transaction costs are positive, allocation of property rights matters and we want to get it right.

The Coase theorem has been applied in many diverse studies like law, environmental economics, organization theories on the boundaries of the firm etc. However, there seems to be a dichotomy between an “ideal Coasian world” and “the real world”. For example, in the case of monopoly or oligopoly the Coase theorem would appear false, since these types of market organizations are unlikely to act like competition. A more precise statement in line with Coase’s own strict qualifications would be Cooters revision of the theorem (1987):

The initial allocation of legal entitlements does not matter from an efficiency perspective so long as they can be exchanged in a perfectly competitive market.

Accepting Coorters revision opens up for analyzing more precise by the question of power and the type of contracts a firm will choose to different activities. Power will be the centre of the discussion in the next chapter 2.2, and market power will be elaborated more specific in relation to contracting with other firms along the agro-food chain in chapter 3.2

To summarize from part 2 and 2.1 the following insights on firm behaviour, firm structure and property rights will be employed:

Definition of a firm:

A firm can be regarded as an *institutional arrangement* where the governance structure is implemented to minimize transaction costs on its bundle of contracts, and secure the most efficient allocation of property rights.

2.2. Property rights, human capital and power

In a more narrow economic understanding the role power plays within a firm is to foster and protect relationship-specific investments, especially in an environment where contracts are incomplete. The smaller the space of contracts that can be written and enforced, the more risky the capital investments can be, and the more important the role of residual rights of control are - and hence power.

In the world of economists property rights to an asset consists of three elements that inherently hands over power (Hart, 1995; Barzel, 1997):

1. The right to consume or dispose a good
2. The right to control the making or exchange of a good
3. The right to appropriate specific, or residual earnings (that is the net earnings that remain after all payments to which it is contractually committed, such as wages, interest payments, and other input supplies).

Property rights in the world of economists.

- Usus, usus fructus and abusus
- Specific and residual rights of control
- Specific and residual rights to earnings

According to Grossman and Hart (1986), Hart and Moore (1990) and Hart (1995) ownership of physical assets (machines, land, capital) gives the owner(s) residual control rights over all the attributes of the assets. The residual control makes the owner(s) residual claimant(s) to residual earnings that the assets generate. In this way specific and residual rights of control over assets automatically transfers residual powers to the claimants.

Marxian theories carry a similar approach. The capitalist (employer) who owns the *means of production* (machinery, labour) has the right to appropriate the *surplus value* from the workers hired to generate a value using the means of production. From a Marxian point of view the relationship between capital and labour is by nature exploitive because the *specific property relations*, where the capitalist owns the physical assets, automatically hands over power to the capitalist (M.N. Ryndina & Tjernikov, 1980).

Rajan & Zingales (1998b) argues that the ownership of physical assets is not the only source of power within a firm nor necessarily the most effective in promoting relationship-specific investments. Within the assumptions of the property rights literature, they identify an alternative, possible non-contractual, mechanism to allocate power: *access*. They define access as the ability to use, or work with, a critical resource. A critical resource can be a machine, an idea or a person. The agent who is given privileged access to the resource gets according to Rajan & Zingales *no new residual rights of control*. All the agent gets is the opportunity to specialize her human capital to the resource and make herself valuable and hence control over the critical resource is a source of power.

However, property rights do not only consist of access, they also carry with them a dialectic counterpart: *exclusion*. Since private property is assumed to be exclusive, the key feature of property rights that concern economists is exactly that of exclusion. Or,

rephrased dialectically opposite, the conditions of access to a resource is that of concern for economists.

When it comes to ownership and management of brands, property rights and power, play an important role in transnational agro-food corporations' financial strategies.

As transnational agro-corporations expand over space, they take with them their brands, patents and corporate know-how. As they establish relational networks with actors in other countries (local partners, joint ventures etc.), financial conditions are established for the rights to use and benefit from these assets (Pritchard, 2000).

Bill Pritchard gives in his paper several examples of agro-corporations' growing emphasis on brands and private labels. "Sara Lee", a global food and beverage company, has been selling out of its vast bulk of manufacturing facilities. By reshaping the company to be only an owner and manager of brands, it plans to contract out the responsibilities to manufacture the physical products attached to those brands. The company has according to Pritchard attempted to apply Nike's contracting strategy to the consumer food business. The guiding principle of the strategy is Sara Lee's notion that its competitive advantage lies in branded product marketing rather than supply chain coordination involving factory production (read: competitive advantage lies in property rights over access rather than physical assets).

The question of market power in relation to residual rights of control and appropriation of net earnings will be elaborated more within the theory of *Industrial Organization* in chapter 3.2 and discussed in relation to firms along the agro-food supply chain.

2.3. Property rights, power and the organic farmer

The theoretical framework of property rights will in this dissertation be used to explain certain dynamic changes and developments concerning farmers and their choice or switch to an organic production.

By choosing organic agricultural as a production method and idea, the farmer gets access to a critical resource. This access gives the organic farmer the opportunity to specialize her human capital to the resource and make herself valuable, and hence control over the critical resource. The specific and residual right of control generates a source of power.

In relation to power the economic approach to property rights are in general focused on preferences concerned with *transactional outcomes* such as price, quality and efficiency. When it comes to organic foods focus should also be directed towards preferences concerning *transactional processes*, where values of trust, traceability, cooperation are part of the marketing transaction. Trading under these values gives a property right to a certain type of access and inclusion, as well as the possibility of exclusion. The way to protect these property rights can be secured by establishing alternative types of ownership like ‘Consumer Supported Agriculture’ (CSA), schemes where consumers own a farm, or a food store. A more open market form could be trading or contracting directly with an organic farmer who delivers every week a box of foods.

Hansmann (1996, pp. 31-32) explains the outcome of these “non-capitalist” or alternative market organizations as a counter reaction to *alienation* or *exploitation* said to characterize capitalist firms. Alienation in Marxian theory is a term used to describe the way modern people are separated from the broader goals of the manufacturing process in which they participate. In the domain of work it has a fourfold aspect: Man is alienated from the object he produces, from the process of production, from himself, and from the community of his fellows. In the organic food production, alternative market organizations emphasizing an altruistic transaction process could therefore be seen as a counter move trying to overcome the alienation or exploitation that follows with a competitive market economy.

Following this line of thought connected to the property rights theory alienation is related to loosing control of specific residual rights. Since these rights are connected to the ownership of the firm’s physical assets alienation can be explained as a function of control over the firm’s physical assets.

Choosing a simple model approach alienation (A) is a function of inputs (x) in control of the farmer:

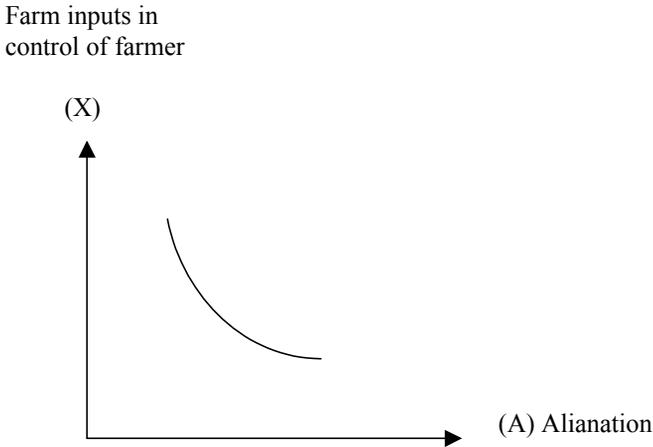
$$A = f(x)$$

where

$$\frac{\delta A}{\delta x} \leq 0$$

This is illustrated in figure 2 where the farmer’s alienation (A) grows with declining control over physical assets.

Figure 2. Farmers alienation as a function of his control over inputs.



A farmer’s utility function can therefore be described as function of the level alienation (A), the amount of control over residual rights (R) in connection with his social values (SV)

$$U (A_{(x)}, R_{(x)}, SV)$$

where

$$\frac{\delta U}{\delta x} > 0$$

With this equation the utility of the farmer will grow with diminishing alienation and increasing residual rights related to the control over the firms physical assets.

The economic drive forcing this sense of alianation in farm production and the reason why farmers could be motivated to shift to organic production, will be elaborated

more in the next two chapters 2.4 and 2.5. In chapter 2.6 consumer motives behind organic for shifting to organic foods will be discussed and connected to the same economic processes in farm production creating alienation and loss of control.

2.4. A theory on Nature's Time and farm production

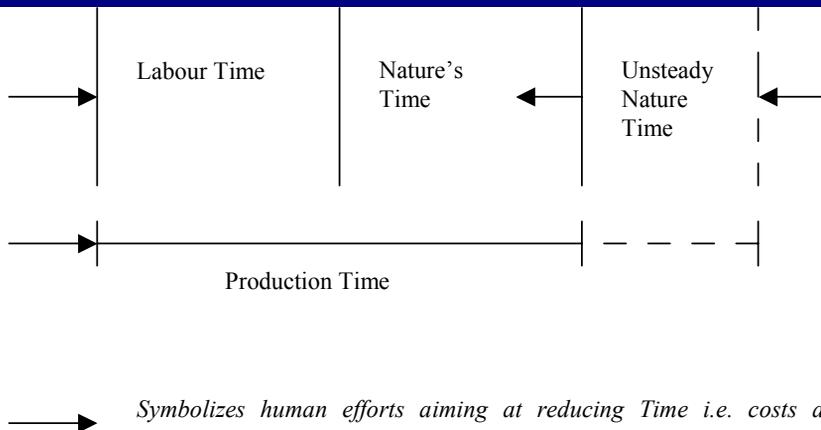
In 1978 James Dickinson and Susan Archer Mann published an article: "Obstacles to the development of a Capitalist Agriculture" in the *Journal of Peasant Studies* (Dickinson & Mann, 1978). One of the central tenets of the Mann-Dickinson thesis was that agro-industrial development progresses most rapidly in those spheres where (Mann, 1990, 34):

1. *Production time* can be successfully reduced
2. Where the gap between *Production time* and *Labour time* can be minimized.

Production time in agriculture consists of two parts: One period when labour is engaged in production and a second period when the unfinished commodity is being produced by nature itself. Two examples of this could be the maturation of cereals in the field or the pregnancy period of livestock. Since the intervals when labour is not being used create neither value nor surplus value, there is no growth of capital during production time when it exceeds labour time. Therefore it follows: the more production time and labour time coincide, the greater the productivity and self-expansion of capital in a given time period.

In figure 3, Production Time consisting of both Labour Time and Nature's Time is illustrated. Production Time can be prolonged due to drought, pests or other more uncontrollable reasons inherent in Nature, so Unsteady Nature Time have been added to the total Production Time. The arrows show the deliberate attempts mainly by research and other efforts to reduce Production Time either by shortening Labour Time or the time it takes for Nature to produce a certain Agro-commodity. Human attempts will more specifically be innovations from farmers, agro-corporations and researchers as well as governmental economical schemes all trying to help agro-capital getting a better and less riskier profit. These attempts could also come from an *indirect* pressure via retailers and food processors squeezing farmers on price premiums and specific requirements on production size and time deliverables.

Figure 3. Production Time in agriculture.



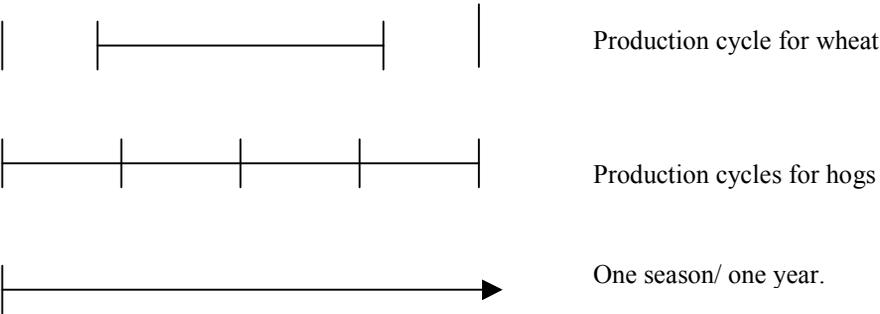
Attempts of making Labour Time coincide more with Production Time would typically be specialization, divisioning and enlargement of the agro-production so the farmer or farm workers only have one or few work processes. For example, one farm takes care of farrowing, another only producing hogs etc. Shortening Nature's Time could be new genetics and feed systems speeding up growth, whereas reducing Unsteady Nature Time could be the implementation of technologies like pesticides, GMO, Precision Farming (GPS: Global Positioning System) etc.

In contrast to an industrial production made from non-living raw materials, commodities in agriculture are living species that automatically slows down the reproduction (turnover) of capital. Since firms extract profits during each turnover of capital, they can only use these profits to replenish and expand their production when the production cycle is over and the product sold.

However, the circuit of capital in agriculture and the relation to turnover time is not only different to the industry of non-living materials. The different agro-commodities also differ considerably to each other regarding Production Time as well as Labour Time in use.

In figure 4 the Production Time of hogs and wheat is shown. The turnover time for hogs can be almost four times pr. Year, whereas for wheat it is only one (in the Northern hemisphere at least).

Figure 4. The number and length of production cycles for wheat and hogs during a one-year season



Hog producers can therefore not only extract capital value more times during the year, they can also replenish and even expand production from the surplus value appropriated. In contrast, wheat farmers must await the annual sale of their commodities, and are not in a position to expand production as often.

The different time cycles for different agro-commodities is therefore one of the main reasons why the traditional family farm used to spread its production (and risk) on various commodities.

One hypotheses put forward in this dissertation will be that the different production cycles, the differences in Unsteady Nature’s Time for different agro-commodities are key components that could help explain why we see the variations between markets, contracting and/or vertical ownership of farm production itself. The more production cycles and the more Nature’s Time are controlled, it follows that Agro-production will be more capital-intensive and open for vertical integration. Furthermore, the fewer the cycles and the less the uncertain effects of nature can be controlled, the more farming will be dominated by family production as well as part time farming. It also follows that the risk burden on capital investments and capital reproduction will be placed as much as possible on the farm owner himself.

Douglas & Lueck (2002) have made similar findings on their research on contracts. They conclude that

“farming is dominated by family production when the random and systemic effects of nature cannot be controlled. Mother Nature not only provides an opportunity for moral hazard but also limits the possibilities of specialization. Generally speaking, farm production provides many opportunities for moral hazard and few for exploiting economies of size. Thus farming is fertile ground for family production”¹.

When it comes to Nature’s Time, time does not always stop at the farm gate though. For many agro-commodities Nature’s Time continues and will influence durability, storability, transportability, and the possibilities for global mobility along the agro-industrial food chain.

As Masten (2000) points out:

“Probably the most conspicuous attribute distinguishing agricultural goods from other commodities is their perishability. Virtually all unprocessed and many processed foodstuffs have limited shelflives. Much of the coordination task in agriculture is related either directly or indirectly to assuring that foodstuffs are produced, processed, and distributed in a timely fashion.....Variations in the inherent stability of agricultural products and the costs of preserving them are likely to be important determinants of organizational form in agriculture”²

2.5. Nature’s Time and Organic farm production

What connections could different production cycles and differences in capital-intensive production systems have on organic farming?

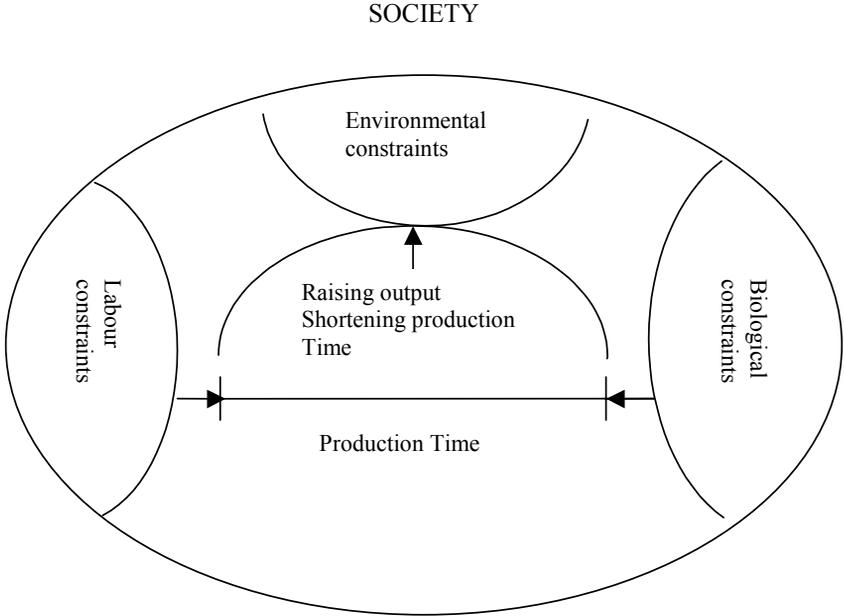
First of all, the consequences of agro-capital trying to shorten total Production Time will at a certain point lead to different types of societal constraints. This is illustrated in figure 5. where constraints are encountered on efforts trying to raise Labour productivity, constraints concerning nature’s biological limits, and environmental con-

¹ Allan, Douglas W. & Dean Lueck (2002): *The Nature of the Farm* p. 202.

² Masten, Scott E. (2000): *Transaction-cost economics and the organization of agricultural transaction* p. 187.

straints encountered from trying to raise output. These constraints can at some point lead to various types of conflicts (or externalities) conceived as alienation, environmental degradation, food safety and animal welfare problems as well as concerns for the marginalization of farmers and rural areas.

Figure 5. The connection between farming and environmental constraints in a market economy



Organic farming can in this respect be viewed as a counter reaction to these externalities. The consequences of Agro-capital trying to reduce the circuit of turnover time can in this respect be seen as the reason for different reactions setting up *counter rules* and regulations trying to avoid certain externalities. The rules and regulations set up by the organic farmers and consumers themselves are in many respect counter reactions that actually *extends* Nature’s and Labour Time and thereby total Production Time. These include rules about animal welfare with regard to space and access to the open air, ban of certain pesticides, limits to fertilizer use, etc.

The rules and regulations in organic farming set up to ‘guide’ Agro-capitals road to profit maximization, seem also related to what type of Agro-commodity that is involved³. Two hypotheses can be made in relation to the latter:

- a. The more production cycles (shorter circuit of capital turnover), the more industrialized a certain agro-commodity will be, the higher probability for a difference between organic and conventional production methods.
- b. The less Labour Time and Production Time coincide in a certain Agro commodity, the greater mutuality will be found between organic and conventional production methods.

Examples of a) could be within heavily industrialized productions like hog, chicken and beef. They are at the same time areas of organic agricultural production where the market is of limited size. If, on the other hand, the difference between organic and conventional production methods is small, it will be easy for Agro-capital to choose the lucrative organic production and harvest the price premiums. The conflict and discussions within the organic farm movement about setting up rules and regulations are therefore very closely linked to where and how the constraints on capital should be made.

Examples of b) could be milk, cereals, fruit and vegetables but with modifications (for example salad with a short production circle could very easily be found in a).

The theory on Labour Time, Nature’s Time and Unsteady Nature Time used specifically in relation to organic farming, seems to open up for:

1. An economic foundation explaining social changes and possible counter reactions in agriculture
2. Explanations to why these social changes occur more strongly in some agro-commodities and less in others
3. Explanations to why the *specific* and *residual* rights of organic farmers are about power and constructed as they are

³ Kledal, Paul Rye (2000): Økologisk jordbrug for fremtiden? (Organic farming for the future?- An economic analysis of the potential organic farmers).

2.6. Nature's Time and organic consumption

The theory on Nature's Time, Labour Time and total Production Time is also applicable to the household level in helping explaining the motives for why consumers purchase organic foods.

Consider the time used for buying and preparing a meal as Labour Time and Nature's Time the time needed for certain food commodities (raw materials) to be transformed (cooked) into a meal. However, a household task of assembling different raw materials and cooking a meal can involve noticeable gaps between Production Time and Labour Time. Analogues to many farm productions, producing a meal in a modern nuclear family is not done on a continuing basis, and can have considerable gaps between Production Time and Labour Time. The same goes with kitchen appliances, which like farm machinery, is used irregularly and therefore inefficiently from a capital investment point of view.

The inefficient economic gap between Production Time and Labour Time, will, because of new innovations and production of scale in the other nodes of the food supply chain, over time make it possible for the various nodes to appropriate certain production processes from the household. In other words, over time the various nodes obtain new possibilities for appropriating certain critical resources from the household. Examples of appropriation from the traditional household could be blanching and preservation of vegetables and fruits, preparing french fries from raw potatoes or time consuming dinner sauces like béarnaise replaced by ready made in the supermarkets.

With the appropriation of certain critical resources follows also the loss of access and hence power from the household. This loss of power to upkeep human capital as well as social values concerning skills of preparing and enjoying certain foods, can in certain situations create a sense of alienation and separation from the product (a meal) the household serves. The feeling of alienation and loss of power can also be intensified by certain food scares or food scandals revealing the distance from farm to plate. The social relations in food production can in the same time be revealed as exploitive either by media exposure of environmental or animal welfare problems at the farm level, or by the use of 'make up' (colours, flavours, synthetic proteins etc.) in food manufacturing to maximize profits at the expense of the consumers health.

The point of origin for a social counter reaction from consumers to demand organic food is therefore resting on the same assumptions regarding the forces motivating farmers to counter react and choose to supply organic products. The consumers want to control the amount of appropriations in the food they buy. The less technical inputs the more control the consumer has over what they purchase.

The utility function of the consumer (c) can therefore be written as

$$U_c (A_{(x)}, H_{(x)}, SV)$$

Where alienation A is a function of control over inputs (x)

$$A = f(x)$$

With a negative slope

$$\frac{\delta A}{\delta x} \leq 0$$

and H representing the consumers notion of health and SV the consumers social values, being a positive slope.

$$\frac{\delta U}{\delta x} > 0$$

However, the pressure from various nodes in the food supply chain to appropriate property rights over food production in the household, through innovations of semi-prepared or prepared convenience foods, is in the same process creating a trade off between time and income in the household.

Household production theory addresses this aspect of consumption, and the solution offered centers on the existence of household production functions, functions that describe the technology by which purchased goods and services are used in combination with owned durables and inputs of the household's time to produce a commodity that the household consumes.

In household production theory (Magrabi, Chung, Cha and Yang, 1991), utility is conceived as resulting from the consumption of home-produced commodities, the output of a household production function:

$$U = u(Z_i)$$

Where Z_i is a bundle produced and consumed by the household. The household production function is a relationship between inputs and outputs. It identifies the quantity of a commodity that can be produced per unit of time with specific combinations of inputs.

The budget constraint must take into account limitations on both income and time. It may be represented by the household's monetary budget (B) plus the amount of household time available for household production (T_h), valued in monetary terms. One possibility used to obtain an estimate of the value of household production is the opportunity cost of using time in this way, that is, the wage rate (w) that the individual would be assumed to be able to earn if the time were available for paid employment. The full budget constraint would be

$$\text{Total budget spending} = B + wT_h$$

The utility function of the consumer can now be 'traded off' with the utility of time for leisure.

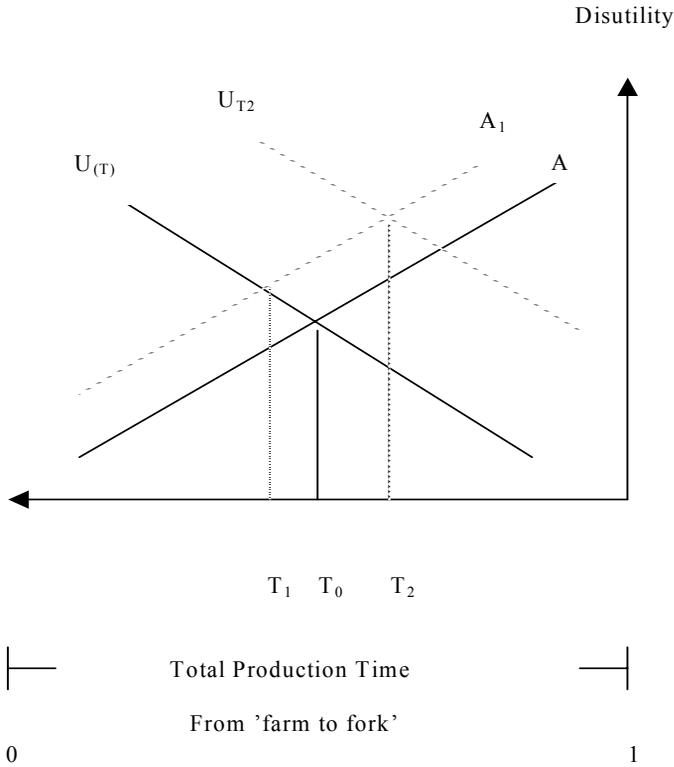
In figure 6 disutility grows with rising alienation illustrated by the A curve. At the same time disutility will fall when time for cooking is traded with time for leisure, shown by the declining $U_{(T)}$ curve.

Starting from the left no alienation is felt when the consumer can be a food producer herself. That means Production Time appropriated from others outside the farm is zero. Moving to the right Production Time rises to one where total alienation is felt if fast food is on the menu every day. Somewhere in between the utility of leisure and the disutility from alienation is traded off.

Food scares can push the A -curve up to the right and T_0 moves to T_1 . This means the consumer will spend more time finding food with less inputs. This move from the consumers can in the same time push the U_T up to the left. Producers will for example present consumers for products with less inputs (organic food), and the consumers

will not have to spend time finding food with the attributes they are searching for. The utility curve shifts T_1 to T_2 .

Figure 6. Food consumption: A trade off between increasing alienation from using semi-prepared food and spending time preparing food yourself



When focusing on consumers purchasing meals traded off for leisure one has to be aware that a rising number of people are having one or several meals *outside* the household everyday. Warde (1997) argues that the consumption of foods is a substitution of practices between different modes of provisioning from

Home to Market.

The substitution of practices between modes has great significance for understanding the social consequences of consumption of food. In contemporary society there are

four common modes of provision, each characterized by distinctive ways of producing goods and gaining access to the fruits of labour:

- Market (restaurants, hyper markets, fast food outlets etc.)
- Institutional catering (hospitals, kindergarden, workplaces etc.)
- Communal (friends, family)
- Home (household/individuals)

Warde argues that the social relations involved in production for the market, the home, in the catering sector and in the communal sphere are dissimilar in many important respects.

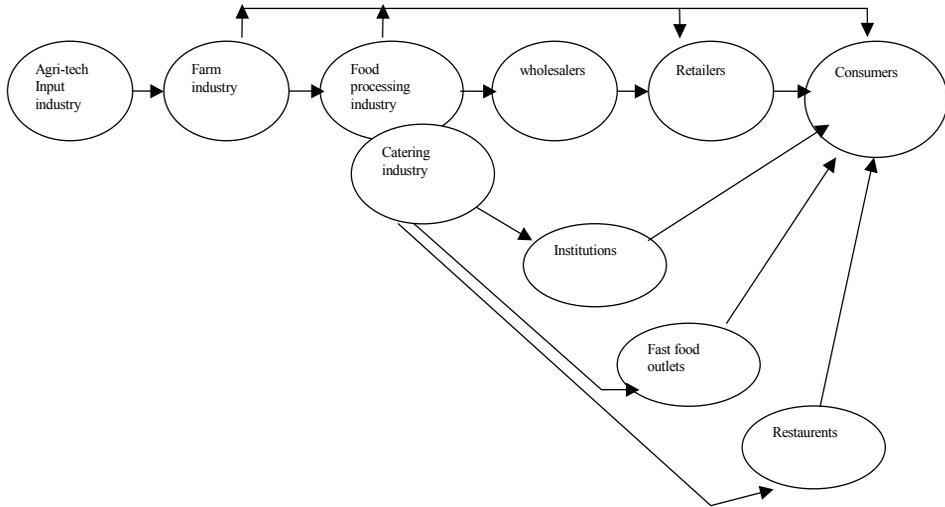
They are about human relations involved with market exchange, familial obligation, citizenship rights and reciprocity, governing the four types of food provisioning, respectively. Moreover, the *access* to goods and services provided in these different sectors are also analytically distinct.

The growth potential of the food industry would need an increasing dominance of the social relations associated with production in the formal economy over those fostered by communal and domestic production. In other words: a greater commodification of these social relations is needed.

In figure 7 a more detailed organic food commodity chain flow, taken into account the various modes of modern consumption, is illustrated.

Figure 7. The modern organic food commodity chain

Alternative supply links



3. Supply chain analysis

The supply chain

Within the framework of Political Economy and critical agro-food research *food filières*, *food networks*, *systems of provision* and *commodity chains*, are well-established concepts and approaches unveiling the different forces acting upon the commodity flows from producer to consumer.

The *supply chain* as a concept is a common term used in the business school literature and in general focuses more on economic behaviour and efficiency problems along the chain. In this research project the insights from the political economy on commodity chain studies will be employed, but the term supply chain will be used to describe the chosen organic supply chains.

The *commodity chain* approach within political economy is first of all a tradition that derives its inspiration from the *World Systems theory* of writers such as Wallerstein (1974). The agenda here is the tracing of commodity flows at a global scale in order to uncover the usually biased and exploitive relationship between the raw material provider and the site of consumption. The approach from the World System writers have in general been Marxian emphasizing historical changes and using food studies as an evolutionary marker.

Another perspective within the Marxian tradition has been to follow the commodity, and thereby reveal the *social relations* hidden by seemingly equal market exchanges or the *fetishism*⁴ of the commodity itself. This form of analysis, taking one food product at a time (fx tomatoes, lettuce, oranges) traces production from the first agro-inputs, through farm production to food processors, wholesalers, retailers and consumers, and includes the labour process, technology and state policies. William Fried-

⁴ Fetishism of commodities: A commodity, for Marx, is first of all an object, which is the product of human creative labor. Secondly, a commodity is also an object of human labor that is circulated. If you sit down and build a birdhouse for yourself, you have produced an object, but not a commodity. If you sit down and build a birdhouse and sell it to someone else, you have produced both an object and a commodity. Marx's central argument here is that the world of commodities, of objects, which circulate in an economy, takes on a life of its own. When you go to the store and see a birdhouse for sale on a shelf, you see only the object, not the labor that went into it. The commodity seems to you to have magically appeared on the shelf for your consumption. The sense that commodities have a life of their own, that they magically appear for people to purchase or exchange, is what Marx means by the fetishism of commodities. This fetishism often leads to the common belief that we consumers have no control over the images and ideas produced by advertisers in order to coerce us by their products.

land (1984, 1994), Burch & Pritchard (1996) have contributed with illustrative research in this mode of analysis.

However, the *Global Commodity Chain* (GCC) approach has attracted significant attention from the early 1990s and its focal distinction introduced by Gereffi (1994), between *producer-driven* and *buyer-driven* GCCs, has generated a number of case studies. This distinction though seems more relevant for sociological studies, whereas an economic explanation would be that the type of driver is related to certain market powers of key players in a specific node of the chain. The economic approach, therefore opens up for more precise answers on exclusion, access and various counter-moves along a given chain (Kledal, 2003).

The GCC approach has links to the broader literature on international competitiveness. For example, there are a number of similarities between GCCs and Michael Porter's value chain approach. Porter's value chain shows the benefits that firms derive in breaking the production process into discrete segments to help them look for innovative organizational and managerial practices to improve their productivity and profit (Porter, 1987 & 1990). While Porter's approach helps pinpoint the mechanisms that generate dynamic competitive advantages, the GCC framework allows to specify more precisely, both in space and time, the organizational features and changes in the transnational production systems under girding the competitive strategies of firms and states.

Gereffi argues that commodity chains have three dimensions (Gereffi, 1994), and has later introduced a fourth (1999b). First, the *input-output structure* of the chain, second the *territory* it covers, and third the *governance structure*. The fourth is the *institutional framework* that identifies how local, national and international conditions and policies shape the globalisation process at each stage in the chain.

The governance structure has so far been very important for the analytic focus, since the type of *driver* in the chain is determined by the location of market power and ability to keep up barriers of entry. At the centre of GCC analysis lays the contractual linkage of formally independent firms, whether as a result of the 'out-sourcing' of previously integrated components of Trans National Corporation activities or through the contractual subordination of suppliers previously linked through 'open market' transactions.

A strong point of the GCC approach is its inclusion of power in economic relations and transactions in international production and trading relations. One important aspect is that power is seen not simply as the effect of barriers to entry, but also of organizational changes and of more effective 'supply-chain management' implemented by key agents (Raikes, Jensen & Ponte, 2000).

In the GCC literature power is not given a formal definition. For Hopkins and Wallerstein (1994) power is very much related to profit and the need for capital accumulation in a capitalist world economy. Here they find that high-profits (more power) tend to stay in the *core* (industrialized countries), whereas low profits (less power) tend to be within the *periphery* (raw-material producing and underdeveloped countries). Gerffi's studies (1994) modifies this and shows that power is also related to the ability to out-source low profit activities and to retain and incorporate those with higher profits. Here power is exercised through higher standards of quality and reliability in produce flows resulting in reduced risks and investment costs for the node controlling entry. This extension of power gives room to explain why actually certain countries in the South are able to join some GCCs and be incorporated in the global market, while others will find it very hard.

In this dissertation the GCC approach will be employed, but with minor changes added. First, *territory* in GCC will be replaced with *market organizations*, analyzing the different market structures along the nodes of the Agro-food chain. Second, the institutional framework will be analyzed within the paradigm of *Food regime theory* in chapter 4.

The commodity chain approach, for analysis on the organic vegetable and pork supply chain, will therefore consist of the following three dimensions:

1. Governance structure/strategies of leading firms
2. Market organizations
3. Input-output structure

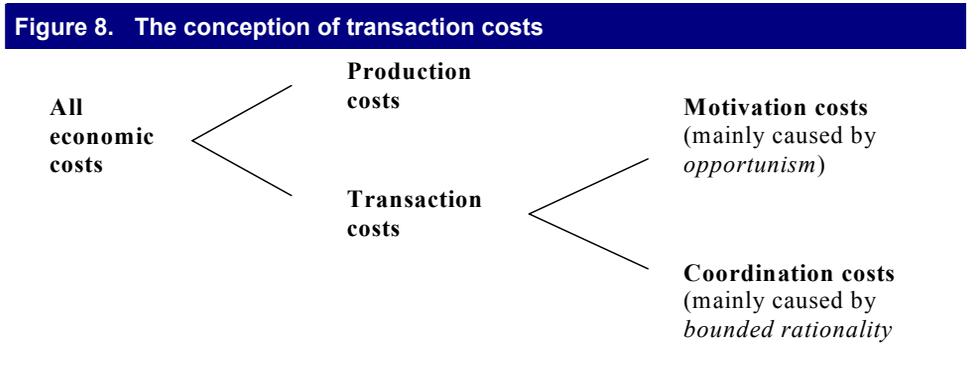
The next chapters in section 3 will be dealing with economic theories explaining the outcome of various governance structures of different firms and their market organizations along the commodity chain. The chosen theories are within *Industrial Organization* and *Transaction Cost Economics*. The *Actor Network theory* is applied as a sociological guidance drawing out the input-output structure of the commodity chains.

3.1. Governance structure and transaction cost theory

Coase conceived of the first article, "The Nature of the Firm," (1937) while still an undergraduate on a trip to the United States from his native Britain. At the time he was a socialist and he dropped in on perennial presidential candidate of the Socialist party Norman Thomas. He also visited Ford and General Motors and came up with a puzzle: how could economists say that Lenin was wrong in thinking that the Russian economy could be run like one big factory, when some pretty big firms in the United States seemed to be run very well? In answering his own question, Coase came up with a fundamental insight about why firms exist. Firms are like centrally planned economies, he wrote, but unlike the latter, they are formed because of people's voluntary choices. But why do people make these choices? The answer, wrote Coase, is "marketing costs" (Economists now use the term "transactions costs"). If markets were costless to use, firms would not exist. Instead, people would make arm's-length transactions. But because markets are costly to use, the most efficient production process often takes place in a firm. His explanation of why firms exist is now the accepted one and has given rise to a whole literature on the issue.

According to the "property rights approach" (described in chapter 2) transaction costs are defined as the costs of enforcing and maintaining property rights – regardless of whether a market exchange take place or not. As a result, transaction costs are more than the costs of a market exchange. Other costs, including search and information costs, bargaining costs, and policing and enforcement costs, can all potentially add to the cost of procuring something with a market (Allen & Lueck, 2002).

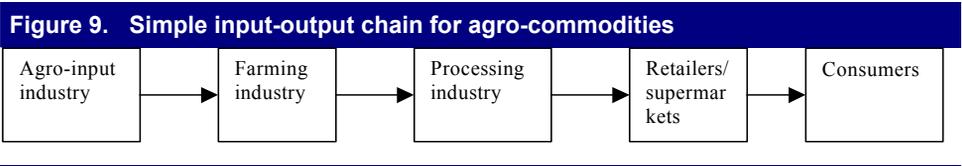
Figure 8 illustrates the difference between transaction cost and firm costs as well as what transaction costs might consist of.



As illustrated in figure 9 transaction costs rest on two basic behavioural presumptions about management perception: *Bounded rationality* and *risk of opportunistic behaviour*. Bounded rationality may result from insufficient information, limits in management perception or limited capacity for information processing. This concept is particularly relevant in complex and uncertain environments as in agriculture producing under Unsteady Nature’s Time.

In an *ex-ante* situation with bounded rationality, management may not be able to identify and consider all potential options, future risks and opportunities as the contract is negotiated. In addition, control in the *ex-post* phase only provides limited capacity to control the results. This may lead managers to adopt opportunistic behaviour. Williamson defines opportunism as “self interest seeking with guile”. He does not presume that all players act in an opportunistic way, but that some players will sometimes behave opportunistically and that it is difficult to predict who will be opportunistic and when it will occur (Halldórson, Skjøtt-Larsen, Kotzab; 2003).

The costs of coordinating exchange and maintaining property rights will arise wherever two or more parties transact across a technologically separable interface. Such technologically separable interfaces – also mentioned as nodes or links - will for example in a simple input-output Agro-production chain include:



At each juncture between the nodes, trans-actors face a decision of how to govern their relationship. Their joint interest is to undertake activities that enhance total surplus. But each transaction involves a potential source of conflict, because both parties try to maximize their own surplus value. Organizations and institutions are from the transaction-cost perspective the means through which trans-actors attempt to regulate this behaviour. The broad goal is to adopt governance arrangements or governance structures that promote efficient adaptations while economizing on the costs of reaching agreements and resolving disputes (Masten, 2000).

3.1.1. Transaction cost characteristics

Transaction cost economics holds that economizing on transaction costs is mainly responsible for the choice of one form of capitalist organization over another (Williamson, 1994).

Three types of economic organizations in a capitalist market economy are relevant in relation to the discussion of transaction costs:

- Simple market exchange
- Contracting
- Internal organization (vertical integration)

In *simple market transactions*, parties are generally free to bargain or not bargain as they please. Moreover, once a transaction is consummated, the parties have relatively few ongoing obligations and may, for example, use or dispose of the items procured in whatever manner they choose.

By *contracting* trans-actors can attempt to limit free riding by defining the range of acceptable behaviour. Contracts can also serve to attenuate hold-up problems by stipulating terms of trade *ex-ante*, thereby reducing the prospect of costly repetitive bargaining.

With *internal organization* hold-up opportunities can be limited by allocating residual rights of control over the use and disposition of assets, and thereby restrict the ability of non-owners to withhold assets from production.

As successive transactions are brought within the firm, additional demands are placed on managers' scarce time and attention, increasing the probability of mistakes and the costs of organizing (Coase, 1937; Williamson, 1975).

The focus of research in transaction cost economics has been to clarify the influences of the relative efficiency of various organizational forms. Five transaction cost characteristics will be discussed here in relation to analysis of the organic vegetable and pork chain:

- Asset specificity
- Externalities

- Complexity/uncertainty
- Similarity
- International Transactions

Asset specificity

Masten (2000) discusses five forms of asset specificity:

- Physical
- Human
- Site
- Dedicated
- Temporal

Masten (2000) and Allen & Lueck (2002) argues that very few assets on a farm, with the possible exceptions of immovable buildings, fruit trees, and (some) specialized equipment, are specific to that farm. Similar findings were made by Kledal (2000) showing that potential organic farmers were farmers who had either old assets (20- 40 years) or rather new (0-10 years) - like barn buildings or stalls - and both could fairly easy be converted back to conventional farming in case of market failures on the organic market. The potentiality of conversion was more a question of how big the sunk costs could amount to in relation to possible net returns from organic production rather than asset specificity.

Assets specificity and hold-up possibilities therefore seems more related to the type of governance structure chosen or enforced, where simple market transactions pose the greatest hazards due to the relative autonomy of the trans-actors.

Klein, Crawford and Alchian (1978) and Williamson (1979) note that contracting parties with transaction-specific assets put themselves in a position of being held up at renegotiation when they use short-term contracts. The possibility of hold-up occurs because each party could potentially extract, during renegotiation, the other's quasi-rents once the investments were made. The hold-up situation is one of the main economic explanations to why farmers organize themselves in cooperatives (or downstream vertical integration).

In relation to organic farming the question of hold-up and asset specificity might be more related to 'dedicated specificity' and 'temporal specificity'. Dedicated specific-

ity are investments made for a particular customer that, though it may not be specific to that customer, are made at such a level that their release on the market would depress the market value of the assets. An opportunistic supermarket chain buying a certain organic vegetable could therefore seek to extract a more favourable price by threatening to discontinue trading (Masten, 2000).

‘Temporal specificity’ is often the case with many agricultural products, because they are perishable. But again the question of governance structure is important, and with simple market exchange as the most hazardous. A farmer producing fresh vegetables ready for harvesting and selling to a single supermarket would be very vulnerable relying only on a simple market exchange.

Externalities

Economists b.c. (before Coase) of virtually all political persuasions had accepted British economist Arthur Pigou's idea that if, say, a cattle rancher's cows destroy his neighbouring farmer's crops, the government should stop the rancher from letting his cattle roam free or should at least tax him for doing so. Otherwise, believed economists, the cattle would continue to destroy crops because the rancher would have no incentive to stop them.

Coase challenged this accepted view in his article “The problem of social costs” (1960). He pointed out that if the rancher had no legal liability for destroying the farmer's crops, and if transaction costs were zero, the farmer could come to a mutually beneficial agreement with the rancher under which the farmer paid the rancher to cut back on his herd of cattle. This would happen, argued Coase, if the damage from additional cattle exceeded the rancher's net returns on these cattle. If for example, the rancher's net return on a steer was two dollars, then the rancher would accept some amount over two dollars to give up the additional steer. If the steer was doing three dollars' worth of harm to the crops, then the farmer would be willing to pay the rancher up to three dollars to get rid of the steer. A mutually beneficial bargain would be struck.

What Coase argued for was that if transaction costs equal zero, then property rights are perfect and organizations does not matter. If these costs are not zero, then the explanation of organization lies in transaction costs. The grand hypothesis of the transaction cost approach is that contracts and organizations are organized to maximize joint wealth net of transaction costs (Allen & Lueck, 2002).

Only considerably more recently however, have the existence and role of externalities (social costs) been recognized and studied. The most common examples involve situations where efforts by one dealer to promote a manufacturer's product or to enhance the value of the brand name also benefit other dealers (Masten, 2000). This could for example be related to organic produce, where advertising for organic foods by one supermarket chain would clearly benefit other supermarket chains selling organic products as well. Contracting and integration of organic foods by selling it under the supermarket's own brand (i.e. "Natura" in FDB/COOP-Denmark), provide alternative means for regulating and ensuring that the supermarket advertising for organic produce also appropriates the full benefits.

Complexity/uncertainty

The relative merits of contracting and integration depend also on the nature of the transaction. Among the factors affecting that comparison is the degree of complexity and uncertainty associated with the exchange. The more complex the transaction, the harder it will be to describe fully and accurately the responsibilities of each party in a contract, and the more difficult it could be for a legal court to assess whether the obligations stated in the contract have been fulfilled or not (Masten, 2000).

The more complex and uncertain a transaction exchange will be the more impact it will have on the structure on the firms organization or type of external contract. By contract structure is meant the methods of payment, the use of assets and the allocation of duties among the contracting parties, and will also define their incentives in the daily activities (Allen & Lueck, 2002).

The level of complexity in producing, processing and selling organic foods could be an important factor forcing organic farmers and their consumers to find alternative and more 'simpler' governance structures from 'farm to table'.

Similarity

According to Coase the internal organization costs are likely to be higher for transactions that are differentiated by either their location or characteristics from other activities in which the firm is engaged. Hence, the costs of supervising and managing employees will be greater where managers are unfamiliar with the production process or geographically removed from the operations (Masten, 2000).

In relation to the production, processing, storing and selling organic foods more costs on organic foods could also be explained by the extent of dissimilarities along the agro-industrial production chain in comparison of conventional food products. The possible higher transaction costs involved along the Agro-production chain, due to the dissimilarities between organic and conventional foods could therefore also be part of the explanations in the creation of alternative modes of organizing organic foods from 'farm to table'. The alternative modes of economic organizations could therefore be seen as efforts trying to reduce the total production costs and transaction costs involved.

International Transactions

Coordination of transactions across national boundaries involves the same concerns and tradeoffs as transactions within a single country, but a number of features of international transactions serve to make those tradeoffs more acute (Masten, 2000). On the one hand, geographical distances, language and cultural differences tend to raise monitoring costs. On the other hand, greater uncertainty on emerging organic markets, with different national or even different organic rules within the same nation controlled by different private organic farm organizations, could all tend to increase hazards in market transactions across national borders.

These types of costs in relation to emerging international transactions could explain why Danish organic products exported to foreign countries seems to copy the same markets as the conventional ones.

3.2. Market structure and Industrial Organization Theory

In agriculture the market structure along the commodity chains in general looks like an hourglass lying down (Heffernan, Hendrickson & Gronski, 1999). It often involves a relatively small number of input producers selling their products to a large number of farmers, who then must sell to a small number of firms that then move their products to millions of final consumers. The commodity chain involves alternating moments of oligopoly and competition. For most Agro-commodities there is very little vertical integration of farming itself. Reasons for this the Theory on Nature's Time seems to be able to contribute with valid explanations. Instead firms in the nodes before and after farm production, shed the risks to the farmers, but try to control prices through oligopolistic control of markets and other strategies (Goodmann & Watts, 1997). In other words, the different market structures and

asymmetric power relations along the food chain will generate different behaviour among individuals and firms in each node of the chain.

The theory on Industrial Organization is the field of economics that studies the behavior of firms and the structure of markets when markets fail to be perfectly competitive. Whereas microeconomics typically focuses on the extreme cases of monopoly and perfect competition, Industrial Organization is concerned primarily with the intermediate case of oligopoly. In this respect Industrial Organization addresses the following questions (Sherer & Ross, 1990):

1. Is there market power?
2. What strategies do firms acquire to maintain market power?
3. What are the implications of market power?

Within an Industrial Organization approach many economists analyze the questions above with reference to a framework known as the *structure-conduct-performance (SCP) paradigm*. Here one looks first at the aspects that characterize market structure: degree of buyer/seller concentration, extent of product differentiation and conditions of entry. Second, one pays attention to the typical conduct of firms in the industry: price and output policies, product development and promotion policies and behaviour towards rivals. Finally, one attempts to determine the market performance by estimating how competitive and efficient the industry is: price-cost margin, production efficiency, relative costs for advertising and promotion, product character and progressivity (Cabral, 2000).

The first SCP studies in agriculture analyzed the rates of reported profit for food manufacturing companies as functions of *four-firm concentration ratios (CR4)*⁵, firm market share, and measures of advertising intensity, generally finding each of the key variables to be positively correlated with profit. More recent work in the SCP framework has emphasized price as a dependent variable in response to the well-known Demsetz critique of studies using profit measures. Demsetz's essential argument was that the often-observed positive correlation between profit rate and concentration could be caused by an efficiency effect rather than by market power. Firms with an efficiency advantage would gain market share and earn larger-than-average reported profits, thus producing the correlation observed in the profit studies (Sexton & Lavoie, 2001).

⁵ CR4: is the percentage of total industry sales originated by the leading *four* firms.

3.2.1. Organization of economic activities in the Agri-food sector

Each node of the commodity chain has a *horizontal* and a *vertical* structure. The horizontal structure is related to the concentration ratio of firms and size of firms in each node influencing the outcome of markets and potential market power. As mentioned in the beginning of this chapter the commodity chain in agriculture often looks like an hourglass with markets changing from oligopoly (few input sellers), to full competition (many farmers), to oligopoly (few food manufacturers), to *bilateral oligopoly* (few retail buyers), to many end consumers.

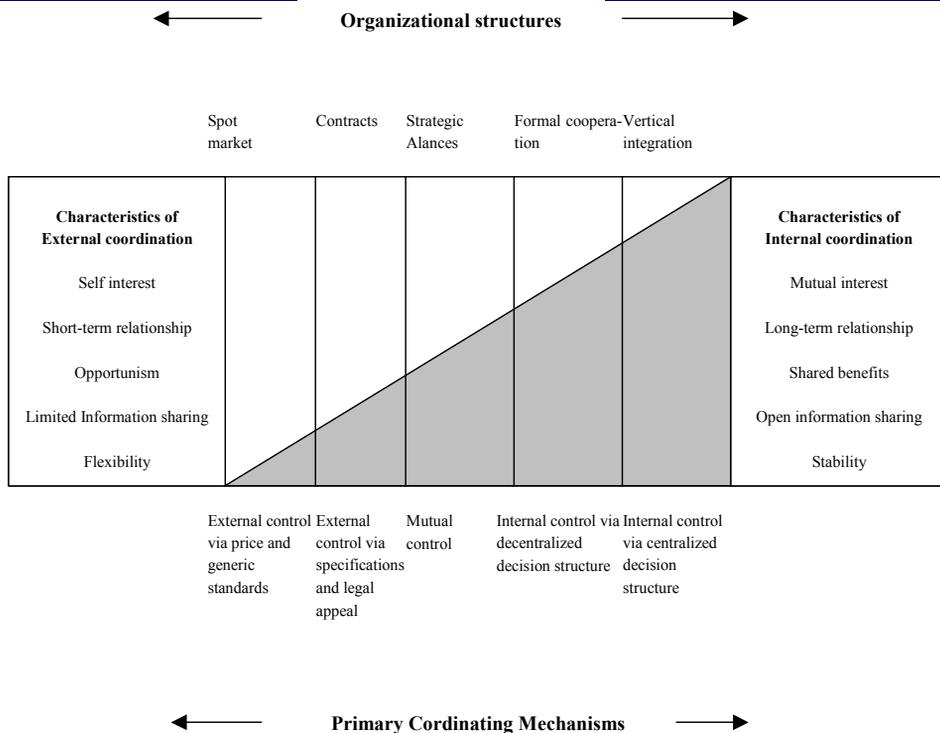
The idea of bilateral oligopoly – a few powerful buyers facing oligopolistic sellers – was put forward by J. K. Galbraith (1952), where he argued that in modern oligopolistically structured industries, the main force compelling sellers to conform to consumers wants and holds prices near cost is not sellers competition, but countervailing power exercised by strong buyers (Sherer & Ross, 1990).

Strong buyers restrain the pricing power of oligopolistic sellers in several ways. One can be by cutting prices in order to land an unusually large order, especially when they have excess capacity. Large buyers can exploit this weakness by concentrating their orders into big lumps, dangling the temptation before each seller, and encouraging a break from the established price structure. Other ways can be to play one seller off against the others to elicit price concessions.

The bilateral oligopoly from retailers and supermarkets are becoming more and more prevalent in farming and food production, but buyer market power has so far been given little attention in the general Industrial Organization literature, and has been a far less frequent focus of analysis in agriculture than has been processors' power as sellers (Sexton & Lavoie, 2001).

The vertical market relationships varies widely, and are usually conceptualised as a continuum ranging from market transactions to vertical integration all with a range of other coordination mechanisms in the middle of this continuum. This is illustrated in figure 10.

Figure 10. Different organizational structures and coordinating mechanisms (Boon, 2001)



At the one end of the continuum *spot market* indicates that the exchange of goods between adjacent stages in the commodity chain is achieved through a control mechanism that is external to the exchange relationship. Transacting parties rely on market prices and a broad system of grades and standards to coordinate the exchange of goods. The diagonal line represents the mix of external and internal coordination characteristics found in each of the five alternative strategies for vertical coordination. The area above the diagonal indicates the relative level of external coordination characteristics, and the area below the diagonal indicates the relative level of internal coordination characteristics.

At the other extreme, *vertical integration* indicates that the exchange of goods between adjacent stages of the commodity chain occurs within a single firm, i.e. under single ownership. The single ownership does not mean that units or subsidiaries can not operate autonomously. For example, slaughtering, meat cutting and processing of hogs are mostly vertically integrated within one single firm. The controlling mechanisms and the alignment of incentives relies more on managerial direction rather than on price signals.

The analytic study of vertical integration is generally traced to Coase's article (1937) on the economic rationale of the firm, where both the market and the firm, either through price mechanism or through managerial guidance, performed coordination functions. Williamson (1989) amplified upon Coase's transaction cost approach to understand vertical integration. Perry (1989) cites technological economies (e.g., the advantages of having various phases of a production process in close physical proximity) and market imperfections as reasons for vertical integration.

A serious market imperfection though is market power itself and the Industrial Organization literature has primarily focused on the incentives to vertically integrate for firms that possess market power. An important consideration in relation to agriculture is that farmers who face monopoly power in input purchases or monopsony (buyer power) in output sales have incentives to integrate vertically to countervail the market power. In this case, the firms facing market power may, by integrating vertically, not only eliminate the market power's inefficiency, but also the larger distributional loss created by monopoly/monopsony power. Because the scale of operation in farming is ordinarily much smaller than in the markets upstream or downstream, it is generally infeasible for farmers to integrate unilaterally. A solution is for farmers to coordinate horizontally and form a marketing cooperative to integrate downstream or a purchasing cooperative to integrate upstream (Sexton & Lavoie, 2001).

Many transactions in the agri-food sector are coordinated through contracts. Mighell and Jones (1963) developed a classification scheme for contracts that remains in use today. *Market-specification* contracts indicate the basis for computing price in accord with market conditions, but few management functions are specified. *Production-management* contracts give the contractor partial control of farm production methods. For example, contracts may specify the field location, seed variety, and harvest date. Under *resource-providing* contracts, the contractor provides major inputs into the production process as seeds or animals, feed, medicine or pesticides to producers.

3.3. The input-output structure and Actor Network Theory

Actor-network theory (ANT) evolved from the work of Michel Callon (1991) and Bruno Latour (1992) at the Ecole des Mines in Paris. Their analysis of a set of negotiations describes the progressive constitution of a network in which both *human* and *non-human actors* assume identities according to prevailing strategies of interaction. Actors' identities and qualities are defined during negotiations between representatives of human and non-human 'actants'. The neologism 'actant' is sometimes used as a neutral way to refer to both human and non-human actors, avoiding the strong human bias in the word 'actor'.

In (ANT) both 'actors' and 'actants' share the scene in the reconstruction of the network of interactions leading to the stabilization of the system. But the crucial difference between them is that only 'actors' are able to put 'actants' in circulation in the system.

According to Latour the modern constitution, or worldview, uses one-dimensional language operating in the framework of opposite poles of nature and culture. Knowledge and artifacts are explained either by society (social constructions) or by nature (realism). In order to transcend this dualism a second dimension is needed. It is the process of nature/society construction that results in the stabilization of a strong network. By selecting this process as a unit of analysis, it is possible to understand the simultaneous construction of culture, society and nature. The Foucauldian idea of a power-knowledge *discourse* is very much inherent in the thinking of Latour.

According to Alrøe & Noe (2003) Actor Network Theory offers a radical view on heterogeneous organizations or networks like a farm, consisting of both human and non-human actors (knowledge, technology, money, farmland, animals, plants etc.), and how these interactions depend on both the quality of the actors and the network context of interaction.

The Actor Network Theory provides a means for understanding the links between actors: humans, objects and hybrids of the two. These links are comprised of influences and interactions of various kinds with agency (human or non-human) more transparent than would be the case in a structuralist or functionalist analysis as for example in a stringent Political economy theory analysis (Lockie and Kitto, 2000). Examples of non-human intermediaries include the contracts that link farmers to processors, the regulation that link processors and farmers to national politicians and the international

agreements that link multinational corporations to the WTO (World Trade Organization).

In other words, a food network is conceptualised as a hybrid that comprises the inter-relationships between the human actors in a commodity chain, but extended to include the non-human intermediaries that bind the actors together in power relations. The Actor Network Theory therefore seems to offer a theoretical frame and a hybrid that could combine a macro social foundation of Political economy in combination with micro economic analysis. The Actor Network Theory raises the challenge of studying reality as transitional in its becoming and as trajectories of creation. This idea of becoming and change is also one of the central methodological ideals of dialectics inherent in marxian approaches.

Actor Network Theory has been adopted by a number of writers on food systems (Murdoch, 1995) and (Marsden and Arce, 1995). Goodman (1999) has recently presented it as a means of overcoming the inability of agro-food studies to give simultaneous priority to both nature and society. The names mentioned here have their disciplines within economic geographers and rural sociology. They therefore emphasize more the importance of spatial changes by agricultural production and its impact on nature as well as society locally and/or regionally rather than focusing on just the mere economic changes.

Fine *et al.* (1996) have commented that food studies hitherto have been highly fragmented according to the approaches traditionally adopted by individual disciplines, and that they have also been lacking in theoretical coherence. The commodity chain and its input-output structure in various manifestations provides one convenient locus for cross-fertilisation, both conceptually and empirically. It encompasses both production and consumption, and it provides clear links with the spatial conceptions of society.

Cook *et al.* (1998) has provided with helpful critiques of the commodity chain literature. It is argued that 'biographies' of foods need to take into account of their social constructions as commodities and the hands through which they are passing.

The concepts from ANT will in this dissertation be used to de-construct the commodity flow from 'farm to plate', and thus contribute with more insights on property rights as well as the quest for residual rights of control by specific human actors along the commodity chain. The theory on Nature's Time gives a good starting point on

how different Agro-commodities with different 'obstacles' to human attempts trying to shorten Nature's Time will interact on the way markets are organized, choices made on technologies, and how the farm or firms along the commodity chain as a nexus of contracts is not only construed on an individual behaviour, but also embedded in a social and cultural construction.

4. The Food regime perspective

The theories on Food regimes have explored the relationship between capital, labour and the state in relation to agricultural production and food consumption. The main starting point is the argument that nation-states play a crucial role in regulating capital accumulation⁶, and they see different ways in which capitalism is regulated as historically specific ‘regimes of accumulation’ (Savage & Warde, 1993). The theories are associated with the Regulation School descending from French structural Marxism of the 1970s (Jessop, 1990). Its principal figures, Aglietta, Liepietz, Boyer, and others have employed a distinctive set of theoretically generated concepts – regime of accumulation, mode of regulation, Fordism.

The different regimes are based essentially on the prevailing labour process: manufacture, dominant in the capitalist countries between 1870 and 1940; scientific management (called “Taylorism” after its main practitioner) and Fordism beginning at the turn of 20th century and dominant from 1940 to the late 1970s; and flexible accumulation, or post-Fordism, beginning with the economic crisis of the 1970s and expanding rapidly in the late 20th century. The regulation school theorized society in terms of development models, their parts, and their transformations: *regimes of accumulation* described the main production-consumption relationships, *modes of regulation* described cultural habits and institutional rules (Peet, 1999).

The Italian Marxist, Gramsci, apparently coined the phrase ‘Fordism’ to characterize the mass-production methods pioneered by Henry Ford in the inter-war years of the 20th century, and some of their effects on social and family life in Italy. The concept re-entered contemporary social and economic thought through the writings of the Regulation School who referred to a complete era in capitalist development as Fordist with its mass-production and mass-consumption. However, they argued that in the 1980s this regime was gradually giving way to a neo- or post-Fordist one, with less demand for mass-produced goods and in which competitive pressures required much more flexible methods of production (Savage & Warde, 1993).

What the Regulation School terms a “crisis of Fordism” occurred with a decrease in the growth of productivity and a fall in profitability in the late 1960s and a more general economic crisis in the 1970s, characterized by the internationalisation of production, state austerity programs, unemployment, and eventually a crisis of demand (i.e.,

⁶ Accumulation of capital: Using investments to build capital assets.

and under-consumption crisis). All these resulted in a new post-Fordist regime of “flexible accumulation” from the mid 1970s to the present (Peet, 1999).

The concept of a ‘Food-regime’ developed in the 1980’s. It draws on the regulation theory recognizing three similar historical periods in international agricultural development, starting with the first regime as a pre-World War I; the second from the 1940s to the 1970s; and the third from the 1980s to the present. Each regime is characterized by particular farm products and food trade structures linking production with consumption and regulations governing capitalist accumulation (Atkins & Bowler, 2001).

The *first food regime* was based on an extensive form of capitalist production relations under which agricultural exports from white ‘settler’ countries in Africa, South America and Australasia, supplied unprocessed and semi-processed foods and materials to metropolitan states in North America and Western Europe. The introduction of refrigerated ships in the 1880s increased both the range of produce that could be supplied by distant colonies and the distance over which perishables such as butter, meat and tropical products could be transported to the metropolitan economies. European imports of wheat and meat (‘wage-foods’) were exchanged for exported European manufactured goods, labour and capital (Friedmann & McMichael, 1989).

The first food regime was undermined by the global economic recession of the late 1920s and early 1930s, but aspects of the regime survived. For instance, food trade in dairy produce, meat and cereals originating in the extensively farmed rangelands of the Americas and Australasia. Another remnant comprises the production of sugar, tropical tree crops (cocoa, coconut, rubber, palm oil, bananas) and beverages (tea, coffee) through quasi plantation systems of production (Atkins & Bowler, 2001).

The *second food regime* developed under US hegemony and with the establishment of two new international agreements: the 1945 Bretton Woods Agreement governing the stability of exchange rates between national currencies (based on the dollar/gold standard); and the 1947 GATT (General Agreement on Trade and Tariffs) rules on international trade. The former underpinned the international diffusion of the national model of economic growth; the latter excluded agriculture from more liberal trading practices and facilitated the further development of national state protection for agriculture: “the agricultural welfare state”.

The second food regime is also characterized by a heavy industrialization of agriculture resulting in a rapid increase in the average farm size and rural depopulation. Farmers leave for jobs in the growing industrial sector, and are in the same time being replaced by agri-industrial inputs like chemicals, farm machinery and fertilizers. Production intensified on pig, poultry and beef lot farms as well as wheat, and all supported by different national farm price schemes and export subsidies for disposal of surpluses.

The crisis of capitalist accumulation that ended the second food regime can be traced to the oil and food crisis of the early 1970s, comprising global recession, the collapse of Bretton Woods, soaring grain prices, the excessive costs of national farm support programmes, and the antagonism between the national regulation of agriculture and the growing commercial power of globally organized corporations (Atkins & Bowler, 2001).

The final form or outcome of the *third food regime* is still uncertain, but several and often contradictory structures and processes have been identified:

- Increased global trading of food
- Consolidation of capital in food manufacturing
- New biotechnology
- Consumer fragmentation and dietary change
- Declining farm subsidies (deregulation) or de-directed from farm price support to more environmental or regional support schemes.

The activities of IMF (International Monetary Fund) and the WTO (World Trade Organization), the successor of GATT, are central to the emergence of a new global regulatory structure. With more liberal trading policies increasing global competition are being brought on those farming regions, food processors and food retailers in developed countries, which for many decades have been protected by national regulatory measures. In the same time Third World countries are drawn into new trade and production-consumption patterns, where they are becoming the ‘Garden of food producers to a First world Restaurant’.

Further more, the processing, marketing and retailing agribusinesses that were forming during the second food regime have become major players in this new competitive environment trading with food. By limiting state farm support programmes, the WTO is extending the corporate power of global agribusinesses relative to national

(public) power, but at the same time supervising new forms of regulation arising out of the contest between nation states, the TNCs (Transnational corporations) and popular movements (e.g. consumers, environmentalist, organic farmers), with the latter not formally present at the negotiations (Atkins & Bowler, 2001).

In the same time there are counter movements by individual states joining supra-national trade regimes claiming their own 'regional rights' within the trading blocs (i.e. EU, NAFTA and APEC). So, while the final dimensions of the third food regime are still uncertain, the outcome seems likely to be influenced by the contest between private global regulation shaped by the TNCs and their requests for universal market rules, and a more democratic global regulation with the right to differentiated rules on production and environment formally controlled by each supra-national trading regime.

The question of relevance to this research project, the development of organic farming in a ten-year perspective in Denmark, is therefore very much related to the outcome of the Third food regime and its 'mode of social regulation'. In other words: the institutional forms and procedures society will put forward to regulate and try to overcome the constraints upon Agro-capital accumulation, as well as mediate between farmers, agro-industrial corporations, food retailers and consumer reactions.

4.1. Organic Farming in the Third Food regime

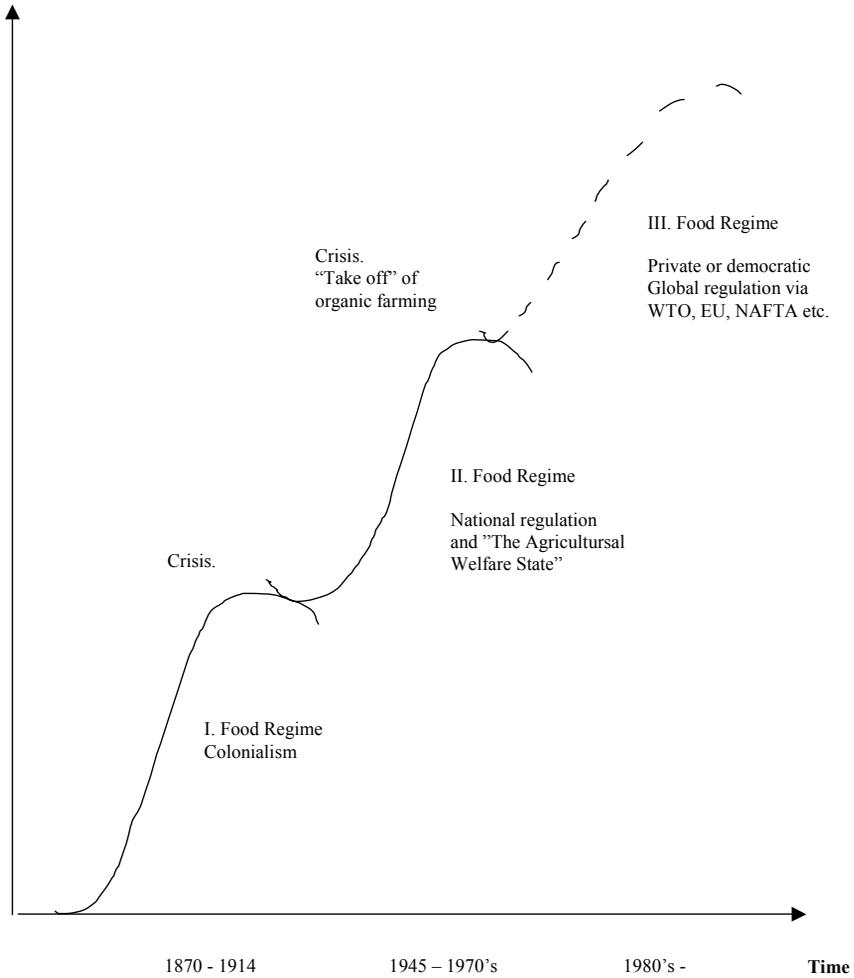
The Food regime perspective will in this dissertation be used to put forward a hypothesis that the market growth, or the "take off", of organic farming is related to the accumulation crisis between the second and the third food regime. The attempts from Agro-capital in the second food regime to raise productivity by using more fertilizer, concentrating more animals on fewer farms, spraying more pesticides - in other words shortening Nature's time, specializing production, making Labour Time and Nature's Time coincide more efficiently - has reached a point where technological and organizational choices only increases environmental problems and raises new Agro-industrial food diseases. The attempts from Agro-capital to overcome significant constraints on growth is only encountered as creating new and more alarming environmental problems.

In figure 11 the different Food regimes are illustrated as 'capital accumulating S-curves' along a historical timeline. The different regimes are distinguished by a period of crisis in capital accumulation. As illustrated in figure 10 organic farming has

its ‘take-off’ with the accumulation crisis and decay of the ‘agricultural welfare state’ in the second food regime during the 1970’s –80’s.

Figure 11. Food regimes

Capital accumulation



In relation to the crisis by the end of the second food regime, encountered as various environmental problems, organic farming can be viewed as a social counter reaction

to these problems creating alliances between farmers and environmental conscious consumers. The success of the organic farm movement lies also in its ability to create alliances within the political institutions and thereby securing societal rules and regulations promoting organic farming on different levels. This could be direct economic support to farmers, economic schemes to organic food manufacturers promoting new products and expanding market opportunities, or building up research institutions or grants helping organic production. That means creating an institutional frame supporting the residual rights of control and net earnings of the organic producers.

From this point of view the paradigm and the ideological foundation for organic farming is based on counter moves in relation to production-consumption structures and relations within the second food regime and its crisis in the 1970's – 80's. But the world is now in a process towards a new food regime with radical changes on global regulation on food production and food trade. Power relations within the food chain itself is moving away from national farmers and food manufacturers towards transnational supermarkets and clusters combined by pharmaceutical, medicine and biotechnical corporations. National governmental regulators are losing power to new supra national institutions or non-elected administrators in powerful agencies like the WTO.

The 10.000-dollar question is: Where is organic farming moving in relation to the forces and the fighting over the shape of the third food regime? As shown with the theory on 'Nature's Time' organic farming is a countermove against the consequences of certain ways to obtain capital accumulation in agriculture, but at the same time it is also part of the same capitalist market economy that needs to see growth if more investments should be directed towards organic farming and foods.

The claim here is, that the future development and growth opportunities of organic farming is closely related to the power struggle and interest conflict concerning the economic and societal regulation on trade as well as production on Agro-foods in the third food regime.

By examining the power struggles and growth strategies within the chosen organic commodity chains, the aim is to see, if these struggles and governance structures are carrying forward new values and standards of integrity for organic foods, as well as new market opportunities.

5. Propositions

In relation to the three levels of social analysis - the firm, the supply chain and the institutional setting - the following five broad propositions will be employed:

- a. First movers of new market organizations in organic production are primarily driven by countermoves to the consequences of alienation and appropriation of property rights in production and transaction processes.
- b. Rules and regulations in organic foods are set up to control the access over the critical resources of organic production methods and thereby regain a sense of power in production or consumption.
- c. Differences between organic and conventional production rules are related to economic constraints and environmental externalities caused by attempts to shorten production cycles or raising output in agriculture.
- d. Governance structures in the nodes of the organic commodity chains are motivated by the following five Transaction cost characteristics:
 - Asset specificity
 - Externalities
 - Complexity/uncertainty
 - Similarity
 - International transactions
- f. The future development and growth opportunities of organic foods are closely related to the power struggles and interest conflict concerning the economic and societal regulation on trade as well as production of agri-foods in the third food regime.

These propositions will be refined and targeted more precisely as the methodological approach comes in place. In line of this process the next phase in the workprogram is to outline the input-output structure of the two chains chosen as case studies.

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