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## SUBSIDIES IN AGRICULTURE AND THEIR INFLUENCE ON SUSTAINABILITY. THEORY AND METHODOLOGY

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### Abstract

Governmental intervention in agriculture and its impact on production quantity and quality; soil, water and energy exploitation; employment; investments; social services and overall sustainability of agriculture, rural regions and the economy has been objecting of discussions and analyses for decades.

Instruments for institutional support defer among countries and the analyses of their efficiency are complicated due to serious differences in business environment, natural resource base, technological level, social conditions, living standards etc. Differences are even deeper when comparing developed with developing countries or in the case of European Union old member states and new member states.

The main objective of this research is to analyze the positive and negative impact governmental support, especially direct payments have on the sustainable development of agriculture and rural regions.

**Keywords:** institutional intervention, governmental support measures, direct payments, subsidies, sustainable agriculture and rural regions.

### INTRODUCTION

This article summarizes some of the theoretical concepts about governmental support to agriculture and rural regions in different countries and different conditions.

The paper is based on literature research about definitions, characteristics and classifications of institutional intervention in the sector, especially direct payments (subsidies). Further analyses on the impact these intervention instruments have on the sustainable development of agriculture and rural areas is carried out.

The idea behind this research was to analyze how support measures work in different parts of the world especially in the EU, and to outline efficient models for intervention in agriculture and rural regions in the Republic of Kosovo, bearing in mind the specifics of the country.

An important outcome from the study is summary of the main instruments for farmers' and rural development' support, governments usually implement and their influence on production quantity and quality; soil, water and energy exploitation; employment, investments, social services and overall sustainability of agriculture, rural regions and the economy.

### MATERIALS AND METHODS

The analyses of the impact of government intervention on agriculture's and rural regions'

overall sustainability are based on classical research methods, such as quantitative, qualitative and comparative. Data is extracted from centralized (national statistics, Eurostat, OECD statistics, etc.) and decentralized (interviews with stakeholders, questionnaires, observations) sources.

The paper is part of a larger project – PhD investigation, done by the authors during 2017–2019 and presents the essence of the first chapter, which is theoretical and literature review. It was also synchronized with the research on “AGROIN” project №15/11, financed by Bulgarian National Science Fund (BNSF).

### RESULTS AND DISCUSSION

Instruments for institutional support defer among countries and the analyses of their efficiency are complicated due to serious differences in business environment, natural resource base, technological level, social conditions, living standards etc. Differences are even deeper when comparing developed with developing countries or in the case of European Union old member states and new member states.

The purpose of agricultural support is to increase production, employment and investments, as well as to minimize negative social and environmental side effects of the business. In the literature, it could be found a large number of publications and analyses about the positive and negative impact of government's intervention in the economy.

Stiglitz (1987) underlines the reasons for intervention policies in agriculture and concludes that free-market distribution of resources and products is inefficient and unacceptable.

He points out why agriculture should be the object of institutional regulations:

1. On credit markets and insurance markets, agriculture is facing imperfect competition and farmers' access is limited;

2. Farmers have limited access to information too. Governments' supply of information should be recognized as a public good, especially on a local level. Dissemination of information is however expensive and the benefits are limited only to people who receive it.

3. There are positive externalities from the intervention. For example, successful adoption of new technology by one farmer could influence others to adopt it too.

4. The most important reason for government intervention in agriculture is the fair distribution of income, generated in the economy. The government should design programs that increase the income of small farmers and provide consumer subsidies to indigent citizens.

The principal argument in support of government policy is that products of subsidised inputs sell at lower prices. If the subsidies were to be withdrawn, agricultural production will be reduced, the prices would rise as the production cost would go up, which would affect the whole market, especially low-income groups of society.

Supporters of farm subsidies have argued that such programs stabilize agricultural commodity markets, aid low-income farmers, raise unduly low returns to farm investments, aid rural development, compensate for monopoly in farm input supply and farm marketing industries, help ensure national food security, offset farm subsidies provided by other countries, and provide various other services (Gardner, 1992; Johnson, 1991; Wright, 1995).

The principal argument against state intervention is that the maximum benefits of this policy are reaped only by large farmers. Paying subsidies to farmers hurts the budgetary capacity of the government and creates fiscal imbalances, which turns into inflation and lowers growth. Sustainable economic growth has to be efficient, but subsidizing agriculture contributes to the enormous waste of power, water, chemicals (<http://www.yourarticlelibrary.com/agriculture/subsidies-in-agriculture-arguments-for-and-against-of-subsidies-in-agriculture/40237>).

According to Alston and James (2002), farm subsidies typically transfer income from consumers and taxpayers to relatively wealthy farmland owners and farm operators. They impose

net losses on society, often called deadweight losses, and have no clear broad social benefit (Alston and James, 2002).

The link between subsidies and their adverse effects on sustainable development, specifically the environmental effects, has been recognized by the research community for many years.

Economists have generally tended to regard subsidies as inefficient, expensive, socially inequitable and environmentally harmful, imposing a burden on the government's budgets and taxpayers (OECD, 2005). Subsidies distort prices and resource allocation decisions, thereby altering the amount of goods and services produced and consumed in an economy.

This type of assistance is preferred for a range of reasons, including to promote regional and rural development support, employment and income and to facilitate adjustments to changing economic, social or environmental conditions (OECD, 2005).

Such support can, however, have negative effects that may be unforeseen or even ignored in the policymaking process. Fuel tax rebates stimulate the use of fossil fuels. Support for commercial fishing can lead to the overexploitation of fish stocks and agricultural support can lead to an overuse of pesticides and fertilizers.

By the late 1980s and thereafter, researchers were calling attention to the deleterious effects that subsidies were having on, for instance, energy demand (Kosmo, 1987; Larson & Shaw, 1992), the depletion of marine fish stocks (FAO, 1992), and soil erosion, agricultural pollution and deforestation (Reichelderfer, 1989; Tobey & Reinert, 1991; Anderson, 1992; Runge, 1996).

### **Definitions of agricultural subsidies**

In general, the subsidy is the result of a government action that confers an advantage on consumers or producers, to supplement their income or reduce their costs" (OECD, 2005).

The government action may consist of payments of money, relief from tax burdens, protection from competition, or a variety of other policies or measures. In other words, an agricultural subsidy is governmental support to farmers and agribusinesses to supplement their income or manage the supply of input resources and influence the marketing of products.

Agriculture subsidies mean the financial assistance provided by the government to farmers through government-sponsored price-support programs. The objective behind agriculture subsidies is to provide benefits to farmers and

thereby stabilize food prices, ensure plentiful production and guarantee fair income to farm families.

<https://definitions.uslegal.com/a/agriculture-subsidies/>.

### Classification of Subsidies

Although people often use the terms “support” and “subsidy” interchangeably, some of the governments’ interventions in agriculture are not in the form of direct payments to farmers but are indirect.

The main instruments of the European Common Agricultural Policy are divided into two pillars. The first one includes direct payments to farmers and market support. Direct payments (subsidies) aim to stabilize farmers’ income in dynamic and volatile market conditions and high risk from weather uncertainties. The information presented by annual publications of the European Commission shows the importance of direct payments as a main instrument of CAP for all Member states (Beluhova-Uzunova, R., D. Atanasov, K. Hristov, 2017).

The market support measures are government interventions in the market to tackle unbalances and to guarantee sustainability (economic, social and environmental). The second pillar is pointed at the rural development and although doesn’t exclude agriculture it provides support in certain conditions to all economic sectors in the rural areas.

Bosch (1985) distinguished five categories of subsidies: direct cash transfers, provision of cheap credits, ‘benefit in kind’ subsidies (sales by government at lower-than-market prices), purchase subsidies (purchases by government at higher-than-market prices), regulatory subsidies (fiscal e.g. taxes and tax concessions; monetary e.g. rate of interest; legislative e.g. land tenure regulations; foreign trade directed e.g. rate of exchange and trade barriers).

According to Bosch (1985), direct agricultural subsidies affect farm input prices, farm output prices and farm income without having a direct impact on other prices. Conversely, indirect agricultural subsidies are either subsidy affecting prices in both sectors simultaneously (agriculture and industry), or subsidies first affecting prices in industry which in turn have an impact on agricultural prices.

**Direct Agricultural Subsidies** represent different types of intervention:

*Direct Farm Income Subsidies* – modifies the distribution of farm income by reducing tax payments, insurance etc.;

*Direct Farm Output Subsidies* – the most commonly applied agricultural support measures: raise or stabilize farm output prices; direct farm import restrictions; direct farm export support.

*Direct Farm Input Subsidies* – a type of support, government intervention to reduce the price of farm inputs (fertilizers, chemicals, seeds, energy, water, etc.). Also cash transfers to farmers subject to the purchase of inputs; reduction of indirect taxes and import duties; agricultural land tenure legislation; and provision of preferential credit to farmers.

The public provision of farm inputs may increase the economic efficiency of production. Since the distorting impact of these public support measures is assumed to be less than that of the subsidies we discussed above, these measures seldom cause disturbances in international trade relations.

Four are most common categories of public support for farm inputs without readily ascertainable market price (Bosch, 1985):

- A. Reduction of Risk in Agriculture;
- B. Technological Development and Agricultural Education;
- C. Land Improvement and Water Management;
- D. Improvement of Agricultural Infrastructure.

**Indirect Agricultural Subsidies** – these policy measures are not always meant to support agriculture:

*Subsidies Affecting Agricultural Prices* – domestic food programs or nutritional (school) programs, may boost domestic demand and hence affect relative farm prices;

*Supply of Domestic Resources* – change in fiscal policy or legislation may alter prices of domestic factors of production such as energy, land, etc.;

*Taxation Policies* – a general income allowance or a reduction in direct taxes for various income categories, affect farm prices.

*Monetary Policies* – devaluation of domestic currency may boost agricultural exports and raise local food prices accordingly. Revaluation may have opposite effects. A change in the money supply may affect interest rates which may in turn influence farm investment and hence alter farm prices;

*Trade Policies* – the imposition of general trade barriers to save foreign exchange may alter agricultural prices in many ways. For instance, general trade barriers may affect the supply of essential farm inputs as well as the competing supply of farm outputs.

### Methodology for assessing the impact of public support on sustainable development

It allows the current and expected results of specific measures and policies to be analyzed and their impact on farms' and rural regions' sustainable development assessed.

Such public support studies are conducted using different mathematical approaches and diverse models. One of the most commonly used in the field of agriculture is the Monkey and Pearson's Policy Analysis Matrix (PAM) developed in 1989. This PAM has been expanded and supplemented for modern analysis by Masters and Winter-Nelson in 1995. It is usually used to explore three major issues of modern agricultural systems in the contemporary stage of social development:

- Impact of implemented policies on competitiveness and profit level at individual farm level;
- The impact of investment policy on economic efficiency and comparative advantages;
- The effect and results of the policy measures applied to the technological development of production;

The information generated by the PAM can be used to formulate important indicators for analysis. Efficiency, as an indicator most accurately reveals resource performance and indicates opportunities for improvement of sustainability (Beluhova-Uzunova, R., D. Atanasov, 2014).

Based on such analysis, key conclusions can be drawn as to how competitive the types of agricultural structures in the respective sector and country, according to their specialization, technological level and agro-climatic zones, are in the current policies and how their structure, specialization and profit would vary if the measures were changed.

The Policy Analysis Matrix uses two types of budgets, one based on existing market prices and the second based on social prices. The matrix is shown as a table with double-counted value systems. The original form of the Monkey and Pearson's framework is as follows:

**Table 1.** Policy Analysis Matrix – PAM

	Revenues	Costs		Profit
		Tradable inputs	Domestic factors	
Market Prices	A	B	C	D
Social Prices	E	F	G	H
Transfers	I	J	K	L

Source: Monkey and Pearson

PAM components can be divided into two groups – primary and secondary. The primary values are six (A, B, C, E, F, G) and are obtained from the integrated accounts, calculated at market or social prices. The detailed formulas of these components of the matrix are as follows:

$$A = P_c \cdot T_c \qquad E = P_c(s) \cdot T_c$$

$$B = \sum_{i=1}^n P_i \cdot Q_i \qquad F = \sum_{i=1}^n P_i(s) \cdot Q_i$$

$$C = \sum_{j=1}^m W_j \cdot L_j \qquad G = \sum_{j=1}^m W_j(s) \cdot L_j$$

Where:

- $P_c$  is the market price of the product;
- $P_c(s)$  - product social prices;
- $W_j$  - market prices of traded raw materials;
- $W_j(s)$  - social prices of traded raw materials;
- $P_i$  - market prices of non-traded raw materials;
- $P_i(s)$  - social prices of non-marketed raw materials;
- $T_c$  - quantity produced per unit (e.g. hectare);
- $Q_i$  - quantity of marketed production factors I;
- $L_j$  - the amount of non-traded factor j used to produce the product;
- m and n are the number of traded and non-traded factors used in the production system.

Secondary values are also six (D, H, I, J, K, L) and are calculated based on primary values, providing information on the status of production and or sector. They are as follows:

- $D = A - (B + C)$  - individual (market) profit that represents the difference between the revenue and the sum of the costs of traded and non-traded factors at market prices;
- $H = E - (F + G)$  - social profit, which is formed as the difference between the income and the sum of the expenses for traded and domestic resources at social prices;
- $I = A - E$  - political transfer to regulate market prices as the difference between individual and social income;
- $J = B - F$  - political transfer to regulate traded production factors like the difference between market and social prices of these factors;
- $K = C - G$  - political transfer to regulate domestic production factors as the difference between their market and social prices;
- $L = D - H$  - pure political transfer shaped by the difference between market and social profit.

The indicator on the first row of Table 1 allows estimating the amount of individual profit, which shows the achieved level of competitiveness of the respective industry or production in the given technologies, prices of products and production factors and existing institutional and political interventions and market distortions.

The second row of the table provides information on the calculation of social profit, which

in turn allows evaluation of the economic efficiency of an industry or sector. The third row of the matrix allows one to trace the net amount of political transfers that reveal the level of public support and the degree of market variation in a given production or sector.

Based on the revenues and expenditures from MAPs, the level of efficiency of different agricultural sectors could be calculated:

- Market efficiency is the ratio of revenue to cost at market prices:

$$E_p = A/(B+C) = \frac{(P_c \cdot T_c)}{(P_i \cdot Q_i) + (W_j \cdot L_j)} * 100$$

- Social efficiency is the ratio between income and expenditure at social prices:

$$E_s = E/(F+G) = \frac{(P_{c(s)} \cdot T_c)}{(P_{i(s)} \cdot Q_i) + (W_{j(s)} \cdot L_j)} * 100$$

The calculation of market and social efficiency allows the analyses of the changes in economic results of different agricultural sectors and the influence of the institutional environment on their efficiency.

Bruno (1972), Scandizzo and Bruce (1980), Scandizzo (1984) use another indicator, Nominal Protection Coefficient (NPC) to shows the extent to which domestic or market prices differ from social (subsidized) ones. It indicates the impact of public support and protectionist policies on the domestic and international markets:

$$NPC = (A/E) - 1 = \frac{(P_c \cdot T_c)}{(P_{c(s)} \cdot T_c)} - 1$$

For example, if the domestic price is 150 and the world price is 100, the NPC is 1.5.

NPC can have positive and negative values. Positive demonstrate public support in favour of consumers, and negative in favour of producers. The effective protection coefficient (EPC) is an indicator reflecting the relationship between the relative value added to the individual price and the value added to the social price. The coefficient is calculated by the formula:

$$EPC = (A-B)/(E-F) = \frac{\{(P_c \cdot T_c) - (P_i \cdot Q_i)\}}{\{(P_{c(s)} \cdot T_c) - (P_{i(s)} \cdot Q_i)\}}$$

When the coefficient is greater than 1, government support is assumed to be consumer-oriented for the certain product and vice versa, when below 1 the support is producers-oriented. This indicator makes it possible to monitor changes in public support and to assess the relationship between changes in the institutional environment and opportunities to improve economic performance.

## CONCLUSIONS

1. Agriculture is a multifunctional sector and along with its main purpose to produce food, it has many other social and environmental roles. Modern societies understand the importance of farming and are taking institutional precautions to ensure its sustainable development. Working in harsh ecological, economic and social environment farmers face serious challenges, which threaten their success and the integrity of society as a whole. No matter what, but agriculture should produce enough food, also it needs to do it consistently. To guarantee food security, optimal exploitation of natural resources and overall sustainability of agriculture and rural communities, governments use various political measures to support this important sector.

2. The purpose of agricultural support is to increase production, employment and investments, as well as to minimize negative social and environmental side effects of the business;

3. Farmers in many countries cannot survive without governmental support, due to weather uncertainty, imperfect competition, lack of information, limited access to financial resources and high risk from market instability;

4. Agriculture subsidies are the financial assistance provided by the government to farmers through various programs. The objective behind agriculture subsidies is to provide benefits to farmers and thereby stabilize food prices, ensure plentiful production and guarantee fair income to farm families.

5. Subsidies stabilize agricultural commodity markets, aid low-income farmers, raise investment returns, help rural development, compensate for monopoly in farm input supply and farm products, ensure food security, etc.;

6. Although subsidies contribute to the overall sustainability of agriculture and rural regions, they hurt different social and environmental aspects. Paying subsidies to farmers hurts the budgetary capacity of the government and creates fiscal imbalances, which turns into inflation and lowers growth. Subsidizing agriculture contributes to the enormous waste of power, water, chemicals;

7. The effect of support measures on different social groups should be assessed by governments to select efficient long term policies. One methodological framework for the assessment of state intervention in agriculture is the Policy Analyses Matrix, constructed by Monkey and Pearson, 1989.

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