Multifunctionality of Agriculture in Comparative Perspective

—Priorities and Policy Instruments in Developed World—

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I Introduction

Since the mid 1990s, multifunctionality and non-trade concerns (NTCs) have been issues of fierce debate in various international fora such as the OECD and FAO, in addition to the WTO. This reflects the fact that Article 20 of the WTO Agreement on Agriculture prescribes NTCs as one of the factors to be taken into consideration in the follow-up negotiations of the Uruguay Round²⁾. In this respect, the debate in international arena plays a role as a precursor to the WTO agriculture negotiations, which were launched in 2000 and are to be concluded by the end of 2004, according to the WTO Doha Ministerial Declaration in November 2001⁵⁾.

International debate over multifunctionality comprises two different issues: scope or coverage of multifunctional outputs on the one hand, and optimal policy instruments for addressing multifunctional concerns on the other. The former issue is concerned with how multifunctionality can be defined and which functions of agriculture, such as food security, land conservation, landscape, biodiversity, can be judged to satisfy its definition. In contrast, the main focus of the latter issue is the division over optimal policy instruments for multifunctionality. Some countries insist on the necessity of tariffs and output-linked price support, while others believe that the current Green Box measures set out in the WTO Agreement on Agriculture are largely sufficient for that purpose^(Note 1).

Against this background, the purpose of this article is to identify the underlying factors creating different priorities to, and policy instruments for, multifunctionality of agriculture in different countries^(Note 2). The next section will compare and contrast perceptions of multifunctionality and NTCs in three groups of countries in the developed world, while the third section will examine how the history of cultivation and types of farming influence different policy prescriptions in each group of countries. The article will conclude with a synthesis of major findings and their implications for future research and policy regarding multifunctionality.

II Priorities

This section compares and contrasts perceptions of multifunctionality and NTCs in three groups of countries in the developed world: Japan, Europe, and North America and Oceania. Prior to that, however, an overview of the scope and content of multifunctionality and NTCs used in international debate will be presented^(Note 3). Multifunctionality is referred to in many international agreements, such as Agenda 21 (Chapter 14) of the Rio Earth Summit in 1992¹⁴⁾, the Rome Declaration of the FAO World Food Summit in 1996³⁾, and the Communiqué of the OECD Agriculture Ministers Meeting in 1998⁹⁾. The OECD defines multifunctionality as “those goods with positive or negative externalities and public goods characteristics jointly provided with

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5) WTO agriculture negotiations

agricultural production or factors of production”, and terms these goods “non-commodity outputs” (NCOs)⁸⁾.

On the other hand, NTCs are used almost exclusively within the WTO context, reflecting the fact that this concept is explicitly prescribed in the WTO Agreement on Agriculture²¹⁾ and also reiterated in the WTO Doha Ministerial Declaration in 2001¹⁵⁾. Contrary to multifunctionality, however, there is no clear definition of this concept, except that the Preamble of the WTO Agreement on Agriculture refers to “non-trade concerns, including food security and the need to protect the environment”²¹⁾. As such, a variety of functions and concerns are being advocated by various WTO Members in the name of NTCs, ranging from environmental protection, land conservation, animal welfare and food safety to food security, poverty alleviation and rural development.

This article is mainly concerned with NCOs satisfying the above OECD definition. In this regard, although NTCs are briefly reviewed to contrast their content between different country groups, the article will not attempt an in depth analysis of NTCs *per se*. Among the three groups mentioned above, there is no division over the inherent functions of agriculture; that is the provision of food and fibre (Table 1). A fundamental difference exists in the scope and content of NCOs and NTCs.

1 Japan

Japan has the following three features in terms of perceptions of NCOs compared with other groups (Table 1, 1st row). Firstly, the highly valued elements of agriculture stem almost entirely from rice paddy farming. These functions include land conservation and water conservation⁵⁾. Secondly, Japan gives high priority to the food security function of agriculture (*i.e.* the role of domestic agricultural production to mitigate possible disruption of food imports in the future), despite high income levels and accessibility to stable food imports. This characteristic may be explained by the high dependence on a single commodity (rice) in caloric intake, and the consistently declining food self-sufficiency ratios in the course of economic development. The third feature is that there is no clear difference in terms of scope and content between NCOs and NTCs. Accordingly, multifunctionality and NTCs are often used interchangeably in international arena.

2 Europe

The European perception of NCOs is similar to that of Japan, in that the Europeans highly value the positive externalities of agriculture (Table 1, 2nd row). In the name of multifunctionality, the most valued functions of agriculture are mainly the provision of landscape and the preservation of biodiversity⁷⁾. These elements are basically “environmental benefits” stemming from farming activity. Regarding NTCs, however, there is significant difference between Europe and Japan. European countries, particularly European Union members and Switzerland, place strong emphasis, in the name of NTCs, on animal welfare, food safety and consumer concerns mainly in trade negotiations (Note 4). These functions are not necessarily provided jointly with agricultural activity,

Table 1 Scope and Content of NCOs and NTCs

Group	Inherent functions	Non-commodity outputs	Non-trade concerns
Japan	- Provision of food and fibres	- Land conservation - Water conservation - Food security	- Ditto (left)
Europe (EU)		- Landscape - Biodiversity	- Animal welfare - Food safety - Consumer concerns (geographical indications and labelling)
North America & Oceania		- Water pollution - Soil erosion - Wet land loss	- None

and thus do not satisfy the OECD definition of multifunctionality. In this regard, NTCs for the EU are completely different from its NCOs in terms of content and its basic nature. From the EU's viewpoint, consideration for NTCs seems to be a necessary condition for further trade liberalisation.

3 North America and Oceania

This category includes developed countries in the New World, *i.e.* the US, Canada, Australia and New Zealand. In terms of NCOs, these countries are exclusively concerned with the negative externalities generated from agricultural activity, typically water pollution, soil erosion and wetland loss (Table 1, 3rd row). To this end, the following remarks by Mr. Truss, Australian Agriculture Minister, well represent their perceptions of the roles of agriculture: "in fact, we also need to address many rural challenges of our own, such as soil salinity, land and soil degradation and management of scarce water resources"¹³⁾. Regarding NTCs, although they do not necessarily deny the legitimacy of such concerns advocated by other groups of countries, they never express their own NTCs. In other words, they are solely concerned with "trade aspects" in trade negotiations. In this regard, their proposals for the WTO agriculture negotiations, which refer neither to NTCs nor to specific means to address such concerns except food security for developing countries, exemplify their perceptions of NTCs^{17, 18, 19, 20)}.

As summarised above, each country group has different preferences and attaches different values to the various NCOs provided through agricultural activity. A natural question in this regard is why such wide differences among these countries exist. The next section will attempt to address this question.

III Policy Instruments

Similar to the wider divergence in terms of priorities attached to different NCOs among above country groups, perceptions of the optimal policy instruments for addressing NCOs also differ. In this section, I will examine how two key features defining the nature of agriculture in each group, *i.e.* types of farming and the history of cultivation, define the divergence in policy instruments.

As a point of departure, Figure 1 shows the classification of developed countries based on these two criteria. In this dichotomy, Japan like Europe has a long history of cultivation and

Fig. 1 Valued Elements of NCOs in Developed Countries

attaches high value to the NCOs of agriculture shaped by human activities over a long period of time. However, since agriculture in Japan is mainly based on paddy rice farming, the contents of NCOs perceived to be significant are different from Europe, where non-rice farming and grazing dominate agriculture. On the other hand, although Europe and North America and Oceania share common values, roughly speaking, in terms of their farming type, perceptions of NCOs produced by agriculture are very different mainly reflecting the history of cultivation.

A practical tool to deepen the understanding of the linkage between the key features of farming and the resultant policy prescriptions for NCOs is a schematic illustration presented in Figure 2, which delineates an interaction between agricultural production (horizontal axis) and the value of NCOs (vertical axis)^(Note 5). RL in the figure stands for "reference level", which is a benchmark to distinguish whether farmers are remunerated to internalise positive externalities or penalised to internalise negative externalities^{1, 4)} (Note 6). More specifically, if farmers' provision of NCOs exceeds the reference level, "Provider Gets Principle" (PGP) will be applied, whereas if farmers'

NCO provision does not reach the reference level, "Polluter Pays Principle" (PPP) is the right solution⁴⁾. The hypothesis in this article is that the position of reference level decides the principles of policy intervention to address NCOs (PGP or PPP), and the relationship between agricultural outputs and NCOs determines the specific types of policy instruments under the principles.

1 Japan

Figure 2-A conceptualises the interaction between agricultural production and water retention capacity of rice paddy fields, which is one of the most highly valued functions of agriculture in Japan⁶⁾. The idea embodied in Figure 2-A was originally presented by Tomioka¹²⁾, and a slight modification to the original diagram is added by the author.

A notable feature in Japan is that the "natural" environment has been transformed to "man-made" agricultural land use shaped by human activities over long periods, and accordingly such land use becomes the norm for the people. As such, the counterfactual scenario to assess the impacts of agriculture on society is usually abandoned farm land, not natural vegetation, which would have been developed without farming activity in specific areas^(Note 7). Such perception of NCOs in Japan is exemplified in Figure 2-A by the fact that, in most ranges, the position of the water retention capacity curve is higher than the RL. This perception also justifies positive incentives to farmers to maintain farming activity and thereby ensuring the provision of NCOs jointly produced through agricultural production.

As far as the shape of the curve is concerned, water retention capacity, like other land and water conservation functions, is considered complementary to agricultural production by

Fig. 2 Interaction between Agricultural Production and NCOs

exhibiting strong jointness as shown in Figure 2-A, and are perceived not to diminish even if agricultural production increases¹²⁾ (Note 8). Therefore, it is widely recognised that the continuation of conventional farming is not only a necessary but also a sufficient condition to ensure appropriate provision of NCOs. As such, these factors, relating to the reference level and the shape of the interaction curve, tend to justify tariffs and output-linked support measures as an optimal policy instrument^(Note 9).

2 Europe

The European case is based on Hodge⁴⁾ and Yabe²²⁾, and depicted in Figure 2-B using the example of landscape provision. It shares a common feature with the Japanese case, regarding the benchmark against which the externalities of agriculture are evaluated.

The Europeans highly value countryside services, such as rural landscape, shaped by human activities over long periods, and the disappearance of such services and resultant restoration of natural vegetation tend to be perceived as deterioration, rather than quality improvement. Such perception is illustrated in Figure 2-B where the interaction curve crosses with the vertical axis below the reference level. To this end, the basic policy principle is the provision of positive incentives for maintaining and maximising NCOs generated through farming activity.

Regarding the shape of the interaction curve, however, the European Model is notably different from the Japanese case. Europeans tend to consider that the provision of valued NCOs (typically landscape and biodiversity) is complementary with agricultural production in relatively low intensity, while they become substitutes as the intensity of agricultural production increases^{4, 22)}. This perception may be explained by the past experience that the high level of market price supported under the Common Agricultural Policy combined with rapid technological developments resulted in intensive farming, and has caused, *inter alia*, the loss of bio-diversity, the deterioration of the cultural landscape due to the removal of hedges and chemical emission to water. As such, an approach in Europe to maximise the provision of NCOs is not mere continuation of conventional farming; thus output-linked payments are clearly not the optimal prescription. Instead of that, cross-compliance payments are considered to be the optimal solution in Europe, as they can adjust the level of agricultural production so as to generate an optimal level of NCOs for society.

3 North America and Oceania

The perception of agriculture is clearly different in North American and Oceanic countries, as depicted in Figure 2-C. Figure 2-C is based on OECD⁸⁾ and Romstad *et al.*¹⁰⁾, and its convex interaction curve to the origin assumes a diminishing marginal damage of water pollution as agricultural production increases.

Table 2 Determinants of Optimal Policy Instruments for NCOs

	Japan		Europe		North America and Oceania	
Key features (Figure 1)	Type of farming:	History of cultivation:	Type of farming:	History of cultivation:	Type of farming:	History of cultivation:
	Rice farming	Long	Non-rice farming	Long	Non-rice farming	Short
Determinants (Figure 2)	Priorities:	Benchmark:	Priorities:	Benchmark:	Priorities:	Benchmark:
	Land conservation Water conservation	Abandoned land	Landscape Biodiversity	Abandoned land	Water contamination Soil Erosion Wetland loss	Intact nature
	Production relationship:	Types of intervention:	Production relationship:	Types of intervention:	Production relationship:	Types of intervention:
	Complements with strong jointness	Positive incentive	Depends on production level	Positive incentive	Substitutes with strong jointness	Negative incentive
Policy instruments	Tariffs and output-linked payments		Cross compliance payments		Regulations and taxes	

One of the notable differences with previous cases is that there is no “man-made” amenity generated from the interaction between human and nature, reflecting the short history of cultivation in these countries. Accordingly, their people only pay attention to negative externalities of agricultural activity, such as water pollution, soil erosion and wetland loss. Because of this perception of agriculture, the shrinking of farming and even reverting to natural vegetation, such as forestry or wetland, are perceived as quality improvements for inhabitants. Such recognition is illustrated in Figure 2-C by the fact that the interaction curve intersects with the vertical axis above the reference level. As shown in Figure 2-C, in which the curve is below the reference level in most ranges of production, it is perceived to be the obligation of farmers to mitigate such “negative” NCOs to the reference level. Standard policy prescriptions would be disincentives rather than incentives for addressing negative NCOs, through the application of PPP.

Another feature of this model is that the provision of NCOs which these countries are concerned with (water pollution, soil erosion and wetland loss) is negatively correlated with agricultural production (negative externalities), and they have strong jointness with each other. To this effect, the increase in agricultural production is considered to induce a further deterioration of the initial negative impacts of agriculture on society. As such, the countries in this group, particularly Australia, and New Zealand are strong proponents for the application of PPP to the agriculture sector.

In short, the main conclusion of this section is that the position of the reference level influenced by the length of cultivation history determines the principles of policy intervention to address NCOs (PGP or PPP), and the shape of the interaction curve conditioned by highly valued NCOs based on dominant farming type decides the specific types of policy instruments under the principle. The causal links presented in the section are summarised in Table 2.

IV Conclusions and Implications

This article attempted to identify the underlying factors creating different perceptions of, and policy instruments for, multifunctionality in developed countries. The main conclusion is that the types of farming and the length of cultivation history determine the highly valued elements of NCOs, and ultimately condition the interaction between agricultural production and NCOs (*i.e.*, the shape of the interaction curve) as well as the way in which externalities exhibited by agriculture should be internalised (*i.e.*, incentive or disincentive). These combined factors in turn decide the optimal policy instruments to address NCOs in each group of countries; tariffs and output-linked payments for Japan, cross compliance payments for Europe, and regulations and taxes for North America and Oceania, respectively. This article shows that the above hypothesis goes a long way to explaining the divide between the Old and New World over priorities to NCOs and the divide between Japan and Europe over policy prescription for addressing NCOs.

Based on these conclusions, it is evident that Japan's perceptions of, and policy prescription for, NCOs are rather unique compared with other groups, and such uniqueness is ultimately a function of the exceptional dominance of rice farming with a long history of cultivation. This finding will have significant implications on research as well as policy regarding multifunctionality and NTCs in Japan in an international context. That is to say, any research or policy initiative neglecting the above mentioned unique characteristics of multifunctionality in Japan would exert little influence in international debate.

Note

- 1 “Green Box measures” are defined in Annex 2 of the WTO Agreement on Agriculture, and exempted from reduction commitments on domestic support under the implementation of the Uruguay Round Agreement, based on the recognition that they have no or minimal trade-distorting effects²¹.
- 2 Optimal policy instruments, which will be referred to throughout this article, do not necessarily

mean the most efficient and least trade distorting policy measures from the viewpoint of welfare economics. On the contrary, "optimal" in this article means the policy instruments considered by each country group as the most appropriate policy response for addressing multifunctionality.

- 3 The FAO uses different terminology: "roles of agriculture", instead of "multifunctionality", and is undertaking comprehensive analysis of developing countries²⁾.
- 4 In the European Union's proposal for WTO agriculture negotiations, animal welfare, food safety and consumer concerns are mentioned under the heading of "non-trade concerns"¹⁶⁾, and geographical indications and labelling schemes are often cited as a concrete means to address consumer concerns.
- 5 Romstad, E. *et al.* (2000) provides a comprehensive review of the interlinkages between NCOs and farm area, production intensity and form of production in the context of Norwegian agriculture¹⁰⁾.
- 6 Hodge, I. (2000) explains the concept of the reference level as follows: "The distinction can be portrayed in terms of a reference level with respect to environmental quality (Hodge, 1989; Hodge, 1994, OECD, 1999, Scheele, 1999). This level defines the particular allocation of individual property rights and hence the level of responsibility which landowners are required to adopt with regard to the wider implications of their choice of land use. Where landowners fail to achieve the reference level environmental quality, this will be regarded as an external cost. Where landowners achieve an environmental quality in excess of this level, they will be regarded as generating an external benefit."⁴⁾
- 7 This perception is supported by the fact that the monetary valuation exercise using the Replacement Cost Method undertaken by the National Research Institute of Agricultural Economics in 1998 employs "abandoned farm land" as a counterfactual benchmark to estimate positive externalities of agriculture and rural areas⁶⁾.
- 8 However, if all positive and negative externalities of agriculture are taken into consideration, the shape of the curve in Figure 2-A would be similar to that of Figure 2-B, by reflecting, for instance, water pollution and the loss of biodiversity as production increases^{4, 22)}.
- 9 In fact, these broad based measures tend to have a large trade impact and welfare loss for consumers. However, consumers in Japan are rich enough to bear the cost resulting from agricultural protection. It is also worth noting that imported commodities whose domestic prices are raised above world prices earn budget revenues for the government and thus the government itself has an incentive to maintain border measures¹¹⁾.

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農業の多面的機能に関する国際比較

—先進国における優先的要素と政策手段—

作山 巧

I はじめに

多面的機能や非貿易的関心事項という概念は、2000年から開始されたWTO農業交渉の帰趨にも大きな影響を与えるものとして、1990年代後半から、WTO、OECD、FAOといった国際機関において、加盟国間で激しい議論を巻き起こしてきた。

こうした議論の争点は、多面的機能の「範囲」と「政策手段」に大別される。前者には、多面的機能をどう定義するかという問題と、いずれの機能が多面的機能の定義に該当し得るのかという問題が含まれる。また、後者については、多面的機能の維持のためには、関税や価格支持といった生産にリンクした保護が必要

という立場と、生産と切り離された「緑の政策」が最適との立場が対立している。

本稿の目的は、多面的機能を巡る国際的な議論の中核である先進諸国を、日本、欧州、北米・オセアニアの3つのグループに分類した上で、これらのグループ間で、重視される多面的機能の要素や多面的機能に対応するために必要と主張される政策手段が異なる要因を解明することである。

II 優先的要素

本項では、農業の有する機能を本来機能、多面的機能、非貿易的関心事項に区分し、各グループが重視す

る機能やグループ毎の特徴を比較する（表1）。

まず、日本では、重視される多面的機能は国土保全、水源涵養といった水田農業に由来するものであること、国家レベルの食料安全保障機能（将来の供給途絶リスクを国内生産の維持によって軽減する機能）が重視されること、非貿易的関心事項は多面的機能とほぼ同義語として使用されているとの特徴がある。

一方、欧州では、多面的機能の要素としては、景観や生物多様性の維持が重視されているのに対し、非貿易的関心事項になると、特にEU加盟国やスイスは動物愛護、食品安全性、消費者の関心を声高に叫んでおり、多面的機能と非貿易的関心事項とは内容や性格が大きく異なるという特徴がある。

これに対し、米国、豪州等の新大陸先進国では、国民が関心を有する農業の機能は、専ら水質汚濁や土壌浸食といった負の外部性であり、非貿易的関心事項という概念に至っては全く顧みられていないのが特徴である。

Ⅲ 政策手段

本項では、上記のようなグループ毎に重視される多面的機能の要素の違いを生み出している基本的な要因として、「作目」と「耕作の歴史」を特定（図1）した上で、こうした要因が、農業の有する外部性評価の比較基準と多面的機能の発現形態とを規定することを通じて、多面的機能に対して最適と各国が主張する政策手段が異なる背景を解明する。

1 日本（図2-A）

日本では、長い歴史を有する水田農業によって形作られた多面的機能の存在が当然視される傾向があり、こうしたプラスの機能の低下を回避するためには、インセンティブの付与が必要との認識がある。また、日本で重視される国土保全といった水田農業由来の機能は、農業生産との強い一体性、補完性を有することから、通常の農業生産の維持がこうした機能の維持につながるという認識が共有されている。こうした要因が相まって、関税や価格支持といった生産にリンクした政策手段が正当化される傾向がある。

2 欧州（図2-B）

日本と同様に長い耕作の歴史を有する欧州において

は、農業的土地利用による多面的機能を高く評価し、自然状態への回帰は環境悪化ととらえる傾向があることから、多面的機能の維持のためにインセンティブの付与が容認されている。一方で、重視される景観や生物多様性といった機能は、過度な粗放化や集約化では機能の低下を招くことから、慣行農業の継続によりこれらの機能が自ずと維持されることはなく、その最適供給の確保のためには、適切な集約度の管理が必要となる。このため、環境遵守要件を付加した直接支払い（クロス・コンプライアンス）が多面的機能に対する最適政策手段と考えられている。

3 北米・オセアニア（図2-C）

重視される機能は専ら農業による水質汚濁といった負の外部性であることから、農業の縮小や農業から撤退し自然の状態に戻すことが環境改善に資するという認識があり、負の外部性の除去費用は汚染者の責任という認識も強い。更に、負の外部性は、農業の集約度と強い一体性を持ち、集約度が高まるほど負の外部性も増すと考えられている。このため、負の外部性を内部化する政策手段としては、汚染者負担原則に基づく規制や課税が主張されている。

Ⅳ 結論と含意

本項の結論は、先進国において、重視される多面的機能の違いを規定するのは、「農法」と「耕作の歴史」であり、この2つの要素の組合せが、一方で、農業の有する外部性評価の比較基準に影響し、他方で多面的機能の発現形態を規定することを通じて、多面的機能に対する最適政策手段のあり方に関する相違を生み出しているということである。

本稿の結論からは、多面的機能として水田に由来する国土保全を重視したり、それを維持するための政策手段として、関税や価格支持による保護が必要という政策手段のあり方に関する考え方は、他国と比較するとかなりユニークなものであり、根本的には、長い歴史を有する水田農業の存在の賜であることが分かる。本稿から得られる含意として、我が国において、多面的機能に関する研究や政策を進めていく上では、こうした日本の置かれた独特の立場を世界的視野の中で理解することが極めて重要と言える。

Key Words : 1) 多面的機能, 2) 非貿易的関心事項, 3) 非農産物, 4) 一体性, 5) WTO 農業交渉

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