

# Integrating Natural Hazards into Economic History: Institutional Economics and the Development of German Crop Insurance\*

## 1 Introduction

In agriculture, hailstorms are one of the most dangerous occurring natural hazards. They can destroy a year's harvest in minutes. One major response to this hazard has been the invention of crop insurance which has been developed into an important device to deal with the economic consequences of such storms.

In German economic history, research on natural disasters is still relatively scarce. Similarly, German business history has not paid much attention to these hazards and especially their consequences for enterprises. Thus, it has not been sufficiently studied how instruments for risk management have evolved in Germany since the 18<sup>th</sup> century. Concerning the history of German crop insurance, most studies date from the beginning of the 20<sup>th</sup> century and analyse the development of this institution only in a descriptive way.<sup>1</sup>

This paper summarises some parts of my research on the initial stages and the further development of the history of crop insurance

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<sup>1</sup> For example N.[ikolaus] Freiherr von Thuemen, Geschichte des Hagelversicherungswesens in Deutschland bis zum Jahre 1895 und seine gegenwärtige Gestaltung, Dresden 1896, Walter Rohrbeck, Die Organisation der Hagelversicherung, vornehmlich in Deutschland, Berlin 1909.

in Germany. In the next section I will present the methods I am using. Then I will outline the cultural and socio-economic backgrounds that were responsible for the foundation of crop insurance. Finally, the focus will lie on the development in the 19<sup>th</sup> century.

This paper is based on a selection of German theological, economic and scientific journals from the 16<sup>th</sup> to the 19<sup>th</sup> century and combine a historical-anthropological study with an economic approach in the field of natural hazards and insurance.

## **2 Methodology**

In dealing with the cultural and social backgrounds of hazard insurance schemes, the reactions and attitudes of the population towards disasters and the strategies to cope with them should be considered. To achieve this goal, historical-anthropological methods are employed. Such an approach puts human reception and emotions as well as their coping strategies in the centre of analysis. It is important to acknowledge that only human perception makes a natural event a disaster. Only in this context can we learn how human beings were able to create functioning strategies and institutions to deal with disasters and to mitigate their effects in a historical perspective.<sup>2</sup> For the analysis of the crop insurance market, I use concepts of institutional economics to discuss the behaviour of market participants or market failure.

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<sup>2</sup> Alessa Johns (Ed.), *Dreadful Visitations. Confronting Natural Catastrophe in the Age of Enlightenment*, New York 1999, Anthony Oliver-Smith/ Susanna M. Hoffman (Ed.), *The Angry Earth. Disaster in Anthropological Perspective*, New York 1999.

## 3 The Background of German Crop Insurance

### 3.1 A fundamental Change of Perception

From the 16<sup>th</sup> until the 18<sup>th</sup> century, there was a fundamental change of perception with respect to natural disasters and concepts of security.

As far as hailstorms are concerned, an analysis of journals and theological tracts shows that up to the 17<sup>th</sup> century, hail was mostly perceived as a scourge of God. The only possibility for human beings to protect themselves was prayer and penitence.<sup>3</sup> However, theology itself changed its attitude towards nature. Around 1700, the so-called physico-theologians tried to combine Christian doctrine with scientific explanations. Nevertheless, God was still the creator of all natural processes.<sup>4</sup> But this point of view also lost ground as enlightened ideas gained acceptance. Henceforth, all aspects of nature including hail were studied in a rational way and God was less and less needed as a substitute for a sound theory.<sup>5</sup>

For the institutionalisation of crop insurance, changing concepts of security also played an important role. Insurance in Germany was not an established institution but was provided to some extent by the churches and guilds until the 18<sup>th</sup> century. In addition, there were forms of maritime and fire insurance, which, however, were

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<sup>3</sup> David Bramer, *Vom Donner, Blitz, Hagel, Sturmwinden und anderen grossen Ungewittern*, Erfurt 1577.

<sup>4</sup> Peter Ahlwardt, *Bronto-Theologie*, Greifswald 1746, Clarence J. Glacken, *Traces on the Rhodian Shore. Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century*, Berkeley 1967, 355-706.

<sup>5</sup> Lorraine Daston, *Classical Probability in the Enlightenment*, Princeton 1988. Religious explanations of nature continue to exist, however, until today.

only marginal. Early German economists, the so-called Cameralists,<sup>6</sup> published literature on insurance, partly with the aim to accelerate its implementation. Recognizing the importance of agriculture for economic growth, concepts of crop insurances were issued soon. However, central features of insurance technique were not considered. For example, risk diversification was only a secondary point in their argumentation.<sup>7</sup>

### **3.2 The Socio-economic Background**

The German population totalled approximately 16 to 18 million in 1750 and reached 24 million in 1816, an increase of 33 -50 %. Furthermore, there were growing possibilities for agricultural export. These developments would have required a commensurate increase in rural production, which could not be realised in the short run. As one consequence, the prices increased between 30 and 50 %. However, agricultural wages and other costs did not expand as much as prices. For example, in the above-mentioned period, wages rose only by 9 %. This price-cost-ratio allowed higher profits in the rural sector. That's why estate-values were rising, making protection of agricultural belongings against any kind of menace more and more attractive.

Secondly, the German agrarian constitution had not been reformed since the High Middle Ages. Nearly all peasants were burdened with feudal and seigneurial obligations, which dominated most of their lifes. However, there were regional differences: roughly speaking, North-West Germany was characterised by large estates. Many

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<sup>6</sup> For an introduction to the cameralists see Albion Woodbury Small, *The Cameralists*, New York 1962.

<sup>7</sup> Johann Heinrich Gottlob von Justi, *Die Grundfeste zu der Macht und Glückseligkeit der Staaten*, Band 1, Königsberg 1760, 763-771.

landless labourers had to work on these large farms (“estate agriculture”). In contrast, a large number of smallholders who sold their labour and had only minor access to land were typical for the agriculture in Southern Germany (“peasant agriculture”). At the beginning of the 19<sup>th</sup> century, in Prussia (and later in other German states), there was a reform called the liberation of the serfs. Theoretically, peasants should receive land to cultivate for themselves. In practice, many of them could not afford the compensation payments which had been assessed. Nevertheless, the foundations were laid for the farmers to become independent economic entities during the 19<sup>th</sup> century.<sup>8</sup>

Theoretically, this was also a point which should have stimulated the demand for coverage. But as we will see, the dissimilar agrarian constitutions cause crop insurance to be implemented at different speeds in Northern and Southern Germany. Also, the transformation of the majority of the peasants into independent economic entities combined with the change in perception went on over almost all of the 19<sup>th</sup> century.

## **4 German Crop Insurance in the 19<sup>th</sup> Century**

### **4.1 The Development until 1914**

The first efforts to realise the cameralistic concepts were state-driven. For example, in 1774, the governor of the Prussian province of Magdeburg had plans to start such a new company, but the project was not implemented. Most civil servants were positive

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<sup>8</sup> Richard J. Evans/ William R. Lee (Ed.), *The German Peasantry. Conflict and Community in Rural Society from the Eighteenth to the Twentieth Centuries*, London 1986, Friedrich-Wilhelm Henning, *Deutsche Wirtschafts- und Sozialgeschichte im 19. Jahrhundert*, Paderborn 1996, 40-127; 634-677.

about the usefulness and the urgency of such an enterprise but were more reserved because of the lack of precise data.<sup>9</sup> Finally, in 1791, the first enterprise was able to start business in the principality of Brunswick, which is in Northern Germany. It was organised as a local cooperation of private landowners but was dissolved in 1794 due to the insufficient number of customers and a wrong premium calculation.<sup>10</sup>

Roughly speaking, there were three periods in the history of German crop insurance before WW I. Until 1853, all companies except for one were organised as local mutual enterprises. Thereafter, new stock corporations gained ground and dominated the branch for 20 years. Around 1870, a new mutual crop insurance company was founded, which was able to compete with the stock corporations. So, finally, there was coexistence between the two legal forms. Altogether, 88 enterprises were established between 1797 until 1907, nearly all in Northern Germany but 54 of them dissolved during this time, mostly because of a wrong premium calculation and an insufficient risk diversification. The value of the insured crops increased from 306 million Marks in 1853 up to 3,5 billion Marks in 1913.<sup>11</sup> This fast development was also a result of the growth of agricultural areas and the need to protect the more valuable crop. In 1869, for example, 10 million tons of crop were produced in Germany, in 1907, this sum amounted to 17 million

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<sup>9</sup> Rosenmüller, B., Versuche zur Gründung einer Hagelversicherungsanstalt in den Jahren 1774 und 1793, in: Zeitschrift für die gesamte Versicherungs-Wissenschaft, 12 (1912), 590-597.

<sup>10</sup> Niedersächsisches Landesarchiv 40 Slg 13052; 23 Neu FB. 1 Nr. 1585.

<sup>11</sup> All mentioned figures are nominal. A deflation would not change the trend significantly.

tons.<sup>12</sup> Why were most of the companies founded in Northern Germany? Mainly because the large landowners disposed of sufficient capital to start such a project.

#### **4.2 Crop Insurance in Southern Germany**

The situation in Southern Germany was different from that in the northern part of the country. Such that, market failures can be analysed in a broader way. Only few crop insurance companies were implemented, mostly because of the area was more periled by hailstorms and the mentioned distinction of the agrarian constitution. Due to the large number of smallholders, it was difficult to raise the money for a company foundation. Furthermore, many peasants did not see the need to protect their belongings as most of their possessions were small. Also, agricultural prices were under pressure, especially in the first decades of the 19<sup>th</sup> century. For example, in 1816, average metric quintal wheat costed about 17 Marks but in 1850 the price was only 12 Marks. Only after 1871 did the agrarian prices increase continuously.<sup>13</sup>

Nevertheless in 1833, a private crop insurance enterprise was founded in Bavaria, the "Hagel-Assekuranz-Verein". Their premiums should be based on the regional hail risk of the last 20 years. Such long-term data were not available, however. Consequently, the calculation went wrong and in nearly every year, the insurance claims could not be paid off. For example, in 1843, only 60.000 marks were distributed while customers were entitled to indemnities worth 351.000 marks. So it was no wonder that most

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<sup>12</sup> Ernst Klein, *Geschichte der deutschen Landwirtschaft im Industriezeitalter*, Wiesbaden 1973, Hans Schmitt-Lermann, *Der Hagel und die Hagelversicherung in der Kulturgeschichte*, München 1984, 245-268.

<sup>13</sup> Wolfgang Zorn, *Kleine Wirtschafts- und Sozialgeschichte Bayerns*, München 1962, 37-44.

clients cancelled their contracts. In 1833, the company started with 1.529 customers, and in 1838, 17.150 peasants trusted the “Hagel-Assekuranz-Verein”. But due to the insufficient payments, the company was not able to build good reputation. Furthermore, modifications of the premium calculation were inadequate, mostly due to the lack of long-term data, and in 1855, only 839 insurance policies were held.<sup>14</sup>

As a consequence, different proposals were discussed in order to make the market more efficient. In 1853, for example, the Bavarian agricultural society demanded that a mandatory crop insurance should be established. Furthermore, private companies from Northern Germany should be granted access for doing business in Bavaria. Only the last point was accepted by the government and in 1856 such enterprises were licensed.<sup>15</sup> However, they had only minor successes, chiefly because of their adamant business policy. Furthermore, most clients from Northern Germany argued that with an expansion of their companies to Bavaria, the risk and premiums for themselves would increase due to the higher local hail danger in the south.

Finally, in 1884, the first state-owned crop insurance company worldwide was founded in Bavaria. The structure and regulations of the new enterprise were created in order to avoid the mistakes of the “Hagel-Assekuranz-Verein”. It was subsidised by the Bavarian government on an annual base but was not a statutory insurance.

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<sup>14</sup> For the figures see Eingabe des Vereins an die Kammer der Abgeordneten, in: Zeitschrift des landwirtschaftlichen Vereins in Bayern, 46 (1856), 158-159.

<sup>15</sup> For the discussions see Die dritte Central-Versammlung des landwirtschaftlichen Vereines für Bayern, in: Centralblatt des landwirtschaftlichen Vereins in Bayern, 43 (1853), 551-570.

Also, only a certain number of peasants in each region were insured in order to create a functioning risk diversification.<sup>16</sup> Furthermore, the authorities tried to improve the statistical material. For these reasons, the new company soon proved successful. In 1893, for example, 75.700 customers insured crops worth 114 million Marks, whereas in 1900, already 126.000 farmers trusted the company and the insurance sum had increased to 194 million Marks. The other private crop insurance companies who still operated in Bavaria profited from this development as well. In 1900, for example, they took care of 38.000 clients.<sup>17</sup>

## 5 Market Analysis

Why did the early crop insurance companies fail? How could these problems solved?<sup>18</sup> First of all, cultural factors were important besides economic reasons. The change of attitudes, especially towards insurance, did not reach the majority of the peasants until the middle of the 19<sup>th</sup> century. For example, even in 1883, the Bavarian parliament criticised that most farmers did not see the need for crop insurance.<sup>19</sup>

At the economic level, there were several important factors: there was not enough capital available in the first decades of the 19<sup>th</sup> century. Furthermore, the premium calculation was inaccurate and the small number of customers did not allow an effective risk diversification. Also, crops were not pooled with other risks.

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<sup>16</sup> For details see Gesetz, die Hagelversicherungsanstalt betreffend, in: Gesetz- und Verordnungsblatt des Königreichs Bayern, 1884, No. 8, 61-68.

<sup>17</sup> For the figures see Statistisches Jahrbuch für das Königreich Bayern, 7 (1903), 175-176.

<sup>18</sup> Unfortunately, an empirical analysis is not able due to the lack of data.

<sup>19</sup> For the discussions see Verhandlungen der Kammer der Abgeordneten des bayerischen Landtages. Stenographische Berichte 1883/ 84, I, 521.

In a next step, I analyse the market with the tools of institutional economics, regarding the occurrence of asymmetric information. Problems of (ex-ante) moral hazard were not given in this situation because the farmer is not able to create a hailstorm. However, crop insurance is typically subject to insurance fraud, as crops can be hidden from insurance inspectors trying to evaluate the damages. This can be interpreted as an ex-post moral hazard. Even more importantly, there were adverse selection problems. On the one hand, potential clients were unsure about the reliability of a company like the "Verein". As mentioned before, the management was not able to build up a reputation in order to mitigate this problem. On the other hand, the enterprise could not rate the exact risk of the individual customer. Especially for Bavaria, the "Hagel-Assekuranz-Verein" had a monopoly position before other companies were licensed. However, the "Verein" could not benefit from this situation.

How could the problems be solved? For Germany as a whole, the basic economic conditions improved. With increasing agricultural prices, there was also a rising need for hail insurance. In Bavaria, public help was responsible for the establishment of a functioning crop insurance market. Also, the competitors profited from an increased demand due to this foundation. Adverse selection problems were solved mostly due to the possibility of a regional limitation of customers and the improvement of the statistical material. Furthermore, reputation of the new enterprise improved partly because of the subsidisation. In conclusion, the new company proved successful and the Bavarian peasants gained an effective protection.

## **6 Summary**

This paper has shown that the changing mentalities both of natural hazards and concepts of security were partly responsible for the establishment of crop insurance. Therefore, concepts for such new institutions were published by early German economists and around 1800 more and more companies were founded. In the first decades, we can find typical aspects of insurance market failures like an inadequate risk diversification. Furthermore due to asymmetric information, adverse selection problems emerged - caused by the insurers' inability to calculate risk-based premiums. Partly by reason of governmental help, partly due to the increasing agricultural prices, these problems could be solved.