

Utilisation of the GPS information technology for the control of providing the EU support oriented on less favoured areas (LFA)

Využití technologie GPS ke kontrole poskytování podpor ze strany EU se zaměřením na méně příznivé oblasti (LFA)

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Abstract: In all partial aspects, subsidies can be effectively realised only if the adequate system of information is set up and used both on the level of subsidy suppliers (government) and on the level of subsidy recipients (agricultural organisations). It is essential to control and evaluate the usefulness of providing the support. The GPS technologies are ones of many options how to contribute to this effort. The proceeding rapid progress and upgrade of these technologies, miniaturisation of the apparatus along with the decreasing price and increasing technological efficiency, accuracy and reliability are together granting significant preconditions for their practical utilisation in agriculture. GPS is practically being used in agriculture in the system of precise agriculture and our experts belong among the world-wide recognized specialists in this direction. The GPS utilisation is additionally offered at the allocation of LFAs as well as at marking the places suitable for agro-environmental measures. In combination with the IACS system and its databases and registers, it is functionally and operatively useful at the land control of fulfilling the conditions of support programmes.

Key words: information technologies, Global Position System (GPS), Less Favoured Areas (LFA), Integrated Agricultural Control System, agriculture land policy

Abstrakt: Dotační podpory ve všech dílčích aspektech lze efektivně realizovat pouze za předpokladu vytvoření a využití odpovídající soustavy informací a to jak na úrovni poskytovatelů dotací (státní správy), tak na úrovni příjemců dotací (zemědělských podniků). Informační technologie GPS je jednou z řady možností, jak tomuto snažení přispět. GPS je v zemědělství již prakticky využíván v systému precizního zemědělství a naši odborníci jsou v tomto směru ve světě uznávaní. Využití GPS se dále nabízí při lokalizaci území LFA a vyznačování míst vhodných pro agro-environmentální opatření a v kombinaci se systémem IACS a jeho databázemi a registry je účelně a operativně prakticky využitelný při pozemní kontrole plnění podmínek programů podpor.

Klíčová slova: informační technologie, informační technologie Global position System (GPS), méně příznivé oblasti (LFA), integrovaný kontrolní systém poskytovaných dotací (IACS), strategie hospodaření na zemědělské půdě

INTRODUCTION

The Czech Republic accession to the EU means harmonisation of all crucial conditions and measures, both of administrative and technological character. At the moment of the Czech Republic accession to the EU, the integration into the entire range of collective programmes, by which the European Commission creates more stable long term goals and economic conditions both for managing the competition within the scope of the international global trade and fulfilling the tasks related to the maintenance and improvement of environment as a landscape to its members, must be completed. Only after that our farmers will be able to utilise all instruments of the Common Agricultural Policy. The contribution of this integration is broadly discussed with

both positive and negative reflections. The resulting fact is that it is substantial and for us a completely new conception of the functions of agriculture and that the financial flow in favour of agriculture and countryside will be significant and will gradually gain in strength. The basic financial limits were agreed on at the joint summit in Copenhagen (Table 1).

The support for agrarian organisations is provided in all developed countries around the world. The reason is the fact that the agrarian production activity is remarkably dependent on natural conditions and it is very difficult to change it in the course of the shorter time interval and furthermore, it is appropriate to support the non-production functions of agriculture. Neither is this situation different in the EU states, where the farmers can benefit from the subsidies partly from structural funds (EAGGF,

Table1. The total financial flows into agriculture and rural development

Indicator	Balance (billion CZK/year)	2004	2005	2006	Totally
Direct payments	payment from the EU	5.6	7.1	8.9	21.6
	the maximum supplement from the state budget	7.6	8.2	9.4	25.2
	total payment	13.3	15.3	18.3	46.9
Rural development up to 80% EU, min. 20% Czech Republic	payment from the EU	4.5	4.8	5.1	14.4
	from state budget	1.1	1.2	1.3	3.6
	total payment	5.6	6.0	6.4	18.0
Market support	payment from the EU	4.3	4.9	5.5	14.7
Total	payment from the EU	14.4	16.8	19.5	50.7
	from state budget	8.8	9.4	10.6	28.8
	total	23.2	26.2	30.1	79.5

Source: Zemědělec, 2003 (1–2)

ERDF, ESF) and partly from the resources supplemented by the individual states. In the Czech Republic, there are every year reserved financial resources from the state budget for the subsidies declared by the Ministry of Agriculture as well as through the PGRLF (Support and Guarantee Farm and Forestry Fund), which supplies credit support to various operational and investment goals.

From the point of the approach of the Czech Republic to the EU, there has been already launched the exploitation of the resources from the pre-accession EU SAPARD fund. The next support programme with the aim to harmonise with the EU law, which is already being put into effect in the Czech Republic, is the support of less favoured areas and regions with some environmental restrictions (protected areas, National parks, protective water zones etc.), being dealt with step by step by the government decree since 2000.

The agrarian support within the EU is not unconditionally granted. The essential precondition for its payment in each member country is fulfilling of the conditions for its granting. The basic frame of the conditions for the granting of the support is specified in the Decree of the Council of the European Union for every country. This frame is formulated rather generally with the aim that all member countries would be able to accommodate to it because the conditions of production of the enterprise in agriculture as well as the position of national economic system of each state in the EU are significantly different. In accordance with the Decree of the Council of the European Union, each state proposes its criteria for the determination of conditions for granting of the adequate support, which in their opinion reflect best the conditions, situation and chances of each state. Each state subsequently submits its proposal and negotiates to the European Union. Only after the endorsement and approval of the national proposal, this can be accepted and then it is possible and necessary to realise it subsequently. These negotiations are significantly long-winded and

very demanding before the mutual agreement is reached. In case of realisation, each state must give the full guarantee and persuade the Union that it has set the absolute and reliable conditions both factual and organisational for the granting, providing and above all for the control of fulfilment of the conditions of each accepted programme. The sanctions in case of breaking the agreed conditions are definitely very severe and uncompromising from the EU side. For that reason, it is very important to set up these criteria of determination for each programme so they will hit the stated target, will be objective, definite, as much as possible not complicated, understandable and especially controllable.

In all partial aspects, the subsidies can be effectively realised only if the adequate system of information is set up and used both on the level of subsidy suppliers (government) and on the level of subsidy recipients (agricultural organisations). The reason is the request for the objective distribution of subsidies as well as the control of use of the distributed financial means, and that respecting the so-called locally pointed approach, which is based on the principle of providing and of control at the right time and at the right place – as a region, organisation, land estate, stable, animal etc.

Because of the necessity of uncompromising control of the admission and exploitation of subsidies, the European Union requires establishing of payment agency and control information system IACS (Integrated Agricultural Control System), which will guarantee and provide the credible basis of fulfilment of the set rules.

IACS, which was established by the Council of the European Union in 1992, is composed as a system of interactively independent controls of fulfilment of the conditions for providing the subsidies according to the realised programmes. It is a detailed system of control of the set of provided agrarian support, which must credibly secure the identification and registration of each proceeding on the level of individual sowing, crop, animal. As a general control mechanism of EAGGF for

direct payments, IACS is step by step extended by further supportive programmes applied under the programmes of the Horizontal Plan of Rural Development what represents an extension of the system by the controls of measures built in the programmes of rural development and in the control of realised agro-environmental measures.

The European Union requires providing of at least two interactively independent control systems by the IACS. There are several technological possibilities as the use of the satellite photos, aerial photos or land controls. The individual methods have their own imperfections and qualities regarding intensity, accuracy, costs or time. All together require a high-quality map basis. It depends on the country what technology and combination it will chose. The IACS control system suggests that the minimum of 5% recipients of subsidies will be controlled every year. This places specific claims on choosing the methods of control systems.

STRUCTURE OF THE EU SUBSIDIES FOR AGRICULTURE AND COUNTRYSIDE AND ITS DETERMINATION

The supportive programmes oriented on land and vegetable production (partly also animal production – for instance the relation to pasture breeding or maintenance of meadows and pastures) are always connected to the terrain, cadastre, concrete plot, field or land. Identification in terrain will be always necessary as well as a detailed map, which will allow the determination of the object of the subsidy.

The following Decrees of the Council of the European Union are relevant:

- Decree of the Council (ES) No. 1251/1999/EC from 17th May 1999, about the system of subsidies for growers of certain crops on arable land
- Decree of the Council (ES) No. 1257/1999/EC from 17th May 1999, about rural development support via the European Agricultural Guidance and Guarantee Fund (EAGGF).

In case of direct payments under the decree of Council 1251/1999/EC, the farmers will receive the payments for “certain crops on arable land”. This subsidy is provided on the land not under the production. The amount of the subsidy is 63.00 EUR/t*reference yield of cereal, oil plant and linseed per 1 ha of the land or 72.50 EUR/t* reference yield of protein crops per 1 hectare of the land. It will be necessary to define this area within the terrain.

Similar it is in case of the decree of the Council 1257/1999/EC, which deals with the definition of less favoured areas with regard to the cadastral territory of the municipality according to the following criteria:

A) *Less favoured areas*

The territory of the municipality is the basic territorial unit for determination of less favoured areas. On the basis of the criteria given by the Decree of the Council 1257/

1999 and taking into account the natural, economical and demographic conditions in the Czech Republic, there have been set the following rules for definition of less favoured areas:

Mountain areas (marking H) – set according to the article No. 18 NR 1257/99

- The average altitude of the municipality is higher or equal to 600 metres above the sea.
- The average altitude is higher or equal to 500 and less than 600 metres above the sea and at the same time, the slope is higher than 7° on the area larger than 50% of agricultural land area in the municipality.

The other LFA (marking O) – set according to the article No.19 NR 1257/99

- The municipalities with agricultural land productivity less than 34 points (80% of the Czech Republic average), population density in the district lower than 75/km² and the share of farmers in the economically active population higher than 6%.

Areas with specific restrictions (marking S) – set according to the article No. 20 NR 1257/99

- Agricultural land productivity lower than 34 points (80% of the Czech Republic average).

B) *Area with environmental restrictions* (marking E) – set according to the article No.16 NR 1257/99

- E1 – 1st zone of National parks and Protected areas, (large-area) according to the Act No. 114/1992 Coll.
- E2 – 2nd zone of National parks, 2nd zone of protected areas and small-area according to the Act No. 114/1992 Coll.

C) *Agro-environmental measures*

Agro-environmental measures are proposed in accordance to the Decree of the Council (EC) No. 1257/99 article 22, 23, 24 and the Decree of the Council (EC) No. 445/2002. Brief summary of agro-environmental measures:

- Sub-measures: organic agriculture
- All-farm sub-measures
 - Care of arable land – grassy borders
 - Treatment of grassland
- Sub-measures for the care of landscape
 - Grassing of the arable land
 - Creating of grassy belts on sloping land
 - Cultivation of intermediate crop
 - Constantly wet meadows and peaty meadows
 - Fencing of valuable localities on grazing land
 - Bird localities on the permanent grassland: crake
 - Maintenance of the extensive gardens
 - Dispersed greenery
 - Bio zones
- Zones measures
 - Bílé Karpaty
 - Bláník
 - České středohoří
 - Litovelské Pomoraví
 - Moravský Kras
 - Poodří
 - Železné hory.

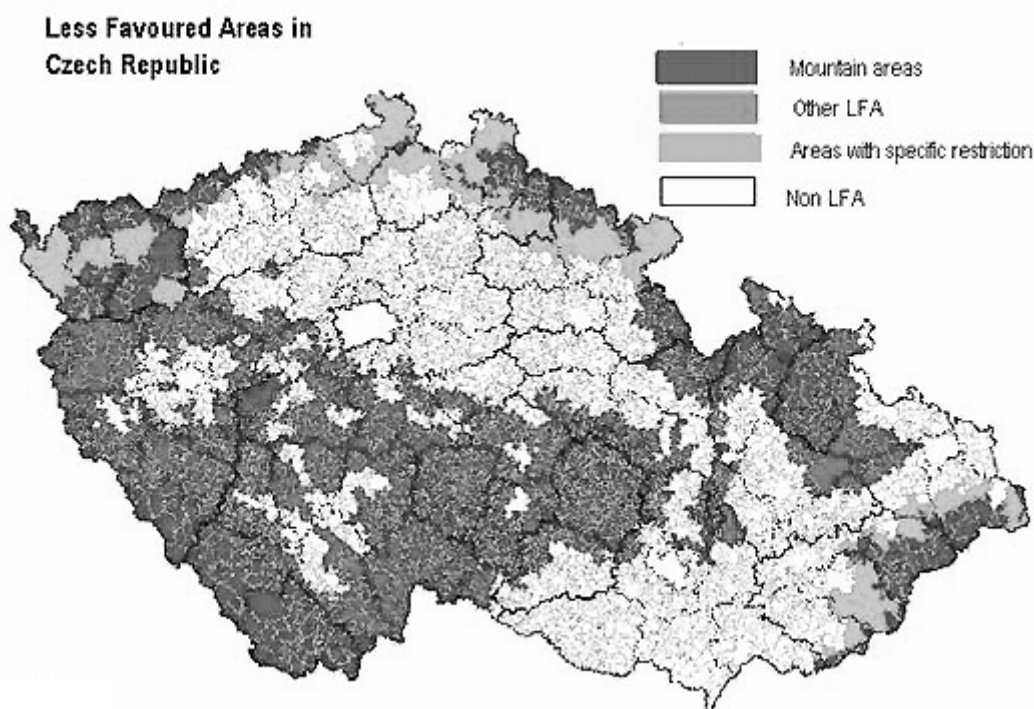


Figure 1. Limitation of LFA regions

Source: RIAFE Prague

All the above-mentioned supportive programmes are pointed at the specific predetermined space. The Ministry of Agriculture IACS system has got the scope of the used farmland in which it is able to identify each user plot and add the utilisation data to it. The areas where the agro-environmental measures are taken into account are not specified yet, even methodically. These areas can possibly be specified by the GPS technology and recorded as an additional level into the IACS database.

UTILIZATION OF THE GPS TECHNOLOGY IN AGRICULTURE FOR THE CONTROL OF PROVIDING THE SUPPORT FOR LFA

GPS is a global positional navigation system that is able to define its position elsewhere on the Earth surface regardless the weather conditions or time. Since its appearance around 1973, it was developed firstly for military use and later, by the beginning of the nineties, it has become completely functional. At first, the signal was accessible only selectively for the reason of intentional deterioration of the location accuracy for civil purposes. At the present time, the measure has been called off and by a new measure, the localisation accuracy for civil purposes has increased more than 10 times so it is possible to define the location with the accuracy less than 10 metres.

GPS is practically being used in agriculture in the system of precise agriculture and our experts belong among the world-wide recognized specialists in this direction. The GPS utilisation is additionally offered at the localisation of LFAs as well as at marking of the places suitable

for agro-environmental measures. In combination with the IACS system and its databases and registers, it is functionally and operatively useful in practice at the land control of fulfilment of the conditions of support programmes (see Figure 2).

The relevant locality is defined using the satellite navigation and this specification can be processed subsequently into the IACS information system as one of the further layers. By this way, the data can be provided both regarding the LFA, with relation to the Cadastral Office and to user land blocks and regarding the localities with agro-environmental measures as the bird-nesting localities (for instance the crane), bio-corridors, bio-zones, maintenance of the extensive gardens, fencing of valuable localities on grazing land etc. In connection with other data from the register of recipients of the support related to the individual programmes, this programme is prepared to operational terrain use right after completing the pertinent map basis.

At the present time, there already exists a sufficient number of useful navigation systems that in combination with a notebook or the pocket computer of type PDA, Handheld with basic equipment, and then more with the access to the internet or extranet, become a very powerful tool of the land control of fulfilment of conditions of the individual support programmes.

Most of these navigation devices dispose of GPS 12 canal receiver that enables reception of differential corrections and works with position accuracy less than 15 m. Two AA batteries usually charge the device with the operational lifetime up to 16 and more hours. It works for instance in the co-ordinated format WGS84, UTM/UPS,

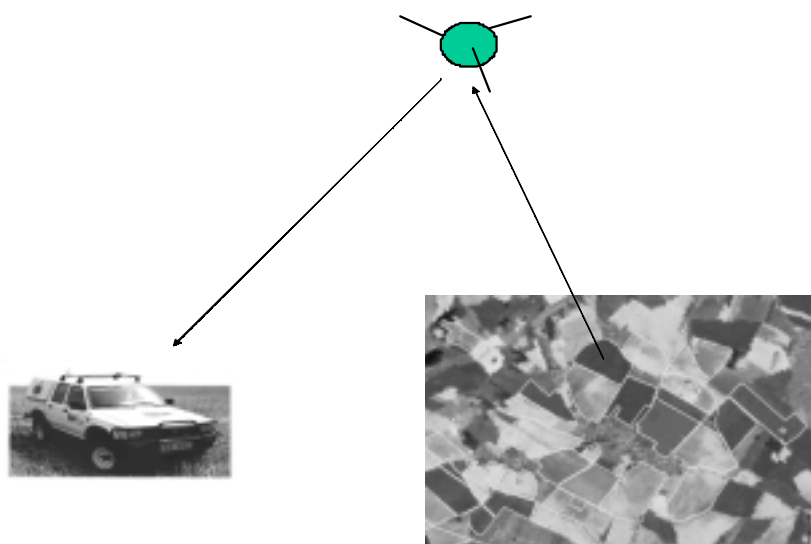


Figure 2. Location mapping with the help of GPS

MGRS, Maidenhead as well as in others. A basic map is usually installed with the possibility to record an additional user defined map basis.

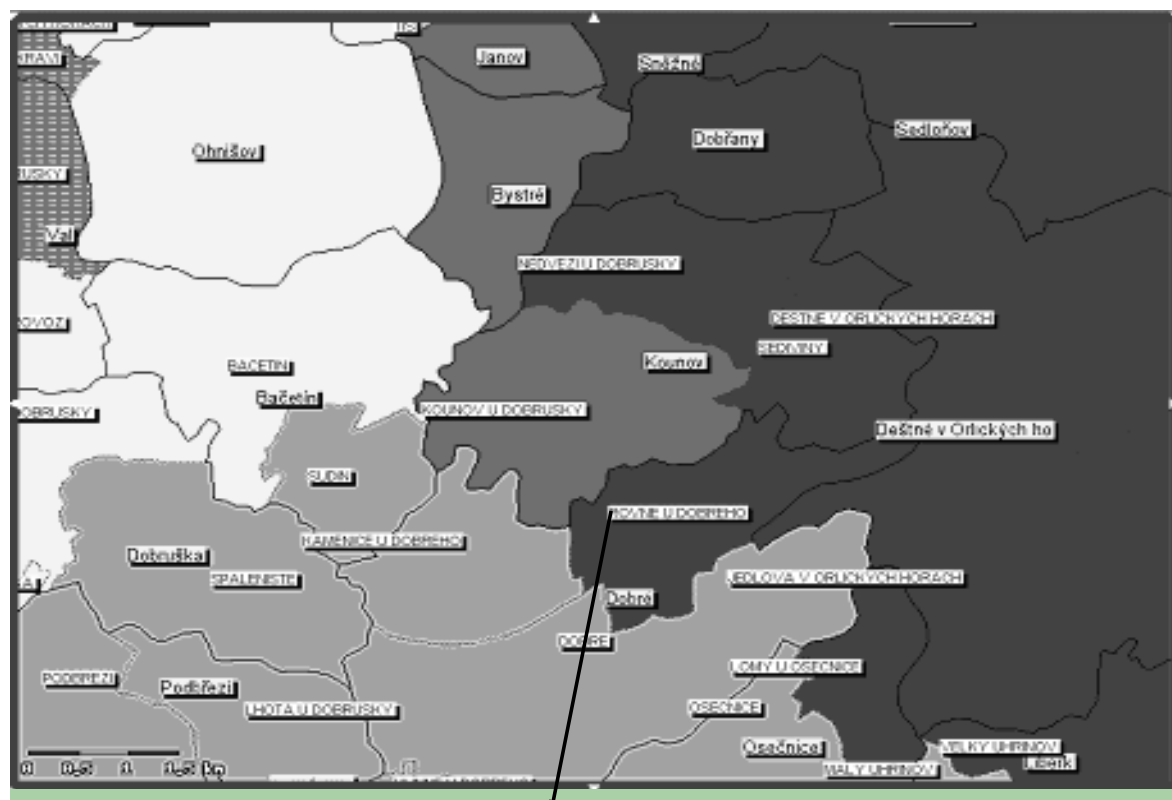
For better description, we are introducing some of whole range of the accessible devices without the further technological supporting information (see Figure 3).

The employee authorised to control the fulfilment of the support programme of a chosen recipient will go into

the terrain equipped with the GPS navigator with the recorded necessary map layers supplemented with additional data from the database necessary for relevant control. After the identification of the relevant user plot, the worker compares the detected facts with the data in the database and will make a relevant recording of the control. In case of the control of agro-environmental measures, the object of the control will be every locality in



Figure 3. Examples of GPS navigators



Basic information

Object

Name of cadaster	Ohnišov
ID of district	3 607
Total area	891.0554
Area	<u>0</u>
Sub area	<u>02</u>
Production area	31
LFA	03
Agricultural land (ha)	670.7691
Arable land (ha)	503.1869
Meadow and pasture (ha)	134.5368
Forest (ha)	157.4624
Official land price	4.02
Population density in district per km ²	70.51
Arable land/agriculture land in %	75.02
Percentage of meadows and pastures	20.06
Percentage of forest land	17.67

Figure 4. Map cut-out of the real estate cadastral office with marking of the LFA with example of the supporting information

accordance with the agreed measures or sub-measures (see Figure 4).

CONCLUSION

Farmer's activities have been always closely associated with the work on land and in the country. Besides

agricultural activities, there also belong the environmental and landscape maintenance activities. More and more of the public interest is shifting into this area in connection with the gradual decrease of the agricultural production intensity level. All these activities are connected with significant financial costs which must be compensated to the farmers by the society. These are not small

amounts of money that on the other hand must be spent efficiently and bring the expected effect. It is essential to control and evaluate the usefulness of providing the support. GPS technologies are one of many options how to contribute to this effort. The rapid progress and upgrades of these technologies, miniaturisation of the apparatus along with the decreasing price and increasing technological efficiency, accuracy and reliability are together offering significant preconditions for their practical utilisation in agriculture.

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