

producer price change was relatively small for both agriculture and fishery products and food industry products; margin index change mostly affected the trade margin rate change.

Examining the changes in cost structure

of wholesale and retail sectors obtained by the linked input-output tables clarifies that the margin index change was affected mostly by wages and salaries for both wholesale and retail sectors.

Developing an Environmental Accounting for Agriculture

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1. Objective

This study aims to consider whether environmental accounting for the non-agricultural sector can be applied to agriculture and how it should be modified, and then to develop an environmental accounting for agriculture.

2. Procedures

First, we consider why environmental accounting for non-agricultural sectors cannot be applied to agriculture. Then, we tried to develop a new environmental accounting for agriculture which farmers can use easily.

3. Application of environmental accounting to agriculture

Although environmental accounting is widely used in large firms in the non-agricultural sector, it is hardly used at all in agriculture. This is because agriculture has followed three characteristics. First, agricultural production strongly relates to nature. Firms in the non-agricultural sector can calculate their environmental loads caused by their activities by measuring pollutants from their facilities and offices. However, as agricultural production is practiced by using natural resources such as land and soil, there is no clear border between nature and agricultural production.

Second, agriculture has multifunctionality. Agricultural production provides not only foods and materials but also positive externality such as environmental benefits and beautiful landscape. As environmental accounting can only measure negative externality, some modification should be made to measure multifunctionality.

Thirdly and finally, the agricultural sector mainly consists of small-scale family farms, especially in Japan. Most farms do not have sufficient knowledge and skills to carry out environmental accounting.

In spite of these three points, environmental accounting in agriculture has some advantages for farm management. As consumer awareness for the environment and food safety

has increased rapidly and some more agri-environmental policies are to be implemented in the near future, eco-friendly farming will become an important requirement. It is important for farmers to evaluate agri-environmental activities objectively. Environmental accounting provides farmers quantitative evaluation of their agri-environmental activities.

How then should we modify environmental accounting to introduce it to agriculture? We found that it is not enough to measure only environmental factors quantitatively; we also need to evaluate qualitative factors if we are to try to evaluate a farm's agri-environmental activities. So, we developed a new tool for evaluating agri-environmental activities both quantitatively and qualitatively. We have called it "Agri-Environmental Activities Check Software: AEACS".

4. Agri-Environmental Activities Check Software (AEACS)

AEACS is a tool for evaluating farmers' agri-environmental activities both quantitatively and qualitatively. It is designed as software and incorporates Internet accessibility and radar chart graphs so that it is convenient for farmers to use. In the project, we developed AEACS for paddy rice cropping farms. This is because rice is one of the most important crops in Japan, and it is widely planted throughout the country.

AEACS consists of 5 parts, from Step 1 to 5. As shown in Fig. 1, in all parts, users can easily input their data on the screen by mouse-clicking or via the keyboard.

In the Step 1, users input 14 items of basic information, such as paddy field area, volume of fertiliser, etc.. Step 2 is based on "Code for Agricultural Practice in Harmony with the Environment", which was formulated by MAFF in 2004. Detailed activities are asked about in Step 3 and activities for multifunctionality promotion are asked about in Step 4.

As shown in Fig. 2, in Step 5, results of the evaluation are indicated by indexes and graphs which are made from input data in previous steps. Environmental loads from agricultural production are calculated in this part. Users

can easily understand the status of their own agri-environmental activities from radar chart graphs. Instructions are also indicated below the graphs. The right side of Fig. 2 illustrates amount of energy use and emission of environmental loads in physical terms.

5. Roles of AEACS

By using AEACS, farmers can understand how their production activities produce environmental loads in physical terms. It is only recently that such a convenient tool for environmental evaluation was developed. So farmers could not evaluate their activities accurately. Under the policy whereby all farmers are sup-

posed to shift to eco-conscious production, it will be highly important for farmers to understand how their production influences the local environment. As AEACS can evaluate farmers' agri-environmental activities both quantitatively and qualitatively, they can promote their activities to consumers or local communities. Furthermore, communities where all members use AEACS can promote their activities at the community level and contribute to environmental regional development .

List of Research Members

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STEP1 Basic Information

Please input information about your farm

1. Place of production

Prefecture

Hokkaido

City

Sapporo

2. Your rice paddy

Volume of paddy area

ha

Volume of cropping area

ha

Distance from your home to paddy

km

3. Planting

Use of fertiliser

seldom use

Times of additional fertilisation

time(s)

Fig. 1. Input of information

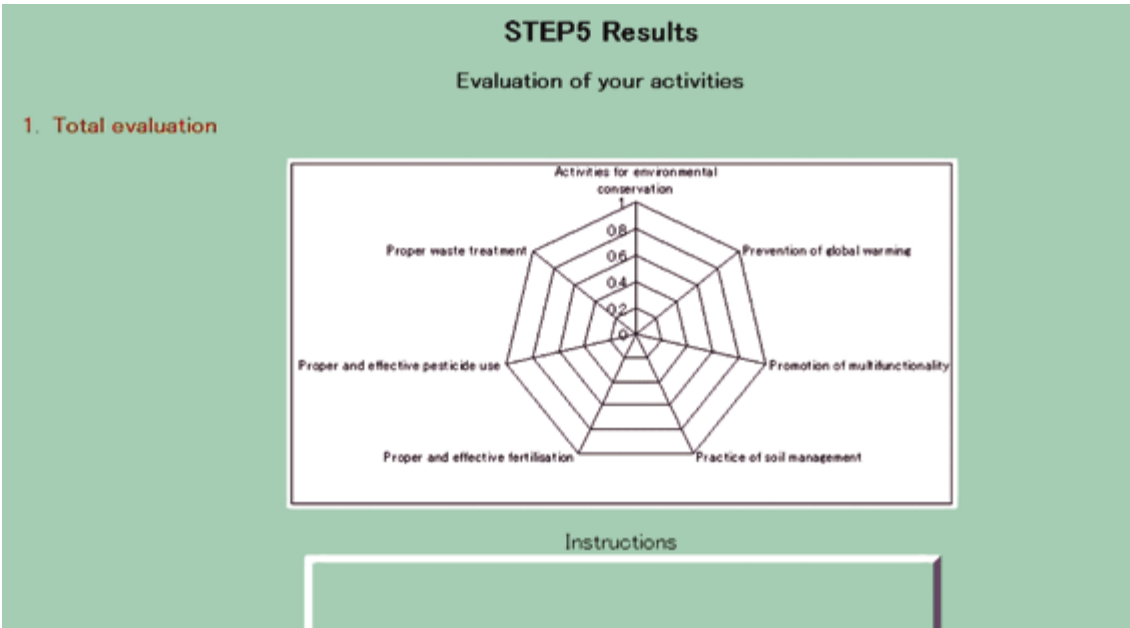


Fig. 2. Result indication