Appropriating and commercialising immaterial goods in knowledge economies

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Monsanto's property regime and the case of transgenic seed

by

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Date of submission:

October 2007

Abstract

Against the background of theories of knowledge economies and by employing a three dimensional property concept, Monsanto's property regime is carved out of the empirical material to exemplarily answer the question of whether and how immaterial goods can be appropriated and commercialised. This question does not only deserve closer inspection because of the intricacies of immaterial goods regarding their appropriation and commercialisation in general, but also because the technology of herbicide resistance, the immaterial good concerned here, is incorporated in a living organism that can reproduce itself: Transgenic seed. The analysis shows that with regard to Monsanto, the appropriation and commercialisation of an immaterial good is possible. However, it becomes obvious that their property regime is built on precarious ground because its implementation totally depends on the creation and maintenance of the artificial scarcity of their immaterial good which is upheld and enforced by numerous discoursive practices.

Acknowledgements

Collecting and organizing the material for the thesis that is submitted here is not just the work a single person. It is with pleasure and gratitude I mention those that made this undertaking possible. Only a few of them can be listed here under their names.

First and foremost, I want to thank my supervisor Bernhard Gill for his guidance, inspiration and support. Over in Canada, Axel Diederichsen, Curator of the Plant Gene Resources of Canada provided lots of hints, ideas and addresses of interview partners and gave an introduction into agriculture in Saskatchewan by showing me around on test plots and the gene bank. Gabriele Waidelich-Harrison of the German Language School in Saskatoon, Ellen Black and Franz-Viktor Kuhlmann of the Department of Mathematics of The University of Saskatchewan made sure I did not get stranded and organized and offered perfect lodging. Special thanks are addressed to Terry Boehm: I am not sure if I would have come to Saskatchewan without his encouragement. Darrin Qualman provided lots of crucial information, showed me around in rural Saskatchewan and invited me to a terrific barn dance. Thank you very much to all of you!

I want to thank all those institutions and their representatives that gave me their time, their attention and all the patience it took to collect and understand the material from which the thesis was to evolve afterwards. Apart from that, quite some information also is the result of rather casual conversations somewhere out in rural Saskatchewan. I want to express my gratitude towards all the farmers who took the time to talk to me and show me around on their farms and fields and, in particular, for the great opportunity of operating an airseeder.

The following institutions, organizations and firms helped me on with my interviews (listed in alphabetical order):

Agriculture and Agri- Food Canada
BASF
Gene Resource Center of Canada
Green Party of Canada
Law firm of Stevenson Hood Thornton Beaubier LLP
Monsanto
National Farmers Union
Saskatchewan Flax Development Commission
Saskatchewan Pulse Growers
Seed dealers in the Saskatoon area

I also want to thank the Saskatoon University Library and their friendly staff.
Special thanks are addressed to The German National Merit Foundation for their support.

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List of abbreviations

CIPO	Canadian Intellectual Property Office
DRM	Digital Rights Management
GM	Genetically Modified
GMO	Genetically Modified Organism
IPR	Intellectual Property Rights
NFU	National Farmers Union
OAPF	Organic Agriculture Protection Fund
PBR	Plant Breeders' Rights Act
SFDC	Saskatchewan Flax Development Commission
SOD	Saskatchewan Organic Directorate
TUA	Technology Use Agreement

1 Introduction

1.1 The research question

As in other years, the awarding of the Noble prizes has been awaited in great suspense. While the official Nobel prizes for Physiology and Medicine were awarded to three geneticists, one of the alternative Noble prizes was given to Louise and Percy Schmeiser who are best known (as well in a positive as in a negative sense) for their long lasting legal struggle with the Monsanto biotech company. The award was presented to them "(…) for their courage in defending biodiversity and farmers' rights, and challenging the environmental and moral perversity of current interpretations of patent laws" (Right Livelyhood Award Foundation 2007). Is this not a very interesting current phenomenon: Whereas three of the official Noble prizes were given to geneticists, one of the alternative Nobel prizes goes to a Saskatchewan farmer couple who oppose the 'perversity of current interpretations of patent laws'. Is this random coincidence? Or is there more to it?

Actually, there has been an increase in the patenting of natural resources like the genetic material of plants, animals and humans and the analytical processes employed respectively over the last decade. These developments are paralleled by very controversial discourses which become apparent and are mirrored by the economic, scientific, ethical, religious and moral convictions of their actors, which range from dedicated individuals to multinational companies and NGOs of all shades. In their intensity or even violence these debates often carry the flavour of religious wars and make use of an accordingly belligerent terminology (compare Cook 2004).

All this gives evidence of the many conflicts of appropriation of natural resources and their genetics, as for instance the cases of The Human Genome Project, the mapping of the Icelandic genome and the medicinal properties of the Indian neem tree or plants from the rain forests. These conflicts are not about material resources like coal, steel or oil which are typical of industrial societies and their respective regimes of production. What they are about are immaterial goods like medicinal traits, genetic information and processes for gaining them. Those, according to various theorists of postindustrial societies, gain more and more importance in so-called postindustrial or knowledge societies. It is argued that in knowledge

societies the main productive factor with regard to added value and the central product is knowledge.

However, there are critical voices that argue that the characteristics of knowledge and immaterial goods (e.g. software) elude the logic of exploitation that is typical of industrial capitalism which is based on the natural scarcity of its material products.

This theoretical assumption gives rise to the following question: Can a company that produces immaterial goods (knowledge) appropriate and commercialise its product[1]? By taking the (chemical and) biotech company Monsanto as an example, this interesting and – at a first look – strange question will be dealt with in the course of this thesis. The immaterial good in this case is the technology of herbicide resistance which is incorporated in seed, which, in this way, is turned into transgenic seed.

1.2 The empirical case study

To tackle the research question, a lot of practical steps were taken. In a first step, a comprehensive inquiry into literature relevant and related to the subject was made. However, it became obvious, that there is hardly any literature on the topic of this thesis. For that reason, it was necessary to conduct an empirical field study and to collect the data. For practical and pragmatic reasons, it was decided to conduct this study in Canada during a three month stay in Saskatoon/Saskatchewan in 2007. This province is situated in the Canadian Midwest between the provinces of Alberta in the West and Manitoba in the East. Saskatchewan is a predominantly agricultural province and lends itself to the thesis' objective for different reasons. Due to the fact that Saskatchewan is an agricultural province all relevant individual actors, organisations and institutions are located in or around Saskatoon and can be easily contacted and reached, for instance farmers and farmers' organisations, plant breeders, seed growers and dealers, lawyers, seed companies, Agriculture and Agri-Food Canada, the Plant Gene Resources of Canada (gene bank), the University of Saskatchewan and many more. Furthermore, transgenic canola has been grown in Saskatchewan since 1996. Since 1998, the legal struggle between Monsanto and Percy Schmeiser has been in progress. So it could be expected that there would be many people holding strong opinions on the subject of this thesis.

[1] The research question will be deduced in detail from selected theories of knowledge economies in the second chapter.

The collection of data was accomplished by means of twenty qualitative guided interviews which were partly recorded and partly logged. The interviews that were recorded have been transcribed. The interviews were conducted in and around Saskatoon, partly on farms that were a hundred or more kilometres away from Saskatoon.

1.3 The structure of the thesis

The study at hand consists of five chapters.

The second chapter analyses the theoretical framework on which the thesis is based. Two theoretical approaches to knowledge economies are presented (Gorz, DeLong and Froomkin). Both approaches deal with possible future societal developments once knowledge becomes the major productive factor (with regard to added value) and an essential good in its own right. From these, the research question is deduced and related to the properties of (transgenic) seed.

In chapter three, a methodological tool is prepared to analyse the empirical material and to answer the research question. This tool mainly consists of a property concept developed by Benda-Beckmann and others. It is operationalized by means of the discourse analysis as outlined by Reiner Keller.

Chapter four consists of two main parts. The first part deals with the question of what discoursive practices Monsanto actually employs to appropriate and commercialise an immaterial good (which becomes tangible in transgenic seed) and what kind of property regime results from this. First tentative answers to the research question are suggested. This part is the very centre of the thesis.
For a better understanding of this, however, the second part of chapter four examines the practices that make up the property regime of the non-GM farmers' community.
Last but not least, chapter five presents, against the theoretic background as outlined in chapter two, a synopsis of the different strands of the empirical findings and relates them to each other. Finally, the research question is answered and critically discussed. The chapter is finally rounded up by a tentative discussion of the question of whether or not the findings of this thesis can be applied to other immaterial (knowledge intensive) goods.

In short, it will be shown how Monsanto tackles the intricacies that come with the appropriation and commercialisation of an immaterial good that is incorporated into a living organism, seed.

2 Theoretical considerations about knowledge economies

Before going into detail, a few words must be said about the background from which the theoretical approaches employed in this thesis originate. In simple terms, they belong to a broad spectrum of theories dealing with the question: What kind of society will emerge from the industrial society?

Looking at the whole range of theories that carry the prefix 'post', it becomes apparent that this question is discussed in a very controversial, lively and ideological way focussing on different central issues. These range from exclusively economic approaches to very comprehensive concepts of society that remind the reader of utopias. Jean Fourastié (1969), for instance, describes the postindustrial society as 'tertiary civilisation' in which people are freed from undemanding work and have time and leisure to devote themselves to aesthetic and personality development activities like dancing, learning another language or work in a citizen's action group. Daniel Bell (1985) conceptualises the postindustrial society as a service society in which theoretical and scientific knowledge can be described as the driving force of societal change. His main focus are the changes in social structure and the stratification of society that are brought about by theoretical knowledge becoming a driving force of society. Peter Drucker (1993) in his concept of postcapitalistic society gives a similar description of social change, emphasising that in contrast to industrial society, knowledge has become the essential productive factor in the process of production. This brings about the emergence of new social classes: The proletarian worker and the capitalist are replaced by the intellectual and the service provider. For the sake of completeness, Manuel Castells (2001) should be mentioned, although his approach is not undisputed. He conceptualises postindustrial society as a network society that has come about by the availability of new communicative technologies. From his point of view, this results in a de-territorialized network economy which has emancipated itself from its former national affiliation.

These examples may serve the purpose of showing that answering the question "What kind of society will emerge from the industrial society?" is a task that is not easily solved. What becomes obvious, however, is the essential role knowledge or knowledge intensive technologies have as a determining factor of social change. This explains why the fact that many authors refer to postindustrial society as a knowledge society or a knowledge economy. In the following, the main focus of interest will be on the economic aspects of knowledge society.

Although the ongoing discussion about postindustrial or knowledge societies is varied and controversial, there is a common consensus that knowledge has or will become a commodity in its own right on the one hand and the main productive factor with regard to the creation of added value on the other hand (e.g. Drucker 1993, Gorz 2004, Stehr 1994). In this, knowledge society differs from industrial society. In industrial society, the creation of added value mainly depends on the productive factors of labour, capital and land. In this equation knowledge is rather treated as a black box, although, of course, knowledge always is and has always been a prerequisite for production. Moreover, in industrial societies, the price the consumer pays refers to the measurable interaction of the traditional productive factors, whereas in postindustrial societies they either pay for the knowledge itself (e.g. software) or for the knowledge incorporated in a material product (e.g. in highly sophisticated electronic technology).

Here, the point has to be made that this thesis will follow the above conceptualisation of knowledge: Knowledge as a commodity and the main productive factor. Of course, it would be possible to further dissect and define the term 'knowledge' (compare: Stehr 1994: 201 ff., Gill 2007). Referring to the research question of this thesis, however, a further dissection of the term 'knowledge' does not seem to result in essentially deeper insights.

Although theories about postindustrial societies more or less agree on the special part of knowledge in postindustrial societies, the conclusions, however, which are drawn highly differ from each other. One branch of this discussion assumes that these societal changes will result in an intensification of capitalism (compare Castells 2001) whereas another one argues that the specific properties of knowledge elude the basic assumptions that make the functioning of capitalism possible and therefore expect its crisis (Gorz 2004, Hardt/Negri 2003).

Within the scope of this thesis, the latter branch will be pursued. This is because the present public debate dealing with questions of intellectual property such as in the discussions about property rights on software, digital music files, the human genome or transgenic seed

confirms the idea that knowledge or knowledge intensive commodities are not easy to appropriate and commercialise. As will become obvious in the analysis of the empirical material of this thesis, the appropriation and commercialisation of knowledge or knowledge intensive commodities actually turns out to be an intricate undertaking.

2.1 Capitalism at stake?

One author, who can both be ascribed to those sociologists theorising about postindustrial society and addressing the issue of a looming crisis of an economic system which is transforming from an industrial to a knowledge economy, is André Gorz (2004). Gorz argues that industrial capitalism, that utilises real capital, gets substituted by postmodern capitalism that utilises immaterial capital (knowledge)[2]. According to him, industrial capitalism is characterised by the fact that the value of labour can be defined by the number of material objects that are produced in a certain span of time as e.g. in assembly line work during the period of Taylorism. In contrast, the value of immaterial labour like creating knowledge eludes the classical criteria of measurement. For him, this is the crucial point of his argumentation and the cause of the crisis that, in his opinion, is threatening capitalism.

One of his central assumptions is that if knowledge becomes the most important source of added value in knowledge economies, the logical consequence will be the crisis of the exchange value. His line of argumentation this: Whereas in industrial capitalism products are manufactured in a way that allows to measure and define their value, in knowledge economies, the value of a commodity depends on its contents of knowledge and intelligence. Now it is impossible to take apart the process of creating knowledge. When does a scientist start and stop thinking? When is his thinking target-aimed or random? Is he paid for the ten years that he has worked on a problem or just for the single moment of sudden inspiration that leads to a solution? Here, it becomes evident that the process of creating knowledge cannot be dissected into single segments to which a monetary exchange value can be attributed. The fact that the time necessary to produce knowledge is not measurable undermines the Marxian distinction between the time of reproduction and the time of surplus labour in which surplus value is created. Gorz follows Marx in so far as he also assumes that only goods that have

[2] Here, only those parts of Gorz's theoretical approach to knowledge economy will be introduced that are relevant for the research question of this thesis, however interesting his ideas of the end of wage labour and the introduction of an unconditional citizens' income are.

been created by measurable human labour can be attributed an exchange value. Consequently, the exchange value of knowledge or knowledge intensive goods cannot be defined.
What does this mean for an economic system that deeply relies on the exchange of material goods and on the possibility of measuring the exchange value of these goods? According to Gorz, this must lead to a crisis of capitalism, all the more, because in contrast to material industrial goods, there is no natural scarcity of (immaterial) knowledge. In other words, knowledge eludes the capitalistic mode of exploitation in two ways: First, because it is impossible to give knowledge a monetary exchange value and second, because there is no natural scarcity.
According to Gorz, however, this crisis could be averted. Although he perceives this possibility, it is important to note that he is no apologist of respective practices. By creating an artificial scarcity of particular sets of knowledge by limiting their accessibility and by ascribing them an arbitrary and fictitious price (exchange value) this crisis could be handled. It can be argued, that the increase in and tightening of intellectual property rights (IPR) account for that fact. In this context, the price is fictitious and arbitrary, because the costs of knowledge production are hard to evaluate whereas the cost of reproducing and copying the knowledge tends towards nil. Gorz exemplifies this by referring to the knowledge that manifests itself either in software, pharmaceutical products or transgenic seed (ibid: 39 ff.). From Gorz's point of view, this necessity to create artificial scarcity and set up fantasy-prices renders knowledge economy instable and open to violation (ibid: 66).
Finally, the results that are derived from analysing the empirical material will confirm these theoretic assumptions.

Although Gorz's theoretical framework will play the major part in this thesis, it seems useful to complement his approach by having a short view at the theoretical reflections about the properties of knowledge as described by Bradford DeLong and Michael Froomkin.

2.2 The properties of knowledge and immaterial goods

Whereas Gorz deduces a looming crisis of capitalism from the crisis of the exchange value (non-measurability), DeLong and Froomkin (1999) argue that the properties of knowledge or immaterial goods per se may prevent their capitalistic exploitation. The authors want to raise awareness for potential economic difficulties that an economic system based on the

commercialisation of material goods will face when transforming and trying to commercialise immaterial goods like knowledge. This is the case because material goods (in contrast to immaterial goods) naturally feature specific characteristics which enable and facilitate their commercialisation, namely: Excludability, rivalry and transparency. The authors refer to these characteristics as three implicit pillars the market system rests on and which steer the way in which property rights and the exchange of goods work (ibid: 6). In other words: When immaterial goods and knowledge become the main object of economic exchange, this undermines the axioms of industrial capitalism. What does this mean in concrete terms?

In simple terms, excludability[3] means that material goods are naturally scarce and are valued according to their scarcity. In other words, two people cannot have the identical lunch or drink the identical bottle of beer. In contrast, there is no natural scarcity with immaterial goods or knowledge. They do not get used up. Consequently, two or more people can 'have' the same knowledge without limiting its utility, and e.g. use the same software or speak the same language. "When commodities are not excludable then people simply help themselves" (ibid: 9).

Accordingly, the use of knowledge or a knowledge-based commodity "(…) will no longer necessarily involve rivalry" (ibid: 12). Rivalry means that if Ego uses a particular good, Alter cannot. Following DeLong and Froomkin, immaterial goods are non-rival because two can consume as cheaply as one. In other words, the marginal costs of making a copy of a specific set of knowledge, e.g. copying software or passing on a formula, tend to be nil or near zero. Consequently, everybody can have it almost for free.

Last but not least, immaterial goods also lack the feature of transparency. In the case of material goods, consumers have different possibilities of estimating the utility and the value of a given commodity; they can see and touch it. In contrast, consumers cannot deal with knowledge or immaterial goods in the same way. In the case of immaterial goods, creating transparency would mean to divulge the knowledge to a potential consumer which would be similar to giving it away for free. In other words, selling immaterial goods or knowledge to consumers is rather difficult. From a consumer's perspective, purchasing knowledge or software is like buying a pig in a poke.

Due to the fact that immaterial goods lack these crucial features, the question of whether or not they can be handled and commercialised in the same way as material commodities is a legitimate question. Having in mind these considerations, DeLong and Froomkin argue that it

[3] This feature is essential in the scope of this thesis. The features of rivalry and transparency are interesting aspects which have to be kept in mind, too, but are not as important as excludability.

is very likely that holders of IPRs like patents will try to artificially establish excludability and rivalry: "(…) technological advances such as "digital watermarks" will allow each copy of a digital data set, be it a program or a poem, to be uniquely identified. Coupled with appropriate legal sanctions for unlicensed copying, a large measure of excludability can be restored to the market" (ibid: 42 ff.). The authors eye these tendencies rather critically. From their point of view, the artificial establishment of excludability and rivalry (where it naturally is not found), e.g. via tightening IPRs, goes hand in hand with social costs which cannot easily be estimated. For the total utility of a national economy, it is not an optimum to establish scarcity on goods that naturally are not scarce and where there is no 'tragedy of the commons'[4].

Analysing the empirical material, it will become obvious that these reflections about the properties of immaterial goods and knowledge are very instrumental in examining and understanding the intricacies that must be dealt with in the attempt of making knowledge (e.g. a new technology) a private and marketable commodity.

2.3 The research question as deduced from the theoretical approaches of Gorz and DeLong and Froomkin

Now, after Gorz's approach has been presented and complemented by theoretical considerations about the properties of immaterial goods and knowledge, the research question of this thesis can be derived. Although Gorz and DeLong and Froomkin have different approaches to knowledge economies, they come to similar conclusions. Both approaches question the possibility of commercialising immaterial goods in principal and arrive at the conclusion that this would only be possible if artificial scarcity could be produced. Again, it should be noted, however, that the authors quoted here would not approve this approach. While conceiving the possibility of creating artificial scarcity, they are no apologists of respective practices. Now, the question is: How do their approaches relate to this thesis in concrete terms?

In the scope of this thesis, the branch of green biotech industry (green genetic engineering) is taken as an example. It is assumed that this branch is typical of knowledge economies because

[4] This term refers to a situation in which there is a finite resource (e.g. a forest) and a group of actors who want to maximise their individual utility. These actors have an infinite demand for wood and unlimited access to the forest. This results in an overexploitation of the forest which, from an economic point of view, is suboptimal. However, since knowledge is not a scarce good, it can never be overexploited and there is no 'tragedy of the commons'.

its foremost activity is research and development. They do not produce material commodities like cups, spoons or refrigerators but (immaterial) knowledge, e.g. a formula about how to make a plant resistant against a particular herbicide. For that reason, it can be assumed that knowledge is both their most important production factor and product at the same time.

Against the theoretical background of Gorz, DeLong and Froomkin, this thesis aims at empirically answering the question of how biotech companies deal with the intricacies that come along with the crisis of the exchange value and the specific properties of immaterial goods and ask if they are successful in commercialising their knowledge.

According to Gorz, DeLong and Froomkin, the only possible way of commercialising immaterial goods is the creation of artificial scarcity and the limitation of their accessibility. Will this assumption be proved to be valid? How do biotech companies accomplish this task? Are they successful in doing so?

Using 'property' as the central point of reference (by employing Benda-Beckmann's property concept), these questions can easily be translated into very tangible questions. This is the case because excludability and rivalry become evident in private property in everyday life, i.e. in the distinction between 'mine' and 'yours' which is an important axiom of capitalistic society. For that reason, it is assumed that biotech companies try to make knowledge a private good by creating its artificial scarcity. By doing so, they kill two birds with one stone: By making it their private property, they turn it into a marketable commodity because they can only sell a commodity they hold a property title to and which is scarce.

As a result, the questions that will be addressed to the empirical material are:

- Can a biotech company appropriate knowledge and make it a private good?
- If so, how is it done?
- Can a biotech company commercialise knowledge?
- If so, how is it done?

In order to avoid misunderstandings, it should be pointed out that the term 'appropriate knowledge' in this context does not refer to the long process in which the knowledge is developed by scientists and 'collected' by the management within the biotech company. This process will be handled as a 'black box'. What the term 'appropriate knowledge' actually aims at is the process in which the company obtains a formal title of ownership attached to the knowledge, for instance by means of a patent.

2.4 The properties of seed as a carrier substance for an immaterial good

In this context, the example of green genetic engineering is of particular interest. Here, the material carrier substance for the immaterial good (technology) is a living organism: Seed. It is an empirical question how a biotech company does not only deal with the intricacies as outlined by Gorz, DeLong and Froomkin, but also with the fact that the living organism carrying the technology that is to be commercialised is a living organism that reproduces (or pirate copies) itself for free. In addition to the questions stated above, this fact constitutes one of the main points of interest of this thesis. Seed as a living organism follows its own logic: In the case of canola, one grain of seed is able to produce hundreds of canola plants which again reproduce themselves (compare Figure 4-1 on page 46). This natural process (and the farmers' habit to make use of it) defies the essential precondition that facilitates the commercialisation of immaterial goods: The creation of artificial scarcity. This special intricacy will be extensively dealt with in the analysis of the empirical material.

To answer the research questions stated above, the Monsanto property regime will be taken as an example. For a better understanding of the Monsanto property regime, which can tentatively be ascribed to the private domain, will finally be contrasted with alternative property regimes dealing with seed which can (tentatively) be ascribed to the public domain. As indicated above, these questions will be examined and operationalized with the help of a three dimensional property concept developed by Benda-Beckmann and others. In the following, this concept will be introduced and harnessed for the purpose of this thesis.

3 Methodology and operationalization – The discoursive construction of property relationships

Having developed the theoretical background and the research questions of this thesis, a methodological framework aiming at analysing the empirical material has to be constructed. This will be achieved by making use of parts of the property concept developed by Benda-

Beckmann and others (Benda-Beckmann et al. 2006) and the concept of discourse analysis developed by Keller (2005a). Both concepts will be presented and elaborated so that the former will be operationalized by the latter. It is important to have in mind that only those aspects of both analytical frameworks will be discussed that will be actually used in this thesis.

3.1 Conceptualising property relationships according to Benda-Bekmann

As a first step, a short description of the overall property concept developed by Benda-Beckmann and other will be given. Then, a detailed discussion of those aspects of Benda-Beckmann's approach that will be used as analytical tools will follow.

In 2006, Franz von Benda-Beckmann and others developed an analytical framework dealing with conceptualising property. In their approach, property is defined as a relationship between social units or actors that are the outcome of a process of negotiation between these actors. These property relationships are defined as bundles of different rights and obligations that are attached to a property object and held by social actors. Further on, the process of negotiating property relationships has three different dimensions: Ideological, legal and actors' everyday life. It has to be kept in mind however, that these layers are all present in the actual process of negotiating property at the same time. In the analysis of the process of negotiating property relationships, they will be examined separately.

The development of this analytical framework can be described as a reaction to (as the authors call it) oversimplified and one-dimensional property concepts as employed e.g. in political, economic or legal models. These one-dimensional property concepts are referred to as the 'Big Four', namely open access, common property, state property and private property (Benda-Beckmann et al. 2006: 8). From their point of view, these concepts are so much idealized that they fall short of describing and analysing present economic or political phenomena and produce biased research results. For instance, the authors point out that if "(…) the bundle of private property rights were to be measured against the mythical yardstick of 'total dominion', most European private ownership has never been ownership and is even further removed from ownership now" (ibid: 12). The use of the bundle metaphor makes perfect sense and dismantles the idea of total dominion with regard to 'privately' owned land. Here, different social actors hold different rights and obligations attached to the land. For

instance, a farmer may be the owner of a peace of land, but he has to entitle rights of way (for people longing for recreation) and keep to specific environmental laws like not to manure in specific times in the year.
Within the scope of this thesis, however, the bundle metaphor will not be used very frequently. Given the empirical material at hand, using the bundle metaphor would not result in deeper insights concerning property relations dealing with seed. For instance, canola consists of about 40.000 genes. One of these genes is patented by Monsanto, the remaining ones are not. If there were four or five genes patented by different companies in the genome of one canola plant, the use of the bundle metaphor would make sense and be useful. As this is not the case, it seems to be reasonable to neglect the bundles of rights metaphor and just make use of the concept of the three different analytical layers.

Now, after that short summary of Benda-Beckmann's approach, the following will give a closer discussion of those parts of the concepts that will be used in this thesis.
After having diagnosed the gap between an oversimplified analytical framework on the one hand and complex property relations in the context of 'real life' on the other hand, the authors start to rethink contemporary theories of property based on the ideas of e.g. Karl Marx or Adam Smith in a much broader way. Within the scope of this thesis and with regard to the theoretical concept of knowledge society as discussed above, their concept will be used to handle and conceptualize property relationships dealing with (transgenic) seed.
The authors conceptualize property as follows: "Property in the most general sense concerns the way in which the relations between society's members with respect to valuables are given form and significance" (ibid: 14).
There are three different components that make up a property relation. First, there are social units, companies and the municipality that are potential holders of rights and obligations attached to a specific property object. Second, theses social units define the actual property object, e.g. land. Third, the social units define different rights and obligations that are attached to the actual property object. From the authors' point of view, the property object and the rights and obligations attached to that property object result from negotiations between the different social units involved. Fortunately, there are a lot of property relationships that do not have to be negotiated on a day to day basis, e.g. if people buy groceries. Each time they go shopping without negotiating the rights and obligations attached to the objects they want to buy, the existing property relationships are validated.

In contrast, the emergence of (potentially) new property objects or social units go hand in hand with negotiations about how to constitute the property relations between the new property object and the social units involved. At present, it is possible to observe one of these negotiation processes from the very beginning. As a consequence of the melting of the arctic ice around the North Pole, the greediness of the littoral states has been awakened because these regions are considered to be rich in natural resources. Different social units (nation states) negotiate about property rights on these regions. These negotiations are accompanied by a wide range of symbolic demonstrations of power that remind of practices typical of colonial annexation (which is a way of constructing property relations, too). Russia, for example, installed the Russian Tricolour made of rust-free titan at the sea ground at the North Pole.

In contrast to one-dimensional concepts dealing with property, Benda-Beckmann's own concept (ibid: 15) consists of three different analytical layers (the ideological, the legal and the concrete layer) which provide the framework in which the negotiation of property relationships take place.

These different layers vary from each other in their level of abstraction. Therefore, they could be described as an information pyramid.

The top part of this pyramid is presented by the layer of cultural ideals and ideologies and has the highest level of abstraction. At this layer, ideologies like Socialism or Communism can be found. The level of abstraction is very high and basic beliefs like "Society can only work if we have private property" or "The benefit of the many can only be achieved if we have common property" are maintained.

The middle part of that pyramid is the layer of legal institutions. Benda-Beckmann and others also refer to that layer as the categorical layer. Property relationships are expressed in formalized and written law and become manifest in lawsuits and texts of law. Customary rights that have not been codified are part of that layer, too. At the legal layer, the level of abstraction is lower than on the first layer but higher than on the third one.

Last but not least, the third layer of that pyramid has a very low level of abstraction. Here, at the layer of actual social practices, property relationships find expression in the social actors' everyday dealings with different property objects. For that reason, the authors also refer to that layer as the concrete layer of property relationships.

The relation between these layers can be described as an interactive one. Even if these three layers can be thought as an information pyramid that does not necessarily mean that the first layer determines the second layer and the second one the third one. In the property concept developed here, the different layers interact and influence each other in a reciprocal way. For example, the concretised social property relations may give rise to changes on both the second and the first layer. These assumptions also imply that property relationships can differ from layer to layer, e.g. in cases where the social actors' everyday dealings with a property object deviates from legal guidelines. For that reason, these different layers may not be transferred into each other. Summing up, the analytical framework presented here allows to consider the third layer both as being influenced (but not necessarily determined) by the first and second one and, at the same time, as being (re-) shaping and influencing the first and the second layer. What actually happens on these different layers and how they interact is an empirical question that will be studied further down.

In terms of discourse analysis, these different layers will be conceptualized as different discoursive levels later on.

Up to now, mainly the ideological and legal layers have been the objectives of scientific research. According to Benda-Beckmann, this means that an important part of observation has been mainly neglected. In contrast to the first and the second layer, there are very little scientific papers on the social construction of property relations dealing with seed in the actors' everyday life. For this reason, this thesis is mainly interested in analysing the third layer. Benda-Beckmann's concept provides a tool that sharpens the researcher's eye for the existence of this layer and gives him a means of examining it.

In concrete terms and against the background of the theories of knowledge society, the concept presented above will be used to analyse how property relationships dealing with non-material goods like knowledge or material goods like seed are constructed. Is it possible to appropriate knowledge, e.g. via patents, and commercialise it like material commodities? And if so, how is it done in Saskatchewan? In accordance with Benda-Beckmann (ibid: 3 ff.) this is an opportunity to watch the emergence of new property objects and the intricacies with regard to political, ethical and legal questions and conflicts that accompany them.

Now, the link between the property concept presented by Benda-Beckmann and others, the objectives of this thesis has been established along general lines. But before starting analysing the empirical material, this coarsely meshed framework and its fundamental terms have to be

operationalized by another more precise and elaborated analytical framework. This analytical framework – in this case the concept of discourse analysis developed by Reiner Keller (Keller 2005a) – will be used to answer the questions stated above in a methodologically controlled kind.

3.2 Keller's concept of discourse analysis

Before going into detail, it must be mentioned again that only those concepts and ideas developed by Keller will be mentioned and explained that are instrumental for the operationalization of Benda-Beckmann's framework presented above and for a precise dealing with the empirical material. For that reason, the statements about Keller's concept of discourse analysis do not claim to be exhaustive but will follow Benda-Beckmann's property concept and the general research questions in a pragmatic way.

First of all, 'discourse' and 'discourse analysis' are very elusive and multifaceted terms and are used in very heterogeneous ways and contexts. There are lots of different basic approaches to discourse analysis that come from diverse scientific fields, e.g. linguistics, ethnology or sociology. Even within these scientific fields, the opinions about what discourses actually are, where they come from and how they affect (and are affected) by social action are very heterogeneous.

The decision to make use of the concept of Reiner Keller's approach of discourse analysis has been made for practical reasons. His concept is a balancing act between the tradition of social constructivism as presented by Peter L. Berger and Thomas Luckmann (1966) and the rather structuralist approach of Foucault's perspective of discourses, combined with the methodological approach of hermeneutic sociology of knowledge. As will be shown later, Keller's concept perfectly suits the purpose of operationalizing Benda-Beckmann's concept of property relationships.

According to Reiner Keller, the purpose of discourse analysis in sociology of knowledge can be described as follows: To analyse and reconstruct the processes of both the construction and the legitimation of significance and sense on the different levels of institutions, organisations or social actors; furthermore, to describe and analyse the social implications of these processes. Discourse analysis of knowledge as laid out by Keller can be seen as a tool that can be used for investigating the constant societal processes of knowledge production, circulation and transformation (Keller 2001: 113).

3.2.1 The approach of Berger and Luckmann

Keller starts outlining his concept of discourse analysis referring to "The social construction of reality" by Berger and Luckmann (Berger, Luckmann: 1966). Here, Berger and Luckmann outline a theoretical framework in which social reality is constituted in a way which is significant and meaningful for social actors. The main objective is the circulation of everyday knowledge and how it is used and produced by social actors. By acting on a day to day basis social actors recognise social reality in processes of perception and interpretation. Reality is seen as a (historic) social construction that is continually produced by knowledgeable individuals. It is a specific body of knowledge, sense and meaning that provides social actors with solutions for given problems in everyday life. As shown by Berger and Luckmann, this body of knowledge is the outcome of processes of negotiating and bargaining different world views, opinions or speculations. During socialization, social actors internalise a particular body of knowledge that is typical of their societal, institutional and historical context. In this sense (in contrast to the term 'knowledge' as used in the discussion of knowledge society above) knowledge is a very heterogeneous term and refers to a wide range of social phenomena, e.g. interpretative schemes or frames[5], languages, ideas, world views and everyday routines and practices - anything that can be interpreted in a meaningful sense is knowledge. There are different kinds of knowledge, e.g. between scientists and none-scientists and it is argued that these actors (according to their knowledge) live in their very own worlds of sense and meaning. Berger and Luckmann account for that fact by distinguishing 'everyday knowledge' from 'expert know-how'. Everyday knowledge is knowledge that most or all social actors have in common, e.g. how to go shopping or use the public transport. Expert know-how e.g. refers to knowledge these actors need in addition to their everyday knowledge, e.g. to be able to do their job-related tasks. In that sense, all social actors somehow are experts, the farmer as well as the lawyer or the professional alpinist.

The consequences of historically different sets of knowledge become obvious in the following example: Medieval sailors were afraid of falling off the earth disc whereas sailors like Christopher Columbus believed in the spherical shape of the earth and did not hesitate to look for a passage to China and India.

[5] The concept of interpretative frames will be discussed later on in greater detail.

It is important to point out that there is always a connection between subjective meaning and social action. At the same time, however, this particular subjective meaning is part of the societal, collectively available body of knowledge, too. Nevertheless, the societal available body of knowledge does not determine social action but is interpreted, (re-) produced, transformed or rejected by self reflexive social actors (Keller 2001: 117). These self reflexive social actors adopt specific parts of the societal available body of knowledge and interpret and modify them depending on their current (common or uncommon) situation.
In other words, a given structure or a given body of knowledge is a precondition for social action – but if the interpretative schemes and frames presented by that body of knowledge fail in providing instructions on how to act, social actor will transform or reject them. It is a continuous circulatory process of producing, reproducing and transforming knowledge.

Within the scope of this thesis, it can be argued that the emergence of trans-genetic organisms is disruptive in that it goes hand in hand with new kinds of property objects and new sets of knowledge defining how to handle these new property objects, e.g. transgenic seed. Therefore it is challenging traditional bodies of knowledge and traditional frames of interpretation answering the question "How to deal with seed?" For that reason, the situation in Saskatchewan can be described as a conflict about who is allowed to define social reality relating to property relationships on seed.

According to Mead and Blumer (compare Keller 2001: 115) special parts of the collectively available body of knowledge become objectified and symbolized, e.g. the doctrine of the Catholic Church is objectified and symbolised in impressive and pompous buildings. These buildings are called churches, have a special purpose and carry a symbolic meaning that is visualized e.g. by paintings of communion or the Holy Trinity. These meanings can change, as they did during secularization. In short, a material object, for instance a church, is not just the material object for itself but symbolises a particular set of meanings, beliefs and instructions that can change over time. The social actor's behaviour towards a specific object depends on the significance and meaning that is attached to or symbolised by that specific object (from the actor's point of view).
Consequently, the different social actors involved in the discourse about property relationships dealing with seed do not only negotiate about property rights attached to seed itself, but also about the significance and meaning that is symbolised by the seed to the seed, e.g. a special way of life or believes in progress and technology.

Although there is a lot more that could be said about "The social construction of reality", these explanations will have to suffice. There would be no additional value for operationalizing Benda-Beckmann's property concept in greater depth.

In view of the concept of property relationships developed by Benda-Beckmann, the approach of Berger and Luckmann is very instrumental in describing what actually happens at the concrete analytical layer of property relationships: 'The social construction of property reality' in social actors' everyday life. In other words, Benda-Beckmann's approach of conceptualising property relationships as the outcome of negotiations between social actors can be described as an exemplification of Berger and Luckmann's "The social construction of reality". It is applied to a small but crucial area of 'social reality', namely property relationships.

However, there are some aspects of "The social construction of reality" that do not completely meet the requirements of the empirical findings Keller wants to describe and explain (Keller 2001: 120). He argues that Berger and Luckmann concentrate too much on the micro level or the perspective of single social actors in describing how specific bodies of knowledge are constructed and appropriated in interactive or (non-) communicative acts in everyday life. Social actors do not only create these bodies of knowledge but are also instructed and guided by them. Although these dynamics are pointed out by Berger and Luckmann, they do not elaborate on their mechanics and societal effects. They neglect to examine in a fundamental and deeply analytical way the resulting effects or even power of those bodies of knowledge that have become perpetuated, institutionalised and symbolised (i.e. the macro level).

According to Keller, this fact – combined with the tendency of hermeneutic sociology of knowledge to rather examine social phenomena on the micro level – have led to biased and one-sided theoretical approaches. Now, what Keller actually wants to do is to include the institutionalised and perpetuated bodies of knowledge into the approach of hermeneutic sociology of knowledge. This ambition is put into practice by making use of different theoretical constructs and basic terms of the Foucaultian approach to discourse analysis.

3.2.2 The Foucaultian perspective

For Keller, the sociological currents of sociology of knowledge and the Foucaultian approach have one thing in common: Their interest in the different ways and the different consequences of the societal and collective construction of knowledge. The difference lies in the theoretical perspective of these two sociological approaches. Berger and Luckmann, for instance, emphasise the idea of a sovereign subject involved in the construction of specific bodies of knowledge whereas Foucault abandons the sovereign subject and conceives these bodies of knowledge as discourses. Discourses evade the intentions of social actors and can be described as self contained patterns (Keller 2001: 122).

Foucault's analytical concept of discourses can be seen as an attempt to establish a link between knowledge and practise. Discourses are communicative practises which produce the things they are about (compare Foucault 1981: 71). Discoursive practices can be summarized as the total arrangement of knowledge production that consists of processes of accumulating and processing knowledge, including institutions, speakers and rules of how to disperse this knowledge in spoken or written word or other media (compare Keller 2001: 123). Within the discourse, there are particular rules that make a distinction between legitimate and none legitimate speakers, e.g. by titles of education like 'master-degree', 'doctor' or 'professor'. In other words, discourses constitute themselves by producing an institutional, organisational and material infrastructure of legitimate speakers (subject positions).

Both social actors and social action are made possible and produced by the discourse (and not vice versa). By doing so, discourses also produce interpretative schemes and frames which favour the issues and actors the particular discourse is about. In that way discourses produce principles and guidelines for what is right or wrong, true or false. There are rituals that have to be performed before something can be assumed to be right or wrong, e.g. scientific research or the publication in well renowned journals. Furthermore, discourses develop and establish mechanisms of control and sanction that become symbolised and materialised e.g. in the wording of law or in special professions like that of a judge or a policeman. In contrast to Berger and Luckmann, who first and foremost emphasise the importance of actors' everyday knowledge, Foucault emphasises the importance of institutions and scientific disciplines in producing knowledge and by this in constructing social reality. Institutions and scientific disciplines provide speakers with legitimate and powerful backgrounds and speaker positions just because they are institutions and scientific disciplines.

Last but not least, discourses exercise a specific kind of power. The link between power on the one hand and a specific body of knowledge – the discourse – on the other hand can be seen in the fact that the knowledge at hand defines what is right or wrong, socially desired or

banned. Discourses exercise power by generating and perpetuating a set of specific schemes and frames of interpretation. In that way different originally contingent bodies of knowledge get defined as the absolute truth. They are perceived as objectively true. It is the power of defining what philosophies and world views are supposed to be right or wrong and the power to define who is a legitimate speaker that is wielded by discourses (compare ibid: 125)[6].

Whereas the approach of Berger and Luckmann helps to examine and describe what actually happens in the actors' everyday life (concrete layer), the Foucaultian perspective is instrumental in explaining from where the actors' behaviour is guided and produced. In terms of Benda-Beckmann and the property issues under consideration it can actually be argued that discourses as conceptualized by Foucault are referred to as the more abstract layer of ideology which partially manifests itself in the legal layer. On this layer, specific strands of the ideological layer become manifest and symbolised by e.g. courts, the wording of law, contracts or prisons. As seen above, Benda-Beckmann assumes some kind of interaction between these different layers. Now, by combining the approach of Berger and Luckmann with the Foucaultian concept of discourse analysis as done by Keller, it will be possible to explain and describe the different layers and the interactions between these layers.

3.2.3 Harnessing Keller's approach to discourse analysis in order to examine property relationships

Against the theoretical background of Berger and Luckmann and Foucault, Keller defines discourses as specific arrangements or bundles of thematic and institutionalised meanings which are produced, reproduced and transformed in a specific set of (non-) communicative practices. Discourses produce specific forms of knowledge that can be interpreted as particular arrangements of reality or as particular sets of meanings. These particular sets of meaning create, spread, (re-) produce and transform social action in a particular societal, institutional and historical context (Keller 2001: 129). In the approach presented by Keller, discourses do not exist detached from social actors. Discourses do not come out from nothingness but come to life by social actors. (ibid: 133). Following the conceptualization of the social actor established by Berger and Luckmann, Keller thinks of the social actor as an

[6] However, Keller criticises Foucault's concept of discourse, too. From his point of view, discourses are not as independent and detached from social actors as postulated by Foucault. Here again, Keller's ambition and concept becomes clear. He does not use either Foucault's or Berger and Luckmann's approach exclusively, but is aiming at utilising both concepts as complementary to each other.

actor who makes use of the knowledge, the meaning and the sense provided by the discourse in a selective and reflexive way in order to be able to navigate through everyday life. By doing so, social actors (re-) produce and transform the body of meaning, sense and knowledge that makes up the whole discourse. There is a specific level of interplay between the social actors and social practices on the one hand and the collectively disposable body of knowledge (the discourse) on the other hand. In other words: Discourses are produced and structured by social actors and, at the same time, serve as instructions and guidelines enabling social action. From that point of view, social actors and social action are produced by the discourse. In terms of a micro-macro model, Foucault could be localised at the macro level. His approach of discourse analysis can be used to explain which perpetuated bodies of knowledge exist and how they influence the micro level. Berger and Luckmann would be localised on the micro level. Their approach can be used to explain how specific bodies of knowledge emerge in everyday life of social actors. Taken together, these concepts should meet the requirements of operationalizing Benda-Beckmann's property concept.

The goals and the definition of discourse analysis as outlined by Keller fit the property concept explained above in different ways. Benda-Beckmann and others present an analytical framework allowing them to observe how property relations actually emerge, develop and change. Following Benda-Beckmann, the driving forces behind the developments and the changes in property relations are social units who either accept or refuse the property relationships conceptualized by another social unit. Analytically, this takes place on different social layers. However, following Foucault, these social actors are not totally free in negotiating property relationships. These negotiations are enabled and produced (but also complicated or eliminated) by perpetuated, symbolised and materialised bodies of knowledge which are represented in Benda-Beckmann's approach by the rather abstract ideological layer. In other words, the negotiations about property relations on (transgenic) seed as observed in Saskatchewan take place in a historic set of perpetuated, symbolised and materialised bodies of knowledge. These bodies of knowledge vary from actor to actor and provide them with various interpretative schemes and frames or instructions on how to deal with any property issues. Within the concept of Benda-Beckmann, the strength of the Foucaultian approach can be seen in being able to explain how the abstract layer of ideology produce, instruct and enable social actors and their doings on the third layer.
Since one of Benda-Beckmann's mainstays is the social unit, the acceptance of social actors by Keller is very important for operationalizing the concept of property relations developed

by Benda-Beckmann. From that point of view, the impetus of discourse analysis as presented by Keller perfectly suits the general research focus of this thesis.

3.2.4 Basic terms of discourse analysis

At this point, it seems to be useful to explain some basic terms that will be employed in analysing the empirical material. These basic terms can be seen as the outcome of Keller's detailed reflections about discourse analysis within the frame of hermeneutic sociology of knowledge presented in "Wissenssoziologische Diskursanalyse. Grundlegung eines Forschungsprogramms" (Keller 2005a: 228 ff.)[7].

According to Keller (2005b), it makes sense to analytically distinguish between a material and a non-material discourse dimension. Studying the material dimension can be described as analysing the materialised and symbolised infrastructure of a particular discourse. Studying the non-material dimension means to analyse the specific bodies of knowledge that establish, (re-) produce and transform the materialised and symbolised infrastructure. Within this thesis, the analysis of the non-material discourse dimension will be limited to analysing the interpretative schemes and frames and the narrative structure accompanying the material dimension.

To cover the material dimension of a given discourse, one has to ask the following questions:

Who is the social actor?

> The term 'social actor' is equated with Benda-Beckmann's term of 'social unit'. According to Benda-Beckmann, social actors can be individuals, e.g. a farmer, or organisations or institutions, e.g. unions, companies or political parties.

What is the 'social role' or the 'speaker position' of the social actor?

> 'Social role' or 'speaker position' give a closer description of the social actor. This can be the spokesman of a company or simply an affected or concerned farmer or citizen. Each discourse creates its own legitimate speaker positions. For instance, the legitimate speaker position for a judge to pronounce a judgement is the courtroom and not the supermarket.

Are there relations to other social actors, e.g. discourse coalitions?

[7] A rather loose translation of that title would be: 'Discourse analysis and knowledge society. Establishing a research program'.

This question aims at figuring out whether or not there is a group of social actors whose statements refer to the same discourse, e.g. by using the same story line.

Who is the addressee or the audience?

The addressee or the audience is a social actor or a group of social actors who is or are addressed by the discourse and who receive and incorporate the discourse into their thinking.

What discoursive practices (or strategies) do these actors employ?

Practises can be described as ways of typified and routinized social action which are picked up, learned and performed in a more or less tactic way. They are patterns of legitimate ways of social action within the discourse and constitute its reality. Discoursive practices are e.g. special rules of speaking, writing and behaving in particular institutional contexts. By employing these discoursive practises, the discourse is updated and reproduced, e.g. making the sign of the cross when entering a church. Within the scope of this thesis, the appropriation of knowledge via patents or the legal construction of property relationships via contracts will be described as discoursive practices.

Are there any dispositives?

Dispositives are material objects that carry a particular set of sense and meaning, they can be seen as the link between the material and the non-material dimension of a discourse. The particular sense and meaning that is carried by a special frame of interpretation becomes manifested and symbolised in a material object, the dispositif. For instance, the cross in a church is not only two pieces of wood that have been nailed together but the crucifix and the central symbol of Christian faith.

To cover the non-material dimension of a given discourse, one has to ask the following questions:

What schemes and frames of interpretation can be discovered?

According to Michael Meuser and Reinhold Sackmann (1992: 16) and Christian Lüders and Michael Meuser (1997: 63) interpretative schemes and frames are nothing more than a specific set of knowledge as described by Berger and Luckmann. Interpretative frames are collectively available instructions with regard to a given problem. They are produced, reproduced and transformed by social action and serve as the actor's meaningful link between interpretation (e.g. of a given problem) and action (how to deal with that problem). It is important to have in mind that these interpretative schemes can

be observed at societal critical situations, for instance when traditional forms of property are challenged. Here, established and routinely applied interpretative schemes fail to provide instructions with regard to a given problem. The old interpretative schemes do not fit into the gap between interpretation and action any longer and the actors involved have to develop a new set of meaning that fits into that gap.

Now, referring to the topic of this thesis, schemes and frames of interpretation can be used to figure out which social actor, e.g. companies, farmers or plant breeders, employ which particular set of sense, meaning and knowledge to deal with the property issues arising within the context of (transgenic) seed. It is an empirical question if there is only one main interpretative frame or if there are more than one in a given discourse (What are the fundamental beliefs and world views that lead to a specific definition of a property relationship referring to seed?). Furthermore, it can be analysed if these frames materialise or are symbolised through material objects (dispositifs).

Which story-line accompanies the particular schemes and frames of interpretation?

The story line can be described as a narrative that ties together the different repertoires of interpretation, sense and meaning that are presented in a discourse by interpretative frames and schemes. The story line organises a given discourse and anchors it in history. They are exploited or used by social actors to build up discourse coalitions and connect social actors from different societal contexts, e.g. farmers, scientists and politicians who believe in similar interpretative frames. Within the context of this thesis, these narratives are conceptualised as tales of salvation employed by different social actors.

3.3 Methodological approach to discourse analysis

Now, after the analytical framework established by Benda-Beckmann has been operationalized, the issue of a methodologically controlled use of that framework can be approached. As can be guessed from the term ‘hermeneutic’ sociology of knowledge, the methodological approach to the empirical material will follow the shape of a spiral. The spiral metaphor refers to the different steps of interpretation of a given phenomenon. It is a steady analytical back and forth movement between theory, methodology and the empiric material

and the field. For instance, scientific insights on the empiric level can lead to changes in the methodology and vice versa.

From that point of view, there is no sense in methodologically distinguishing between the material and the non-material dimensions of a discourse[8]. That is so because at the start there is no possibility to know e.g. what dispositives exist, who the audience is and what interpretative schemes accompany the discourse. In other words, there is no definite starting point for analysing the empirical material. For that reason, analysing the empirical material can start with any kind of document or text passage that seems promising referring to the loose assumptions or hypotheses about the properties of the empirical field that have emerged during the collection, transcription and logging of data.

For practical reasons, the search for interpretative schemes and frames referring to the research questions is a good starting point for analysing the whole discourse. The search for interpretative schemes and frames is usually done by sequential analysis[9]. In short, sequential analysis means that a text is analysed and interpreted in three different steps on a sentence to sentence basis. It aims at revealing the latent patterns of sense and meaning that underlie a particular text segment. To avoid a prejudiced perspective on the text some authors using the approach of sequential analysis call for a special mindset that can be described as artificial kind of stupidity.

In the approach of 'Grounded Theory' (compare Strauss/Corbin 1996) introduces three different steps of sequence analysis: Free or open coding, axial coding and selective coding. During the first step of open coding various meaningful versions of a given sentence should be developed. In doing so, there emerge numerous more or less meaningful ideas that are elaborated, transformed or discarded in more detail during the second step of axial coding. Last but not least, the third step of selective coding aims at selecting *that* elaborated idea (a tentative interpretative scheme or frame) that mostly fits the research question. That procedure is repeated with different texts and text passages. If the similar tentative schemes and frames emerge frequently in other texts or passages they loose their tentative status and can be generalised. However, because of lack of space, the procedure of sequence analysis is demonstrated in detail only once.

[8] However, it makes sense to keep this distinction in mind as a helpful theoretical tool that helps to dismantle the different parts of a given discourse.

[9] For further reading about the approach of sequential analysis within the context of knowledge sociology see Reichertz (1995), Froschauer (1992), Hopf (2000) and Strauss/Corbin (1996).

Afterwards, these interpretative schemes serve as the starting point for the further analysis of the whole discourse, e.g. by looking at the social actors, material objects, social roles or practises that go hand in hand with these schemes.

4 The empirical case study

In the following, the analytical framework developed by Benda-Beckmann will be put to test. But before going into detail, some basic assumptions concerning the empirical field and the empirical material must be made.

During the last decades, Canada's seed sector has undergone some major changes in which the power to define property relationships on seed has shifted (depending on the particular variety) from the public to the private domain[10].

For that reason and according to Berger and Luckmann, it can be assumed that the bundle of meaning and knowledge attached to seed has changed over time – that is the interpretative schemes dealing with the question "How to handle seed?" have been transformed. Until the introduction of the "Plant Breeders' Rights Act" (PBRs) in 1990, these interpretative schemes were rather transformed than totally challenged[11]. It was in 1996 that Monsanto first started to market transgenic canola seed. Genetically modified (GM) canola has in it a patented gene that makes the whole plant resistant to a particular herbicide and, what is important, it is also produced and marketed by Monsanto (however, there are other companies in the market that offer a generic equivalent). The herbicide is called Roundup and is very popular with farmers in North America. It is a broad-spectrum herbicide that was introduced in 1973. Its main active ingredient is glyphosate. Patenting and commercialising this particular herbicide-resistant gene goes hand in hand with a totally new property concept respectively interpretative frame answering the question "How to handle seed?" that is primarily attached to the gene itself. As the patent holder, Monsanto is entitled to create property relationships with other social actors which totally suit the company's ambitions. From that point of view, the new property concept which accompanies the patented technology can be described as disruptive since it challenges traditional interpretative frames dealing with seed.

[10] Mr. Burns, a BASF representative, points out that farmers think that they should save and re-grow seed and so on. "But they can't. That's part of the change in agriculture" (ibid: 3).
[11] For further reading about the PBRs see Kuyek (2004: 15).

To cut a long story short, it is assumed that there are at least two competing discourses about how property relationships on seed should be constructed. In simplified terms, these competing discourses can be described as located at the two opposite ends of an imagined scale. At the one end, the construction of property relationships on seed rather follows the concept of collectively owned property within the public domain whereas, at the other end, the construction of property relationships on seed rather follows the concept of privately owned property (private domain)[12].

Now, it is an empirical question what actors, dispositives, practices, story lines and interpretative schemes and frames can be assigned to or appear in which discourse. From an actor's point of view, the present situation in Saskatchewan can be described as a struggle about the question "Who is allowed to define and enforce property relationships on seed? Is it multinationals like Bayer, BASF, Pioneer, Syngenta, Dow AgroScience or Monsanto on the one side or is it the community of non-GM farmers on the other side?" It is important to have in mind, that the distinction between the different groups of farmers is difficult because most of them fall into more than one category. For instance, some farmers grow transgenic canola and conventional varieties at the same time. The group of organic farmers is the only group that can be sharply outlined.

Due to the fact that the process of patenting and commercialising transgenic crops and the Roundup Ready® technology can be conceptualised as the creation and starting point of a new and challenging answer to the question of "How to define property relationships on seed?" (and therefore have triggered the present situation of rivalling property concepts), the analysis of the empirical material will start with Monsanto's property concept dealing with seed. Wherever it seems adequate, the empirical findings will be related to the theoretical background. In a second analysis, Monsanto's concept will be contrasted by the property concept employed by the non-GM community. This part will not be related to any specific theory because it just serves for contrasting and clarifying the property concept and relating practices as used by Monsanto. It is important to have in mind that Benda-Beckmann's three-dimensional concept of property relationships is the main analytical tool in both cases. Although this framework is operationalized by Keller's concept of discourse analysis, this thesis will not overemphasise its exemplification.

[12] After Benda-Beckmann's critics on oversimplified property concepts, the use of the terms 'public' and 'private' might seem to be inconsequent. Here, the distinction between common and private property (from the actor's perspective) only serves as a first starting point in analysing the empirical material. According to the actors' opinions on how property relations (referring to seed) should be discussed, the empirical material will be sorted along that scale. It will be shown later what specific property relationships actually constitute these terms.

4.1 The Monsanto property regime

As shown in the discussion about different approaches to knowledge economy, the question of whether or not knowledge as an immaterial good can be appropriated and marketed by social actors is an important issue. However, in this discussion, the term 'appropriation' appears to be a rather diffuse and slippery one. In the following, the term 'appropriation' will be referred to as a particular way of defining and conceptualizing property relationships as outlined by Benda-Beckmann. From that point of view, the act of appropriation, e.g. a technology, via patents can easily be reconstructed and analysed. Before doing so, however, at least a quick glance must be thrown at the ideological background and, resulting from it, the legal frame against which a biotech company can assume a legitimate position of speaking to apply for a patent.

4.1.1 The ideological background of Monsanto's property concept

A detailed analysis of the ideological layer of property relationships referring to appropriation via patents is an endeavour justifying a thesis of its own. Thus, the following remarks concerning the ideological layer will be presented in condensed form only.

The ideological layer is the most abstract layer of property relationships. And it is impossible to define a particular social actor or a particular property object on that layer. Instead, one rather has to look for discourses that favour e.g. private property, technological progress or private companies. Here, the capitalistic and neo-liberal discourse, their interpretative frames and schemes and their dispositives come to mind. These discourses promote world views and philosophies that make economic growth a societal priority. The concept of private property is seen as the most effective one in realising these ideological goals. And it is assumed that growth depends on innovations and that innovation will only happen if there are monetary incentives at hand that reward those actors who are innovative. For instance, the interpretative scheme "Social actors will only innovate if there are economic incentives for them" has led to discoursive practices like the expansion of various intellectual property rights like patents or trademarks that reward an innovative actor with special benefits like the legal right of a temporarily monopolistic commercialization of a herbicide-resistant gene. In turn, these discoursive practices constitute the capitalistic and neo-liberal discourse.

Now, the construction of private property following a practice of appropriation via patents seems to meet these demands of both stimulating and privatising innovations. From that point of view and according to Foucault the categorical layer or – to be more precise – intellectual property rights like patents and copyrights can be described as part of the materialisation and symbolisation of the neo-liberal discourse. They only make sense if they are seen against a given and historically grown ideological framework of specific and perpetuated frames and schemes of interpretation and their materialisation (dispositives). For example, the Canadian Patent Act or the Canadian Intellectual Property Office (CIPO)-building could be described as symbolizations and materialisation of these interpretative frames. Furthermore, the capitalistic and neo-liberal discourse e.g. provides companies like Monsanto with legitimate positions of speaking to apply for patents that could not be found within a socialistic or feudalistic discourse. This point also becomes clear in a statement made by Ms Roberts (ibid 2007: 9) in which she legitimizes Monsanto's practice of appropriating knowledge via patents by referring to the public good. She points out that patents are incentives to make sure people will be innovative. Being innovative goes hand in hand with positive external effects like environmental protection, e.g. when farmers need less herbicides and fuel to grow more acreage. Again, such comments can only be made and only make sense against a given discoursive background. In other words, such a statement can be made and is produced by the capitalistic and neo-liberal discourse[13]. However, patenting higher life forms (or parts of them) is a rather new phenomenon of neo-liberalism whereas the process of patenting whatever machinery or way of fabrication is a rather old phenomenon of liberal capitalism.

To sum it up: Looking at the ideological layer provides important background information instrumental in describing and understanding different processes on the legal and the concrete layer of property relationships, e.g. appropriation via patents. In the theoretical discussion of knowledge society, the artificial construction of scarcity with regard to immaterial goods is the prerequisite for commercialising them. As can be seen above, this is facilitated by the presence of the ideological background of capitalism and neo-liberalism.

4.1.2 Patenting a gene – the controversially discussed legal appropriation of knowledge

[13] Here, it can also be shown that a given discourse picks up interpretative schemes that can be found in other discourses to legitimize e.g. the appropriation of knowledge.

First, who actually are the social actors involved in the act of patenting? In this case, the social actors directly involved are the Monsanto Company and the Canadian government's CIPO. Monsanto has to apply for the patent on a given "composition of matter"[14] at the CIPO.

Second, the property object has to be identified. This question definitely is a very intricate one. In terms of the theories of knowledge societies, what Monsanto actually does is produce particular knowledge or knowledge about particular processes and procedures. Initially, they produce knowledge and its character is non-material. Without going into detail, by transferring a special gene into e.g. a canola plant, Monsanto has developed the recipe to make canola resistant to their Roundup brand herbicide[15]. This technology allows farmers who grow e.g. Roundup Ready® canola to spray it with the Roundup herbicide. The herbicide will kill all weeds but it will not harm the crop (compare Figure 4-1 and 4-2 on page 46). So, what Monsanto actually wants to appropriate by the process of patenting is the immaterial know-how or recipe for the entire procedure of genetically modifying a crop, in this case canola. Empirically, this knowledge is bundled and symbolised by the particular gene that codes for herbicide resistance. For that reason, the patent aims at appropriating the gene that codes for glyphosate-resistance and symbolises the whole technological procedure of genetically altering crops – in short, the property object is the herbicide resistant gene.
The patent on "Glyphosate-Resistant Plant" (Canadian Patent No. 1,313,830) was granted in 1993 and will expire in 2010 (Supreme Court of Canada 2004: 8). In 2004, eleven years after the patent was granted, the Canadian Supreme Court confirmed the scope and validity of that patent in the "Monsanto Canada Inc. v. Schmeiser" case[16]. Without going into detail, this case also clarifies that there are numerous social actors involved in the construction of property relationships via patents. Take, for example, the authority of the state that is needed to protect and enforce the legal rights resulting from a patent.

[14] As can be seen in the Canadian Patent Law, patents cover various kinds of inventions that are referred to as 'process', 'machine', 'manufacture' or 'composition of matter' (Department of Justice Canada 1985).
[15] The agrobacterium tumefaciens has the ability to transfer genetic traits into plants. Monsanto uses that agrobacterium to carry the gene that codes for glyphosate-resistance into the plant's genome. Now any cell of that plant will be resistant to glyphosate. Another example would be transgenic corn, so called Bt-corn. Here, the plant is genetically modified in such a way as to produce its own pesticide and protect the plant from insect pests. Monsanto took the gene that codes for the production of a specific toxin from the Bacillus thuringiensis (Bt) and transferred it into the plant's genome. Now any cell in that Bt-corn produces the Bt-toxin and the plant protects itself e.g. from the European Corn Borer (compare Irmer/Siedel 2005, Glick/Pasternak 1995).
[16] The "Monsanto Canada Inc. v. Schmeiser" case appears quite often in the empirical material. In short, Mr Schmeiser (a farmer) was accused of infringing Monsanto's patent on "Glyphosate-Resistant Plant". Although there are a lot of different interpretations of the case, what may be inferred is that Schmeiser knowingly grew Monsanto's herbicide resistant canola without paying licence fees.

After the Supreme Court's decision in the "Harvard College v. Canada (Commissioner of Patents)" case in 2002, the decision of the Schmeiser case rather came as a surprise. In the "Harvard College v. Canada" case, Harvard College tried to patent a transgenic animal, the so called Onco-Mouse[17]. In this case, the question was whether or not higher life forms are a patentable "composition of matter" within the context of the Canadian Patent Act. In a very close 5:4 decision, the Supreme Court judges ruled that a plant or an animal just does not fit into something that could be patented (compare Supreme Court of Canada 2002).
Two years later, in the Schmeiser case, the Harvard mouse decision was held up and flipped around simultaneously in a narrow 5:4 judgement. The majority of the judges ruled that a gene that codes for glyphosate resistance is not a higher life form and for that reason (according to the Harvard mouse case) can be patented. In contrast, the minority of the judges argued that it does not make sense to distinguish between the gene on the one hand and a higher life form (e.g. a plant) on the other hand because each single cell of that plant has in it the particular gene. In other words, patenting the gene is an indirect patent on the whole plant which cannot be patented according to the Harvard mouse case. Mr Thompson (a lawyer in Saskatoon) puts it like this: "This one is a patent on a gene so theoretically every organism that would have the gene in it would be one that potentially could be subject to the patent" (Thompson 2007: 2). From his point of view, this goes far beyond providing protection to patent holders. The examination of these cases respectively the issues they deal with and their narrow decisions reveal that the legal construction of property relationships via patents referring to higher life forms (or parts of higher life forms) like seed is far from being definite or final. It rather seems to be an intricate and ambiguous undertaking which hovers around the question of the patentability (and appropriation) of higher life forms (or parts of them) in general and has not come to an end yet.

Third, what is the scope of the patent? What does Monsanto gain by patenting the herbicide resistant gene? By approving the patent, the CIPO ascribes to Monsanto temporarily limited and exclusive (monopolistic) rights attached to the gene for a clearly defined number of years. From these legal rights, e.g. economic rights like monopolistic commercialisation can be derived. Within the scope of this thesis, one specific right is of major importance: Monsanto's monopoly empowers the company to construct and define particular property relationships between itself and other social actors like farmers, plant breeders, seed companies and so on.

[17] Here, "(…) a cancer-promoting gene ("oncogene") is injected into fertilized mouse eggs as close as possible to the one-cell stage" (Supreme Court of Canada 2002). For that reason, the mouse is called Onco-Mouse.

In terms of Berger and Luckmann, they are entitled to create their own legal reality and property regime referring to that gene. By patenting the gene, they have not only patented the gene itself but also have appropriated the right to establish a property regime defining the terms and conditions of 'how to use' the herbicide-resistant gene for other social actors (compare Roberts 2007: 10), e.g. via the Technology Use Agreement (TUA)[18]. Farmers willing to use the Roundup system have to sign the TUA (vgl. Monsanto 2006a)[19].
What is more, Monsanto's patent on the herbicide resistant gene features another peculiarity: According to Monsanto representative Ms Roberts and Mr Thompson, Monsanto has no formal legal responsibility whatsoever for its herbicide resistant gene. "There are no legal liabilities that are attached to Monsanto's property rights" (Roberts 2007: 12). However, the wording of the TUA shows that there must be some kind of moral obligation or pressure from the side of the public felt by Monsanto which is passed on the farmers. For instance, farmers have to take their harvest to elevators (compare Figure 4-7 on page 49) from where they are shipped to markets where the GM variety is accepted. And they are obliged to employ farming practices that make sure insects will not develop resistance against e.g. Bt-varieties (compare Monsanto 2006a). The suspicion of some sort of moral obligation or pressure felt on the side of Monsanto hardens against the background of the present discourse about property-related responsibilities that come with patent ownership.

What is true of the patentability of higher life forms, also goes for the question of formal property-related responsibility on the side of the patent holder in that it is ambiguous, too. At a first glance and on a legal basis, this issue seems to be clear. Yet, at the same time, the same issue is discussed in a highly controversial manner. In other words, although the decision of the Schmeiser case was the narrowest one can think of, jurisdiction has made it clear that Monsanto's patent is valid and that the company is the owner of the herbicide-resistant gene. But in contrast to other property objects, there are no or only very few property-related responsibilities on the side of patent holders, e.g. in the case of contamination. This phenomenon is picked out as a central theme within the legal discourse about the construction of property relations via patents. It is evaluated as a legal disequilibrium which has to be balanced (De Beer 2007a, De Beer 2007b, Glenn 2004, Müller 2006, Phillipson 2005).

[18] The TUA is a contract defining the terms and conditions of how to use Monsanto's technology.
[19] The term Roundup system refers to a farming practice in which farmers make use of the whole Roundup-package: They sign the TUA, buy seed that has in it the herbicide-resistant gene and buy the Roundup brand herbicide. There usually are two to three applications of Roundup: The first application is usually done a short time before seeding to "burn off" the weeds, the second and the third application are done during the growing season to kill those weeds that have survived the burn-off or have germinated after the burn-off.

Up to this point, one crucial question that is controversially discussed within the theoretical horizon of the knowledge society can be answered to some extent: "Is it possible to appropriate knowledge (defined as the result of research and development activities)?" and produce artificial scarcity regarding an immaterial good by doing so? Conceptualising this question with the analytical framework presented by Benda-Beckmann shows first results: The appropriation of knowledge (as symbolised by the gene) via patents can be seen as a specific kind of constructing property relationships and, as shown above, it is possible to appropriate knowledge in the form of a particular set of rights (the patent) that is attached to that knowledge. What Monsanto actually appropriates are temporary and monopolist rights of commercialising the patented knowledge which empower the company to construct and define particular property relationships between itself and other social actors like farmers, plant breeders, seed companies and so on. However, the examination of the Schmeiser and the Harvard mouse case has shown that the practice of appropriating knowledge via patents has the blessings of the legal system just at the moment, but is highly controversial and leads to a legal disequilibrium which is perceived as being illegitimate by different scholars (and farmers). For that reason, it can be assumed that even minor changes on the ideological or concrete layer of property relationships are enough to provoke major changes in the legal act of patenting knowledge like a gene that codes for herbicide-resistance. Here, it is possible to observe what Gorz, DeLong and Froomkin put up in theoretical terms about the construction of artificial scarcity and its importance in knowledge economy. Moreover, Gorz seems to be right in the assumption that the construction and stabilisation of artificial scarcity is unstable (Gorz 2004: 66) – at least as far as the legal discourse on the privatisation of immaterial goods like Monsanto's technology is concerned.

Now that the ideological and legal dimensions of patenting knowledge have been discussed, the focus will switch to the concrete layer of property relationships. What Benda-Beckmann puts up for discussion is that one should not conclude prematurely that the third layer is directly derived from the second (legal) or the first (ideological) one. To answer the question of whether or not the appropriated knowledge can be commercialised on the third layer, too, one has to inquire into what social actors actually do with the knowledge respectively the herbicide-resistant gene on the third layer and if their actual behaviour is not in contrast to the behaviour as expected or dictated by the law .

This question will be dealt with by analysing the process of commercialising the knowledge on the concrete layer.

4.1.3 Commercialising a herbicide-resistant gene – IPR in practice

In the following, the construction of property rights at the concrete layer will be inquired into. First, the discoursive practice of signing the TUA will be dealt with. The examination of this practice is done within a framework that is accompanied by theoretical considerations dealing with the intricacies that arise in the attempt of commercialising an immaterial good. Later, various discoursive practices that aim at making congruent the legal terms and conditions that accompany the use of Monsanto's technology as outlined in the TUA and farmers' everyday life and dealing with seed will be discussed.

4.1.3.1 How can an immaterial good be turned into a marketable commodity?

Monsanto's entrepreneurial success of commercialising its technology depends on a multiple set of factors. First, as mentioned in the discussion about knowledge society, knowledge in general is a good – in contrast to other goods – that is available to anybody for free. For this reason and from a company's perspective, profitable commercialisation of a non-material good like knowledge seems to be a hopeless business venture – unless companies find a way to artificially create scarcity, in this case by bundling their knowledge in the form of a herbicide-resistant gene and incorporating the gene into a material commodity like seed.
Second, the technology per se or a single gene that codes for herbicide resistance is not attractive to farmers at all – unless it is contained in seed. "We can't market this technology in test-tubes. It would offer no value in a test tube. But it does offer value when delivered to farmers in seed" (Roberts 2007: 2). For that reason, farmers will only demand the technology if it is incorporated in, for example, the genome of canola and materialises in canola seed that will grow up to Roundup resistant canola plants. Given this perspective, it can be understood that, to Monsanto, seed is of overall importance. "Seed for us is the carrier for our technology. The technology is useless unless it is inside the seed" (Roberts 2007: 10). To put it in simple terms: Commercialising the gene has to start with giving it the form of a marketable commodity. And this is accomplished by incorporating the herbicide-resistant gene for example in the genome of canola which in turn is inside every single grain of canola seed.

However, incorporating the technology into seed causes various intricacies and unwanted effects for its commercialisation. Seed is a living organism that can reproduce itself for free and by doing so, the technology in it is reproduced for free, too. Furthermore, canola is an open-pollinating crop. Open pollination means that pollination is carried out by e.g. insects or the wind. In other words, how can the plants' reproduction be controlled? The herbicide-resistant gene just refuses to stay put in the plant and the field where it has been seeded. In principle, the technology that Monsanto is out to market can spread around unhampered – and for free. Moreover, the traditional practice of farmers of saving and exchanging seed among them is as well contradictory to Monsanto's goal of commercialising the technology. In other words, implanting the gene into the seed is a requirement for making it a marketable commodity, but by doing so it becomes a non-marketable commodity at the same time. The following analysis is devoted to a sophisticated contract Monsanto has developed to get a grip on these intricacies and unwanted effects: The TUA (compare Kershen 2004: 577).

4.1.3.2 The discoursive practice of signing the TUA

Before examining the actual TUA, there are some aspects that need clarification, first.
With Benda-Beckmann, commercialising a commodity can in general be described as transferring both a property object and a set of rights and obligations attached to it between social actors. Commercialisation is a special kind of constructing property relationships. For that reason, the first question has to be: "What social units are directly involved in commercialising the herbicide-resistant gene?" During the field study conducted in Saskatchewan in 2007, three different types of social actors who are directly involved in commercialising the herbicide-resistant gene were identified: First, there is the Monsanto Company which (according to Roberts 2007) provides services, seed (i.e. seed including e.g. Monsanto's Roundup technology) and chemicals to farmers. Second, there are several seed companies and Monsanto's own seed brand DEKALB. Monsanto does not directly sell its technology to farmers but has a broad licensing strategy and retail network. Monsanto licenses its knowledge (the technology) out to these seed companies. The seed companies breed the herbicide-resistant gene into locally adapted varieties and sell it to the farmers. Third, there are those farmers who (for whatever reason) opt for the genetically modified seed. The seed companies serve as some kind of middlemen between Monsanto and the farmers. For Monsanto, they have an important function in commercialising the herbicide-

resistant gene and in legitimizing the property relationships between Monsanto and the farmers.

Before GM farmers like Mr Wheeler or Mr Scott can actually grow a herbicide-resistant canola crop, they have to go through different bureaucratic procedures. First, all farmers who want to purchase canola seed containing Monsanto's technology have to attend a special seminar, a so-called grower meeting[20]. "They just tell you about the rights and rules and what supposed to do and one of that thing is they have the right to enter your land at any time – basically I think – and check your stuff and so" (Mr Scott 2007: 4). Once a farmer has accepted these conditions, he will get a so-called 'grower number' or 'tech-number'. The tech-number is similar to a customer number. It enables the farmer to purchase seed containing Monsanto's technology at the local seed dealer. Mr Becker (who works for a seed company in the area of Saskatoon) points out that he is not allowed to sell seed containing Monsanto's technology to farmers who do not have such a grower number. If a farmer cannot submit his grower number, Mr Becker has to call Monsanto, give them the farmer's name and ask for his tech-number. What is more: Before the farmer, who has been identified with a tech-number, can leave the seed dealer with a truckload of seed, he has to sign the TUA.
The TUA is a contract in which the terms and conditions of how to use Monsanto's technology are laid down. These terms and conditions are similar to those stated in the grower meetings. To give a few examples: Farmers are not allowed to save seed and re-grow next year or to hand seed over to other farmers (Monsanto 2006a). There are different data Mr Becker has to fill into the TUA form: Farmer's name, farm's name, grower number, amount of seed purchased, number of acres the farmer wants to grow with this seed, geographic location of the land he wants to grow canola on. After that, the farmer has to sign the TUA and has to pay for the seed and the 'technology fee'. The technology fee is 15$/acre and can be described as a lending or access fee (with Gorz and with regard to his postulate of the crisis of the exchange value, it can be argued that this price is arbitrary or a fantasy price). In addition, the farmer has to pay about 3 to 6$/acre (depending on the variety) just for the seed itself containing the Roundup technology and the Roundup herbicide[21]. What the farmer actually purchases are temporary rights of use attached to the gene (compare Black 2007). In

[20] In Saskatchewan, farmers are often referred to as growers. Both terms are interchangeable.
[21] The TUA does not stipulate that farmers must by the Roundup brand herbicide. Farmers can also purchase the Roundup resistant seed a spray the crop with a generic glyphosate. What the contract stipulates is that Monsanto will only guarantee and back the performance of their immaterial good if Roundup brand herbicides are used.

other words: Monsanto rents out the technology and collects lending fees in return. Below, some exemplary paragraphs taken from a TUA (Monsanto 2006a) are listed[22].

After agreeing to and signing the TUA that the farmer is allowed to make use of Monsanto's technology. Mr Becker will send all TUAs to Monsanto where all data will be fed to Monsanto's data base. What follows is a selection of what the farmer has signed.

- "This Monsanto Technology/Stewardship Agreement grants Grower a limited licence to use (…) Roundup Ready® Canola".
- "Growers receive from Monsanto Company: A limited use licence to purchase and plant seed containing Monsanto Technologies ("Seed") (…). Monsanto retains ownership over the Monsanto Technologies including the genes (for example the Roundup Ready gene) and the gene technologies. Growers receive the right to use the Monsanto Technologies subject to the conditions specified in this agreement (…)".
- "Grower agrees: To use Seed containing Monsanto Technologies solely for planting a single commercial crop. Not to save any crop produced from Seed for planting and not to supply Seed produced from Seed to anyone for planting other than to a Monsanto licensed seed company. (…)Not to transfer any Seed containing patented Monsanto Technologies to any other person or entity for planting. (…) To allow Monsanto to examine and copy any records and receipts that could be relevant to Grower's performance of this Agreement".
- "Monsanto Remedies: If Grower is found by any court to have infringed one or more of the U.S. patents listed below, Grower agrees that Monsanto will be entitled to a permanent injunction enjoining Grower from making, using, selling, or offering for sale Seed and patent infringement damages to the full extent authorized by 35 U.S.C. § 271 et.seq.. Grower will also be liable for all breach of contract damages. If Grower is found by any court to have infringed one or more of the U.S. patents listed below or otherwise to have breached this agreement, Grower agrees to pay Monsanto and the licensed Monsanto Technology provider(s) their attorneys' fees and costs."
- "Grower's Exclusive Limited Remedy: THE EXCLUSIVE REMEDY OF THE GROWER AND THE LIMIT OF THE LIABILITY OF MONSANTO OR ANY SELLER FOR ANY AND ALL LOSSES, INJURY OR DAMAGES RESULTING FROM THE USE OR HANDLING OF SEED CONTAINING MONSANTO TECHNOLOGY (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, PRODUCT LIABILITY, STRICT LIABILITY, TORT, OR OTHERWISE) SHALL BE THE PRICE PAID BY THE GROWER FOR THE QUANTITY OF THE SEED INVOLVED OR, AT THE ELECTION OF MONSANTO OR THE SEED SELLER, THE REPLACEMENT OF THE SEED. IN NO EVENT SHALL MONSANTO OR ANY SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR PUNITIVE DAMAGES".

Reading these formulations of the TUA, it becomes apparent that the TUA is a legal tool that completely aims at handling the intricacies mentioned above by legally sterilising the seed.

[22] These paragraphs are quoted from a US-version of the TUA that is available in the internet. Mr Becker was asked if he was willing to hand over a Canadian TUA blank form but he did not like that idea. He pointed out that he was not sure about his legal obligation referring to such a request. Nor did he allow to take photographs of the commodities displayed such as different herbicides or pesticides.

However, it has been assumed that commercialising actually means the transfer of both the property object itself and a specific set of rights and obligations attached to it between social actors. Such a conceptualisation can easily be applied in the case of selling material commodities like e.g. beer or bread but it somehow fails in giving an adequate description of what actually happens in the case of Monsanto renting out their (immaterial) technology.

In the case of renting out material commodities like cars or houses, the actual property objects are rights of use which are symbolised by the material object. However, the renter can be sure that the hirer does not use the car or house after the leasing contract has ended. This is so because they are material, visible, touchable etc. commodities. Furthermore, it is impossible to make an illegal copy of a rented car or house.

It is different with renting out immaterial goods like music, software, movies or technology incorporated in seed. Here, the renter cannot be sure that the hirer actually will not use the immaterial good after the leasing contract has ended. The hirer can easily make a copy of music or movies and use it for free after the end of the leasing contract. Since there is no competition and scarcity with immaterial goods and due to the fact that these goods are not used up by making copies of them, the renter will never know if the hirer will stop or has stopped using the non-material good after the end of the leasing contract.

But how about farmers growing canola? Against the background of the above considerations, it can be argued that the TUA and its enforcement is Monsanto's main strategy in constructing property relationships between farmers and itself. In terms of the artificial construction of scarcity the TUA can be seen as a tool by which the farmers commit themselves to support this construction. In other words: The TUA creates scarcity by obliging farmers not to make use of the seed's nature to reproduce itself.

Seed is a living organism. It is the nature of seed (or any other living organism) to reproduce itself. And it is the farmer's job to provide conditions that allow the seed to multiply as effectively as possible – the greater the harvest, the better. In the case of seed containing Monsanto's technology, growing that seed without paying licence fees is called "piracy" (as long as the patent is valid). Due to the fact that the practice of saving seed is opposed to Monsanto's goal of commercialisation their technology, the TUA can be seen as a leasing contract that tries to legally sterilise the seed and artificially reduce the availability of the

technology[23]. According to Gorz (ibid: 51) the farmer is not the owner but the "user" of the technology that is incorporated in the seed.

In terms of discourse analysis, the interpretative frame that leads to the legal construction of property relationships via the TUA could be described as "Seed is a private property" (insofar as it picks up the property qualities of the gene and cannot be separated from it). Against the ideological background presented above, this interpretative frame makes perfect sense. Ms Robert (2007a) points out that the purpose of the TUA is to protect Monsanto's 'property'. It is designed to prevent farmers from 'stealing' Monsanto's technology[24].

According to Benda-Beckmann, it is an empirical question whether or not farmers will stick to the rules outlined by the TUA. In that context, the practice of signing the TUA may serve yet another purpose apart from constituting legal property relationships. Here, similarities to religious practises such as adult baptism may be seen with Monsanto representing some sort of religious institution employing a soteriology in which farmers will find salvation from e.g. low yields, pests, weeds and a backward image. From this perspective, the entire practice of signing the TUA could be compared to Christian baptism in which farmers become disciples in the Monsanto parish. As will be seen further down, Monsanto employs a tale of salvation (story line) in which farmers will find redemption when obeying Monsanto's "Ten Commandments" but find themselves in the legal purgatory should they dare and deviate from them.

4.1.3.3 Discoursive practices implementing and enforcing the TUA – or: How to socialise farmers?

[23] There is also a technology at hand that would allow the biological sterilisation of the seed, the sterile seed technology. Opponents to this technology also call it "terminator technology". It can be described as a functional equivalent to the TUA. In short, a seed that has the 'terminator gene' introduced into its genome will only germinate once and it does so in the first generation. The offspring of that crop is nonviable and will not germinate. However, the sterile seed technology is not applied due to broad and heavy public opposition to it. Another possibility of quasi-sterilisation can be seen in hybrid varieties. Hybrids are high-yielding varieties in the first generation, but yields of the following generations drop significantly. Given such conditions, saving seed does not make (economic) sense. (Burns 2007: 4).

[24] Unfortunately, the personal communication with Ms Roberts is only at hand in form of a log written after the phone call. For that reason, the classic steps of sequence analysis cannot be made, here. However, the use of terms like 'Monsanto's property' and 'stealing' suggests that the interpretative frame that is at work here is based on the belief and the conviction that "Seed is a private property". As will be seen later, there are more practices that can be assigned to that frame.

In terms of Berger and Luckmann, what Monsanto tries to create and implement is a new set of knowledge that aims at regulating farmers' handling of seed in a new way. Traditional interpretative frames and schemes have told and still tell farmers how to handle seed in everyday life. These frames have developed and have perpetuated themselves by everyday routines like the practices of saving and exchanging seed as a collectively owned good. As discussed earlier, interpretative frames are collectively available instructions on how to react to a given problem; they fill the gap between interpretation and action. For instance, the problem of "How can I grow canola again next year?" is answered by "Save some of this year's canola harvest" or "Exchange barley for canola with your neighbour".

In contrast, according to the interpretative scheme promoted by Monsanto, seed is a private good. Here, the answer to the problem stated above is: "Go to your local seed dealer and purchase new seed and the rights of use attached to it".

By signing the TUA, farmers, in a first step, accept the new interpretative frame on a legal basis (at least on paper). To make absolutely sure farmers will not only sign the TUA but actually act in accordance with it, it is assumed that Monsanto tries to replace the traditional by their own interpretative frame.

However, it sure is not an easy job to substitute a traditional interpretative frame defining property relations on seed by a new one that curtails farmers' traditional rights on seed. How can such a change be accomplished? This question will be dealt with next. In short, there is a whole range of discoursive practices that can be interpreted as aiming at making farmers accept and internalize Monsanto's interpretative frame. Monsanto employs two different kinds of discoursive practices. Just as in religious belief systems and narratives, there are discoursive practices that are more or less related to the 'carrot' or the 'stick', to salvation and purgatory respectively.

The discussion of these discoursive practices will close with the examination of Monsanto's tale of salvation (story line) in which the discoursive practices are connected and related to each other in a meaningful way. This tale of salvation has to be so powerful and convincing that farmers will even accept their traditional rights on seeds being curtailed.

4.1.3.3.1 The auditing program

The official Monsanto practice is called "auditing program" or "field check program" and aims at monitoring (showing the 'stick' to) Monsanto's paying customers (disciples). By signing the TUA, farmers agree to accept this kind of monitoring. Ms Roberts describes the auditing program as follows:

> "We do random field checks on customers every summer and the field check program is well advertised so people know when the checks are being done in their community. Those customers who are randomly selected for a field check are called in advance and an appointment is scheduled at their convenience" (Roberts 2007a).
> "We are very public and very clear about our goal to ensure compliance (ie… we want growers and paying customers to understand that we will not tolerate growers who steal our technology) and so yes, we provide information to growers and our retail network about our program and part of that information includes information about how to report any suspected violation. As I noted earlier, we have always been transparent and openly communicated the rules of using our technology and the ramifications a grower could face should he choose to violate those rules or infringe on our patent" (Roberts 2007b).

To continue in the religious terminology, the discoursive practice of the auditing program can be compared to an itinerant preacher travelling from farm to farm and shriving growers by controlling their fields and relevant documents. The function of this practice is to remind farmers of the "Ten Commandments" as stated in the TUA. The sense and meaning transported by this practice is the new interpretative scheme "Seed is a private property". Furthermore, this practice demonstrates to farmers that the TUA is not just a harmless paper tiger but that Monsanto is well prepared to enforce it. In Orwell's words, farmers are shown that "Monsanto is watching them".

In short, it can be claimed that the auditing program aims at discouraging farmers from violating the conditions as laid out in the TUA. It is Monsanto's main (scare-) tactics and strategy to make the TUA and its property construction work in everyday life. As will be seen, the communicative circulation of different versions of the 'Schmeiser-myth' is also highly instrumental in holding up the legal property construction of the TUA in farmers' everyday life. Empirically, there are so many different tales entwined around the "Monsanto Canada Inc. v. Schmeiser" case (Supreme Court of Canada 2004) that the whole case can be referred to as a myth. There even is a play titled "The Seed Saver". It is about farmer Joe and his wife Mindy and their struggles with Monolith, a multinational chemical and seed company, caused by contamination (compare Koller 2007). In terms of discourse analysis, the version that is employed by Monsanto can be seen as the counter tale to its tale of salvation. It serves as an example that shows farmers quite plainly what they will have to face should they

not comply with Monsanto's legal property construct or the patent law but decide to offend it – namely "legal purgatory".

4.1.3.3.2 The retail-network

As seen above, it is relatively easy to control farmers who have signed the TUA via the auditing program. But what about all other farmers like Schmeiser who have never signed a TUA? How to make sure that these farmers do not use Monsanto's technology? Here, the unofficial practices of controlling farmers' everyday use of seed come into play.

As Ms Roberts points out, one of them can be seen in Monsanto's retail-network.

> "Farmers or others in the community rarely feel bad about reporting a cheater or someone who is doing something illegally. When you see someone shop lifting and report it, do you feel bad? If someone robs a bank and you witness it, do you feel bad about giving evidence against that person? (…) Monsanto people live and work in rural communities across Canada and are active members of that community so people know who they are and where they live and how to get hold of them" (Roberts 2007a).

In addition, farmers can dial the Customer Care toll free number and anonymously report a suspected farmer. Here Monsanto creates the image of fair farmers who want Monsanto to take care of a "level playing field" (Roberts 2007: 4) and who are willing to report neighbours that cheat. Furthermore, using the technology without paying licence fees is compared to crimes like shop lifting and bank robbery. The strategy behind that practice can be seen in giving farmers a guideline on how to behave if someone does not follow the legal property construction via the patent or contract law. Furthermore, Monsanto tries to free them of any qualms. By creating a positive image of fair farmers and by comparing infringement (using the technology without paying licence) to robbery, Monsanto tries to promote a state of mind that makes it easier for farmers to report a neighbour's misbehaviour. And thanks to the fact that there are Monsanto disciples in practically every community, snitching gets uncomplicated and reporting on somebody is made an easy thing.

4.1.3.3.3 The non-availability of the seed treatment

Another practice or fact of influencing farmers' everyday dealings with seed can be seen in the fact that seed treatment against the flea beetle disease with canola seed (e.g. Helix®) is

Figure 4-1: Canola field near Pike Lake National Park.

Figure 4-2: A clean acre, there are no weeds.

Figure 4-3: A test-plot of Monsanto's home brand DEKALB.

Figure 4-4: A test-plot of Monsanto's home brand DEKALB.

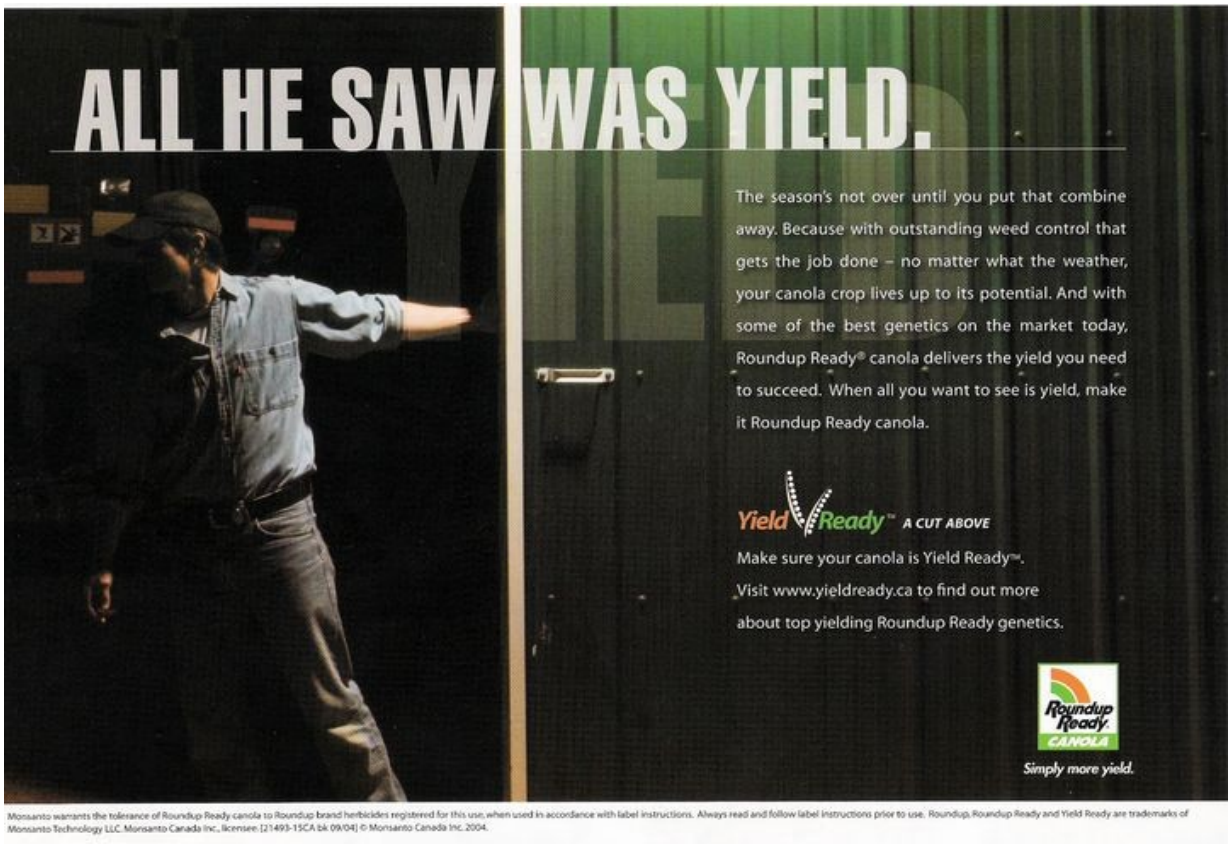

Figure 4-5: Advertising salvation from low yields (Canola Council 2004).

Figure 4-6: Advertising salvation from low yields (Canola Council 2004).

Figure 4-7: Elevators dominate the Saskatchewan landscape.

Figure 4-8: Seeding canola with an airseeder.

not freely available for just any farmer in the market. “Farmers can’t buy the seed treatment to treat his own seed, so now, it has to be custom done” (Scott 2007: 2). As Mr Wheeler and Mr Scott point out, there is no sense in saving seed legally or illegally (called “brown-bagging”) as long as the seed treatment is not available. Mr Scott was asked if any brown-bagging was going on:

> “Not anymore. They eliminated that with not being able to buy seed treatment (…). Now you have to buy their seed. For example, some guys wanted the same treatment for their yellow mustard – and there is no TUA or anything on it, you can use your own seed – you can’t buy the chemical to do it … the treatment” (Scott 2007: 2).

What can be inferred from this wording is that there actually was some degree of brown-bagging in the past. For that reason, it can be assumed that the circulation of the narrative of the Schmeiser-case in some way has been helpful in socialising and educating farmers. As Prof. Adams points out, the Schmeiser-case discourages farmers from brown-bagging (Adams 2007: 10).

> Farmers like Schmeiser who save seed give their seed away to get it “(…) treated in order to give you sufficient protection against the flea beetle and seedling diseases. And there are only a limited … the number who have the ability to treat their seed on farm now. That means you have to take it to a seed processor to get it treated. You expose yourself when you do that because the seed treater will take a sample of seed before he treats and after he treats for his own protection” (ibid 2007: 11).

In the Schmeiser-case, Monsanto asked the seed treater to hand over part of the sample he had taken before treating Schmeiser’s seed. Monsanto analysed that sample and Schmeiser was found guilty of brown-bagging. “They really nailed him on that one” (ibid 2007: 11). Following Berger and Luckmann, it can be argued that that part of the Schmeiser-case has become part of farmers’ everyday knowledge and that they have stopped brown-bagging for fear that something similar might just as well happen to them.

From the perspective of theories of knowledge society, the strategy that is behind the discoursive practice of not making the treatment available to farmers can be seen in depriving the non-material good of its material prerequisite. From a farmer’s perspective, it is even easier and cheaper and more secure not to brown-bag but to purchase new seed (that has already been treated) every year.

4.1.3.3.4 Creating commitment on the farmers' side – or: How to be perceived as a fair company?

On the other hand, it is quite evident that Monsanto tries to create commitment ('carrot') on the farmers' side to legitimize their legal property construction and its consequences. In the following, some of these discoursive practices will be presented.

Reading the log of the conversation with Ms Roberts and her emails, the first thing that comes to mind is that Monsanto presents itself (like its paying customers) as a fair and reliable partner[25]. That becomes clear in the choice of words and phrases like "The choice is completely in the grower's hand" (Robert 2007: 2), "…ensure level playing field…" (ibid: 5) or in the statement that Monsanto is not opposed to the system of intensive checks a new product has to go through before it can be marketed. The argumentation runs like this: These checks make sure that Monsanto has developed and will market a good and safe product (ibid: 6).

4.1.3.3.5 Sharing risks

One practice that goes hand in hand with the communicative practice of presenting themselves as a fair company can be seen in some kind of insurance Monsanto provides to farmers. Mr Scott describes the practice like this: "You buy the seed and the TUA and the Weather Max spray and if something happens to your crop until June 30, I think it is, they will give you all the money back – the seed, spray and the TUA" (Scott 2007: 7). Mr Wheeler points out that, to him, Monsanto has always been fair (ibid: 4). "One year, I got flooded out about six acres and they returned the technology fee on that portion" (Wheeler 2007: 3).

Of course, this voluntary responsibility does not only serve to create commitment but can also be seen as a marketing tool. For some farmers, this quasi-insurance is an incentive to buy Monsanto's GM seed for the sake of risk reduction[26]. Furthermore, farmers are shown and feel they actually and only pay for what they get. In other words, it is not enough to grant them the rather invisible permission to use the Roundup technology and charge them 15$/acre. From that perspective, the quasi-insurance can be seen as a tool that both aims at legitimizing the technology fee and at creating commitment. It can be argued that it is meant as a signal which

[25] In "2006 Monsanto Pledge Report: The Sum of our Commitments" (Monsanto 2006), it is obviously one of Monsanto's goals to be perceived as fair.

[26] For instance, paying 15$/acre is a high and risky investment. Buying seed for 400acres will cost a farmer 6000$ (plus the costs for the seed).

stands for a 'family-like' form of solidarity where one family member supports the other in case of need. In other words, Monsanto wants to pave the farmers' ways by making it easy for them to opt for their technology.

4.1.3.3.6 Stewardship work

Other discoursive practices of creating commitment and of legitimizing the technology are summarised under the title of "stewardship work" that Monsanto provides for their farmers. These are services growers can use for free. Mr Scott and Mr Wheeler point out that growers can, at any time, dial Monsanto's Customer Care number and consult them about their crops, the latest insect pests or how to handle a particular weed. Mr Scott was asked if he makes use of these extra services:

> "Yes, sometimes. More so when you are first time spraying is kind of funny … you are used to spray Roundup on stuff you want to kill and now you spray your crop. So, the first few times you are pretty cautious about 'should it be now or later?' or 'how much?' or … you just hope that your seed is really Clearfield seed or Roundup Ready seed that you seeded" (Scott 2007: 5).

In tricky cases Monsanto also sends a representative out to a farm to get a precise idea of a specific problem. Of course, this could also be put into the basket of discoursive practices to exercise control.

The above quotation cannot only be used to demonstrate what stewardship work means and how it is used to create a feeling of fairness and cooperativeness that in turn are supposed to create commitment. In terms of Berger and Luckmann, it also demonstrates that Monsanto's technology goes hand in hand with new farming practices that challenge farmers' traditional knowledge about how to farm. From that point of view, stewardship work can also be described as discoursive practices that educate farmers by communicating new sets of knowledge about questions like "How can I grow a herbicide resistant crop?" within the interpretative scheme that "Seed is a private property".

Over the last pages, different discoursive practices that aim at stabilising and backing up Monsanto's legal property concept at the third layer have been discussed. As seen above, the interpretative frame that goes hand in hand with these practices can be summarised as "Seed is a private property". In terms of Keller, these discoursive practices and interpretative frames are interpreted and connected to each other in a meaningful way in narratives. Furthermore,

they are symbolised by different dispositives, i.e. the specific idea underlying an interpretative scheme like "Seed is a private property" becomes manifest and symbolised in a material object one can hold in one's hands. Here, the number-one dispositif is seed. Of course, it could be argued that the form of the TUA or the grower number are dispositives, too.

4.1.3.3.7 Monsanto's tale of salvation

The narrative employed by Monsanto can be described as a tale of salvation[27]. It will be discussed next. Again, it is important to have in mind that Monsanto's tale of salvation aims at socialising farmers (that is to teach them a new interpretative frame replacing respectively complementing their old one) to make the TUA work in farmers' everyday life. This tale of salvation connects the discoursive practices discussed above in a meaningful way and is itself spread by different discoursive practices, too.

There are newsletters like "Trait Value Today", magazines like "Canola digest", all kinds of advertisement via newspaper, radio or television and various promotion activities like road trips or setting up test-plots (e.g. compare Figures 4-3 to 4-6 on page 47-48) by the roadside. Monsanto's "Pledge Report" (Monsanto 2006b) does not only address farmers, but also the public in general.

The public is also addressed via organisations like "CropLife Canada" that can be described as advocates of the biotech industry[28].

By purchasing Monsanto's technology and following the 'rules of the game' – that is accepting Monsanto's property regime – farmers will find salvation from poor yields, insect pests, bad weed control, inefficient farming practices and an image of being backward. Consequently and according to Ms Roberts (ibid 2007: 3), Monsanto's technology makes it

[27] For a better understanding of what the term "tale of salvation" actually aims at, please have a look at "For a better America" (Monsanto 2005), Annex 3. It is a short video clip of a Monsanto advertisement that lends itself for exemplifying what is actually meant with the term of 'tale of salvation'.

[28] "So, they're an advocate of, um, Monsanto and Dow and all of the multi-nationals and things like that. So yeah, I wouldn't – no, they're not neutral. They are, uh... They're a medium for all of our companies to, uh... try and get a good word out without having already the names of these companies behind them. You know, because when Monsanto says "we're good", nobody wants to listen, but if somebody like Crop Life says, you know, what they're doing is good, then maybe more people might listen" (Ericson 2007: 22). Mr Ericson works for a well known chemical and biotech company and has his own farm. However, he emphasises the point that he cannot make statements about the company he works for. He was interviewed as a grower and not as a company's representative.

possible for farmers to sneak out of the agricultural cost-squeeze[29]: They can pay their bills and feed their families thanks to higher yields and better farming practices.

Following the headlines of Monsanto's 2006 Pledge Report, the public, even the world population will find salvation from present plagues like scarcity of food, fossil fuels, environmental pollution or unhealthy food. "At Monsanto, we strive to develop, manufacture and deliver products that provide societal, environmental, and economic value" (Monsanto 2006b: 22). Of course, these tales can also be interpreted as another discoursive practice that aims at legitimizing Monsanto's property concept. It must be mentioned, however, that there are also critical voices who question the benefits of transgenic crops. Dr. Charles Benbrook, for instance, points out that there is empirical evidence showing that transgenic crops have not significantly reduced pesticide use or increased yields (Benbrook 2002).

Again, within the scope of this thesis, it is important to always have in mind that these discoursive practices of communicating technological salvation via transgenic crops are seen as a strategy that aims at legitimising Monsanto's legal property construct, the TUA. In terms of Berger and Luckmann, these tales of salvation are part of the communicative practices in which social actors negotiate the question of what the social reality referring the dealings with seed should be like. The tales presented above definitely aim at establishing Monsanto's interpretative scheme of "Seed is a private property".

It will be shown that there are other social actors that employ similar tales of salvation. However, these actors argue that their tale of salvation will only materialize if seed stays in the public domain. Their interpretative frame is "Seed is a collectively owned good".

4.1.3.4 Monsanto's property regime – a short résumé

The starting point of the last chapters has been that there are two competing discourses or constructions of reality referring to the question "Is seed a private or a public good?"

It has been shown that and how the appropriation (conceptualised as a specific form of constructing property relationships) of knowledge via patents can be achieved and what requirements must be met to make knowledge a marketable commodity. However, by

[29] The term cost-squeeze describes the process in which farmers are faced with ever-increasing costs for input-factors like seed, fuel, fertilizer, herbicides, pesticides and so forth per acre, whereas, at the same time, farm-gate prices stay the same or even go down. Small wonder the margins per acre are on a downward slope. Consequently, farm sizes become bigger and bigger and the demand for technologies that allow farmers to acquire more and more land in the same time is on the rise. Mr Wheeler speaks of a never-ending treadmill and Mr Thompson points out that "(…) you almost have to be a genius to be a farmer to find a way within that thin margin to make a living" (Thompson 2007: 7).

incorporating the immaterial good of knowledge into a living organism that reproduces itself for free, Monsanto is forced to construct a very intricate frame of various discoursive practices which aim at stabilising Monsanto's property regime concerning seed by creating an atmosphere of deterrence and fear on the one hand and fairness, commitment and legitimacy on the other hand. These discoursive practices are linked in a meaningful way in Monsanto's so-called salvation tale directed at different and specific addressees. Of course, the spreading of that tale of salvation is a discoursive practice, too.

In short, by applying Benda-Beckmann's concept of property relationships, it becomes apparent that commercialising an immaterial commodity which is incorporated into seed is a very complex undertaking. So far, in can be seen that Monsanto practices what Gorz, DeLong and Froomkin perceive as the only possible way of commercialising immaterial goods. The company itself uses the means of scarcity in a well considered and sophisticated way and could be called a "paragon of knowledge economy" (this might disappoint those who hoped for a crisis of capitalism caused by the crisis of the exchange value).

Up to now, Monsanto's effort in constructing a new form of "property reality" concerning seed has been presented and analysed. However, referring to Benda-Beckmann, there are at least two social actors that are involved in the construction of property relationships. Here, the second set of social actors apart from Monsanto are GM farmers respectively Monsanto's paying customers. It depends on them whether or not they accept Monsanto's property concept in everyday life. In other words, analysing what GM farmers actually do will shed a light on whether or not Monsanto's efforts of making congruent the legal conditions of the TUA and farmers' everyday dealings with transgenic seed have been successful.

4.1.4 Implementing the TUA – the (GM-) farmers' perspective

This chapter aims at analyzing whether or not farmers (Monsanto customers and non-customers) who have or have not signed Monsanto's legal definition of property concepts as outlined in the TUA accept it in everyday life, too. Or do they deviate from Monsanto's TUA or infringe on their patent by saving seed, exchanging seed or by brown-bagging? If the answer is: "No!" the next question will be "Why do they not do it?" Is it because they really feel committed to Monsanto or are there any other reasons?

These questions will be answered by analysing the interviews with Mr Scott, Mr Wheeler and Mr Ericson.

First of all, there are two things these farmers have in common: They appreciate Monsanto's technology and the advantages (good farming practices like, for example, easy weed control) it offers them. They think that the technology "is worth it", but all the same do not like to pay the technology fee (for economic reasons). Furthermore, they do not think that the TUA is a legitimate thing as will become apparent in the following interview sequence (Scott 2007: 1).

> **For what reason do you grow a GMO variety of canola and not the conventional variety?**
> "First of all because you can use Roundup on it for weed control. All high yielding varieties are either Roundup Ready or Clearfield".
>
> **Is it just for practical reasons or are there other reasons, too?**
> "It's economic. I think with the TUA and the cheaper Roundup it's economic and it's worth it. It's good canola and it's good weed control".
>
> **You did not make that decision because of environmental reasons?**
> "No. It was economics and agronomics, I guess."
> "It's good weed control, good farming practise."
>
> **What do you think about the TUA? Do you think it is legitimate?**
> "No, not really, but it's just part of life … I don't like income tax either but … everybody has to pay his share, I guess. It's based on what in the market you pay for: Bayer … they've figured out that either you spend 20$ an acre on spray or 15$ an acre on TUA and 5$ on Roundup Ready … so …"
>
> **Do you think it is legitimate that you have to pay for seed, now?** (He thinks about that question for a long time)
> "I don't mind canola – it's not that much seed. But if it was everything – yeah, that would … if we couldn't save our own wheat seed, that would be kind of annoying! So, is it legitimate? No, I guess not."

Here, Mr Scott emphasises that the decision whether or not to grow transgenic canola is made on a basis of practical (pragmatic) and economic considerations. These aspects can also be found in Monsanto's tale of salvation (salvation from bad weed control and inefficient farming practices) whereas arguments like the protection of the environment apparently are only of minor or no importance to Mr Scott.

However, these positive aspects of the technology do not lead to a positive perception of the TUA. Mr Scott compares it with other annoying things like taxes he just accepts without liking them or thinking that they are legitimate[30].

[30] When asked why he does not stop growing canola in view of his opposition to the TUA he points out that he cannot stop growing it because it is part of his rotation system (ibid: 4). And for economic reasons (e.g. he cannot treat the seed himself), it does not make sense to grow a conventional canola variety. The bottom line is that he is forced to either grow the Roundup, a Clearfield or a Bayer variety.

> "But what choice do you have? It bothers me a bit that they have all that … it's kind of a lifetime thing … I guess they fly around and drop bombs or little balloons full of Roundup and see if it kills canola – have heard of them doing that" (Scott 2007: 4).

Here, it becomes clear that he feels at least a bit uneasy about the fact that Monsanto has all the information about him (having a grower-number is referred to as a "lifetime thing"). The statement about Monsanto flying around and controlling farmers by dropping spray-bombs can be seen as an evidence that he has internalized the message ("We are watching you and enforce our rights if necessary") behind Monsanto's discoursive practice of the auditing program ('stick').

Mr Wheeler also refers to these bombs and says that Monsanto dropped them on Schmeiser's fields. This would be clearly illegal, but within the scope of this thesis it does not matter whether or not Monsanto actually did this or that. What does matter is the fact that farmers do believe Monsanto has done something like dropping spray-bombs or at least is powerful enough to do so. These convictions and their communicative circulation directly tie in with Monsanto's discoursive practices of controlling farmers, e.g. the auditing program, and become operative in farmers' daily life – they do not save seed.

It can also be shown that Monsanto's discoursive practices of creating an atmosphere of fairness, commitment and legitimacy totally bounce off Mr Scott. When asked if the whole seed business including Monsanto, seed dealers and farmers is a fair game and if everybody plays by the rules his answer is:

> "No, it's not. They are trying to make money out of that part [the farmers] with the seed. It's more expensive than it used to be. And again, the same with the seed treating guy. I guess he would be with the seed company, I guess" (ibid: 2).
> "My biggest concern is the seed company and the chemical company together. Like they are going to go to bed together for like of better terms (…)" (ibid: 6).

For Mr Scott, accepting Monsanto's property regime is only a nasty means to one end – economic and profitable production. The only reason he uses the Roundup technology respectively the Clearfield system is because canola is part of his rotation and because the transgenic varieties are cheaper and easier to handle than conventional ones. When asked if farmers could not get together and collectively start brown-bagging he argues that since the seed treatment is not available, brown-bagging is not an option for him[31]. Moreover, he is scared that Monsanto "(…) would take us to court like Percy Schmeiser" (ibid: 6). In short, Mr Scott only reluctantly accepts Monsanto's construction of property reality. However, he

[31] "You have to treat canola – there is no sense to seed it without" (ibid: 3).

does not do so because he feels so much committed to Monsanto or wants to be fair and noble (and in so far come up to Monsanto's ideals)[32]. His main driving force is his not being able to treat the seed and the discouraging effects of the Schmeiser-case and the myth of bombs containing Roundup. From this perspective, Monsanto actually has succeeded in socialising Mr Scott. This is because they have successfully made congruent the legal conditions of the TUA and Mr Scott's everyday dealings with transgenic seed, but their discoursive strategies of creating commitment have totally failed.

Without going into detail, the same conclusion can be drawn for Mr Wheeler, too. However, when going through the logs of his interviews, it becomes clear that he rather finds himself standing between his very own thoughts and ideas, that more or less resemble Mr Scott's views and Monsanto's argumentation on the other hand.
For example, he critically argues that at one point the technological 'arms race' between farmers must come to an end. If not, they would be doomed to follow the logic of the "treadmill" for ever (Wheeler 2007: 10). Unfortunately, he does not see a way out. Although he thinks that farmers will 'cut their own throats' by doing so in the long run, he, too, makes use of technologies that allow him to survive in the treadmill (at least in the short run). For that reason, he decides to use Monsanto's technology and accepts their property regime and interpretative scheme that "Seed is a private property". However, he seems to feel sympathy with Schmeiser (ibid: 8). He points out he likes Mr Schmeiser for rebelling against Monsanto. Their technology fee is too high and he does not like them to hold so much power over the farmers (although, in the first place, he agreed to the terms and conditions of the TUA). However, he does not feel sympathy for the way Schmeiser rebels, i.e. by breaking the law.
Nevertheless, Mr Wheeler appears to have adopted parts of the gospel or slogans out of Monsanto's tale of salvation. For instance, he repeatedly mentions that Monsanto has always been fair with him (ibid: 2). Further on, the technology fee is described as being legitimate because they (Monsanto) "(…) have to recover their costs somewhat" (ibid: 3). Although he does not question the technology fee in general, he thinks that it would be nice if it was cheaper – for economic reasons.

In contrast to Mr Scott and Mr Wheeler, Mr Ericson is totally convinced of the legitimacy of Monsanto's property regime as can be illustrated by the following interview sequences:

[32] For instance, he emphasises that he does not care about his neighbours' doings. And in case he knew that they are brown-bagging, he would never report them to Monsanto (ibid: 3).

How do you feel about the TUA?
"Um... I guess if I didn't have to, you know, it would be ideal because you could save that money. But you understand the value of... the technology you are using, so there is definitely justification for paying for that technology... Just like anything. There is a saying in Canada, "you get what you pay for", so usually if you're paying something more for something you're getting something better, and I think that's the case in, in any kind of herbicide trait" (Mr Ericson: 5).

And would you say that it's, that it is a fair practice, or do you think... is it worth it?
"Yeah, I believe it is definitely worth it, because there is still conventional varieties available to farmers that you could choose to use, and, um.... and keep - you know, there's always a selection every year that's occurring based on what happens in a farmer's field so, um, if they didn't believe these companies were doing a good job of providing better genetics they could keep propagating, you know, the varieties that they did have, and that. So yeah, I believe that it's, yeah, it's a very good investment. And the amount that it saves the environment because of the reduced pesticides and herbicides that are being used, and then at the same time the amount of money that it saves the farmer because you don't have to go as many passes over your field to clean your field up, and you don't have to cultivate as often as we used to do, so it saves your land, it saves you money, it saves you time. So yeah, I think it's a very good investment" (ibid: 5).

"So they [Monsanto], yeah, they would be the ones to talk to, yeah. Well, they're, yeah, they're amazing. They're an amazing company, what they've done to - for agriculture. And the, you know, the amount of chemicals when you read - you know, like the tons and tons of chemicals that have been saved because of their traits and that. It's very interesting to … and it's too bad that more of that doesn't get out because of what that company has done for the environment, yeah, but they're always perceived as evil or, or... out to make money, ha ha, yeah" (ibid: 22).

From his point of view, of course it would be nice if he did not have to pay the technology fee. However, he does not mind paying it because he is convinced that the new traits are really better than the old ones. Due to the fact that farmers are not allowed to save (Monsanto's) seed, companies can invest a lot of money in the development of new traits. "So the genetics tend to be a lot better in a variety where the company knows that there's a return investment, you know, they can put more money into the research" (ibid: 4). In short, the TUA and Monsanto's interpretative scheme ("Seed is a private good") can be justified in his eyes because they have made and still make possible the development of better genetics.

What the second paragraph reveals is this: Not only does he accept Monsanto's construction of 'property reality' for better genetics. Actually, he really believes the tales of salvation that glorify Monsanto's property regime[33]. From his point of view, Monsanto's technology paves the way for goals (like the protection of the environment) that go far beyond the economic cost-benefit analysis as brought up by Mr Scott and Mr Wheeler. In addition, and from his

[33] It could be assumed that he is in favour of their tale of salvation because he is an agent with a well known biotech company. He sure is familiar with such practices and strategies.

choice and use of words in the third paragraph, one could even think he admires Monsanto as a benefactor and is thankful for what they have done for agriculture in general.
In the case of Mr Ericson, it can be concluded that Monsanto has been successful in totally convincing him of its property construction on seed and all its accompanying features. In contrast to Mr Scott and Mr Wheeler, the acceptance of Monsanto's property regime is exclusively based on the belief in the value and the benefit of the technology and in the admiration of Monsanto and its noble goals.

4.1.5 Implementing the TUA – concluding remarks

So there definitely are farmers that do not brown-bag and do not save seed. For that reason, Monsanto can be sure that their property construct works. Yet, the degree to which it works is another question. Nobody knows to what degree the above findings can be generalised and translated into the cases of all remaining farmers (potential free-riders). According to Ms Roberts (ibid 2007a), "(…) we typically have 98 to 99 per cent compliance with the contract from those farmers who are paying customers." Mr Scott (ibid 2007: 5) believes that the total rate of brown-bagging is around 10 per cent. There are different reasons that account for that relatively high accordance between the legal and the concrete layer of Monsanto's property construct.
First, the performance of the seed containing Monsanto's technology depends on a material product that is not available for farmers: Seed treatment. In other words, the non-availability of seed-treatment constitutes a material barrier to saving seed and brown-bagging. This finding also counts for potential free-riders. Mr Becker (a seed company agent in the Saskatoon area) reported the following case: A farmer showed up at the seed company and asked for a flea beetle pesticide to spray his canola crop[34]. Mr Becker knew the farmer and was sure that he had not signed a TUA for canola that year. He began asking him some questions about his seed and where it was from etc. The farmer reported he had had a technical problem with his harvester the summer before and there had been a huge spill-over. Much of his harvest had ended on the ground. Consequently, the farmer wanted to grow a new canola crop from that spill-over the following year. However, since the spill-over had in it Monsanto's technology, Mr Becker's legal obligation would have been to report the farmer

[34] It is possible to seed untreated canola seed and spray it against flea beetles (compare Figure 4-8 on page 49). However, this practice is not very practical since flea beetle plagues farmers during seeding time and farmers do not have the time to do the spraying then. Furthermore, spraying is pretty expensive.

to Monsanto. But instead of reporting the farmer, Mr Becker and the farmer made their own deal. Mr Becker would not report him and, in return, the farmer agreed to destroy his crop on the basis that it was illegal. This example illuminates another function of Monsanto's retail network and that Monsanto's net for protecting their property is very fine[35]. For that reason, the low rate of brown-bagging can partly be explained by the non-availability of specific seed treatment. And it can be assumed that this goes both for Monsanto's paying customers and all other farmers.

Second, Mr Scott and Mr Wheeler are scared-off from saving and brown-bagging seed for economic reasons, by the Schmeiser-case in general and specifically by the myth of Monsanto flying around and dropping bombs containing Roundup in order to control farmers ('stick'). Again, in terms of generalising, the finding of a low rate of brown-bagging and the fact that the Schmeiser-case (in some form or another) has become part of everyday knowledge of Saskatchewan farmers, it can be assumed that it has a discouraging and deterring effect on farmers in general.

Third, Mr Ericson not only fully agrees with Monsanto's property regime and definition of 'property reality' referring to seed. He even hails Monsanto's discoursive practices and strategies aiming at creating an atmosphere of fairness, commitment and legitimacy.

So there is clear evidence and no doubt that Monsanto employs a broad range of discoursive practices that fall either into the categories of 'stick' or 'carrot'. Some of these practices aim at exercising control in either a direct or in an indirect way. Others aim at creating an atmosphere of fairness, commitment and legitimacy. Both kinds of practices aim at stabilising and enforcing Monsanto's legal property construct on the concrete layer[36]. The analysis of the three above interviews has shown that Monsanto is very successful in doing so. By employing a broad set of various discoursive practices, Monsanto addresses and reaches a wide spectrum of people and makes sure that for every paying customer and any public group there will be available a hand-tailored discoursive practice and approach – and all of them serving Monsanto's interests. Mr Woodman (who works for another seed company in Saskatoon) puts it this way: First of all, Monsanto wants to have control and prevent farmers from brown-bagging. They try to achieve that goal with help of the TUAs, the auditing program, the grower meetings and other "scare tactics" like law suits with a huge media, e.g. the Schmeiser case. They really try to hold tight hands on that (Woodman 2007: 2).

[35] Also remember that part of the Schmeiser-case where he was found guilty partly because of the samples the seed-treater had taken from his crop.

[36] The non-availability of the seed treatment serves the same goal.

Referring to Gorz, the farmers quoted above seem to be paragons of their kind in so far as they could be titled “paragon consumers in a knowledge economy”. Some grumble, some cheer, but they all buy – or so they say.

4.2 The non-GM community and the traditional practice of saving seed

The empirical material on which this part of the thesis is based is abundant, colourful and very exciting. The non-GM farmers mostly liked to talk about their situation so that it would be possible to describe and analyse the material in great detail along the analytical dimensions as developed by Benda-Beckmann. However, as this part of the thesis is not about the main object of analysis but serves to contrast the findings about Monsanto’s property regime, the original draft of this chapter had to be abbreviated and condensed.

The purpose of the following chapter is to clarify Monsanto’s way of appropriating and commercialising seed by way of contrasting it with the non-GM farmers’ dealings with seed. Therefore and in contrast to the Monsanto property regime, they have not been analysed against a specific theoretical background. A first step towards a theory that would serve to conceptualize the non-GM farmers’ property regime would be a study of Elinor Ostrom’s work (compare Ostrom 1999a, Ostrom 1999b).

Looking back, it has been assumed that there are at least two different discourses answering the question “How to define property rights on seed?” In the preceding chapter, it has been Monsanto’s construct of reality concerning property rights on seed that has been dealt with against the analytical background of knowledge economy. In the following, the focus will shift to a construction of property relationships dealing with seed completely opposite to Monsanto’s. In it, seed is not linked to an immaterial good as it would be typical of knowledge economy. Although it is true that knowledge is incorporated in this kind of seed, too, it does not play a major part in the creation of added value by far (in contrast to Monsanto). Here, seed is not conceptualised as a commodity, but (seen as an ideal type) rather as a collectively owned good that is held by farmers and developed by farmers and farmer-based organisations respectively.

4.2.1 The ideology of peasant culture

In the analysis of many hours of interviews held with non-GM farmers, many-facetted ideological building-blocks have been found to outline a possible ideological background against which the construction of property relationships dealing with seed in the non-GM community can be described and analysed. Further on, the ideological background of the non-GM community will be called "peasant culture"[37].

In a nutshell, peasant culture is made up by paying respect to creation (to life itself), by respecting the traditional agricultural practices of independently developing, saving and exchanging seed within the farmers' community and by employing farming practices that are integrated into natural circles in general. This includes the rejection of the Monsanto property regime and what is associated with it.

> **So do you see a need for change in the patent law or in the interpretation of it?**
> "(…) But I don't believe they should be patenting life forms (…). I mean, life forms are … and … shouldn't be allowed under the patent law. They've got … they shouldn't be patenting plants and animals and discoveries and birds and everything else. I mean they can patent the process, you know, they can patent the process of creating genetically modified things or whatever but not actually patent the plant (…)".
>
> **So for what reason do you feel like this? Do you think it's immoral to have patents on any life form?**
> "Yeah personally I think it is … I think it's … manipulation of life forms or whatever. I think it's mankind overstepping their … you know, to me I guess from a religious point of view or anything else, it's just not right that we can say that we can take life and change it" (Gordon 2007: 6)[38].

In short, the ideology-based way of life and farming is deeply rooted and engrained in the social and environmental sustainability of a peasant culture that fends off the feeling of alienation and (negative) unintended effects of technological progress (compare Dean 2007, Chaney 2007)[39].

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[37] Please have in mind that there are people who use the term 'peasant' in a derogative way. Here, the term is used in a neutral way and does not imply any connotations. In a personal communication, Mr Gordon characterises organic and non-GM farmers as knowledgeable individuals (in contrast to the derogative meaning of peasant) that know better than to embrace GM technology and use seed saving and seed saving techniques instead.

[38] Mr Gordon is an organic farmer. He is a member of the "Saskatchewan Organic Directorate" (SOD) and the "Organic Agriculture Protection Fund" (OAPF). At the moment, the OAPF is trying to take Monsanto and Bayer Crop Science to court. Together with others, the OAPF has already succeeded in stopping these companies commercializing transgenic wheat. Today they are trying to make them pay compensation to them for the loss of their ability to grow organic canola on the ground of what they call contamination by GM crops.

[39] Mr Dean is an active member of the National Farmers Union (NFU). He is a conventional farmer who is opposed to growing GM crops for personal convictions. According to their website, the NFU's main goal is to develop social and economic politics that will result in maintaining the family farm as the primary food producing unit in Canada. Ms Chaney is a member of The Canadian Green Party.

Peasant culture is symbolised by the traditional practices of saving and exchanging seed. In terms of discourse analysis, it can be argued that seed is a dispositif that symbolises a whole range of significance and meaning attached to a way of life called peasant culture. Ms Miller (she is an organic farmer and an active member of the NFU, too) puts it this way: "Seed is key. (…) It is the key component" (ibid: 7). Seed is "(…) essential, it's the start, it's the the the life, uh, it's the life of the whole enterprise and of ourselves (…)" (Miller 2007: 8).

Against the background of the industrialisation of agriculture, the meaning of these practices and the meaning of seed as a dispositif has gained an ever increasing importance since seed has been, respectively is, the last major input factor farmers are able to produce for themselves (compare Ericson 2007: 10) and therefore is perceived as the last bastion that stands between them and complete dependence on agricultural input factors they have to purchase. Non-GM farmers highly value their independence and do not want to be "(…) sucked deeper and deeper into thinking and behaving like we're commercial cogs in the corporate machinery. That's an altogether different self image too. So it's [the Monsanto property regime] not just economic and political erosion, it's also sort of identity erosion" (Miller 2007: 20).

Farmers of the non-GM community reject the patenting of life forms or parts of living organisms for different reasons. Some of them compare genetically manipulation to abortion and argue on moral or religious grounds that any genetic modification of life is beyond of what man is allowed to do. To them, life in its natural form is sacred (compare Gordon: 6ff., and Miller: 7, 8, 17, 20, 21). Many farmers consider the commodification of seed as an illegitimate process because 3000 years of collective breeding efforts are 'stolen' by one single actor who claims monopolistic property rights after having added only one gene out of 40.000 (compare Gordon 2007: 6, Thompson 2007: 5). Last but not least, Mr Dean and Mr Gordon reject Monsanto's property regime because it symbolises a technology that is associated with a further increase in the industrialisation of agriculture and with negative unintended environmental and social effects, and further more, as a hazard to public health (compare Dean 2007, Gordon 2007: 21, 29).

The ideology of peasant culture and the social and environmental consequences respectively that result from this ideology, present a narrative that circulates within the non-GM community. This narrative can be conceptualised as a tale of salvation, too – salvation from environmental and social un-sustainability caused by technological progress and the industrialisation of agriculture as described above.

Coming back to the question of how the non-GM community defines property concepts dealing with seed, it actually must be stated that seed is seen as a good that is collectively owned by the non-GM community. And in contrast to Monsanto, the interpretative scheme that these social actors employ when dealing with seed definitely is: "Seed is a good that is collectively owned by farmers" (compare page Figure 4-9). In other words, the ideological background of the non-GM farmers is diametrically opposed to Monsanto's, which follows the logic of scarcity. While the non-GM farmers explicitly feel threatened in their way of life by Monsanto's property regime, it could also be said that Monsanto's practice of artificially producing scarcity could be threatened by the non-GM farmers' ideology, too. In the end, it is an empirical question; the answer to it will become evident in the course of the next decades.
As will be seen in the analysis of the peasant culture in practice (concrete layer), there are lots of discoursive practices that aim at realising and preserving as much as possible of this tale of salvation and in doing so, they undermine the Monsanto property regime to a certain extent.

The paragraphs below taken from Ms Miller's interview lend themselves to the demonstration of how the identification of the interpretative frame "Seed is a good that is collectively owned by farmers" follows the three different steps of sequence analysis: Free or open coding, axial coding and selective coding. The relevant passages have been underlined:

"(…) given how far we are from those sort of uh non-industrialized peasant cultures where seed exchange and seed gathering and and uh you know sort of reusing of seeds, farm saved seeds was of course the way, I mean was the only way in which farming was done. We're a long distance from that but a lot of us save seed and and plant our own seed. We still do and and a lot of us, uh I mean now that we're organic we have to be more conscientious about where we source our seeds and making sure that we've tried to get organic seed and so on and so forth, but a lot of conventional farmers when they see a nice field of wheat that your neighbor has they'll come on the yard and say, "Well if, you know, if that turns out well I'll want some bushels of that (…) to seed you know I'll clean it up" and so there is still a lot of sort of uh on the ground farming (…) which relies on and is is part of our culture. (…) That we're we're we're selling each other's seed we're looking to see who had a good crop of you know, nice clean peas that did nice and stood up nice and that's the kind we like and if he's got seeds to spare, you know. So even in a in a venue where uh in a in a place where uh it's all highly industrialized and … it's all ready, the seed catalogues and the sort of uh newspapers would have you believe that seed is a commercial commodity and and that's just where it is. Actually, on the ground it's a commercial transaction often but it's also really a sort of a kind of exchange.
(…) so we've got two fields of wheat, different kinds of wheats and and oats and usually we do barley, this year we didn't do barely but we do flax and we do peas and you know everybody's got a variety of seeds so some of it we cleaned up our own seed and some of it we bought from the neighbor, the oats we bought from the neighbor and uh you know we're still on on one level not very far away from the sort of farm saved neighborhood seed stock, we're not, it's a little more commercialized and uh, of course you have the, you know the certified and and and all those sorts of stipulations apply, but culturally we're not that far

away" (Miller 2007: 17 ff.)

The identification of the interpretative frame "Seed is a good collectively owned by farmers"

First step: Open coding

Ms Miller touches the subject of what non-industrialised farming was like in the peasant cultures. She points out that using farm-saved seed was 'the only way in which farming was done'. The farmers' present situation is compared with the situation of these non-industrialised peasant cultures and some differences like 'we are long distance from that' and common features like 'but a lot of us save seed and and plant our own seed' are brought up . From a cultural point of view, she concludes, non-industrial peasant cultures and present farmers are not very different.

Second step: Axial coding

Closer examination reveals that she emphasises the fact that the practices of 'seed exchange and seed gathering' and the 'reusing of seeds' was the 'only' practice in which farming was done in non-industrialised peasant cultures. In addition, seed is specified as 'farm saved seeds'. Further on, it is repeatedly made clear that the present situation does not differ very much from the situation of non-industrialised peasant cultures because 'neighbors' are still 'selling each other's seed'.
She underlines that although 'the seed catalogues and the sort of uh newspapers would have you believe that seed is a commercial commodity' 'we're still on on one level not very far away from the sort of farm saved neighborhood seed stock'. Here, a difference is made between seed as a commercial commodity on the one hand and a seed stock that is saved by neighbors on the other hand. Again, emphasis is placed on the fact that present farmers are not very much away from that 'farm saved neighborhood seed stock'.

Third step: Selective coding

There are different indications that reflect the interpretative frame "Seed is a good collectively owned by farmers". First, the only actors that are named in the above paragraphs are farmers and neighbours respectively (which indicates a strong feeling of togetherness). Second, what this group of farmers actually does is save and exchange seed. By doing so, they pile up what is called a 'farm saved neighbourhood seed stock'. Third, there is a clear distinction between seed as a commodity and seed as a farm saved good. Last but not least, it is emphasised that these practices have a lot in common with the practices of non-industrialised peasant cultures. In these cultures, there is no seed industry, nor are there any strong and well developed public breeding programs. Instead, seed is developed and provided on the basis of the farmers' collective efforts.
Therefore, it is quite reasonable to claim that the construction of property relationships dealing with seed within the non-GM community follows the interpretative frame of "Seed is a good that is collectively owned by farmers".

Figure 4-9: The identification of the interpretative frame "Seed is a good collectively owned by farmers".

4.2.2 Customary rights and patent law – an ill-assorted couple?

To a non-professional in legal matters, the attempt to analyse the legal discourse about property relationships that follow the interpretative frame "Seed is a good which is collectively owned by farmers" is a challenging undertaking. The reason can be seen in the very nature of the Canadian Anglo-Saxon so-called "Common Law" which is a system of laws that are derived from old customs and from decisions made by judges in the past (precedents). In terms of Benda-Beckmann, the common law system emerges from social actors who negotiate and conceptualize property relationships referring, for example, to seed in everyday life. This can be observed on the side of the non-GM community (compare Ms Miller 2007: 17). Even if it is possible to deduce customary rights from old customs or practices, it is difficult to identify these customs and practices on the legal layer. Practices are more likely to be discovered on the concrete layer of social interaction. In other words, in the case of the non-GM community, the legal and the concrete dimension of property constructs merge in a very peculiar way. For that reason, the focus will have to move to the concrete layer pretty soon.

Farmers who feel affiliated to the non-GM community do not have a legal construct comparable to Monsanto's TUA or the patent law that explicitly answers the question of "How to construct property relationships on seed?" in a codified way. In the Canadian Anglo-Saxon system of common law is derived from traditional habits which become precedents. Common law is defined as the "(…) unwritten law (esp. of England) that receives its binding force from immemorial usage and universal reception (…)" (G. & C. Merriam Co. 1960: 166). This definition exactly meets the traditional practice of saving seed from which a customary right could be deduced.

For instance, there is the so-called 'farmers' privilege' in which the traditional practice of saving seed finds legal recognition. This is a legal clause that is comparable to the TUA in so far as it stipulates the way farmers deal with seed. It aims at attenuating the effect of "The Plant Breeders' Rights Act" of 1990 which allows plant breeders to get legal protection for new varieties[40], so that, after harvest, the farmer has the privilege (farmers' privilege) to save seed to re-grow it the following year. However, farmers are not allowed to commercialise their harvest as seed without getting permission of the holder of the right of the plant breeder.

[40] The PBR aims at providing incentives and rewards for successful plant breeders. In concrete terms, that means that all plant breeders are allowed to use a protected variety A for their own breeding program. But if they develop a new variety B out of A and commercialise it, they have to pay royalties to the breeder who has developed variety A. Farmers who want to grow variety A have to purchase seed from the breeder who has developed that variety.

Certainly, there are other voices that seriously criticise the term farmers' privilege. They do not see it as an achievement but as a trick to conceal the fact that the scope of the farmers' rights on seed is becoming narrower and narrower[41].

As patents come into play, the traditional practice of saving seed and its legal recognition come to their limits, as seen in the Schmeiser-case. Although Schmeiser did not use Monsanto's technology in terms of spraying Roundup, he was found guilty of infringing Monsanto's patent by growing Monsanto's Roundup Ready® canola without paying license fees. In this context, Prof. Adams points out:

> "(…) there is no way that the seed blew on to his land. And there was no way, that it was contaminated by pollen. He planted it. And he actually admitted on the stand that he harvested the seed that his neighbour grew the year before. (…). I don't think there is a farmer in Western Canada that believed Schmeiser in the first place. It's very hard to get these volunteers to grow in nice straight rows like he had" (Adams 2007: 8 ff.)[42].

In short, farmers principally have the legal right to save seed, but in the case of Roundup Ready® varieties protected under the Canadian patent law the right to save seed is repealed.

Again, one has to remember that the Supreme Court decision in that case was a very close one. Since judges working under the conditions of the common law have the right to create new laws and rights by establishing precedents, the close decision might indicate that the legal discourse and dispute about property rights on seeds (and its progenies) could as well come to different results in the future. It will become apparent that the non-GM community aims (among other things) at establishing new and different precedents in their favour. For instance, the "Organic Agriculture Protection Fund" (OAPF) is just trying to make Monsanto and Bayer liable for the damages their technology is supposed to have caused to organic farmers in Saskatchewan. Being asked what the consequences of a potential success of the OAPF would be for the biotech sector in general, Mr Burns (he is a BASF representative) points out that that might mean the fatal blow to and the end of genetically modified crops (Burns 2007: 7).

Here again, it becomes apparent that the picture derived from the examination of the legal discourse is rather blurred and unclear. However, this is not a disappointing result at all. It rather confirms and backs the assumption that there actually are at least two different discourses which compete for the power of defining property concepts dealing with seed. Furthermore, it can be argued that the blurred and ambiguous picture of the legal layer in

[41] For further reading about intellectual property rights like the PBR Act and their consequences for the Canadian seed system see Kuyek (2004).

[42] The term 'volunteers' refers to transgenic crops which grow in places they are unwanted.

some way is typical of a legal system which is going through a time of upheaval with regard to living organisms or parts of them. In simple terms, it could be argued that the (old) existing precedents fall short of solving the present intricacies caused by intellectual property rights that extend to living organisms and their progeny in social actors' daily lives – and new precedents are not at hand yet. Mr Thompson describes the situation as follows:

> "Well, it's a challenge for me to try and explain that to the court. That's the subject matter of what we are dealing with is living material that does have the properties you just described. These plants when they arrive on your land, they don't just sit there like a rock. They take roots, they grow, they propagate, they spread and that's a challenge legally I think legally to recognise that that has to make a difference in the legal regime for liability as well as the legal regime for property rights and patent rights" (Thompson 2007: 5).

What has been found in the ideological context, namely that the non-GM community is opposed to Monsanto's artificial creation of scarcity, becomes obvious from a legal perspective, too. As Mr Thompson points out, the non-GM farmers try to make use of the unintended effects of transgenic crops to legally oppose Monsanto's property regime.
Now, after the discourse about property concepts dealing with seed has been discussed from a legal perspective, the focus will switch to the daily life of the members of the non-GM community and their discoursive practices aiming at creating precedents and at constructing property rights on seed within the ideological background of "peasant culture".

4.2.3 Peasant culture in practice

In a step analogous to the analysis of Monsanto's discoursive practices, it is assumed that the members of the non-GM community will try to empower and enforce their own ideology-based (peasant culture) tale of salvation. Their tale of salvation can be summarised in the slogan of 'salvation from environmental and social un-sustainability'. Actually, the promises and goals that are promoted in their tale of salvation have a lot in common with those promoted by Monsanto. However, their means are totally different. Whereas Monsanto and other biotech companies paint a scenario in which social and environmental sustainability will be achieved by technological progress, the non-GM community almost demonises (compare Perriere/Seuret 2000) the kind of technological progress as proposed by Monsanto and concentrates on maintaining the conventions of peasant culture. From their point of view, such an approach will lead to high quality food, reduced use of chemicals, preservation of biodiversity and defend mankind from the incalculable consequences of genetic modification

– to just name a few. For non-GM farmers, their approach will lead to a higher degree of independence and autonomy from agricultural suppliers such as chemical or biotech companies and hence to a reduced feeling of alienation – they claim.
In the following, some discoursive practices that aim at implementing and enforcing the goals of peasant culture will be discussed. It is important to have in mind that there is an ideological link between these practices in general and the conceptualisation of property relationships dealing with seed within the non-GM community. Even if these practices do not explicitly deal with property concepts on seed, they all aim at implementing or represent the ideology of peasant culture which, for the time being, is found to have taken form in the traditional practice of saving seed. This symbolisation shines through all discoursive practices.

4.2.3.1 Individual and collective practices of maintaining and implementing the conventions of peasant culture

The analysis of the interviews conducted with members of the non-GM community suggests that there are two categories of discoursive practice: Individual practices of avoidance and practices that involve other social actors.

4.2.3.2 Individual Practices

In the case of individual avoidance strategies, an individual social actor tries to avoid Monsanto's property regime in particular and a higher level of industrialisation of his farm in general to maintain as much of peasant culture as seems desirable to him.
The individual form of the avoidance strategy depends on the farmer's personal goals and circumstances and ranges from measures such as building one's own machinery and tools, using non-GM canola seed that was harvested prior to 1996 (that was the first year transgenic canola was grown) or as the most extreme measure 'going organic' which seems to suit the image of peasant culture rather perfectly (compare Dean 2007, Gordon 2007, Miller 2007). However, to get certified as an organic grower, farmers have to meet specific demands. One of these demands is that their production has to be totally free of genetically modified organisms (GMOs). For that reason, organic farmers theoretically (as long as there is no

contamination!) do not have to care about Monsanto's property regime because they do not grow transgenic crops anyway[43].

However, if it comes to issues that demand too much of the individual farmer as for instance contamination or the looming commercialisation of a new transgenic variety like flax or wheat, Saskatchewan non-GM farmers employ discoursive practices and strategies involving other social actors. These practices are not only about maintaining and implementing an ideology-based life form. For organic farmers, contamination rather is a real and substantial threat to their material existence and their whole farm.

4.2.3.3 Collective practices

There is one main argument that can be used to explain why non-GM farmers employ the discoursive strategy of involving other social actors in their discoursive practices. In terms of Foucault, the discoursive background to Monsanto's property regime, i.e. the discourses of capitalism and neo-liberalism, provides social actors with very powerful positions of legitimate speaking, interpretative schemes and story-lines. In contrast, the discoursive background of the non-GM community summarised as peasant culture provides speaking positions which are far from being as powerful. For that reason they often make use of the Canadian judicature or join in citizen action groups to compensate for their less powerful positions of legitimate speaking. There are indeed a good deal of cases that could be brought up to exemplify this practice such as the prevention of the commercialisation of transgenic flax and wheat.
However, within the scope of this thesis the OAPF class action initiated against Monsanto and Bayer Crop Science seems to best serve this purpose. The following discussion of the OAPF's class action can also be read as an addition to the diagnosis of a blurred and ambiguous picture of the legal layer.

4.2.3.3.1 The case of the OAPF's class action against Monsanto and Bayer

[43] The simultaneous existence of different farming styles that employ or avoid transgenic canola is also referred to as 'coexistence'. It seems, however, that coexistence does not seem to work in the case of transgenic canola in Saskatchewan.

In May 2005 the OAPF (a group of Saskatchewan organic farmers) tried to get certified as a class action to initiate, in a combined effort, legal proceedings[44] against Monsanto and Bayer Crop Science whom they blame for no longer being able to grow organic canola in Saskatchewan. The Saskatchewan Appeal Court denied the OAPF the class action status and so the OAPF now tries to appeal that decision by addressing the Canadian Supreme Court.

The OAPF argues that organic farmers cannot grow organic canola in Saskatchewan any longer because of cross-pollination respectively the contamination of the seed stock[45]. "(…) the technology is flawed … in that it won't stay put. It won't stay put in the field you put it on, it goes and cross-pollinates into my field" (Gordon 2007: 11). "(…) the genie is out of the bottle" (ibid: 20).

However, it is important to have in mind that contamination is an issue that potentially affects all farmers but organic farmers in a special way. Mr Wheeler (a GM farmer) points out that he always mixes some 2,4-D[46] into his Roundup Ready® to get rid of transgenic volunteers, e.g. if he wants to grow wheat where the year before transgenic canola was grown (compare Wheeler 2007)[47]. It is different with organic farmers. They are not allowed to spray 2,4-D and for that reason volunteers have to be picked by hand (provided that they can be identified).

What organic farmers actually loose (according to the OAPF) is a crop that used to realise good prices on European markets and they loose a crop in their rotation system which is instrumental for weed control. In addition, the farmers hit by contamination must face high costs in case of contamination, e.g. for cleaning their fields and equipment, and the risk of loosing his licence for organic farming. Mr Thompson explains: "So, it's like the introduction of one thing takes away the choices of somebody to use the other thing" (Thomson 2007: 10).

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[44] At the moment, Monsanto and Bayer are the only companies which commercialise transgenic canola.

[45] There are two ways by which land and plants get contaminated with the traits of transgenic canola. First, since canola is an open pollinating crop, contamination can happen through cross pollination, e.g. by wind or insects. Second, the seed stock itself can be contaminated. According to Mr Gordon, the contamination of the seed stock was about seven percent in 2002. Today, he argues, the seed stock will be contaminated to a higher degree (compare ibid: 2). Prof. Adams: "(…) I am sure there a lot of farmers that have ten to fifteen percent of somebody else's herbicide tolerant gene in their field" (Adams 2007: 8). In a personal communication, however, he pointed out the degree of contamination may vary from region to region and could also be only one to two percent. For further reading about the issue of contamination also see *"Gone to Seed. Transgenic Contaminants in the Traditional Seed Supply"* (Mellon/Rissler 2004).

[46] 2,4-Dichlorophenoxyacetic acid is one of the main agents of "Agent Orange" used for defoliating entire forests during the Vietnam war.

[47] From Ms Roberts' point of view, most farmers are not really concerned about volunteers. They just deal with it like Mr Wheeler does. She emphasises the fact that Monsanto is the only company that has some regulations in place to remove volunteers containing their technology (although there is no legal obligation to do so). According to her, farmers just have to call Monsanto and tell them how (spraying or plowing) they want them to remove the volunteers – Monsanto will come up for the costs (compare Roberts 2007: 12).

The OAPF argues that the farmers' (customary) right to grow on their acres a crop of their choice ought to be protected[48]. In this context, there are also voices who give rise to the objection that growing organic canola is not an option anyway. That is because it is difficult to organically grow canola due to the presence and damage of insects and weeds normally controlled by insecticides and herbicides. This perspective implies, that organic farmers do not grow organic canola because of contamination, but because it is difficult to grow without chemicals. What the OAPF argues, however, is, that organic farmers in principal have the right to grow organic (non-GM) canola if they want to – whatever difficulties are associated with it.

Furthermore, the OAPF claims that it is not the GM farmer who is to be held liable in case of contamination as he is not the owner but the user of the technology. From their perspective, it is the patent owner that is the respective biotech company, who is to be held liable. Mr Gordon asks: "Now, how're you going to be responsible for the bee that flies, or the wind that blows?" (Gordon 2007: 14).

In addition to that, they argue that the judgement in the Schmeiser-case was about the question of ownership attached to the technology which was clearly decided in favour of Monsanto as the sole owner of the technology. What the OAPF tries to initiate and produce now is a precedent that deals with the question of what kind of responsibilities come along with patent ownership. "Who is liable for (irreversible) damages caused by transgenic, self-propagating living organisms and what is the range of these liabilities?" (compare Gordon 2007: 10). As has been pointed out earlier, there actually is a discussion under way aiming at establishing and extending the property-related responsibilities in the case of patent owners, as in the case of contamination (compare De Beer 2007a, De Beer 2007b, Glenn 2004, Müller 2006, Phillipson 2005).

In terms of discourse analysis, what can be observed here is a clash of competing discourses: "Seed is a private good" vs. "Seed is a good that is collectively owned by farmers" and the struggle about the power of answering the questions of "How to construct property relationships dealing with seed?" At the moment, this struggle manifests in the class action initiated against Monsanto and Bayer and it all seems to depend on the courts to define the scope and the validity of these competing property regimes. It will be interesting to have a

[48] "Our position is that (…) even though you may be a farmer somewhere that never grew canola, but you wanna have a right to grow canola. You have a right to grow canola, you have a right to grow any crop. And as an organic farmer they can't grow that crop anymore. Or they can't even decide, "well I wanna grow that crop". Their neighbour is growing it, the GMO canola"(Gordon 2007: 2).

look at the positions of the different actors involved and their speculations and comments on this process and its outcome.

Ms Roberts points out that the OAPF has failed miserably so far. From her perspective, the OAPF has no chance to win because of their weak arguments. Furthermore, she refers to the fact that Monsanto's technology met all the regulatory conditions and has been approved by the government (compare Roberts 2007: 11).

Mr Burns (a BASF representative) argues that technological progress causes changes which go hand in hand with "fallouts", like the fact that organic farmers cannot grow organic canola any longer. However, he points out that cases of contamination could be avoided by sterile seed technology. He thinks that, in case the OAPF should prevail and Monsanto and Bayer would be held liable for the damages they are alleged to have caused, that would be the end of transgenic crops. Analogously, he wonders what the consequences of the seed industry saying bye-bye would be: "They are bigger than not having organic canola out there" (Burns 2007: 7).

Mr Thompson and Mr Gordon assess the chances of an OAPF as follows:

> "But more towards the political point of view you have the biotech lobby and the notion that if you … you know … if you start introducing laws that are going to discourage the development of our technology then you are going to impair a significant industry that Canada wishes to explore and pride itself of being the world leader and … so there will be a lot of political resistance to pulling the brakes – except, you know, if … an example would be wheat where there was a large wide objection to the introduction of genetically modified wheat" (Thompson 2007: 4).

> "So that's what you're up against. It's as simply as that. You're up against a whole bunch of power, and big money, and big power. So our chances of winning are very small. It's going to take … some judges, somewhere, with a whole bunch of courage to change this. And that's the only way it can be changed"(Gordon 2007: 18).

Against the background of these statements, the chances of success of the OAPF's class action seem to be rather poor, even if they get certified as a class by the Canadian Supreme Court. If they get certification, there might be the chance that their case will finally be dealt with under the Saskatchewan Class Actions Act. This would increase their chances of a new precedent in accordance with their goals (although the opposite may happen just as well).

Here, it becomes obvious how, according to Benda-Beckmann, the different analytical layers of property relationships interact. In this context, the OAPF rather seems to be like a grass root movement trying to influence legislation in the favour of its cause, whereas in the case of Monsanto's superimposed property regime, legal constructs (namely the TUA and the patent law) influence and determine the farmers' everyday practise.

4.2.3.3.2 The formation of different producer organisations

Another discoursive practice in which farmers cooperate and combine their efforts can be seen in the formation of different producer organisations like the "Saskatchewan Flax Development Commission" (SFDC) or the "Saskatchewan Pulse Growers". There is an interesting peculiarity to these producer organisations: They do not only serve farmers of the non-GM community but also farmers who for instance like to grow transgenic canola and conventional peas, lentils and flax. At the moment, none of the producer organisations mentioned above develops transgenic varieties for fear of loosing European markets (compare Smith 2007).

An annotation must be made here: Although the social actors who are organized in such producer organizations cannot exclusively be ascribed to the non-GM network, these organisations must be mentioned here because, with reference to seed, they follow the interpretative frame of "Seed is a collectively owned good".

For lack of space, the present changes in the Canadian seed system (compare Kuyek 2005), that have favoured the formation of these organisations, can be explained in short terms only. Prof. Adams describes the situation like this:

> "Well, actually … how many years ago this was now … but about fifteen years ago the Department of Agriculture decided that their client was no longer the farmer. Their client was the business (…). And with that the whole perspective of where public money went changed. (…) Ok, and it's got worse as time went on (…). I think it was a major major mistake. Because we are an agricultural country and particularly in Western Canada relies on its agriculture to a great deal and we need to support the basic industry which is the individual farmer" (Adams 2007: 17).

This 'change of client' results in very one-sided research and breeding activities that are often carried out in cooperation between governmental institutions and biotech companies. Since Monsanto recoups its investments via technology fees which are paid on a per acre basis, there is no incentive to invest millions of research dollars in crops that are grown on small acreage only, such as flax or lentils. In contrast, lots of money goes into the development of new varieties which are grown on a huge acreage, as canola, soybeans, corn and cotton. In short, the decision where to put the money in for the development of a new variety depends on the costs for research and development on the one hand and on the acreage the crop is expected to be grown on the other hand (compare Jones 2007: 8).

However, farmers who grow small crops like flax or lentils are constantly looking for new and better varieties and organisations taking care of their need for research. Take the example

of flax that produces healthier oil and more and stronger fibres at the same time. Since such research is less and less provided by public breeding programs, farmers have founded organisations like the SFDC to close the 'gap of research' that has been caused by the Department of Agriculture's change of client (compare Smith 2007: 2). Producer organisations like the SFDC, plant breeders and biotech companies alike find assistance in an institution provided by Agriculture and Agri-Food Canada: The Plant Gene Resources of Canada (gene bank). The gene bank, in simple terms, watches over the biodiversity of Canada and globally collects varieties of plants that could be adapted to the Canadian climate. They preserve these varieties and provide them to researchers and breeders. In this way, they are part of the property regime of the respective social actor they provide with seed, too.

Ms Smith points out that the SFDC is legislated by the law of Saskatchewan to collect check-offs (fees) from flax growers of 1,18$/ton for seed and 0,15$/ton for straw. Reading her log, it becomes apparent that maintaining the ideology of peasant culture definitely is not the SFDC's main objective. However, the organisational form itself – founded by and representing a specific group of farmers – and the practice of collecting check-offs from each member of the group to, in turn, benefit the whole group, perfectly fits into the interpretative scheme of "Seed is a good that is collectively owned by farmers".

The case of herbicide resistant lentils[49], which have been developed in a cooperation of the University of Saskatchewan, BASF and the Saskatchewan Pulse Growers is a very interesting one. In this case, the interpretative frame that leads to the construction of the property relationship between BASF on the one hand and farmers (pulse growers) on the other hand can be described as a mixture of "Seed is a private good" and "Seed is collectively owned by farmers".

> "(…) the agreement we have with BASF is kind of unique. I mean, there are other agreements with canola, for example, and wheat … are different in the way they distribute seeds, so we got quite a unique agreement with them where the growers can replant their own seed as long as they sign the commitment again. There is no fee associated with it this time, so we haven't had any negative feedback from the growers who had to sign the commitment so far. (…) But they can buy that … the grower who buys the seed originally from us then owns the seed. And that right is basically given to them because of the one percent you said they pay to us as a check-off. They're investing that money into research of varieties, so in turn we give them access to the varieties without a royalty. So, … it's fairly unique!" (Meyer 2007: 4 ff.).

[49] These herbicide resistant lentils have been developed through mutagenesis. In contrast to transgenic breeding methods, in the case of mutagenesis the desired trait is produced by exposing the plant's genome to specific chemicals. Since breeders do not have to cross borders between species here, mutagenesis is seen as rather similar to conventional breeding methods.

In contrast to Monsanto's property regime, farmers not only rent the technology incorporated into the seed, but actually purchase and own the seed and the technology, provided that they sign the so-called 'Clearfield Commitment'. Signing the Clearfield Commitment means farmers are bound to have their seed tested and pay BASF for these tests. This test is called 'Clearfield Confirm Test' and is required by the (governmental) Canadian Food Inspection Agency to ensure seed quality. There is no technology fee and farmers can save and sell seed (as long as they sign the Clearfield Commitment). However, if they want to grow these lentils as a seed, they have to spray it with Odyssey® (a BASF product) to make sure that there is no contamination with conventional lentils[50]. Before they can sell it, the buyer has to sign a Clearfield Commitment, too. If farmers grow these lentils for commercialisation (and not as seed), they are free to use any other (generic) herbicide including a similarly active ingredient (compare Saskatchewan Pulse Growers 2006: 54). As in the case of the SFDC, the interpretative frame that underlies the 'Clearfield property regime' follows the interpretative frame of "Seed is a collectively owned good", too.

In short, even if these producer organisations do not directly aim at maintaining peasant culture, they follow the interpretative frame of "Seed is a collectively owned good" and contribute to it when constructing property relationships dealing with seed which is opposed to Monsanto's approach of artificially creating scarcity.

4.2.4 The non-GM community – concluding remarks

In the preceding main chapter, the different analytical layers of the non-GM discourse dealing with the question "How to define property relationships dealing with seed?" have been described and examined. Against the ideological background of peasant culture, the interpretative frame answering this question is: "Seed is a good collectively owned". Within this context, the traditional practice of saving and exchanging seed can be seen as the constituting element of peasant culture. The assumption expressed after discussing the discourse from a legal perspective was that the Canadian common law and its existing precedents fail in dealing with the present intricacies caused by intellectual property rights that extend to living organisms and their progeny in social actors' daily lives. Looking at the layer of concrete property relationships, the OAPF's discoursive practice of trying to sue Monsanto and Bayer backs this assumption – they try to create precedents dealing with the

[50] If the herbicide resistant lentils are contaminated with conventional lentils, e.g. to 10%, the farmer will kill 10% of his crop when spraying with Odyssey® or a generic.

question of who is to be held liable for damages caused to innocent bystanders by transgenic crops. Further on, there is a wide scope of discoursive practices that aim at circumventing Monsanto's property regime and further industrialisation of agriculture which range from individual strategies of avoidance to more or less joint practices which involve other and more social actors, e.g. law suits or the foundation of producer organisations.

Last but not least, the examination of these producer organisations has led to two important insights: First and due to the fact that public breeding programs are more and more replaced by private breeding programs conducted by biotech companies (and partly subsidised by the government), the question of whether or not a conventional variety gets a 'transgenic sibling' depends on the acreage that variety is or will presumably be grown on.

Secondly, the previously found property regimes put into action by Monsanto and the non-GM community have been added to by another property construct: The 'Clearfield property regime'. In contrast to Monsanto's property regime, the property concept that is interwoven with the commercialisation of Clearfield lentils rather follows the interpretative frame that "Seed is a collectively owned good". Here, the term 'collectively' not only refers to farmers and their producer organisations but also to BASF and the University of Saskatchewan. In case the 'Clearfield property regime' works out in the future, it could serve as an archetype for further property concepts dealing with seed. That would clearly deprive Monsanto of the legitimacy of its property regime and challenge their whole approach of constructing property relationships dealing with seed.

Moreover, it becomes obvious that a new meaning of the term 'collective' with regard to property regimes has emerged. Up to now, the discourse about property relationships dealing with seed seems to propagate and play off against each other no more than two modes in which property rights on seed can be held: Private or collective. In this, the term 'private' referred exclusively to a company holding exclusive and monopolistic rights, whereas the term 'collective' referred exclusively to farmers, breeders and producer organisations (but never a company). In this context, the Clearfield property regime seems to be rather unique. Here, a company is part of a collective and not of a private property regime.

Against the theoretical background of knowledge economy, this is an interesting finding, too. That is so, because here, a (knowledge intensive) company is involved in commercialising an immaterial good (the trait of herbicide resistance) without making use of the practice of creating artificial scarcity as Monsanto does. In this, BASF has much in common with software companies that do not make money out of the immaterial good they sell (or give

away for free) but out of services necessitated by the use of the immaterial good (compare Merten/Meretz 2005). In the case of BASF, the service rendered is the Clearfield Test.

Now, after the non-GM community and their dealings with seed has been described and analysed, the empirical findings about the Monsanto and the non-GM property regimes will be recapitulated against the theoretical background of knowledge economy and an outlook on possible future developments will be attempted.

5 Summary of the thesis's findings and their discussion

5.1 The research question and the theoretical and methodological approaches

This thesis deals with the question of whether and how knowledge (e.g. knowledge that expresses itself in the trait of herbicide resistance) can be appropriated and commercialised. The subject is derived from the theories of knowledge society and knowledge economy which postulate that knowledge as a factor of production and a product in its own right is increasing in importance with regard to added value. There are two main currents that can be found in the wide range of theories attempting to evaluate possible future economic and societal developments with regard to the assumed increasing importance of knowledge. One branch suggests an intensification and increased growth of capitalism (on the basis of knowledge) whereas another branch argues that there will be a crisis of capitalism because of the specific characteristics and particularities of immaterial goods (compare Gorz and the crisis of the exchange value and DeLong and Froomkin and three implicit pillars the market system rests on). The research question of this thesis has been derived from the latter branch.
The questions deduced from this theoretical background have been operationalized by means of the three dimensional property concept as developed by Benda-Beckmann and others. This analytical framework has been put to use by the method of discourse analysis as developed by Reiner Keller. These theoretical and methodological tools have been effective in highlighting how the appropriation and commercialisation of an immaterial good have been facilitated by the Monsanto property regime. But it did not, however, provide access to a question such as what effects the Monsanto property regime has on the rural community (e.g. its social

structure) which is left to further study. To answer the question of whether and how knowledge can be appropriated and commercialised, Monsanto was used as an example. While Monsanto (and its practices) is the main empirical object of the study, numerous other social actors have been taken into consideration, too. In this, the examination of the GM farmers' dealings with seed and their opinions about what Monsanto does serves to illustrate if Monsanto's practices constituting the commercialisation of seed are successful (from the company's perspective). The examination of the non-GM farmers' community serves the purpose to emphasize the peculiarities of the Monsanto property regime as a whole.

The idea to follow this approach is a result of the fact that Monsanto's property regime was created and implemented within a particular historical situation, which was (and partly still is) characterised – with reference to property relationships dealing with seed – by the dominance of the interpretative frame "Seed is a good collectively owned by farmers". Due to the development of a new technology, namely the possibility to make plants herbicide resistant by genetic manipulation, seed has changed its properties. The actual grains of seed no longer are the good or the commodity that is exchanged or purchased. Depending on the variety, they have turned into the carrier substance of an immaterial good – the technology that is expressed in herbicide resistance.

In this context, a variety of intricacies forced Monsanto to create a new property regime following the interpretative frame "Seed is a private good". These become all the more visible if the particularities of seed, of knowledge and of the traditional property concept of peasant culture are related to the theoretical background of knowledge economy.

5.2 Appropriating and commercialising an immaterial good

5.2.1 The physical intricacies of knowledge and seed and the social intricacies of peasant culture

Gorz, DeLong and Froomkin point out that the commercialisation of an immaterial good can only be achieved by providing the condition of scarcity and excludability, because these are prerequisites of capitalistic economy which are not met by the properties of immaterial goods. In the following, it is recapitulated and demonstrated why it is a difficult and complicated task to create artificial scarcity in the face of the particularities of seed, of knowledge and of the

traditional property regime typical of peasant culture[51]. It will be recapitulated, how Monsanto, in the face of these difficulties, creates and enforces a property regime that follows the interpretative frame "Seed is a private good".

Knowledge as an immaterial good is (in principal) available in an inexhaustible 'amount'. It cannot be used up and in this way defies the logic of scarcity. How to put a price on this kind of good and, for good measure, how to exact this and legitimate it? And on top of all this, this slippery good is incorporated into a living organism.

The special problems that seed presents to the artificial creation of scarcity is that it is a living organism that can (in principal) reproduce itself for free and abundantly. This is true as well of seed that is used as a carrier substance. From a company's perspective, it can be argued that the carrier substance (pirate) copies the immaterial good that is incorporated in it. Furthermore, by the process of cross pollination, the immaterial good does not only reproduce itself where it was seeded by the farmer, but also spreads its progeny further abroad. Wind and insects carry the knowledge (pollen) across the fields and prairies – in terms of the creation of artificial scarcity, this is a difficult scenario.

The third hurdle that stands in the path of the creation of artificial scarcity is the traditionally established property regime that follows the interpretative frame "Seed is a good collectively owned by farmers" in which Monsanto has to implement its new property regime. This is the hub around which peasant culture revolves. In a nutshell and with regard to seed, what peasant culture is about is avoiding scarcity. This can mainly be observed with regard to their ideology and their everyday life which are deeply intermingled with each other. Non-GM farmers (e.g. organic farmers) strive to maintain and implement as much of their ideology as possible in their day to day living. This ideology is symbolised and put into action by the traditional practice of saving seed which stands for a desirable way of life with regard to environmental and social sustainability. Whereas the ideology and the practices of non-GM farmers impede the artificial construction of scarcity, there is no essential impediment to this principle from the legal perspective. Of course, a customary right could be derived from the tradition of saving seed. However, it seems that this has either not been attempted or has not been successful. Obviously, patent law overrides customary rights. In the case of customary rights, it is the legal layer that intermingles with farmers' everyday practices. This is because they have not been codified but find expression in farmers' everyday life and have to be

[51] In this way, Gorz's theory is indirectly applied to the case of the non-GM community because it helps to point out in what way the peculiarities of the non-GM property regime oppose scarceness.

observed there, e.g. when Mr Gordon points out that farmers have a right to grow organic canola if they want to. As is observable in the example of the class action intended by the OAPF, however, the discoursive practice of suing Monsanto and Bayer could result in a codified law that will hamper the artificial creation of scarcity regarding seed.

Summing up the preceding paragraphs, it can be said that there are quite a number of stumbling blocks in Monsanto's path to appropriating and commercialising their technology. How does Monsanto deal with and circumvent these stumbling blocks?

5.2.2 Monsanto: How to deal with the intricacies of knowledge, seed and peasant culture?

In short and with regard to the theoretical background of knowledge society and the stumbling blocks pointed out above, the empirical findings about the Monsanto property regime can be summarised as follows: The central theme and the benchmark of their doings is the creation and maintenance of artificial scarcity and excludability with regard to their immaterial good. This is the main idea that could be found through all analytical layers. All of their discoursive practices aim at circumventing the stumbling blocks mentioned above.

As outlined in the theoretical discussion, private property is highly instrumental in creating scarcity. The idea of private property is deeply rooted in the capitalistic and neo-liberal discourse. It is the ideological basis on which Monsanto's whole property regime is constructed. That is because the ideology manifests itself in a legal infrastructure that allows Monsanto to produce artificial scarcity referring to their immaterial good by attaching a property title to it by patent law. Monsanto gains exclusive and temporarily limited rights of use attached to their technology which allows them to define property relationships with regard to e.g. farmers. This is the prerequisite that enables Monsanto to commercialise its immaterial good because the act of patenting makes the technology a product to which access is limited (although the immaterial good is inexhaustible in its nature). In other words, the first stumbling block (the inexhaustibility of knowledge) has been circumvented.

Next, the second and the third stumbling blocks in the shape of the nature of seed as a living organism and the farmers' traditional practice of saving seed are dealt with. They are mentioned in one go because they are overcome by the same discoursive practices. The legal construct of the TUA is Monsanto's main tool to handle both seed's reproductive property and the farmers' traditional practise of saving seed: By prohibiting farmers from saving seed,

the TUA legally sterilises the seed and therefore artificially makes it a scarce commodity. In addition to the TUA, Monsanto employs discoursive practices that aim at legitimating, implementing and holding up its terms and conditions: The auditing program, the retail-network, the non-availability of the seed treatment, creating commitment, and, last but not least, Monsanto's tale of salvation. In a narrow time slot, these practices directly aim at implementing the TUA. In a wide time slot, they aim at socialising farmers and at exchanging their traditional interpretative frame of "Seed is a good collectively owned by farmers" for "Seed is a private good". In short, the empirical findings of this thesis have shown that Monsanto actually copes with all the stumbling blocks outlined above. In this context, the examination of the GM farmers' perspective has shown that Monsanto not only overcomes the physical intricacies that are characteristic of knowledge and seed (as a carrier substance), but also succeeds in making congruent the legal construct of the TUA and farmers' everyday dealings with seed.

At the beginning of this study, it was assumed that there are at least two competing discourses about how property relationships dealing with seed should be constructed. And indeed, it was demonstrated, that there are two main approaches to conceptualise property relationships with regard to seed. While one of these functions along the lines of scarcity and private property, the other one follows the logic of free access and collective ownership.

5.2.3 Answering the research question

Against the background of these considerations and the findings of this thesis in general, the research questions as derived from the theories of knowledge economy can be answered.
Can a biotech company appropriate knowledge and make it a private good?
Can a biotech company commercialise knowledge?
Using the example of Monsanto, it has been shown that the answer to both questions is: Yes, it is possible to make knowledge a private good and commercialise it.
However, it can only be achieved by an enormous innovative, bureaucratic and organisational effort which is backed up by a hierarchical structure that includes all the participants involved in its property regime, such as breeders, seed growers, seed dealers, farmers and the state authority. This is made possible and secured by the state legislation which enables Monsanto to appropriate knowledge via patents and to enforce and defend it.

5.3 Putting into perspective the research results

Although the overall answer to the research questions of this thesis is "Yes", a very distinctive "But" has to be added because the empirical findings allow the conclusion that the Monsanto property regime is built upon instable ground. This is because (and according to Gorz), the creation and maintenance of artificial scarcity and excludability is a very demanding task with regard to its preconditions and protective measures. In a general way, it could be stated that every building block that makes up the wall that limits the accessibility to Monsanto's immaterial good presents a potential point of vulnerability. If any or all of these building blocks were broken out of this wall, the point would be reached where, according to Gorz, the immaterial good could be no longer commercialised. This would result in a situation jeopardizing the foundation of capitalism.

Once again, according to Benda-Beckmann, these weak spots can be categorised along the three dimensions of ideology, legislation and everyday life.

To begin with, the Monsanto property regime heavily depends on the predominance of the neo-liberal and capitalistic discourse since they promote the idea and efficiency of private property. However, ideologies are subject to change, and, without going into detail, the neo-liberal ideology is under attack from a variety of groups which can rather be ascribed to the leftwing spectrum. It is possible to envision situations in which the predominance of the neo-liberal ideology could be broken.

A first glance at the legal dimension of property relationships dealing with seed, could suggest that the Monsanto property regime is stable and not vulnerable. Looking at the outcome of several law cases, however, it becomes obvious that the legal situation is not clear cut at all. The Harvard mouse case and the Schmeiser case have shown that the Supreme Court judges do not come to a unanimous decision regarding the patenting of living organisms or parts of them. Taking into consideration the argumentation of the minority judges, one could imagine that ensuing law cases will come to distinctly different decisions. This is because the Canadian Supreme Court has addressed the Canadian Parliament in its verdict of the Schmeiser case to enact a specific law regarding patents on genetically modified organisms (compare Supreme Court of Canada 2004). This process is under way at the moment. In addition, there are attempts to extend the responsibility of patent owners with regard to the object of their patent (compare the OAPF intended class action) the success of which would mean the "fatal blow" to biotechnology. These looming and potential changes of

the legal framework that facilitates the Monsanto property regime at the moment, could lead to a situation in which it would be difficult and maybe unprofitable to maintain a system that limits accessibility and provides excludability.

The examination of the GM farmers' perspective has shown that the Monsanto property regime partly is perceived as a necessary evil they have to accept to survive the agricultural cost squeeze and treadmill. They use Monsanto's technology and approve of its benefits, but they feel that the accompanying framework is illegitimate. It seems reasonable to ask the question whether this low level of acceptance is another vulnerable spot of the Monsanto property regime. What would happen, if, for instance, a supplier of an alternative seed treatment appeared in the market? Would farmers start brown bagging and collectively hijack Monsanto's technology? Given the empirical findings, a scenario like this is not absolutely unfounded.

The examination of the non-GM and organic farmers that have been questioned for this thesis has shown that, if they feel threatened in their existence, they (happily) take advantage of every opportunity of individually or collectively throwing spanners into the works of Monsanto's infrastructure of which the property regime is an essential part. This has been practised successfully when the commercialisation of transgenic wheat and flax was stopped. The intended OAPF's class action could result in the heavy spanner of legal responsibility. This would lead to a situation in which Monsanto (and Bayer) would not only hold exclusive rights but also would be exclusively liable for unintended side effects caused by their technology.

Last but not least, the examination of producer organisations like the "Saskatchewan Flax Development Commission" or the "Saskatchewan Pulse Growers" has shown that there are alternative property regimes to Monsanto's. In contrast to Monsanto's interpretative frame "Seed is a private good", these property regimes operate along the frame of "Seed is a good collectively owned". In the case of the Clearfield property regime, the major actors involved are BASF, the University of Saskatchewan, the Saskatchewan Pulse Growers and farmers. As farmers actually purchase the Clearfield technology incorporated in the lentils instead of only renting it for one growing season, they are allowed to save, re-grow and sell seed – but only on the condition that they sign the Clearfield Commitment. In other words, the farmers are allowed to copy the technology inside the seed and even sell it. This is completely opposed to the principle of the artificial creation of scarcity and excludability as practiced by Monsanto. In this context, the Clearfield property regime is fairly unique because a company, namely BASF, operates along the interpretative frame "Seed is a good collectively owned". It can be

argued that these practices could rob Monsanto of their laboriously established legitimacy with regard to the restricted accessibility to their immaterial good and with regard to their technology fee, the TUA, the auditing program and so on. If the Clearfield property regime should serve as an example for future property regimes dealing with immaterial goods, the Monsanto property regime will face a problem of legitimacy. In the case of the Clearfield property regime, a peculiarity can be observed which also is typical of the software industry. The company does not earn its main income with the immaterial good itself, but with services that are attached to it. In the case of the Clearfield property regime, the service that is provided with the Clearfield Test is quality management. Transferring the Clearfield property regime to the example of software, this would mean that Microsoft would allow its customers to pass on their software to anybody interested in it. The only condition for passing on the software would be that Microsoft checked the software to make sure that there is no virus and to guarantee its faultless function.

Now, that many of the factors contributing to the big "But" – that is all the phenomena that make (according to Gorz) the artificial creation of scarcity and excludability a fragile construction – have been outlined, it must be mentioned that they interact with each other on all of the analytical layers defined by Benda-Beckmann. This construction is even more fragile, as these layers may interact in many unexpected ways that cannot be predicted. For instance, if the social costs caused by the technology itself and by the mode of its commercialisation as perceived by the farmers or other social actors exceed a certain level, some kind of public pressure will build up and might react on the ideological and legal dimensions.

In addition to the insecurities mentioned above, there are some more that have not explicitly been dealt with in this thesis but also contribute to the fragility of Monsanto's property regime. For instance, any specific changes in the markets (e.g. caused by new European legislation on the subject of GMOs) could rebound on the dissemination of property regimes that follow the frame of "Seed is a private property". At the moment, it can be observed that consumers for whatever reasons prefer organically to industrially produced food. In California, for instance, the industrialised agricultural production regime is being partially substituted by an organic production regime. This change was caused by the occurrence of negative unintended effects of industrial agriculture and a growing demand for quality food (which is equated with non-GM and organically produced food) (compare Morgan et al. 2006). In the case of Canada, a similar trend could be on the horizon. Although the number of

organic farms in relation the total number of farms in Canada still is minuscule, the number of certified organic farms has more than doubled from 1995 to 2005. In Saskatchewan, the number of certified organic producer even has quadrupled in the same period (compare Macey 2006). Should this trend continue, this would result in a situation in which the demand for transgenic food would decrease, and with it, the acreage it is grown on, and, consequently, the extent to which a property regime like Monsanto's is used would decrease as well.
The opposite trend, however, is possible, too. In the face of the increasing demand for regenerative energy resources, e.g. bio fuels, the acreage on which respective plants are grown could increase. As the cultivating of huge acreages seems to be less complicated (at least in the short run) when transgenic varieties are grown, this could mean a dissemination of a property regime like Monsanto's.

5.4 A short comparison of software and transgenic seed regarding their respective property regimes

The findings of this thesis are interesting in themselves, especially as there are only few other analyses of property regimes dealing with seed. However, the question comes to mind if these findings can be generalised in any way for other immaterial goods, e.g. software. It should be noted that at this point this question will rather be floated instead of being answered in detail. However, some similarities between Monsanto and e.g. Microsoft on the one hand and the property regime of the non-GM community and e.g. the open source software community on the other hand, seem to be obvious, especially as software is a volatile good comparable to the technology embedded in seed. Therefore, it demands the same intricacies of handling when it comes to appropriating and commercialising it. It actually can be claimed that Microsoft's and Monsanto's approaches have in common one central principal: The artificial creation of scarcity and excludability. What follows is the well known pattern of patenting the immaterial good (source code) and commercialising it by means of a legal construct: Licences. What comes next are different practices (e.g. digital rights management (DRM)) aiming at enforcing the terms and conditions as outlined in the license, namely not to pirate copy it or to use it after the license has expired. In these terms, Microsoft customers and farmers are both 'users'.
In the same way, the non-GM farming community and the open source software community have a lot in common: They counter the concept of scarcity with the concept of sharing.

Where the non-GM farmers share seed, the open source users share software and its source codes. If licences are used, they serve to protect the absolute accessibility of the product. For both groups, their identity which implies independence and freedom of action is symbolised in the free accessibility of either seed or software. The example of software is not only interesting because there are unexpected similarities to seed, but also because Gorz and others (compare Merten/Meretz 2005) consider the dissemination of free software as the starting point of postcapitalistic society.

This short outlook suggests that the findings of this thesis are remarkable as it became evident that the appropriation and commercialisation of immaterial goods other than seed appear to follow similar lines. This it not a surprise as any company trying to commercialise immaterial goods will be confronted with similar problems as outlined by Gorz, DeLong and Froomkin.

5.5 Concluding remarks

Taking Monsanto as an example, it has been shown, that the appropriation and commercialisation of immaterial goods is possible, although it requires a lot of problem solving and constant alertness to defend the bastion of artificial scarcity in the ideological, legal and practical dimension. Even if the example of Monsanto's property regime seems to show that the looming crisis of capitalism as outlined by Gorz, is not imminent, it should be kept in mind that the continuity of capitalism (or the artificial perpetuation of capitalism respectively) does not only depend on the prosperity or the downfall of Monsanto's property regime, but on the global outcome of the numerous conflicts that are centred around the capitalistic appropriation of immaterial goods, as in the cases of The Human Genome Project, the mapping of the Icelandic genome and the medicinal properties of the Indian neem tree or plants from the rain forests.

If, for what ever reasons, these numerous conflicts of appropriation and commercialisation should fail due to the properties of immaterial goods, it might be interesting to have another look at the work of Gorz to get a vision of what postcapitalistic societies could be like and what kind of surprises and benefits they possibly could provide.

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Annexes

Annex 1: Interview transcripts and records

Mr Adams	Agriculture and Agri-Food Canada, May, 15. 2007.
Mr Becker	Seed company in the Saskatoon area, Jul., 17. 2007.
Mr Black	Agriculture and Agri-Food Canada, May, 23. 2007.
Mr Burns	BASF, Jul., 5. 2007.
Ms Chaney	The Canadian Green Party, Jun., 15. 2007.
Mr Dean	Non-GM Farmer, Jun., 3. 2007 and Jul., 1. 2007.
Mr Ericson	GM-Farmer, Jun., 26. 2007.
Mr Gordon	Organic Farmer, Jun., 17. 2007.
Mr Jones	Agriculture and Agri-Food Canada, May, 31. 2007.
Ms Meyer	Saskatchewan Pulse Growers, May, 24. 2007.
Ms Miller	Organic Farmer, Jun., 29. 2007.
Ms Roberts	Monsanto, Jul., 12. 2007.
Mr Scott	GM-Farmer, Jun., 16. 2007.
Ms Smith	Saskatchewan Flax Development Commission, Mai, 18. 2007.
Mr Thompson	Lawyer, Jul., 20. 2007.
Mr Wheeler	GM-Farmer, Jun., 16. 2007 and Jun., 24. 2007.
Mr Woodman	Seed company in the Saskatoon area, Jul., 27. 2007

Annex 2: Emails

Roberts (2007a): Email from Jun., 16. 2007

Roberts (2007b): Email from Jun., 17. 2007

Annex 3: Additional material

Koller, K. (2007): The Seed Saver. A play in two acts (draft), (forthcoming).

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Declaration Starnberg, October 30, 2007

I hereby declare that apart from the given resources the thesis submitted here has been written independently and without further assistance or help.

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Johannes Schubert