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## An unexpected discovery: Johann Heinrich von Thuenen and the tragedy of the commons

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**Thünen-Series of Applied Economic Theory**  
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Working Paper No. 135

**An Unexpected Discovery: Johann Heinrich von Thuenen and the  
Tragedy of the Commons**

by

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# **An Unexpected Discovery: Johann Heinrich von Thuenen and the Tragedy of the Commons**

By Ludwig Nellinger, Bonn

## **Abstract**

William Forster Lloyd's 1833 sketch about poor cattle on the commons and the well-fed animals on the adjacent enclosures published in his "Two lectures on the checks to population" has hitherto been assessed as one starting point of the economics of renewable resources. In the 20<sup>th</sup> century the question of the use of common property resources has initially been treated by fisheries economists, at first in unknown publications of Jens Warming in 1911 and 1931, and after a disruption of more than 40 years starting again with the contributions of Gordon and Scott in the 1950s. Important results have been the derivation and presentation of the economic criteria for the open access equilibrium case on the one hand and the private property equilibrium case on the other hand. Garrett Hardin's well known 1968 Sciences article brought a new title and increased awareness to the "tragedy of the commons" and Elenor Ostrom's 2009 nobel prize in economics finally underlined the importance as well as the diversity of institutional rules to achieve an efficient use of the natural resources – challenging the favored liberal concept of a privatization of scarce resources.

Johann Heinrich von Thuenen's contributions on the commons – hidden in an 1831 article about urban agriculture in the journal "Neue Annalen der Mecklenburgischen Landwirtschaftsgesellschaft" and in an unpublished manuscript – have been totally neglected until now, although he published his article about the core problem of the commons two years earlier than William Forster Lloyd and almost in the clarity of the fisheries economists 80 resp. 120 years later. He not only presented the correct allocation criteria for both property rights scenarios but additionally developed a framework

- a) how to gain the maximal rent of a resource through an auction system – drafting the first demand table
- b) how to redistribute the gains to the communal property owners – developing an adequate compensation mechanism
- c) and finally how to establish this institutional innovation democratically - thereby applying important elements of Elenor Ostrom's Common Property Rights Framework.

Due to these contributions Johann Heinrich von Thuenen deserves the title of the founder of the economics of renewable resources. Moreover, in combination with his publications on forestry, land use, soil improvement and agricultural processing industries he should also be seen as the creator of a discipline which got its name but now, the creator of bioeconomics.

JEL-classification: B13, B15, B16, Q15, Q21, Q22, Q24

keywords: bioeconomics, economics of renewable resources, tragedy of commons, fisheries economics, urban agriculture, factor demand table, auction system.

# **An Unexpected Discovery: J. H. von Thuenen and the Tragedy of Commons**

**by Ludwig Nellinger, Bonn**

## **I. Introduction**

Prefacing the first English translation of part III of the “Isolated State in Relation to Agriculture and Political Economy” the great 20<sup>th</sup> century economist Paul A. Samuelson titled Johann Heinrich von Thuenen (1783-1850) an “economist ahead of his times” who “still speaks to us”.

Samuelson’s famous 200<sup>th</sup> anniversary article in 1983 has brought a new push to the investigation of Thuenen’s works. Progress has been made in understanding his contributions to the theory of distribution, to his capital theory and to monetary theory by particularly considering his unpublished manuscripts and his rarely known publications in the “Neue Annalen der Mecklenburgischen Landwirtschaftsgesellschaft”.

This article will underline that the following lines from Erich Schneider – an appreciated German economist of the past century – will fully apply not only in 1934 when they were written but also 80 years later in 2014 : “Only a few of us realize that problems which now stand in the very center of our present investigations had been already recognized by von Thuenen in their full significance with incomparable clearness; and that moreover there are contained in his books many valuable hints and data as to their efficient treatment.” This is the fact particularly with respect to Thuenen’s contributions to the economics of renewable resources as well as to the solution of the institutional problems concerned.

## **II. The Tragedy of the Commons and its treatment in the economic theory**

In 2009, about 160 years after the death of Johann Heinrich von Thuenen, Elenor Ostrom received the prestigious Nobel Memorial Prize in Economic Sciences for her analysis of economic governance and particularly her answers to the question how common property could be successfully managed by groups using it. The questions which arise with respect to an efficient use and the avoidance of overuse of common pool resources had scarcely been treated in the economic literature of the past centuries, although they have been from great importance especially in rural societies for thousands of years. The only exception may be contributions to forestry economics by foresters and administrators.

### William Forster Lloyd's contribution

According to the hitherto existing economic literature William Forster Lloyd was the first economist who introduced the concept of the overuse of a common by its commoners in his *Two Lectures on the Checks to Population* (1833), a problem which was later described by the ecologist Garrett Hardin and termed by him as "The Tragedy of the Commons". W.F. Lloyd questions in 1833:

*"Why the cattle on a common are so puny and stunted? Why is the common itself so bare-worn, and cropped so differently from the adjoining enclosures? No inequality in respect of natural or acquired fertility, will account for the phenomenon. The difference depends on the difference of the way in which an increase of stock in the two cases affects the circumstances of the author of the increase. If a person puts more cattle in his own field the amount of the subsistence which they consume is all deducted from that which was at the common, of his original stock; and if, before, there was no more than a sufficiency of pasture, he reaps no benefit from the additional cattle, what is gained in one way is lost in another. But if he puts more cattle on a common, the food which they consume forms a deduction which is shared to all the cattle as well that of others as his own, in proportion to their number, and only a small part of it is taken by his own cattle. In an enclosed pasture, there is a point of saturation, if I may so call it (by which I mean a barrier depending on considerations of interest), beyond no prudent man will add to his stock. In a common, also, there is in like manner a point of saturation. But the position of the point in both cases is obviously different. Were a number of adjoining pastures, already fully stocked, to be at once thrown open, and converted into one vast common, the position of the point of saturation would immediately be changed. The stock would be increased, and would be made to press much more forcibly against the means of subsistence." (Lloyd, 1833, pp. 31-33)*

Lloyd's lectures are first and foremost an essay on overpopulation. The example of an overcrowded pasture serves mainly as a metaphor in this context. The whole two lectures treat the problem of Malthus' forecasted overpopulation caused by a geometrically increasing population and an arithmetically increasing productivity (Lloyd, 1833, pp. i-ii) and measures to achieve the equilibrium between food and population.

Nonetheless William Forster Lloyd recognizes important similarities between overpopulation problems in a world with limited resources and the problems of the economic use of common pool resources in general, especially that individual efforts and gains may not fit together with efforts and gains for all participants of an economic system. Lloyd for example criticizes the inefficient cost-benefit ratio in the case that a sole individual effort leads to gains for all, or the situation that two or more persons use one purse of money, without any restriction or regulation of their disbursements. From importance for the history of economic thought is also his insight in the underlying intertemporal allocation problem. The consequences of the act of one will equally divided between all so that there is no later individual benefit from abstinence now. Last not least he outlines that there are differences between the private enclosure equilibrium and the open access equilibrium.

Lloyd recognizes: "The fault may rest, not with them as individuals, but in the constitution of the society, of which they form part." (Lloyd, 1833, p.23), thereby anticipating the central institutional message of resource and environmental economic literature 150 years later.

### Garrett Hardin's treatment of the problem

Let's now have a look on Garrett Hardin's treatment of the problem, published in 1968. Hardin is also discussing the problem in the context of overpopulation problems, but to our opinion without adding much from great importance to W.F. Lloyd's analysis:

*"As a rational being each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks: "What is the utility of me to add one more animal to my herd?" This utility has one negative and one positive component.*

*1) The positive component is a function of the increment of one additional animal. Since the herdsman receives all the proceeds of the sale of the additional animal, the positive utility is nearly +1.*

*2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all herdsman, the negative utility for one particular decision-making herdsman is only a fraction of -1.*

*Adding together the component partial utilities, the rational herdsman concludes that the only sensible course to pursue for him is to add another animal to his herd. And another, and another .... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked in a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in freedom of the commons. Freedom in a commons brings ruin to all." (Hardin, 1968, p.1244)*

We wouldn't be just to Hardin's contribution, if we neglected possible recipes he presents. For the case of National Parks – overcrowded by unlimited access of visitors – he delivers possible solutions:

*"What shall we do? We have several options. We might sell them off as private property. We may keep them as public property, but allocate the right to enter them. The allocation might be on the basis of wealth, by the use of an auction system. It might be on the basis of merit, as defined by some agreed-upon standards. It might be by lottery. Or it might be on a first-come first-served basis, administered to long queues. These, I think, are all the reasonable possibilities. They are all objectionable. But we must choose – or acquiesce in the destruction of all commons that we call our National Parks." (Hardin, 1968, p. 1245)*

Finally Hardin makes some points on introducing the necessary institutional measures and procedures to solve the problem:

*"To many, the word coercion implies the arbitrary decisions of distant and irresponsible bureaucrats. The only kind of coercion I recommend is mutual coercion, mutually agreed by the majority of people affected. To say, that we mutually agree to coercion is not to say that we are required to enjoy it, or*

*even to pretend we enjoy it. Who enjoys taxes? We all grumble about them. But we accept compulsory taxes because we recognize that voluntary taxes would favour the conscienceless. We institute (and grumblingly) support taxes and other coercive devices to escape the horror of commons.” (Hardin, 1968, p.1247)*

Neither William Forster Lloyd as an economist nor Garrett Hardin as an ecologist analyzed the economic circumstances of the use of a common property in depth; the literature on the development of the history of economic thoughts assumed that this has been reserved to some fisheries economists of the 20<sup>th</sup> century.

### Jens Warming's, Scott Gordon's and Anthony Scott's economic theory of fishing grounds as a common property resource

The main lines of Fisheries economics were initially developed by the unknown and neglected contribution of Jens Warming at the beginning of the 20<sup>th</sup> century (1911 and 1931). After a long disruption fisheries economics was started again – without taking notice from Warming's contributions – in the mid-1950s publications of the Canadian economists Scott Gordon (1954) and Anthony Scott (1955). Their ideas and results were based on biological fisheries modelling, primarily the works of Schaefer (1957), in which the relationship between fishing activities and biological growth has been formalized. Models of the population growth made it possible to evaluate biological and economic impacts of different fishing arrangements, fishing activities and management decisions. Jens Warming and the Canadian economists added the economic interrelations and allocation criteria to the biological models, mainly important are two theorems:

A sole fisher with well-defined property rights will follow a strategy:

Marginal Revenue = Marginal Costs.

This equilibrium condition delivers the maximal rent of the resource under the “usual” assumptions.

The equilibrium of a free access fisheries grounds on the other hand is:

Average Revenue = Average Costs.

A behavior according to this equilibrium condition completely annihilates the rent.

One could add much more details about fisheries economics and the underlying model (cf. Gordon, 1954; Scott, 1955 and others), but this is not necessary here.

### **III. Thuenen's analysis of the use of Common Property Resources**

The unpublished manuscripts of Johann Heinrich von Thuenen are an underestimated source to comprehend the not self-explainable parts of his published works as well as to discover further important economic contributions, which haven't been recognized and appreciated until today. This is particularly the fact with respect to the contributions of Thuenen to resource economics and property rights issues.

#### Thuenen's contribution to the economics of property rights in the fisheries

Let's first turn to an unpublished manuscript, "Excerpts from Political Economy" of Johann Heinrich von Thuenen, which has been presented and partially explored by Rieter (2002).

The following passages have been presented and commented for the first time in an article "Thünens nachgelassener Text zu Monopolpreisen und Verfügungsrechten" (Thuenen's descendant text on monopoly prices and property rights) by Nellinger in the "Thünen-Jahrbuch" in 2010. It is unknown, when Thuenen has written his text. It can be assumed that this happened between 1820 and 1830. In this text he critically comments Eusebius Lotz', a contemporary German economist's analysis of the economics of local fishery:

"In a country, where everyone is allowed to fish, fishes will come to market at a lower price in comparison to countries where local fishing grounds have become a property of individuals, which strive for a rent of their property. The price of fish consists in this case not only of the fishing costs but also of the rent for the owner of the inshore water." (Lotz, 1814, p. 259)

Thuenen comments:

"The remark of Lotz can lead to interesting considerations about the origin of the rent (which is not purely caused by the appropriation) and its impact on the prices of the produces." (Thuenen, o. J., p. 51)

Thuenen then differentiates between an open access case "where everyone is allowed to fish" and the private property case and describes correctly the resource allocation and influence on the long term market price of fish for both institutional arrangements:

#### **(1) Open access case**

"If fishing activities gain a higher product than agricultural or industrial activities: the number of fishers will increase, by this increase of fishing the stock of fishes will decrease, fishery will yield lower returns, until in the end fishing does not pay more than labour in other business sectors. The entitlement of everyone to fish causes a decrease of the amount of marketed fishes, whereas the demand is the same as before and thus follows an increase of the price of the fish. "(Thuenen, o. J., p. 52)

#### **(2) Private property case**

„If the lake is the property of an individual: The owner then has a monopoly enabling him to increase the price. His scope must be getting the highest return from the lake, and one has to ask at what



amount the price has to be increased in order to fully achieve this purpose. If he fixes prices as high, that no one is able or is willing to buy fishes, he will have no revenue at all. If he lowers the prices as much, that the rich and those which have the strongest demand for fish, will be motivated to buy fishes he will gain some income. If he decreases the price more, less prosperous people are enabled to buy fish. The sales are increasing more and the higher amount of sold fishes at lower prices can yield higher income than a lower quantity of fishes at higher prices. By the further decrease of prices and thus further increased sales we will reach a point, where the income from the rural lake is a maximum, and this would be the maximum, and if we only consider the consumer, this would be the natural price of fishes.

On the other hand the labour productivity of the fisher will be lower and more valuable, the more the fish stock decreases. If the owner only considers this fact, he will maintain as much fishes in the lake as able to survive, as under this condition labour yields the highest product, and as under this condition the lake sustainably delivers the highest yield. Which of these both considerations has the strongest effect on the determination of the price?" (Thuenen, o. J., p. 52)

We recognize in these passages probably written between 1820 and 1830 that Johann Heinrich von Thuenen was the first economist who firstly and exactly described the economic equilibria of the use of a common property resource under different institutional arrangements and their consequences for the market prices of the produces.

Far more surprisingly than the discovery of this unpublished text is the analysis of an until now neglected publication from Johann Heinrich von Thuenen in a contemporary agricultural journal, the "Neue Annalen der Mecklenburgischen Landwirtschaftsgesellschaft" from the year 1831, that means two years before Lloyds lectures on overpopulation, to which we will turn now.

#### Thuenen's published Expertise about urban farming from 1831

Urban agriculture, actually intensively discussed in agrosociologies as well as in the context of the United Nations Programmes to overcome hunger and to contribute to environmental goals, has a long history, especially for towns and periurban areas.

Around 1830 Johann Heinrich von Thuenen was asked to check the efficiency of urban agriculture in Mecklenburg and to develop proposals to improve this sector. His "Erachten über die Verbesserung des Ackerbaus der Städte" was published in the agricultural journal „Neue Annalen der Mecklenburgischen Landwirtschaftsgesellschaft“ in 1831. The expertise deals with the profitability of the production of cereals, potatoes, vegetables, wood, flax, milk and other branches of animal husbandry under the specific circumstances and restrictions of urban areas on the production side as well on the demand side. He exactly analyses the opportunity costs of labor through other business, the synergies between factor use in agricultural and nonagricultural production, specific joint production and municipal manure questions.

Thuenen also points out the critical issues of these “mixed enterprises”:

*“Does a citizen not only work as a farmer but also as a craftsman: so he won’t be a master in any of these business; his work will be from low quality and his labor product will be low. The disadvantage arising from this cannot be calculated exactly – but it will be larger than it seems in the first moment – and likely this is the main reason, why the products of producers in small towns can’t compete with the producers of foreign countries neither with respect to the quality nor to the prices.”*

With respect to the urban agriculture he concludes:

*“In the urban agriculture we recognize a strange mixture from profitable and loss-generating productions, an almost incomprehensible pursuit to powerfully engage in unfertile productions and in contrast to restrict the fertile productions, or to make them useless by wrong institutional provisions. We recognize, that and how cow pastures, which can yield a high rent, stop to deliver this rent because of overgrazing by too much cattle.”*

We’ll turn now to Thuenen’s treatment of what is called the tragedy of the commons. We’ll start with the presentation of Thuenen’s passages in English translation in full length and with only some brief remarks in order to underline his important achievement in one of the most important resource economic questions.

#### Analyses of the use of the communal pasture in Thuenen’s expertise

*“The cow pasture on municipal fields is communal grazing land. The right to drive livestock to this pasture may be linked to different conditions in the different towns; as far as it has come to my knowledge, however, the number of those entitled is so large everywhere that - if everybody makes use of his right - the pasture cannot feed the cattle.*

*In many, perhaps in all, towns no rental rate is paid for the cattle driven to the commons, but only a small herding wage.*

*Now where does such a ratio lead? This may become clearest through the following example: Let us assume a rural lake rich in fish which used to be private property until that time, and which produced a considerable fishing rent, is now left to the free, unlimited use of any and all - what is the necessary consequence thereof? Fishing work thereby becomes more lucrative than any other; every labourer leaves his hitherto practised occupation and hastens to fish. Bit by bit, the number of fish in the lake decreases, the same labour generates an ever lower product until, at last, fishing does not pay more than ordinary wage labour. The end result of such generosity therefore is that the lot of the labourers does not improve, but that the rent, which the lake used to yield, is annihilated.*

*The same goes for the commons in case of the free access thereof.*

*Capital, labour and industry always turn towards the object which grants the highest returns. For as long as the use of the pasture still grants a higher use than other branches of industry, the proliferation of the livestock will continue, and this proliferation will not find a limit other than that the use of the pasture no longer produces a profit.*

*The pastures, which, given an appropriate use, would be a source of prosperity for the towns, thus cease to yield any rent.*

*The high value of milk in the town also bestows a high value to the grass which grows on the pasture; but the manner in which this grass is turned into milk is so inexpedient, and thus so expensive, that the costs of this transformation cancel out the value of the grass, and reduce the net yield/product of the pastures to zero.”(Thuenen, 1831, pp. 354-356)*

We clearly recognize, that Thuenen’s analysis of the common property resource problem – although published in 1831, two years before W.F. Lloyds Essay on overpopulation – could be taken out of an economic textbook of the 21th century. There is nearly nothing to add to the main messages. Thuenen verbally explains the central equation which constitutes the open access equilibrium, which leads to the full loss of the possible rent of a common property resource, superiour to Lloyd’s as well as to Garrett Hardin’s treatment of the problem and fully comparable with the fisheries economist’s analysis. Thuenen clearly points out the consequences which are caused through the institutional rules

*“The administrations of the municipalities recognize the deficiencies for a long time, and lively desire for a change, as well as the individual citizen, who is entitled to bring cows on the communal pasture, is acting according to his own interest, if he uses this right as long as cow husbandry yields any low profit. The evil consists in the organisation of the municipalities with respect to farming, which brings the individual interest in opposition to the interest of the whole community.” (Thuenen, 1831, p. 369)*

*“By grazing so much livestock on the commons that it cannot feed them is the root of the evil from which urban agriculture suffers; because this not only ruins the rent which the pasture can yield, but also necessitates the extensive cultivation of grain to obtain straw for the numerous cattle. A remedy is difficult here, however, since no recognized law may be violated, no single person's entitlement to drive livestock on the commons may be taken. (Thuenen, 1831, p. 376)*

### Reorganisation of the grazing rights

Finally Thuenen develops the following proposals for the improvement of the use of the communal pasture as an important element of urban agriculture, anticipating the construction of a factor demand function and a democratically enforceable institutional arrangement including a fair redistribution of the gains of this new arrangements:

*“Proposal: To increase the rental rate for the livestock to the point at which the entire commons produces the highest monetary yield, and distribute the sum resulting from the rental rates to all those who hold the right to use the pasture in accordance with the size of their entitlement.*

*It was shown in the first chapter that, when no rental rate is paid, but a mere herding wage, it is in everyone's interest to drive cattle to the pasture for as long as this produces some profit, and that only the total disappearance of this profit can move those entitled to pasture not to make use of this right – whereby the yield from the pasture for the community as well as the individual drops to zero.*

*If, in contrast, a rental rate of 2 thalers is paid for one cow, all those who do not value the pasture at 2 thalers, refrain from the use of the same, and the pasture will then become more plentiful.*

*If the rental rate for a cow is then increased successively to 3, 4, 5 thalers etc., fewer and fewer cows will be put on the commons, and, eventually, only those citizens, who, because of their other economic situation, derive the highest use from cow husbandry, will drive cattle to the commons. The pasture will then be very plentiful, and the cows will repay the rental rate paid though their yield. Let us assume*

<i>at the rental rate</i>	<i>the pasture is run</i>	<i>the net product of the commons is</i>
<i>of 0 thalers</i>	<i>with 500 cows</i>	<i>0 thalers</i>
<i>" 1 "</i>	<i>" 450 "</i>	<i>450 "</i>
<i>" 2 "</i>	<i>" 400 "</i>	<i>800 "</i>
<i>" 3 "</i>	<i>" 350 "</i>	<i>1050 "</i>
<i>" 4 "</i>	<i>" 300 "</i>	<i>1200 "</i>
<i>" 5 "</i>	<i>" 250 "</i>	<i>1250 "</i>
<i>" 6 "</i>	<i>" 200 "</i>	<i>1200 "</i>
<i>" 7 "</i>	<i>" 150 "</i>	<i>1050 "</i>

*In this calculation, which only serves as an example, the pasture would produce the highest net revenue at a rental rate of 5 thalers per cow, and this would be the point at which one would have to come to stop the increase of the rental rate.*

*If the pasture belonged to an individual, this person would keep so many cows on it, that he would obtain the highest possible net product from the total pasturing area. We achieve the same result for the commons by increasing the rental rate, and so, in this respect, the communal pasture can be taken to the same net product as the private pasture.*

*The sum calculated from the rental rate – 1250 thalers in the above example – would then be distributed among the commoners, and the share falling to each individual would be a net increase of his income; since those who do not presently keep cows gain – since the pasture would not multiply the net product from the cows which they would otherwise keep, – the whole amount of the rental rate; and those who presently keep cattle are recompensed for the rental rate they give through the higher yield in milk but are paid back their part in the rental rate as a net profit. Or, in other words: the pasture, which hitherto produced no net product at all, will now produce a rent of 1250 thalers, which, distributed among the citizens, increases their income.*

*But in order to find out at which rental rate in a given year – since this will not be identical in every year, – the commons will produce the highest net revenue, I propose the following means: To draft several lists for a rental rate of 1, 2, 3, 4 thalers etc. per cow, and call upon the citizens to put down in each list the number of cows they would want to put on the commons at the stated rental rate, and*

*to add the condition that the list whose subscription results in the highest net revenue of the pasture, will serve as a norm the next year.*

*As decided and self-evident as the advantage may be which such an arrangement would grant: there is no prospect for the realisation of this proposal, because the refusal of acceptance of one, perhaps entirely ignorant individual citizen suffices to impede the execution.*

*But given such a situation, a municipality can prosper and progress to the better just as little as a state can.*

*Before we can thus proceed to an improvement in urban agriculture, a joint decision of the citizens would have to constitute that changes to the agricultural system may be made as soon as the majority, or also two-thirds, of citizens of voting age have decided in favour of it, with the approval of the magistrate.*

*If this is unachievable all suggestions for improvement remain fruitless; if it can be achieved, however, I see no insurmountable difficulties in the execution of the above proposal.”(Thuenen, 1831, pp. 376-380)*

#### **IV. Summary and a brief evaluation of Thuenen’s contribution**

Thuenen exactly analyses the allocation mechanism of an unregulated use of a common property already in 1831, exactly 80 years earlier than the unknown Dane Jens Warming and more than 120 years earlier than the appreciated Canadian economists Scott Gordon and Anthony Scott.

In his unpublished comments on Lotz’s determination of the price of fishes he drafts the functional relationship between the price of fishes and the demand for this produce, he further anticipates the price determination in the case of a monopoly; in his expertise on urban agriculture he drafts a table, which allows to determine the demand for pasture rights in dependence of their price by all interested commoners.

Thuenen proposes an institutional arrangement, in which marketable rights to the flow of common resource units are developed in order to overcome the suboptimal use of the common and to achieve a maximum of the rent, considering also the uncertainty and the risk of annual variations of the yield.

He proposes an efficient allocation mechanism for the distribution of rights among those who are entitled to use the communal resource and the redistribution of the gained profit.

Last not least he discusses the chance to introduce his institutional/organizational proposal by a democratic process on the level of the municipality.

By this contribution Johann Heinrich von Thuenen anticipates modern approaches to analyse the Common Property Rights problems. His proposal considers the main requirements of the framework to solve such problems developed by Elenor Ostrom, the economic nobel prize winner of 2009, and others.

The content of Volume III his “Isolated State”, which is subtitled “Principles for the Determination of rent, the Most Advantageous Rotation Period and the Value of Stands of Varying Age in Pinewoods” and the above presented contributions to fishery economics and the common property resource allocation of a municipal pasture justify to bestow a further title on Johann Heinrich von Thuenen. Besides his pathbreaking merits in marginal analysis, location and general equilibrium theory, mathematical modelling and econometrics he may also be called the founder of the economics of renewable resources and – being aware of his contributions to agricultural economics and agricultural processing industries – as the founder of bioeconomics in general.

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