

Final report on the research project  
"Calculate it right: Implementation of extended financial  
accounting in agriculture, including monetary valuation of  
external effects".

November 2019

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The project was supported by



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# 1. Introduction

## 1.1 Background and relevance

In autumn 2019, farmers in Germany walked the streets and demonstrated because they felt their livelihoods were threatened by the measures adopted by the Federal Government for more environmental services. In Baden-Württemberg, the protest is still being fired up by the petition for a “Save the Bees” referendum. The society, and above all the young generation and the current situation, urgently require more sustainable uses of natural resources. Agriculture must be much more sustainable and regional, but is this possible with the very low prices for milk, meat, and vegetables? More sustainable farming does not only mean the elimination of synthetic chemical fertilizers and pesticides - sustainable organic farming requires knowledge, extra capacity, and costs money.

Why does it make sense in this situation to develop the "Calculate it right" method for agriculture, and how could its application contribute to securing livelihoods of farmers? It is urgently necessary to reform the income statement of agricultural enterprises and to calculate the correct figures. In the accounting and balancing practised on farms to date, all qualitative and quantitative figures and values miss real evaluation of ecological and social, as well as regional economic, performance factors. This concerns both the value-creating side of the economy, and the value-destroying side of the income statement. The value of natural and socio-economic assets is currently set to zero in the accounts, regardless of how the business is run. Business assets such as soil fertility or specialist knowledge are created or lost without being adequately reflected in the abstract income statement.

However, the economic income statement is of crucial importance in raising capital, setting prices, and assessing operating success. Since this phenomenon does not only occur in individual companies, but is a systemic pattern, unsustainable economic activity has spread on a large scale. As a result, existentially threatening risks and damage occur, such as climate change, contamination of groundwater, or loss of soil fertility. Farmers are often aware of the problems of their economic activity, but in the current situation of an incomplete income statement, with incorrectly calculated product prices (leaving external costs and extra expenses out), it is difficult for them to counteract them.

In order to give the urgently-needed course change towards more sustainable agriculture a chance, the extension of the profit and loss account to include sustainability factors is key. Risks must be captured and evaluated, and positive performance must be rewarded. This requires methods and instruments that are practical.

## 1.2 The project “Calculate it right”

From May 2018 to October 2019, Regionalwert AG Freiburg, in cooperation with the research association “Die Agronauten e.V.” and four agricultural enterprises from the region, carried out a project for the recording, evaluation, and balancing of social, ecological and regional economic services in agriculture. It consisted of two modules: the practical recording and evaluation of sustainability performance on four farms; and the social and ecological impact on the farms, the farm managers, and their social environment. This module was mainly carried out by Prof. Christian Herzig from the University of Kassel-Witzenhausen.

The project was financially supported by the Innovation Fund of the regional energy supplier badenova and the Software AG Foundation.

The project was developed against the background that sustainably operating businesses incur additional costs in order to avoid negative external effects of agriculture through various measures, including the rejection of chemical-synthetic fertilizers and pesticides, more extensive animal husbandry, regional origin of inputs, use of seed-solid varieties and training. The farms assume additional costs for this, which, as a

rule, and are insufficiently compensated by product price. This additional expenditure and the associated services are neglected in classic accounting abstraction or are not taken into account in annual accounts or, if they are considered, it is only on the cost side. However, these values are rarely considered as profit, nor calculated on the assets side of the balance sheet.

In the project "Calculate it right in agriculture" it was possible to show ways in which the sustainability performance of farms can be recorded, evaluated, and monetised. The task of the project was to identify accounting data in which sustainability performance is hidden. The cause-related allocation of expenses and revenues on the basis of accounting documents and their utilisation in extended financial accounting makes ecological, social, and regional economic performance values visible, and makes it possible to draw up a sustainability balance based on ordinary accounting (according to HGB).

The project's approach was to provide evidence of the operational added value that had been created, and not to provide evidence of a reduction in expenditure with the consequence of economic risks and asset losses, as demanded by various actors in politics and society. However, at the end of the project it can be stated that the developed method, as well as the instruments, are also suitable for a risk analysis and evaluation with regard to sustainable operational management. Accordingly, the method could be used in the sense of the recently published obligation of the Federal Financial Supervisory Authority (Bafin) on the financial relevance of risks arising from non-sustainable management.

## 2. Methodology of "Calculate it right"

### 2.1 The procedure

In order to be able to reflect the created values and services of an agricultural enterprise in the Regionalwert sustainability accounting, three preliminary steps are required:



#### Step 1: Recording sustainability performance

Within the framework of "Calculate it right", a set of seven categories, almost 50 subcategories and about 180 input values for the recording of sustainability performance was developed. The compilation and definition of the individual input values was, and is, an ongoing process, based on the following questions: Which services describe a sustainable operation? How can these services be recorded in a practicable and appropriate manner? In doing so, it is always necessary to navigate between a complete presentation of the operating situation on the one hand, and an easily manageable effort of recording on the other?

#### Step 2: Evaluation

In order to be able to evaluate the data collected, an interpretation framework is necessary. To this end, it is important to know the current state of agricultural practice, and to define goals per indicator. From this, limit values can then be derived, which are divided into three evaluation stages. The three levels correspond to a traditional traffic light system consisting of the three value ranges: Green (= sustainable), yellow (= moderately sustainable) and red (= not sustainable).

#### Step 3: Monetisation

In order to show that sustainability services not only generate operational costs, but also build or maintain assets (soil fertility, biodiversity, etc.), it is important to reflect these services in monetary terms. In the

“Calculate it right” method, there are different ways of calculating the monetisation of performance indicators.

#### Step 4: Regionalwert sustainability accounting

Finally, the recorded and monetized values of a company are integrated into new income statements in the profit and loss account and logged in the annual balance sheet under "social-ecological benefits". For this purpose, a regional value model account framework was developed which presents the accounts of farms in a uniformly structured and differentiated manner.

### 2.2 Recording sustainability performance in “Calculate it right”

Seven categories and nearly 50 subcategories and 180 input values for the recording of sustainability performance were developed for the “Calculate it right” framework.

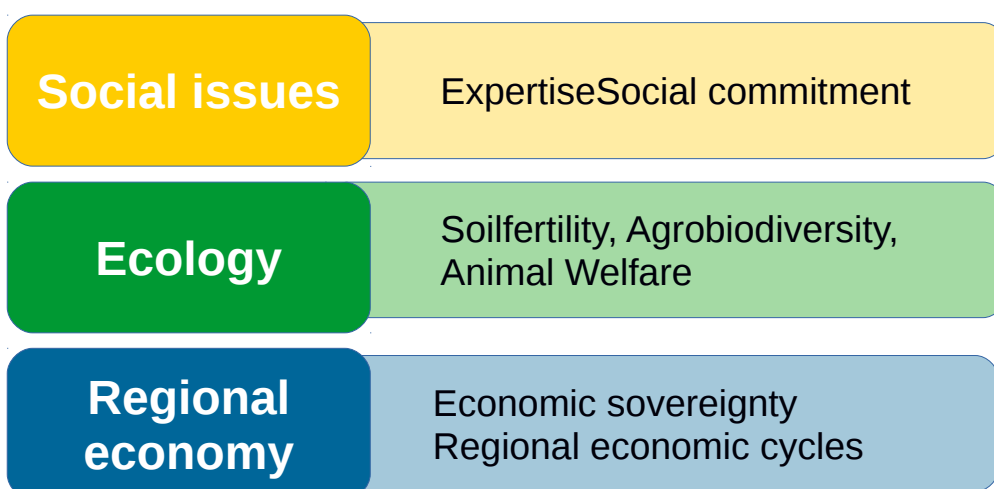


Figure 2: The three dimensions and the corresponding categories of “Calculate it right”.

The categories in turn consist of several subcategories, which are entered via one or more **input values**. All in all, the “Calculate it right” entry currently consists of nearly 50 subcategories and about 180 input values. Figure 2 demonstrates the hierarchy of data entry using an example. Some of the categories and subcategories are, of course, only relevant for certain types of farm businesses, such as animal welfare information.

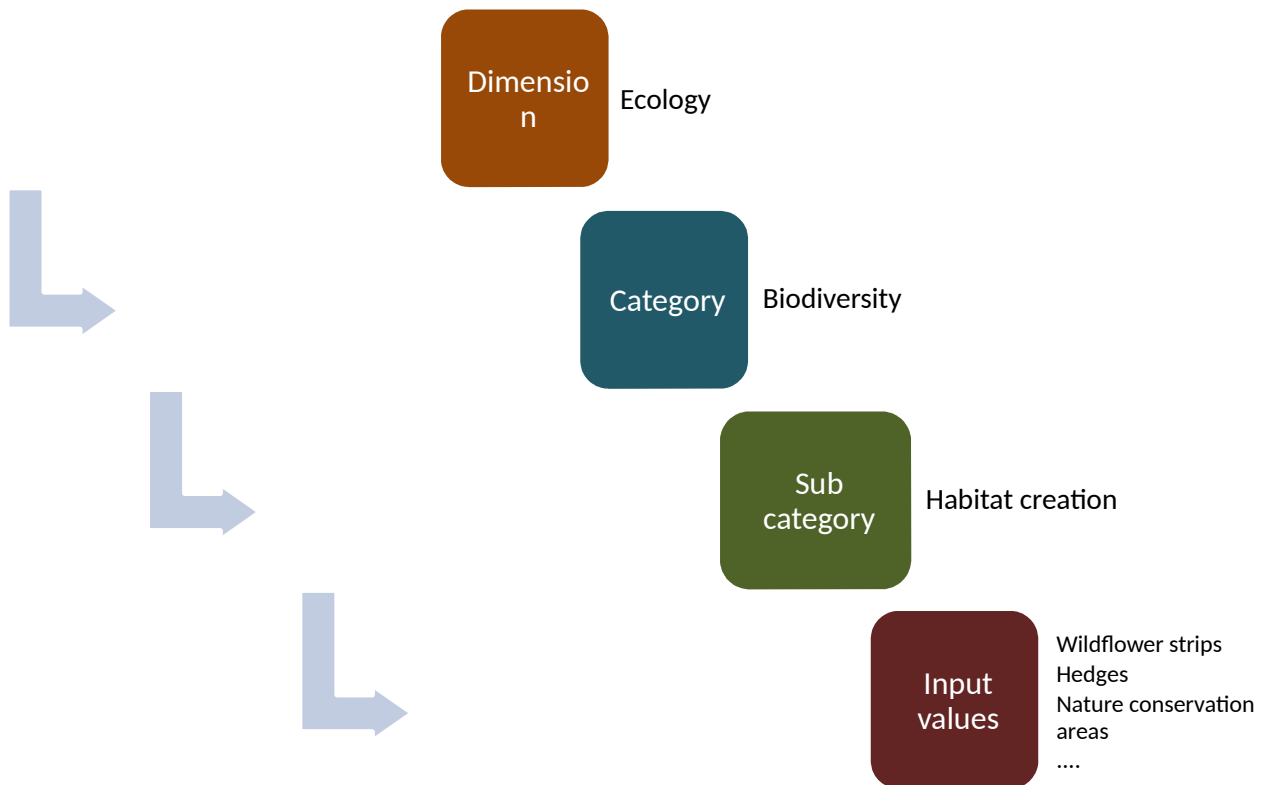


Figure 3: The hierarchy of collection of “Calculate it right” using an example of the category agrobiodiversity.

The companies involved in the project recorded the input values relevant to their operations for one year (July 2018 to June 2019). The individual input values differ with regard to their entry interval. Some of the values were recorded once, i.e. annually; others were recorded monthly; and a small proportion of the input values record hours worked for specific services. The input values to be recorded are clearly defined in the recording tool filled in by the farm-managers, so that the data is recorded correctly and can therefore be compared and evaluated.

Some input values can be directly evaluated and monetized, while other input values must first be set in relation to other input values in order to be evaluated. The value that can be evaluated and monetised is called the **performance indicator**. This key performance indicator consists either of a single input value or of a ratio of two or more input values. In total, over 100 key performance indicators were described to evaluate and monetise the sustainability of a company. A performance indicator speaks to the sustainability performance of a farm, and thus represents a control variable for agricultural enterprises.

The individual input values have different functions. The information from the input values is either used to evaluate the performance, and/or for monetisation, or as a pure control variable.

Table 1: The input values can have three different functions: information, valuation, and monetisation. It is also possible for an input value to have several functions, i.e. it represents both a value for evaluation and a value for monetization.

<b>Information</b>	These input values serve as information, for example as a control variable for a plausibility check.
<b>Measurement parameter</b>	<p>These input values are used to evaluate the performance key figures. In order to be able to evaluate some input values, these must first be set in relation to one or more input values.</p> <p>Example: skilled employees. The two input values "hours of permanent employees" and "hours of skilled workers" are set in relation to each other in order to be able to evaluate the <i>proportion of skilled workers</i> (= performance indicator).</p>
<b>Monetization factor</b>	<p>These input values are used as clearing values to monetize the performance key figures. In many cases, the monetization of an indicator refers to an assigned input value.</p> <p>Example: skilled employees. Depending on the valuation result, the monetary value is calculated as a proportion of the "wage paid to skilled workers", which is recorded via a further input value.</p>

Table 2: The table names the subcategories of the seven categories in "Calculate it right". The subcategories are entered again using several input values.

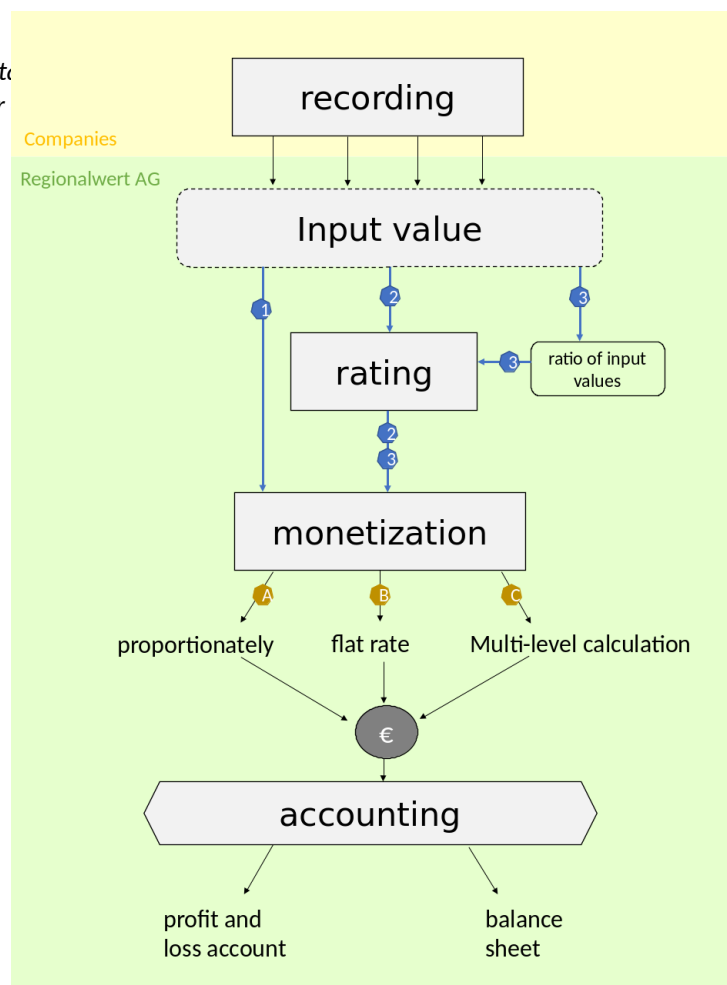
<b>Social matters</b>	<b>Specialist knowledge</b>
	<ul style="list-style-type: none"> <li>- skilled workers</li> <li>- apprentice</li> <li>- external training</li> </ul>
<b>Ecology</b>	<b>Social commitment</b>
	<ul style="list-style-type: none"> <li>- interns</li> <li>- educational initiatives</li> <li>- research</li> <li>- inclusion</li> </ul>
<b>Ecology</b>	<b>Soil fertility</b>
	<ul style="list-style-type: none"> <li>- nitrogen balance</li> <li>- type of nitrogen</li> <li>- area trimming</li> <li>- compost</li> <li>- catch crop</li> <li>- crop rotation</li> <li>- erosion control</li> <li>- biodynamic preparations</li> </ul>
	<b>Agrobiodiversity</b>
	<ul style="list-style-type: none"> <li>- seeds and seedlings</li> <li>- production of seeds and seedlings</li> <li>- access to genetic resources</li> <li>- concentrated feed</li> <li>- diversity within the farm</li> <li>- habitat creation</li> <li>- plant protection</li> </ul>
<b>Ecology</b>	<b>Animal welfare</b>
	<ul style="list-style-type: none"> <li>- stable conditions</li> <li>- area per animal</li> </ul>

	<ul style="list-style-type: none"> <li>- transport</li> <li>- use of antibiotics</li> <li>- interventions on animals</li> <li>- life performance dairy cows</li> </ul>
Regional economy	Economic sovereignty
	<ul style="list-style-type: none"> <li>- value-added stages cow/pig/chicken</li> <li>- direct marketing</li> <li>- highest turnover customer</li> <li>- highest turnover product</li> <li>- inter-company cooperation</li> <li>- seasonal workers</li> <li>- energy</li> <li>- closed resource cycles</li> </ul>
	Regional economic cycles
	<ul style="list-style-type: none"> <li>- regional sales</li> <li>- regional purchase of merchandise</li> <li>- regional purchase of animal feeds</li> <li>- regional purchasing of seeds and planting stock</li> <li>- regional purchase of fertilizers</li> </ul>

### 2.3 Assessment and monetisation of sustainability performance

The data from data entry can be accounted as monetary values in different ways. Figure 4 illustrates the input value paths from data entry to monetization and finally to accounting.

Figure 4: The paths from data entry to monetization and finally to accounting. Below further





<b>Type 1</b>	<b>Without rating</b> Input value is directly monetised (e.g. material costs, expenditure hours)
<b>Type 2</b>	<b>With evaluation - direct</b> Input value is evaluated directly (e.g. crop rotation, number of varieties) and then monetised.
<b>Type 3</b>	<b>With evaluation - ratio</b> input value with other input values (evaluation values) and the ratio is evaluated (e.g. proportion of skilled workers, proportion of organic fertiliser). This is followed by monetization

<b>A</b>	Proportion of monetization amount (e.g. 1% of material costs, 1.5% of sales, etc.)
<b>B</b>	Flat rate per assessment variable (e.g. Euro per hectare, Euro per hour, etc.)
<b>C</b>	Multi-stage calculation (several variables and arithmetic operations)

## 2.4 Ways to monetisation

The input values can either be monetized directly (Type 1) or must be evaluated before monetization can take place (Types 2 and 3).

Some of the input values to be valued (e.g. crop rotation) can be valued directly (Type 2). Other input values require a further intermediate step before evaluation, because not all input values automatically represent performance indicators. A large part of the data obtained from the input values cannot be evaluated, but only be interpreted (Type 3) if they are set in relation to other (input) values. In this case, the ratio represents the performance indicator (e.g. proportion of skilled workers). In total, there are over 100 key performance indicators that can be transferred to accounting as monetary values (provided they are relevant to a company and have been recorded).

## 3. Project outcomes

### 3.1 Key data of the farms involved in the project

	Vegetable nursery (organic)	Fruit farm (organic)	Vegetable nursery (conventional)	Mixed operation (organic)
<b>Certification</b>	Demeter	Demeter	-	Demeter
<b>Surface</b>	18 ha	70 ha	25 ha	150 ha
<b>Staff</b>	7 permanent employees	13 permanent employees	3 permanent employees	7 permanent employees
<b>Cultivation</b>	60 vegetable crops and 150 vegetable varieties, clover grass	8 vegetable crops, 10 fruit crops and 52 fruit varieties, cereals	24 vegetable crops and 100 vegetable varieties, cereals, maize	9 arable crops, 50 vegetable crops and 75 vegetable varieties, grassland, forest
<b>Animals</b>	-	500 chickens, sheep	-	40 dairy cows, retaliated breeding, stud bull, 50 porker, 100 chickens, sheep, ducks

## 3.2 Results in detail - examples from the three dimensions of sustainability

On the basis of a few examples, the results of the project "Calculate it right in agriculture" are presented below. The examples refer to sustainability services from the three dimensions (social, ecological and regional economic). The examples make it easier to understand both the "correct calculation" methodology and the results of the monetary benefits.

### Social dimensions

- **Key performance indicator: Percentage of skilled workers (category "Expertise")**

Relevance: Agricultural enterprises in Germany are facing growing demands (new technologies, increasingly scarce resources such as soil and water, etc.), which makes good specialist knowledge in farm management all the more important.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Skilled workers	3,77	3,3	2	6,5
Percentage of permanent employees	57%	26%	86%	100%
Rating green-yellow-red	>40%	20-40%	>40%	>40%
Monetization factor	professional wage	professional wage	professional wage	professional wage
Value in €	4.161	2.816	2.611	8.057

The number of skilled workers employed in the company is compared with the number of permanent employees (given as full-time employee), and the ratio evaluated. In this case, the ratio represents a performance indicator. The evaluation key classifies a skilled worker share of 40% or more as sustainable, a share between 20-40% as moderately sustainable, and anything below 20% as non-sustainable. Monetisation refers pro rata to the wages paid to skilled workers. The amount of the share of the skilled worker's wage varies depending on whether the result is in the green or yellow range. In this case, three farms are in the green zone and one farm is in the yellow zone. The different euro values are due to the company-specific wage payments.

- **Key performance indicator: number of trainees (category "specialist knowledge")**

Relevance of the category: Society is often not sufficiently aware of the importance of expertise in agriculture. Through training, knowledge is preserved and built up. This also represents an added value for society. Though fewer apprentices are being trained on farms, most of them receive training on organic farms.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	mixed organic
Apprentice	1,66	0,53	0	2,08
Percentage of permanent employees	24,9%	4,4%	0%	32%
Rating green-yellow-red	>10%	<5%	<5%	>10%
Monetization factor	Expenses + share of apprentice wages	Expenses + share of apprentice wages	Expenses + share of apprentice wages	Expenses + share of apprentice wages
Value in €	4.460	1.049	0	5.601

The number of trainees employed in the company is compared with the number of permanent employees (given as full-time labour force). In this case, the ratio is a performance indicator. The evaluation key classifies a proportion of trainees of 10% or more as sustainable, a proportion between 5-10% as moderately sustainable and anything below 5% as unsustainable. Monetisation refers proportionally to the wages paid to apprentices and to the personnel expenditure (hourly recording) for the instructions given by apprentices. Both the share of the trainee wage and the hourly rate vary depending on whether the result is in the green or yellow range. In this case, two farms are in the green zone and two farms are in the red zone. The different euro values are partly due to different hourly records or the early discontinuation of training at a company.

## Ecological dimension

- **Key performance indicator: Diversity of crops (category "Agrobiodiversity")**

Relevance: A range of crop varieties is more complex to cultivate than a small number of crops on a large scale. Consequently, the cultivation of several crops entails additional costs and time. Through the diverse cultivation, the company creates added value in the quality of its work, for the preservation of species diversity and distributes the cultivation risk among many crops. The diversity of crops used in agriculture, horticulture, fruit growing, and viticulture has declined considerably in the last century, not only in Germany but worldwide. Only a few crop species are globally economically important for cultivation, and the diversity within a species (variety level) of crop plants is declining. The aim is to preserve the diversity of cultures, both socially and in terms of diversity of regional plant species. In addition, a diverse crop can also protect against major damage caused by pests.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Number of vegetable crops	60	8	24	50
Rating green-yellow-red	>30	<15	15-30	>30
Monetization factor	Proceeds from vegetable gardening	Proceeds from vegetable gardening	Proceeds from vegetable gardening	Proceeds from vegetable gardening
Value in €	2.827	0	2.931	533

The number of vegetable crops cultivated on the farm during the financial year can be assessed directly and does not have to be put into proportion. In this case, the input value "Number of vegetable crops" directly represents a performance indicator. The evaluation key classifies a number of vegetable crops of 30 or more as sustainable, a number between 15-30 as moderately sustainable, and anything under 15 as unsustainable. Monetisation refers proportionally to turnover from the sale of vegetables produced in-house. The share of sales varies depending on whether the result is in the green or yellow range. In this case, two farms are rated green, one yellow and one is in the red zone. The different valuations are partly due to the fact that one farm does not cultivate vegetables as its main branch of business.

- **Performance indicator: Area with legumes (category "soil fertility")**

Relevance: Leguminous plants contribute to increased soil fertility because they bind nitrogen from the air and deliver it into the soil. In addition, they loosen the soil and lead to effective weed control through broken infection chains. However, while the area is covered with green manures, it is temporarily unusable for market produce in the short term. For this reason, it is financially disadvantageous because the produce for sale from this area is missing.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Average area (ha)	5	17,71	1,08	20
Percentage of arable land	31,3%	42,3%	6,8%	32,3%
Rating green-yellow-red	>25%	>25%	<15%	>25%
Monetization factor	€ per hectare leguminous crops	€ per hectare leguminous crops	€ per hectare leguminous crops	€ per hectare leguminous crops
Value in €	3.000	10.656	216	12.000

The average area of leguminous crops on farm during the whole financial year is compared with the area of arable land, and the ratio evaluated. In this case, the ratio is a performance indicator. The valuation key classifies a legume share of 25% or more as sustainable, a share between 15-25% as moderately sustainable, and anything below 15% as non-sustainable. Monetisation takes place through a flat-rate area payment per hectare of leguminous land. The flat rate varies depending on whether the result is in the green, yellow, or red range. In this case, three farms are rated green and one is rated red. The different euro values are due to different area sizes. In addition, a monetary value is also attributed to red in this case, since the cultivation of legumes already represents a positive measure even for a small proportion of the area.

### Regional economic dimension

- **Key performance indicator: Share of renewable energies (category "economic sovereignty").**

Relevance: In contrast to increasingly scarce fossil fuels, renewable energies conserve resources. By using sun, wind, biomass, geothermal energy, water, or tides, the emission of greenhouse gases and other pollutants can be avoided.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Costs electricity renewable (€)	6.049	21.200	9.635	19.839
Share of total electricity	100%	100%	100%	100%
Rating green-yellow-red	>90%	>90%	>90%	>90%
Monetisation value	Renewable electricity costs	Renewable electricity costs	Renewable electricity costs	Renewable electricity costs
Value in €	151	530	240	495

The share of electricity consumption from renewable energies is set in relation to the total electricity consumption of the farm in the financial year, and the ratio evaluated. In this case, the ratio is a performance indicator. The valuation key classifies a share of 90% or more as sustainable, a share between 90-80% as moderately sustainable and anything below that as unsustainable. Monetisation refers proportionately to the cost of renewable electricity. The proportion of costs varies depending on whether the result is in the green or yellow range. In this case, all companies are in the green zone. The different euro values are due to the different electricity consumption. The comparatively low monetary values are due to the fact that renewable energies are not specific to agriculture, and are already subsidized elsewhere. Nevertheless, for a holistic approach to an agricultural sustainability assessment, energy supply cannot be ignored.

- **Key performance indicator: Share of regional turnover (category "Regional economic cycles")**

Relevance: A region is fit for the future if, in addition to a diverse, social, and environmentally compatible agricultural sector, it also remains economically viable. Regional economic activity creates jobs by promoting regional crafts and the regional service and education sector. This means that production, added value, and jobs remain in the region. In addition, short transport and working distances protect the environment, promote regional transport companies and save energy costs. In addition, a high degree of self-sufficiency strengthens a region with regard to global challenges. In the area of food and agriculture, in particular, increasing international competition, constantly falling prices and an agricultural policy geared to intensification and specialisation often mean that small- and medium-sized enterprises can no longer operate profitably. An agricultural enterprise can strengthen regional economic cycles by selling its products regionally. Demand for regional products is also growing.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Regional turnover (€)	403.000	1.550.000	611.000	718.000
Share of total sales	100%	86%	99%	100%
Rating green-yellow-red	>80%	>80%	>80%	>80%
Monetization factor	Regional sales	Regional sales	Regional sales	Regional sales
Value in €	2.015	7.750	3.056	3.590

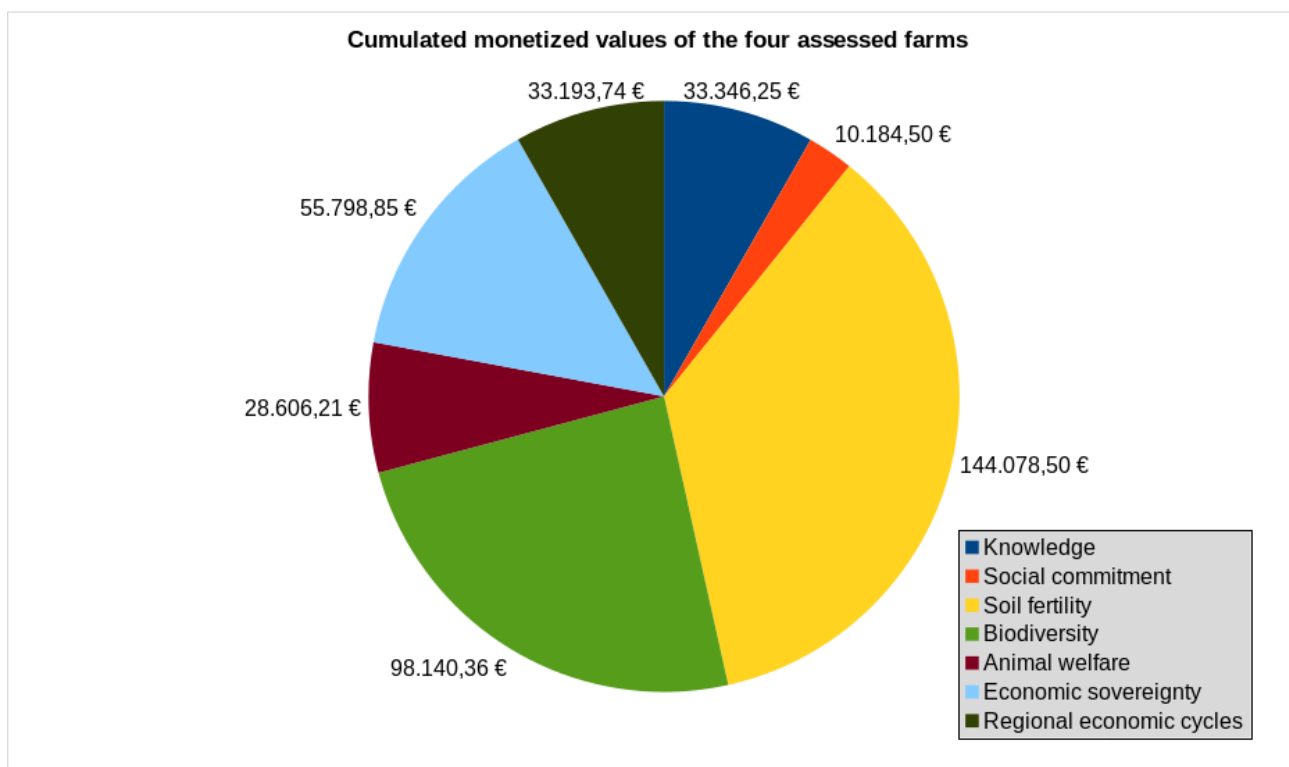
The share of regional sales is put in relation to the total sales of the farm in the fiscal year, and the ratio evaluated. In this case, the ratio is a performance indicator. The valuation key classifies a share of 80% or more as sustainable, a share between 60-80% as moderately sustainable, and anything below 60% as non-sustainable. Monetisation refers proportionately to regional turnover. The share of regional sales varies depending on whether the result is in the green or yellow range. In this case, all farms are in the green zone. The different euro values are due to the different sales figures.

### 3.3 Results of the sustainability performance of the four farms

The following diagrams show the sum of the monetarised sustainability performance of the individual project operations, and the share of the categories (expertise, social commitment, soil fertility, biodiversity, animal welfare, economic sovereignty, regional economic cycles), in the recorded performance. The percentages provide information on the shares of the individual categories in the total added value created by a farm, but do not provide any information on the valuation of the respective categories.

For example: The conventional vegetable nursery has created additional services worth a total of €22,184. Of these, 29% are attributable to the "Economic sovereignty" category, i.e. an added value of €6,433 was calculated for the key performance indicators in this category.

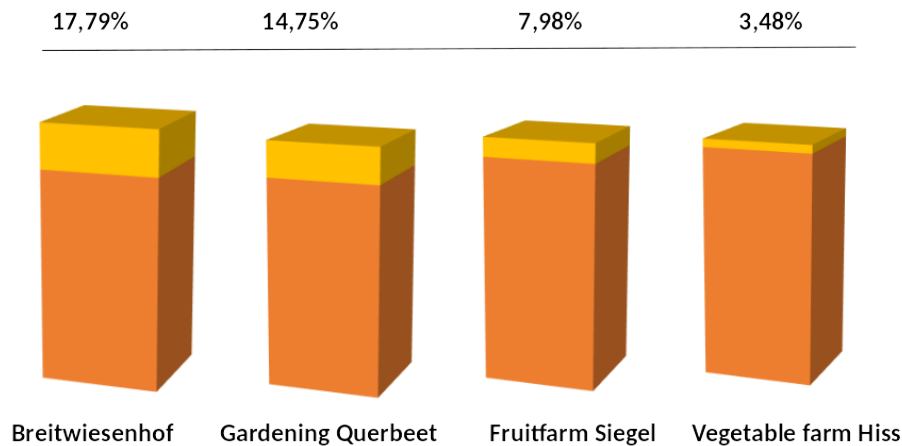
It should be noted that the share of the category "social commitment" is low for all companies. This is due to the fact that this category consists of only a few input values. The input values record the efforts made for educational initiatives (research, educational initiatives, practical training, inclusion), which are not the main purpose of farms and therefore represent only a small part of the added value achieved in comparison to the other categories (soil fertility, biodiversity, etc.), even with great commitment.



The following chart shows the share of sustainability services in the turnover of the four companies. A total of €403,348 in additional services was created through the sustainability services of the enterprises, which

on average accounts for 10.2% of the total turnover of the four enterprises. The large differences are due, among other things, to the different turnover figures of the individual companies.

## Share of sustainability performance in total sales

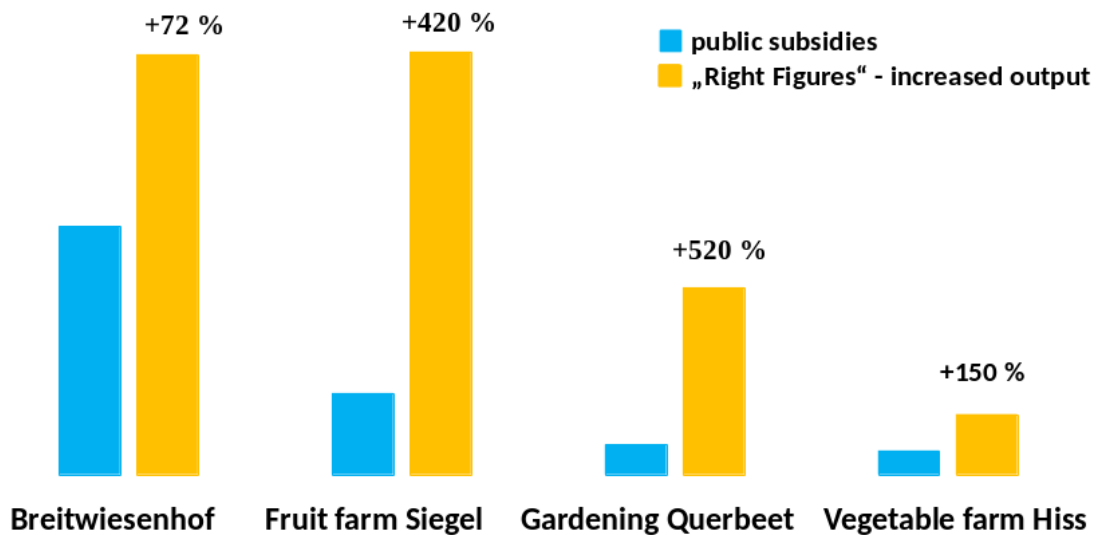


An exciting picture emerges if one compares the calculated added value of the sustainability services according to “Calculate it right” with the public subsidies received by the companies (EU subsidy, FAKT). The “Calculate it right” increase in output exceeds the subsidies by between 72-520%, which means that the sustainability performance of the companies is currently not sufficiently remunerated, or hardly remunerated at all. Farms that create prioritise improving social, ecological, and regional impact receive very little support from EU subsidies, because most of it relates only to the area farmed.

It is striking that although the mixed farm has achieved similarly high sustainability performances to the fruit farm, In this case, the mixed operation was able to cover significantly more sustainability services through public subsidies than the other operations. The biggest imbalance occurred in the organic vegetable nursery, which created a lot of added value relative to its small size, but was not subsidised.

The conclusion that German subsidies would have to be increased fivefold is not correct. German agriculture has an annual turnover of roughly 38 billion euro. The figure above shows that the social-ecological services of the four enterprises account for approximately 10% of their turnover. This means that the social-ecological costs of agriculture could be paid at 3.8 billion euros, if the average value of 10% of turnover for all farms was confirmed. Currently, annual subsidies paid in German agriculture amounts to 6.6 billion euros.

# Ratio of increased output to EU subsidy



## 4. Identification of the practical social aspects of the introduction and implementation of extended bookkeeping

Phase 2 was dedicated to practical social factors that are relevant for the development and application of the monetisation approach of “Calculate it right”. Broadening the technical perspective, this module looked at organisational and cognitive aspects of the introduction and implementation of extended accounting in order to identify problems in the application and use of these new accounting practices over time, and to develop solution proposals. This was done in cooperation with the farms and the other project participants, as well as with the help of individual and group interviews, focus groups, observations, and document analyses.

At the *operational level*, it was examined what benefits the individual actors see in the recording of sustainability performance and what expectations they have for dealing with an extended form of accounting. The latter mainly concerns the "master tool", but also information for the formulation of a future guideline.

The second level, the *shareholder level*, was used to examine the importance of participatory development and the establishment of a monetary reporting and value system for the overall project. The focus of the shareholder workshops was on a game for evaluating sustainability, with the aim of providing shareholders with in-depth insights into a valuation approach and creating a basis for valuing operating performance expressed in monetary terms.

- **Company talks and internal project workshops: Design parameters for the acquisition tool and orientation aids**



Prof. Dr. Christian Herzig (University of Kassel-Witzenhausen) was involved in "Calculate it right" (2016-2018) in order to investigate the process of creating and testing the methods, together with the participating agricultural enterprises and other actors of the project (other enterprises of the Regionalwert-Network, as well as the project team). With the help of interviews with the farm managers, members of the project team, and group discussions (internal project workshops), "Calculate it right" then examined whether the design parameters considered relevant in Phase 1 (P1) would also prove decisive in the further development and long-term application of the method. Attention was paid to whether there were differences in the identified characteristics and benefit expectations between farms with different farm structures, and between farms from the organic sector and conventional agriculture.

➤ **Shareholder workshop at the 2018 Annual General Meeting of Regionalwert AG Freiburg**

On 14 July 2018, a workshop was held in Eichstetten on the topic of "Calculate it right in agriculture" before the Annual General Meeting, and was attended by 52 shareholders. The workshop served to inform the participants about the project, its contents, tasks, and objectives, as well as to convey some basics for the extended financial accounting. At the meeting, the shareholders present were asked to participate in the further course of the project.

➤ **Individual interviews with shareholders of Regionalwert AG Freiburg**

Thirteen interviews with shareholders of Regionalwert AG were carried out between the end of May and the middle of June. The interviews lasted 30-45 min. The interviewees were shareholders who had declared in writing at the Annual General Meeting in July 2018 that they would be happy to be contacted as part of the "Calculate it right in agriculture" project, and that they were interested in participating in the research and development work.

➤ **Shareholder workshop in the run-up to the 2019 Annual General Meeting of Regionalwert AG Freiburg**

The workshop with shareholders on the topic of "Calculate it right in agriculture" took place on June 7, 2019 in Eichstetten at the office of Regionalwert AG. A total of 14 shareholders took part. The organisational team of the Phase 2 (P2) project first reported on the contents, methods, and objectives of the project, and then worked on the following questions together with the participants: Which ten indicators are most important to you for evaluating a farm? What monetary compensation should the companies receive for their sustainability services?

The aim was to strengthen motivation and awareness for increased sustainability in agricultural production, because operational sustainability services can only be provided or maintained in the long term if they are rewarded. In the course of the workshop, a game was used to evaluate sustainability with the aim of providing shareholders with basic knowledge and an understanding of evaluation approaches. In the game, pretend money was used in the form of chips of varying value. Each player could use their money in the three dimensions of sustainability (social, ecological and regional economy). Finally, the participants discussed among themselves which sums should be allocated to the individual sustainability indicators.

➤ **Shareholder workshop at the 2019 Annual General Meeting of Regionalwert AG Freiburg**

On the morning of the Annual General Meeting of Regionalwert AG on July 13 2019, another shareholder workshop was held in Eichstetten, which was offered to all shareholders (approximately 50 attended). Here

we first reported briefly about the project "Calculate it right in agriculture". The workshop focused on the sustainability performance assessment game, which was now divided into sub-groups due to the larger number of participants. The aim was to test a socially based valuation for sustainable management with the shareholders of Regionalwert AG Freiburg.

## 4.1 Results from Phase 2

In Module 2, the analysis of the development and application of the method, which took place over a full year and included different farm structures and contexts (Bio and Konvi), was able to extend and further differentiate the results from P1. The results for the two areas "design factors" (divided into "Findings on benefit expectation" and "important features of the method") and "Participative development of a common monetary reporting and value system" are presented below.

### ➤ Findings on benefit expectation

#### *Appreciation and remuneration*

An expectation that companies have for the benefits of sustainability services is the improvement of their own financial situation through appropriate appreciation and remuneration. The concern companies have about adequate remuneration is not about financial enrichment. Rather, it is driven by existential fears of survival, in order to have "room to breathe" again in the current market system. There is hope to be able to increase the room for manoeuvre within the company again. This is also supported by the shareholders, who say that the added value that ecologically and regionally operating companies generate should be paid out to companies.

Interestingly, the farm managers surveyed already showed a willingness in P1 to offset the costs of the voluntary services provided between farms (or within the network in the case of RWAG). This is further proof that individual interests are not the primary concern. This observation is also linked to a second kind of benefit offered by the "Calculate it right" method, described below.

#### *Strengthening the common self-image*

The results from P1 have already pointed out that joint work in "Calculate it right" can strengthen inter-firm relationships or the joint self-image of an organisation or network, be it in relation to joint work in Regionalwert AG Freiburg or, in the context of agricultural cooperation, individual organic movements or production networks. In view of the fact that the companies surveyed were expected to implement extended cost accounting and remuneration on behalf of, and in cooperation with, the society, shareholder workshops were held in P2 as part of the project to "capture" further social perspectives. These showed that here, too, a great sense can be ascribed to the joint work in "Calculate it right" – to strengthen or cement the common vision of a fair paid and sustainable production of food (see also the results of the shareholder workshops below).

#### *Formalisation / concretisation of the value discussion*

A key benefit, both from the point of view of farm managers and shareholders (who also reported from the consumer perspective), lies in the formalisation and concretisation of the discussion of values that is achieved through monetisation. Both the discussions with the plant managers and the discussions in the shareholder workshops showed that the figures from "Calculate it right" are regarded as evidence of the actual success or enterprise value of the company and as an important basis for the "true" product prices that are absolutely necessary. These figures enabled the actors to engage in a targeted discussion about the services provided, thus possibly avoiding diffuse and repetitive normative justification constraints about business success or failure and product prices ("Why does a product have to cost so much?"). However, this

should not be understood as avoiding a discussion of values, but rather as making it clear which values are discussed in which context, i.e. prices can be seen through a more holistic lens.

#### *Learning processes / comparability*

A fourth benefit, the initiation of learning processes and comparison possibilities, primarily concerns the perspective of the farm managers. Confirming the results from P1, it was emphasized that one can get to know one's company better and see a development over the years. On the other hand, the inter-company exchange or learning process is also regarded as desirable, whereby due to the different company and sector contexts, and limitations in comparability were also referred to here.

#### ➤ **Important properties of the methodology**

Before discussing the individual results on the characteristics of “Calculate it right”, it is important to note that there were **no significant differences between organic and conventional farms in the way** the methodology was applied, or the information collected and evaluated. The information could thus be understood and processed equally by all farm managers. This method could therefore be applied meaningfully across all crops.

#### *Effort minimization*

One wish expressed by the companies across the entire “Calculate it right” project was to minimise the effort involved in collecting the data. Although it has to be considered that the operations and the data collection were part of the development process of the new method and therefore the final version of the master tool was only completed at the end of the project.

The long-term application in P2 has once again clearly shown this. Even for companies that were involved in P1, the data collection effort in P2 posed a major challenge. The project took this into account by continually reviewing and editing the master tool. An essential aspect here is the reduction of the number of key figures.

#### *Simplification of data management*

Another important design parameter is simple data management. Data collection should be as automated as possible. Some decisions were taken to facilitate this, including: obtaining data in the Mastertool from existing operating figures; selecting simplified reference values that entail less documentation effort; in principle, avoiding frequent recordings, i.e. where possible and where no daily recording is absolutely necessary, the data collection is distributed over the year (i.e. monthly or at the end). It also seems advantageous to define responsibilities within a farm for certain figures, especially in the case of more complex farm structures, such as mixed farms or larger farms.

Taken together, minimizing the amount of data required regularly and simplifying data management appear to be extremely relevant for connecting to the real world of operations.

#### *Connectivity*

A potentially advantageous feature of the “Calculate it right” method is its compatibility with existing reporting obligations of farms. This does not mean integration into bookkeeping in the narrower sense, but the avoidance of several documentation processes for different frameworks in the areas of e.g. legal reporting, EU premiums, reporting obligations for organic associations and “Calculate it right”. If a stronger link could be established here, it could further increase the attractiveness and acceptance of “Calculate it right”. However, the P2 study paints a sobering picture in organic and conventional farms alike, characterised by incompatible reporting channels (reporting processes as parallel “satellite systems”).

#### *Flexibility / Adaptability*

The three methodological characteristics mentioned above focus on operational features. "Flexibility / adaptability" indicates that the "Calculate it right" method can be accommodating, and makes it possible to integrate variable social and natural conditions into the evaluation. In other words, the definition of categories and subcategories and their weighting can be adjusted (and be justified and comprehensible). This requires a discussion of questions such as: How much would the product have to cost for us? Which regional, ecological and social aspects are important to us? This in turn calls for greater participation by representatives from the region to address these issues together. Different formats are conceivable here, e.g. food-councils (Ernährungsräte) or food forums. In the case of P2, workshops were held with shareholders, the results of which are described in the last section.

### ➤ **Participatory development of a common monetary reporting and value system**

The individual interviews with shareholders, which were conducted as preliminary interviews for the shareholder workshops, showed what prior knowledge exists on the subject of monetarisation, what significance the topic has for them, and what expectations exist for its implementation.

Overall, the topic of "monetarisation" was consistently rated as very important by the respondents, for a variety of reasons, and there was interest in giving more time to the topic. The reasons why monetarisation is important from the perspective of the interviewees included education, soil, seeds, water, insect diversity, eutrophication, animal welfare, energy, and climate protection. The need to develop a counterproposal to the agri-industrial economy, the negative consequences of which are currently being publicly discussed, was also referred to.

All in all, the individual interviews mentioned many relevant applications and topic areas. It also became clear, however, that the state of prior knowledge tends to be of a general nature. In other words, the issue of monetarisation was seen as very complex, and it was difficult to prioritise in which area it would be more important.

On one hand, these findings make participation challenging, e.g. for a detailed discussion of the values and weightings of sustainability performance. On the other hand, they show how important it is to address this issue together in order to increase understanding of monetarisation, and to create a consensus for evaluation.

The two shareholder workshops in the summer of 2019 served to test how a common value system can be developed to monetise sustainability performance. The participants were introduced to this process in a playful way, with the help of chips that had a monetary value and could be placed in different areas of effect and activity. In these workshops, it was possible to observe how prioritisation was developed in the discussion, and how one's own points of view were examined alongside others'. In this way, a common set of values was formed discursively, and step-by-step, a common set of values designed. Accordingly, communication about sustainability services and their monetary "valorisation" had a meaningful effect.

In practical terms, the workshops also provided the project team with insights into shareholder weighting trends. However, the format only resolved the complexity to a limited extent, as there was not enough time for detailed and comprehensive explanations. In addition, an expert workshop was therefore held in the P2 project. Which concrete procedure will be chosen in other monetarisation projects in the future is unresolved. The P2 project has shown, however, that the joint examination of the issue of monetarisation and the collective evaluation of activities that have a positive impact on the environment and society can strengthen the common understanding of such processes and concerns in a region.

Overall, the consideration of practical aspects presented here provides insight into how the development and application of an innovative approach such as "Calculate it right" can be designed to be manageable, and further dissemination possible. The results improve our understanding of key factors that are relevant

in the development and implementation process, i.e. can promote or hinder new "accounting practices". This also includes the important insight that the development of a common values system for the monetarisation of sustainability services can be helpful for increasing the acceptance and connectivity of the accounting innovation "Calculate it right".

## 5. Summary of the project

### 5.1 Main findings of the project

An important result of the project was the development of key performance indicators to show the efforts and added value of a sustainable business. The aim was to depict the operating process as completely as possible and at the same time to optimise the recording effort and manageability for the farm managers. The results of the second phase of the project presented show the great progress that has been made in identifying performance indicators for recording the sustainability performance of agricultural companies. In addition, the effort involved in recording data was significantly reduced for the companies, with approximately 80% of the input values being determined only once at the end of the fiscal year. Positively, feedback from the farm managers of the project farms suggested that they learned more about their own farms by recording the needed data.

Further significant progress has been made in setting limit values and monetarising performance towards more sustainability. The answer to the question 'which limit values describe a sustainable operation?' was presented not only to the project team, but also to the farm managers, experts, and shareholders in various workshops. This made it clear that the assessment and setting of limit values must be a social and participatory process. The exchange promotes awareness-raising and stimulates discussions about sustainable agriculture. Through valuation and value creation (monetarisation), the synthesis of the balance sheet can then take place, and the sustainability performance of a company can finally be shown as income and assets in the annual balance sheet.

The feedback from farm managers on the value added which was calculated in the annual accounts was an important finding, and showed that the development of the "Calculate it right" method is on the right track. Overall, the four farm managers found their operations well-reflected in the results of their recorded, evaluated, and monetarised sustainability performance, along with the distribution of added value across the various sustainability categories. They share the opinion that the monetary value of the value-added services is appropriate and realistic. With these sums they could plan reasonably, i.e. it would be possible to make upcoming investments, or to pay skilled workers adequately. The plant managers see the opportunities to implement their own ideas for improved on-farm sustainability, and no longer have to focus solely on narrow competitive economic and financial elements. In addition, they could imagine the "Calculate it right" method as an incentive to improve certain performance indicators, or to introduce new measures.

### 5.2 Outlook

Society rightly demands a multitude of social, ecological, and regional economic services of agriculture for the protection and preservation of the natural and socio-economic livelihoods of agriculture. There are many and varied problematic developments with regard to the sustainability of current economic practices. The reason for this is the incorrect evaluation of social, ecological, and regional economic factors in impact assessments and company reporting. As a result, incorrect objective parameters are used to calculate product prices and subsidies. Companies that provide extended sustainability services often have more

diverse positive impacts than companies that engage less, but generate higher risks and losses, and run more expensively. These elements have not been adequately reflected in the measurement of operational success. There is a lack of a regulatory framework and evaluation system that would enable the objective recording, assessment, and evaluation of both services and risks.

In the project "Calculate it right in agriculture", the measurement of farm performance was extended to include services for sustainable management on the basis of four farms in order to be able to properly record and evaluate their additional ecological, social, and regional economic costs. The project offers a new approach to differentiation, evaluation, and ultimately remuneration. The results of the four farms show that a company that achieves a great deal should receive extra monetary added value. This creates an effective incentive system for individual farms to develop more sustainably.

The question remains as to where the money comes from that farms need to finance the cost of creating added value. There are a number of possibilities for this, the elaboration of which was not the subject of the project, but will be addressed in subsequent phases. The following options can be roughly identified as: a) compensation through payments from public and private funds; b) recalculation of product prices on the basis of the evaluation of services and risks for sustainability; c) through attribution, depreciation and risk provisions with their long-term corrective influence on corporate management; and d) specific consideration in tax assessment.

The methods developed in this research project are also suitable for use in the recently published obligation of the Federal Financial Supervisory Authority (Bafin) for financial risk analysis and evaluation with regard to sustainable business management. The document requires credit institutions to demonstrate the value of loans with regard to environmental and social indicators.

The method resulting from the project, and the instruments based on it, will be further developed by the project participants to such an extent that they can be applied more widely from spring 2020. A pilot phase is planned in which up to 100 farms can participate.