IDENTIFY AND SOLVE THE PROBLEMS OF ACCESS TO BASIC SERVICES IN RURAL COMMUNITIES THROUGH THE INTEGRATED RURAL ACCESS PLANNING SYSTEM

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ABSTRACT

The inhabitants of low-income rural communities need basic services to maintain or improve their standard of living, such as health, education, rural roads, employment, transportation services, drinking water, socio-administrative services, and where many of these services are located in municipal capitals or communities of regional importance. Therefore, the lack of access to these services is considered one of the main factors of poverty in rural areas. Given this dilemma, the objective of this paper is to develop a computer platform, entitled *Integrated Rural Access Planning System* (IRAP System), to support a development project of the International Labor Organization (ILO), called Integrated Rural Access Planning, through a tool that facilitates the capture of field information on the access problems of low-income rural communities to the points of supply of basic goods and services, and simultaneously generates immediate results on which basic services group the greatest access problems and which need to be solved. In this way, the *IRAP System*, proposed in this paper, seeks to support local and national decision-makers in their planning processes, to quickly assess what needs to be done and where, and to identify appropriate solutions to improve access to priority basic services.

This System consists of two modules: data entry and generation of results. The data capture module allows entering into the system the information on the main access problems by basic service described by the inhabitants of low-income rural communities and thus generating the database, which is the input for the results generation module. In the results generation module, the hierarchy of basic services to be addressed is obtained, and the three main access problems for each basic service are grouped together. In fact, 80% of the main access problems are concentrated in a few basic services. It is important to note that, at the moment of capturing the information, the results are generated simultaneously for a community, micro-region or municipality. Another aspect of the IRAP System is that it is available in three languages: Spanish, English and French, so that the system can be used by rural development planners in developing countries in Latin America and the Caribbean, Africa and Asia. Finally, the PIAR system was applied in 10 low-income rural communities in Mexico and a course on the system was given to authorities in Sudan.

1. INTRODUCTION

The IRAP is a local participatory planning methodology that was developed by the International Labor Organization more than ten years ago, based on the concept of rural access, which is considered as the level of ease or difficulty for rural people to use, reach or obtain basic goods and services [1]. Access is an important factor in rural development, therefore, it is perceived as one of the main factors of poverty, particularly in rural areas of developing countries. People need access to water, energy, land for crops, health services,

education, transport services and markets. The absence or deficiency in this factor limits the opportunity people have to improve and maintain their social and economic well-being. Improved access and poverty reduction are correlated.

Given the above, IRAP simultaneously seeks to improve the rural transport system and the distribution of basic infrastructure and services. The objective of the methodology is to cost-effectively improve access to goods and services in rural areas, particularly in poor and disadvantaged communities. IRAP as a participatory planning methodology is based on the access needs of the rural population and seeks to maximize the use of resources (human, material and financial) of local and federal governments. Its main characteristics are its simplicity, user-friendliness, low-cost application and immediate results. The IRAP supports local and federal decision-makers in their planning processes, to define priorities in different sectors and communities, to quickly assess what should be done and where, and to identify priority investments in services and/or rural infrastructure. Thus, the IRAP was applied in four low-income rural micro-regions located in the municipality of Amealco in the south of the state of Querétaro, Mexico [2, 3, 4 and 5], and based on this experience, the Mexican Institute of Transportation developed a computer system (software) that facilitates the capture of information from the IRAP questionnaire applied in the field and at the same time generates immediate results to support decision-makers in identifying the most pressing access problems and thus design feasible solution proposals.

Based on the above, the IRAP methodology was again applied together with the *IRAP System* developed in 10 low-income rural communities located in the Mexican states of Nayarit, Guerrero, Tlaxcala and Estado de México, with the objective of defining and prioritizing the problems and needs of access of rural inhabitants to the supply points of available basic goods and services, and thus identifying and proposing solutions to improve such rural access [6].

Finally, with the support of the International Labor Organization, a course was given to Sudanese authorities on the methodology and system of Integrated Rural Access Planning, which was 100 percent practical and included field work in a low-income rural region located south of the capital of the African country [7].
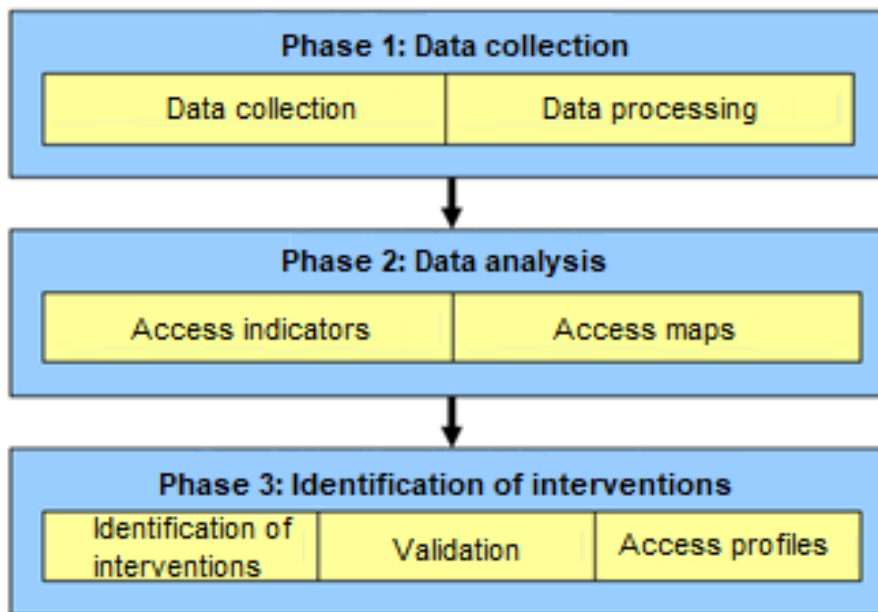

2. INTEGRATED RURAL ACCESS PLANNING

As mentioned above, IRAP is a participatory planning methodology comprising ten steps [8], which can be grouped in three phases:

Phase 1. Data collection.
Phase 2. Data analysis.
Phase 3. Identification of interventions or proposed solutions (see Figure 1).

Source: International Labor Organization

Figure 1. Phases and steps of Integrated Rural Access Planning

2.1 Phase 1. Data collection

The methodology begins with the application of the IRAP questionnaire (composed of 11 sections) to groups of key informants (maximum 10 people) in community meetings held in the low-income rural communities under study. Through this questionnaire (see Figure 2), men and women provide consensual answers on the following topics:

a) General information. - Date of the meeting and place where it is held; names of key informants and their position in the community; distance and direction from the municipal capital; type of land where the community is located; population and number of families.

b) Location of the basic services and facilities in the community.

c) Existing problems of access and mobility of villagers to: health facilities, schools (primary level), drinking water, post-harvest facilities, markets, administrative services and employment.

d) Existence of transportation services and infrastructure and the trafficability of the routes.

e) And, the community's three main access problems with three possible solutions.

Once the access information is obtained through the application of the IRAP questionnaire, this information is entered into the IRAP system to generate the corresponding digital file and, subsequently, a review of the information in the digital file is carried out to correct any errors in the entry.

Health Facilities

Community:				Survey number:							
Health facility 1				**Health facility 2**				**Health facility 3**			
Name:				Name:				Name:			
Location:				Location:				Location:			
Tiype	Check	Management	Check	Tiype	Check	Management	Check	Tiype	Check	Management	Check
Hospital		Government sector		Hospital		Government sector		Hospital		Government sector	
Clinic		Private sector		Clinic		Private sector		Clinic		Private sector	
Health house				Health house				Health house			
Other:				Other:				Other:			
Distance on Km :				Distance on Km :				Distance on Km :			
Access to facility			Check	Access to facility			Check	Access to facility			Check
Easy access all weather				Easy access all weather				Easy access all weather			
Difficult access on rain weather				Difficult access on rain weather				Difficult access on rain weather			
Difficult access all year				Difficult access all year				Difficult access all year			
There are not access				There are not access				There are not access			
Main problems			Check	Main problems			Check	Main problems			Check
To far				To far				To far			
Water crossing				Water crossing				Water crossing			
Difficult terrain				Difficult terrain				Difficult terrain			
There are not transportation				There are not transportation				There are not transportation			
Bad roads/trails				Bad roads/trails				Bad roads/trails			
Lack of medicines				Lack of medicines				Lack of medicines			
Lack of medical doctors				Lack of medical doctors				Lack of medical doctors			
Lack of beds/rooms				Lack of beds/rooms				Lack of beds/rooms			
Other				Other				Other			
Main means of transport used			Check	Main means of transport used			Check	Main means of transport used			Check
Walking				Walking				Walking			
Donkey/horse/mule				Donkey/horse/mule				Donkey/horse/mule			
Cart				Cart				Cart			
Bicycle				Bicycle				Bicycle			
Motorcycle				Motorcycle				Motorcycle			
Vehicle/pickup truck				Vehicle/pickup truck				Vehicle/pickup truck			
Van/Collective/bus				Van/Collective/bus				Van/Collective/bus			
Truck				Truck				Truck			
Canoe (without engine)				Canoe (without engine)				Canoe (without engine)			
Boat/panga (with engine)				Boat/panga (with engine)				Boat/panga (with engine)			
Other				Other				Other			
Average travel time			TT (min)	Average travel time			TT (min)	Average travel time			TT (min)
Dry season				Dry season				Dry season			
Rain season				Rain season				Rain season			
Frequency of visits			Num.	Frequency of visits			Num.	Frequency of visits			Num.
Times per year				Times per year				Times per year			

Source: International Labor Organization

Figure 2. Example of a section of the IRAP questionnaire

2.2 Phase 2. Data analysis

With the use of the IRAP system, data analysis is performed as follows:

1. The system automatically calculates the Access Indicator for all services and for all rural study communities. The Access Indicator (AI) shows the difficulty that rural households have in making use of a service, i.e., it shows the cumulative average travel time of rural households when making use of a given service. In this way, it is observed whether the service is easily accessible or not by comparing the AI values between communities for a particular service. The way to calculate the AI is through the following equation [8]:

$$AI = TT \times NF$$

where:

NF = Number of families permanently residing in the community, town, village, hamlet or other given area under consideration.
TT = Travel time or average travel time a family spends to get to a facility.
AI = Access indicator: the multiplication of the average travel time and the number of families. This quantifies the level of difficulty with which families have access to a given need or service; in "family-minutes".

This indicator effectively shows the communities where families "consume" too much time to access a service. With this, we have a clear idea of which communities should be given priority in solving their access problems, once the sector or service to be addressed has been defined.

2. Hierarchization of priority problems. - This second point makes it possible to obtain the ranking of the sectors or services to be addressed, and where the three main access problems for each service mentioned by the key informants are added together. For example, for the health service, the access problems with priority 1 were added, plus the access problems with priority 2 and, finally, the access problems with priority 3. This procedure was repeated for the other sectors mentioned by the key informants: transportation, education, drinking water, administrative services, handicraft sales, markets, roads and drainage.

The hierarchization of priority problems makes it possible to focus on one sector at a time and thus generate feasible solutions to solve these problems, making the best use of available and often limited resources.

2.3　　Phase 3. Identification of interventions or proposed solutions

In order to develop feasible and low-cost solution proposals, it is necessary to develop access profiles.

An access profile is the description of the data analysis supported by graphs and access maps, where the priority sectors or communities to be served are clearly identified. This visualization of access problems allows local planners to generate various solution proposals that are agreed upon with the local population and decision-makers in community meetings or validation workshops.

## 3. THE INTEGRATED RURAL ACCESS PLANNING SYSTEM

As will have been observed, the *Integrated Rural Access Planning System*, proposed in this paper, was developed to strengthen phases 2 and 3 of the IRAP methodology. Indeed, this system accelerates the capture and processing of field information and, simultaneously, generates immediate results that show the basic services with the greatest access problems by micro-region and community.

In the development of the *IRAP System* it was decided to use some elements of the following technology: Progressive Web Apps (PWA), which use the latest technology in browsers to behave almost like a native desktop or mobile application without depending on the operating system on the desktop or laptop computer. Thus, the IRAP system was programmed under web development standards such as JavaScript, CSS3 and HTML5.

Therefore, this system has the following characteristics:

1. It is functional for every user, as long as the default browser is Google Chrome, Microsoft Edge or Opera regardless of the operating system installed on the computer equipment.
2. It can operate without Internet connection or with poor connectivity.
3. It is multiplatform, adapting to any screen, be it a desktop or laptop computer..

The system is integrated by two modules: "Data capture" and "Results generation", see Figure 3.
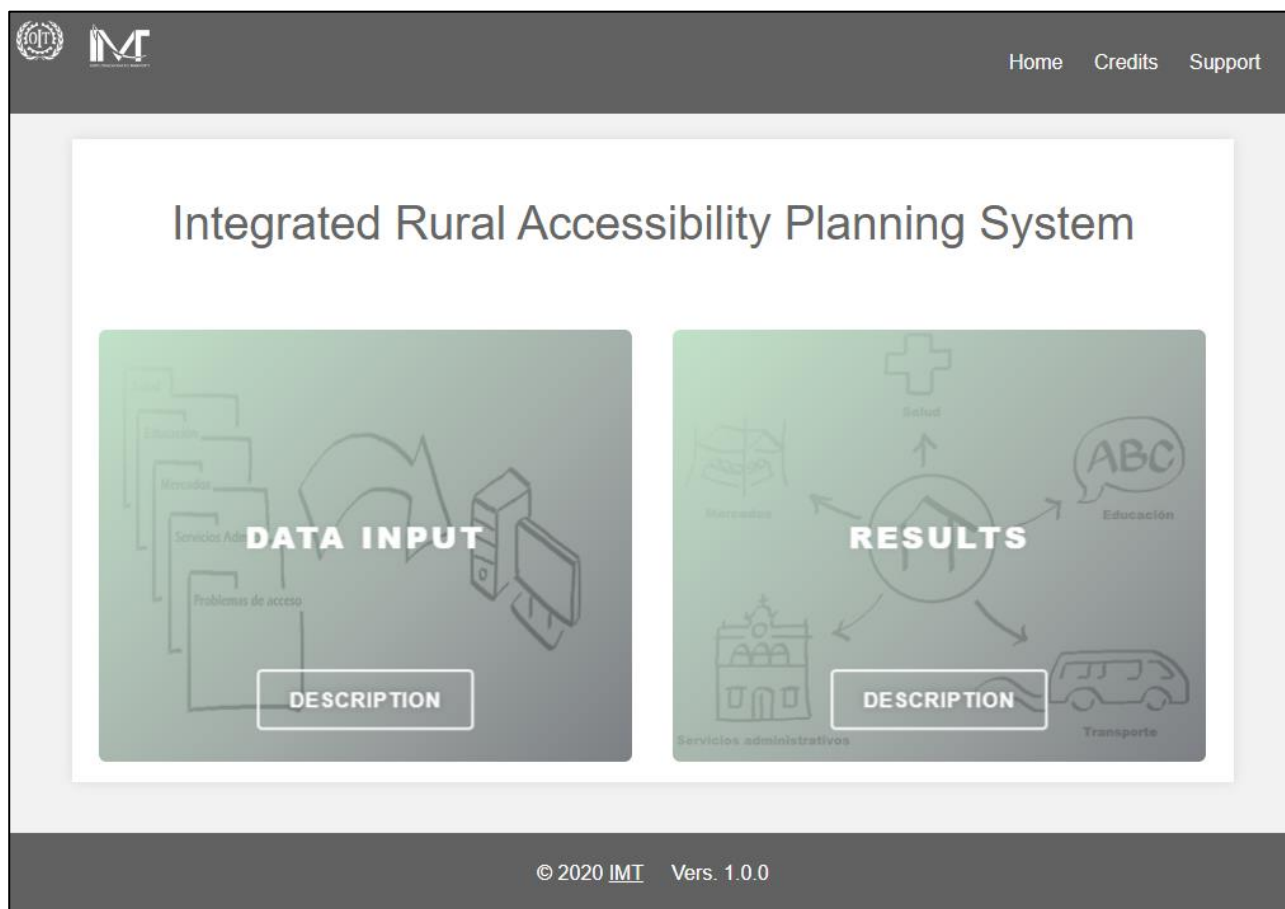
Figure 3. IRAP system main screen

In the "Data Capture" module, the field information recorded in the IRAP questionnaire applied in the rural communities is entered to obtain digital files that together make up the database for the generation of results.

The "Generation of results" module calculates the access indicator that shows the difficulty or ease with which rural families have to use a basic service. In addition to obtaining the hierarchy of sectors or basic services to be addressed, and where the three main problems of access to each service mentioned by the key informants are grouped together.

3.1   Data capture module

The data capture module has the same format as the IRAP questionnaire, i.e., it is the questionnaire in its electronic format. This facilitates the capture of field information obtained from the meetings with key informants in the rural communities under study. Thus, this module has eleven sections for capturing information (see Figure 4):

a. General information
b. Health facilities
c. Primary education
d. Drinking water
e. Post-harvest facilities

f. Markets
g. Socio-administrative services
h. Employment
i. Transportation and road infrastructure
j. Access problems
k. Community projects
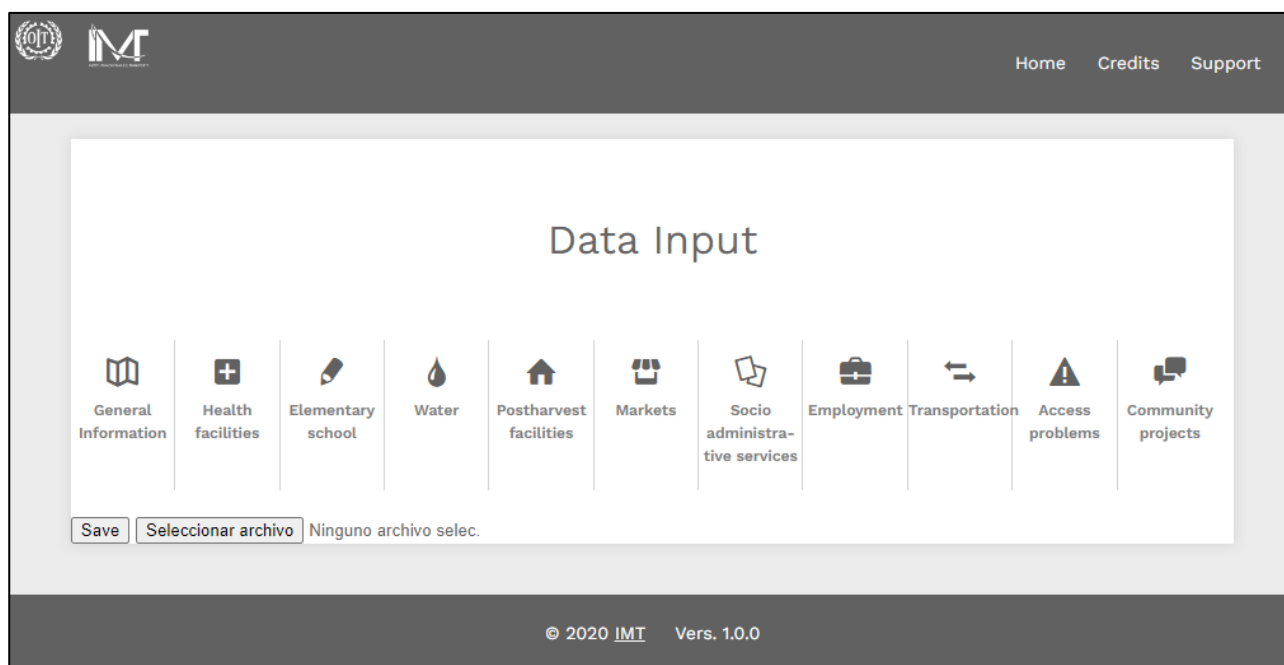
Source: IRAP System

Figure 4. Data capture module

3.1.1 *General information section*

In this section the following data are entered: survey data; the name of the key informants and their position in the community; community data; type of land where the community is located; and population information (number of men, women, children and families).

3.1.2 *Sections on health, education, water, post-harvest, markets, socio-administrative services and employment*

The structure of the *IRAP System* for capturing data on health, education, water, post-harvest, markets, socio-administrative services and employment services is similar, and therefore these sections are described together below:

a. Health service. This section collects data related to the health facilities that rural residents use to treat their illnesses: type of facility, management and distance; access to the facility; main access problems; main means of transportation used; average travel time and frequency of visits.
b. Education service. This section collects information related to children's school attendance at the primary level, such as: maximum degree of studies and type of management; number of students and distance traveled; access to the facility (school); main problems of access; main means of transportation used and average travel time..
c. Drinking water. This section captures data related to rural households' access to drinking water: type of facility (water source), use, number and distance; access to

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the facility; main access problems; main means of transportation used; average travel time and frequency of visits.

d. Post-harvest. This section contains information related to the storage of crops belonging to the families of the rural community visited: type of facility (storage), type of energy used and distance; access to the facility; main access problems; main means of transport used; average travel time and frequency of visits; and the number of visits to the facility.

e. Markets. This section captures data related to the places where basic products and others that are necessary for the daily activities of rural families are obtained: location of the market, products sold, coverage and distance; access to the facility (market); main access problems; main means of transportation used; average travel time and frequency of visits.

f. Socio-administrative services. This section contains information related to governmental or private procedures to be carried out by rural inhabitants: location of the socio-administrative services, type of services offered and frequency of visits; access to the place to carry out the procedure; main access problems; main means of transportation used and average travel time.

g. Employment. In this section, data related to those people who have non-agricultural jobs in the visited community are captured. Thus, the data that need to be captured are: Main source of household income both inside and outside the community; important workplaces outside the community; type of employment and location; access to the workplace; main access problems; main means of transportation used and average travel time.

3.1.3 *Transport section*

This section contains information related to the means and services of transportation available in the community visited, as well as the transportation infrastructure: Means of transportation available in the community; transportation services available in the community; characteristics of the transportation infrastructure and trafficability of the routes (see Figure 5).
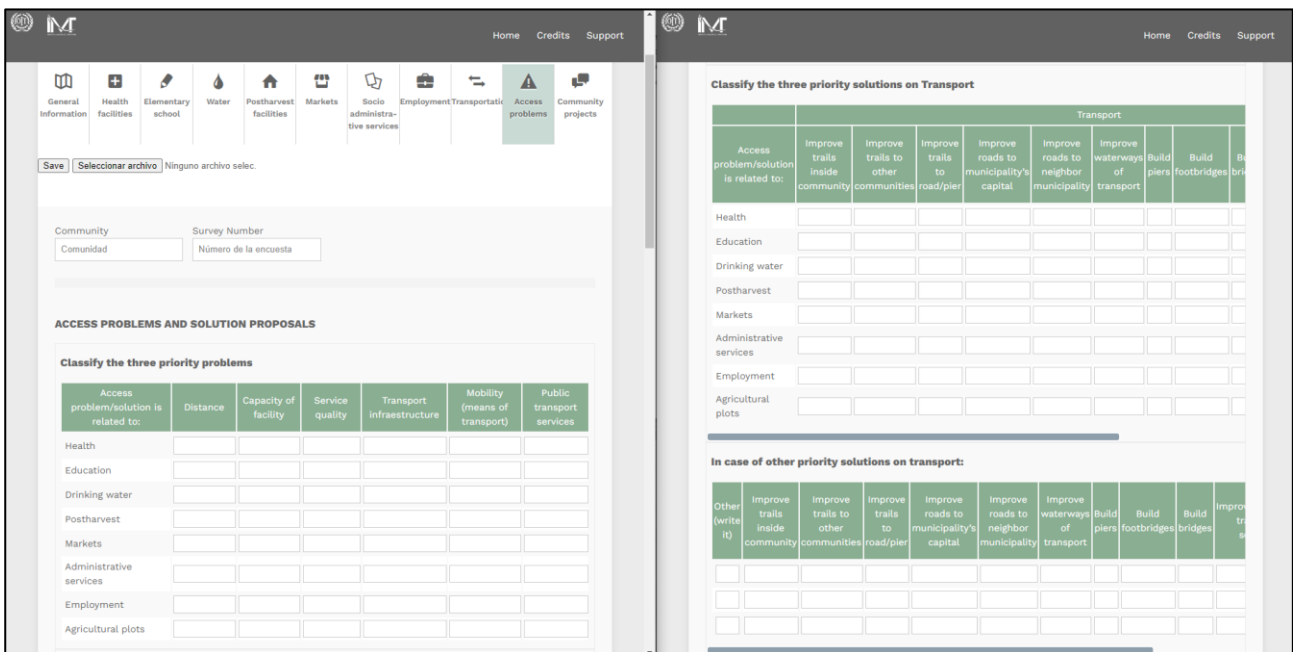
3.1.4 *Section on the main access problems*

This section captures data related to the three main access problems faced by rural families, as well as the three proposed solutions by the same key informants. Thus, the data captured are: With which services each of the main access problems is related and what are the proposed solutions; classify the three priority problems and classify the three proposed solutions (see Figure 6).
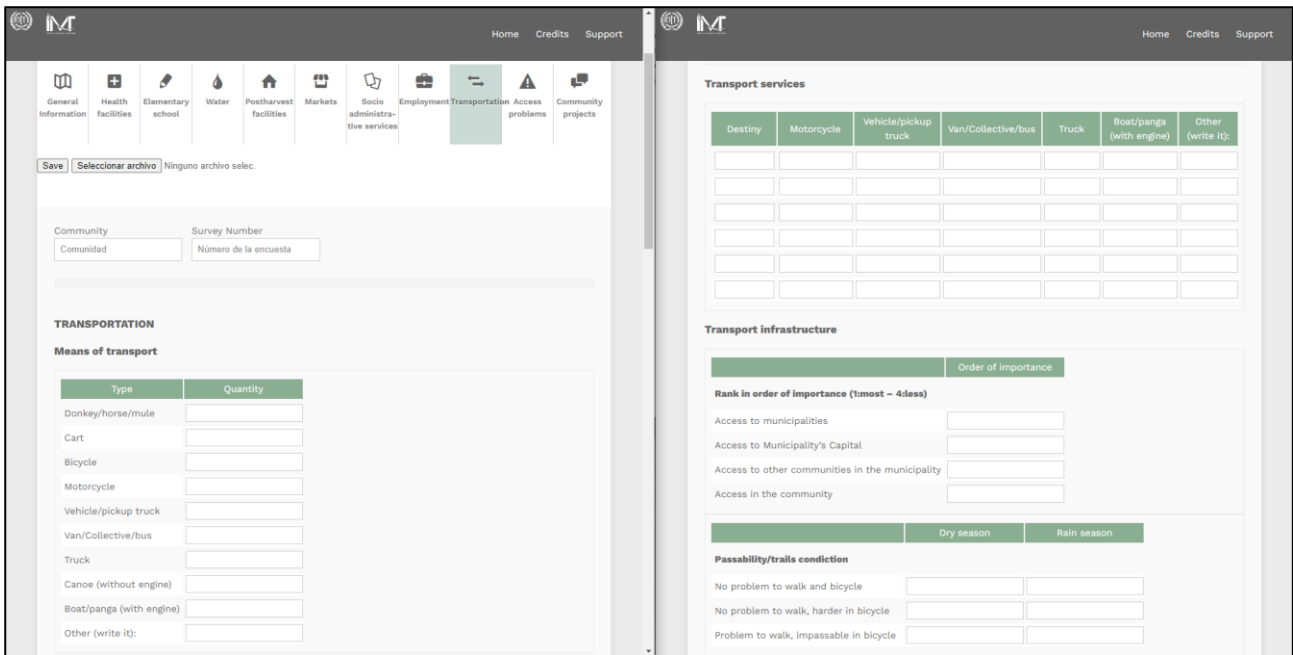
Source: IRAP System

Figure 5. Transportation section

Source: IRAP System

Figure 6. Section on main access problems

3.1.5 *Section on Community Projects*

This section contains information related to how the community's inhabitants organize themselves to carry out projects and in decision making: Name of the project and characteristics; main obstacles that affect the implementation of projects and participation of the community's population in decision making.

3.2 Results generation module

This module calculates the access indicator and obtains the three main access problems for each service mentioned by the key informants. These two elements help the decision-maker to direct the necessary actions to solve the access problems of rural families and in which community, in order to optimize the available resources.

In fact, the IRAP system processes the digital questionnaires obtained in the data capture module to first generate the graph "Priority services/sectors to be addressed", where the decision maker clearly identifies the priority sectors whose main access problems need to be solved. In this case, the priority sectors with the highest percentages should be chosen and when added together they should be around 80%, that is, few priority services accumulate the greatest number of access problems to be addressed (see Figure 7).
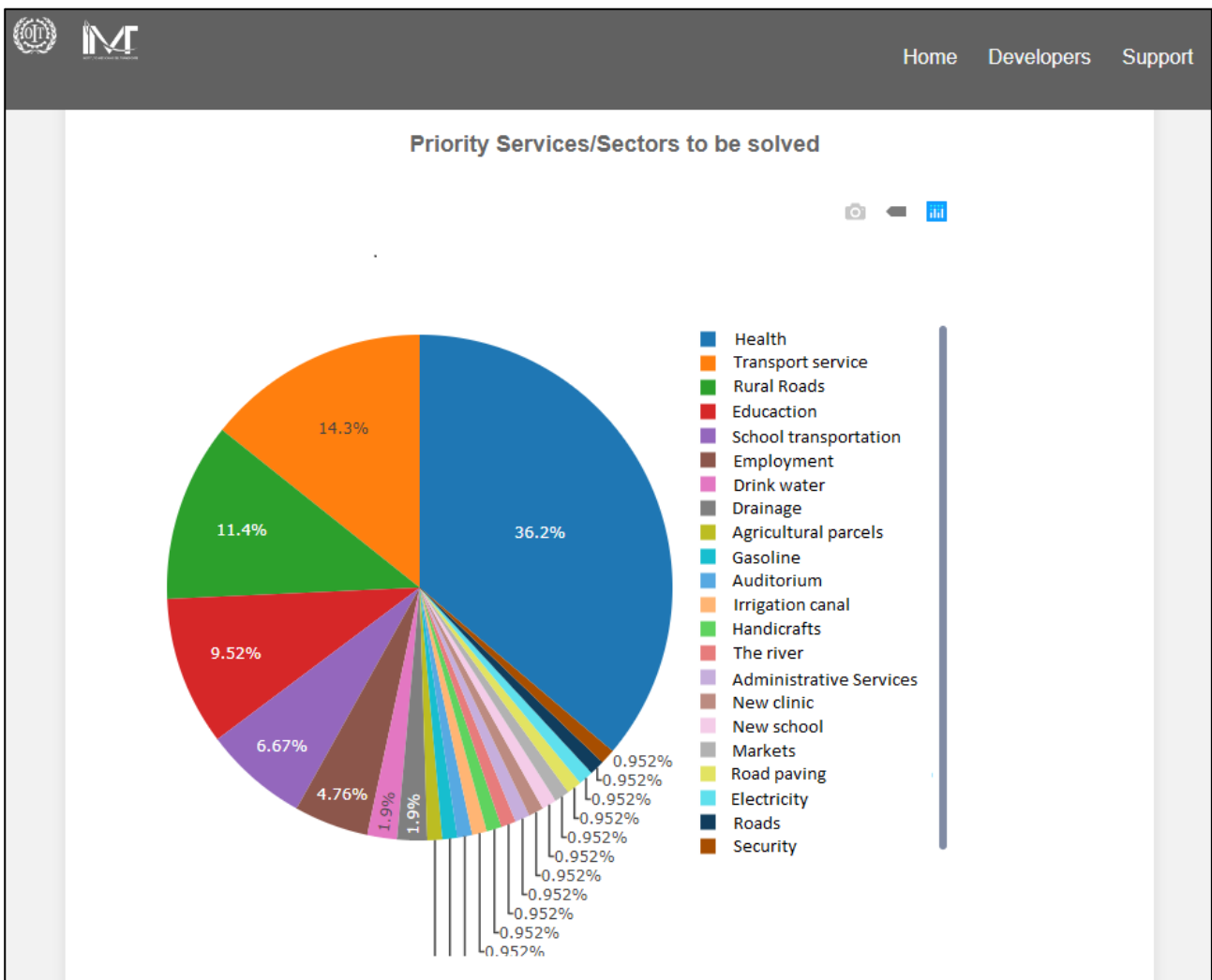
Source: IRAP System

Figure 7. Graph of priority services/sectors to be solved

Secondly, the system generates the "Access Indicator Table", which facilitates the decision-maker in which rural communities to direct the necessary actions to solve the main access problems and which services should be prioritized (see Figure 8).

Access Indicator Table						
Community	Service	FN/SN	Name/Type	Place	Access Indicator (AI)	Priority
Barrio 5to	Health	324	Health center	Barrio V	19440	2
Barrio 5to	Health	324	Health center	Amealco	19440	2
Barrio 5to	Health	324	Health center	San Juan del Rio	38880	2
Barrio 5to	Education	200	School	Barrio V	8000	0
Barrio 5to	Market	324	Santiago Barrio I	Santiago Barrio I	19440	0
Barrio 5to	Market	324	Amealco	Amealco	19440	0

Source: IRAP System

Figure 8. Access indicator table

4. RESULTS OF THE USE OF THE IRAP SYSTEM

Based on the above, the IRAP methodology was applied together with the system in 10 low-income rural communities located in the Mexican states of Nayarit, Guerrero, Tlaxcala and Estado de México, in order to define and prioritize the problems and access needs of rural inhabitants to the supply points of available basic goods and services, and thus identify and propose solutions to improve rural access. The following are the results obtained: The ten study communities have a total population of 3,114 inhabitants (2010), which are located in mountainous terrain (80% of the localities) and undulating terrain (20% of the communities). Of these communities, 80% have a high degree of marginalization, 10% have a very high degree of marginalization and the remaining 10% have a medium degree of marginalization (see Figure 9).
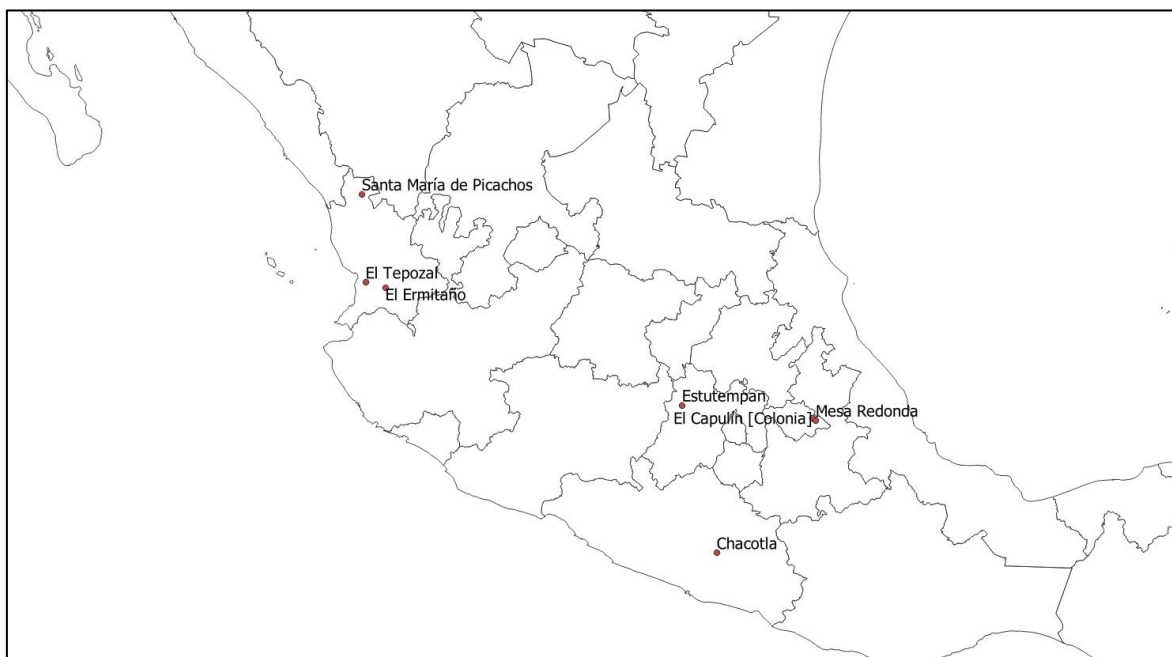

Source: Own elaboration

Figure 9. Selected rural communities

The economic activities carried out in the communities were identified based on information gathered in the field. Ninety percent of the communities studied carry out agricultural work for self-consumption. Because this agricultural production does not provide adequate sustenance for rural households, their members are forced to carry out the following activities outside their communities: In five communities, an average of 6% of households are employed in activities related to the area of construction, with the destinations being state or municipal capitals. And in one rural community, an average of 5% of households are employed in commerce.

Once the information has been analyzed, the following access profile is generated, which is the description of the results obtained in this analysis. Based on the hierarchy of priority problems, generated in the IRAP system, it was identified that the preferred services to which access problems need to be solved in the study communities are: health, employment, education and rural roads (mentioned as bad rural roads), which together account for 77% of the access problems (see Figure 10). Indeed, health services account for 33.3% of the total access problems mentioned by key informants, followed by employment (20.2%), education (13.1%) and rural roads (10.1%). The remaining access problems are distributed among services related to markets, post-harvest and drinking water.
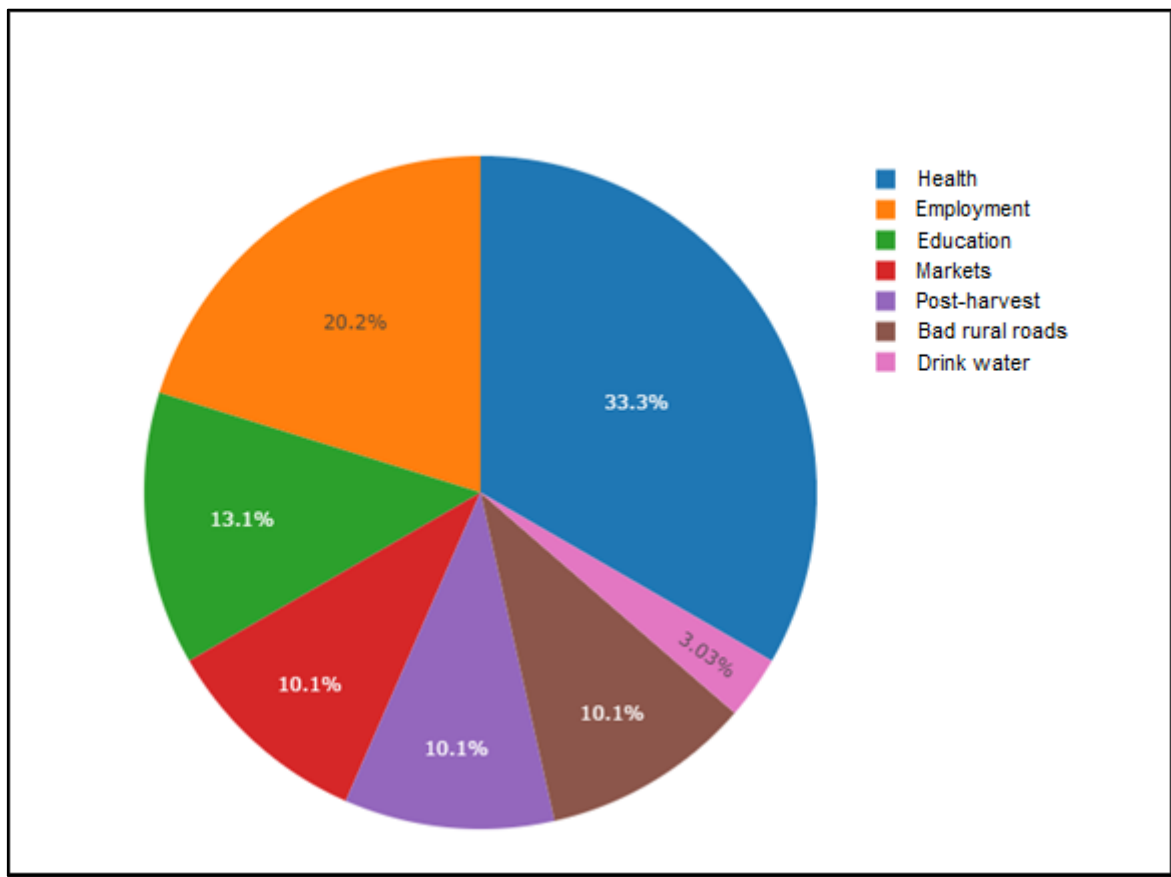
Source: IRAP System

Figure 10. Hierarchization of priority problems by sector or service.

As can be seen in Figure 11, market services, post-harvest and rural roads (bad roads) have the same percentage 10.1%, for the selection of the most urgent service the criterion of the highest number of priority mentions was used, in this way rural roads were selected as the

most urgent sector, since as can be seen in Figure 11 rural roads or roads in bad conditions have a mention in priority 1, while markets and post-harvest have no mention (zero).

Priority Services/Sectors				
Service / Sector	Priority Problems			
	Priority 1	Priority 2	Priority 3	Total
Health	9	1	0	10
Education	0	4	0	4
Employment	0	0	6	6
Markets	0	2	1	3
Postharvest	0	1	2	3
Drinking water	0	1	0	1
Bad rural roads	1	1	1	3

Source: IRAP System

Figure 11. Selection of the most pressing service based on priority number 1

In order to improve the problems of access to priority services, which account for 77% of these problems, the following solutions have been proposed (see Figure 12):

1. Health sector. - It is suggested to build or improve the infrastructure of the health facilities where people go for medical attention. And to improve the quality of service.
2. Employment. - It is proposed to have more job offers (quality and infrastructure).
3. 3.   Education. - It is recommended that the infrastructure of schools be built or improved, and that the quality of service be improved.
4. Rural Roads (bad roads). - It is proposed to improve the road surface and the technical characteristics of the roads.

Proposed solutions for improving rural access by service type				
Concept	Quality	Infraestructure	Improve roads to neighbor	Total
Health	4	6	0	10
Education	2	2	0	4
Employment	4	2	0	6
Markets	1	1	1	3
Postharvest	0	3	0	3
Drinking water	0	1	0	1
Bad rural roads	1	2	0	3

Source: IRAP System

Figure 12. Proposed solutions for improving rural access by type of service

To identify which rural communities should be served based on the above results, the access indicator tables are used to achieve this objective. In this way, the following is obtained:

a. Health sector: As shown in Figure 13, the three communities with the highest Access Indicator related to health access are Santa María de Picachos, El Hermitaño and Tepozal. Indeed, these communities are the ones that should be attended to first in order to solve their problems of access to hospitals and clinics.

Community	Service	FN/SN	Name/Type	Place	Access Indicator (AI)	Priority
SANTA MARIA DE PICACHOS	Health	112	ROSAMORADA HOSPITAL	ROSAMORADA	21840	1
SANTA MARIA DE PICACHOS	Health	112	SSA	SANTA MARIA DE PICACHOS	7840	1
EL HERMITAÑO	Health	86	BIENESTAR CLINIC	SAN LEONEL	6020	1
TEPOZAL	Health	70	SSA	SAN ANTONIO	3500	1
EL HERMITAÑO	Health	86	HOSPITAL	SAN CAYETANO	3440	1
El Capulin	Health	162	SESSA	TERRENATE	2835	1
EL CALVARIO	Health	32	MEDICAL OFFICE	CHILPANCINGO	2320	1
EL CALVARIO	Health	32	HEALTH CENTER	PETAQUILLAS	1680	1
EL MALINAL	Health	156	IMSS CLINIC	EL MALINAL	1560	1,2
EL POTRERO DE IXTAPAN	Health	20	HEALTH CENTER	POTRERO DE IXTAPAN	1500	1
Mesa Redonda	Health	58	CESSA ALTZAYANCA	ALTZAYANCA	1015	1
CHACOTLA	Health	35	HEALTH CENTER	MAZATLAN	962.5	1
Mesa Redonda	Health	58	CESSA FELIPE CARRILLO PUERTO	ALTZAYANCA	406	1
EL CALVARIO	Health	32	HEALTH HOUSE	EL CALVARIO	320	1

Source: Own elaboration

Figure 13. Access indicator table for health services

b. Employment: The communities that need to be addressed in this area are Santa María de Picachos, Tepozal and El Capulín (see Figure 14). This means that there is a need for more jobs in their municipalities.

Community	Service	FN/SN	Name/Type	Place	Access Indicator (AI)	Priority
SANTA MARIA DE PICACHOS	Employment	112	SANTA MARIA DE PICACHOS	SANTA MARIA DE PICACHOS	7840	3
SANTA MARIA DE PICACHOS	Employment	112	SANTA MARIA DE PICACHOS	SANTA MARIA DE PICACHOS	7840	3
TEPOZAL	Employment	70	TEPOZAL	TEPOZAL	7350	3
El Capulin	Employment	162	MUNICIPALITIES	MUNICIPALITIES	2025	3
CHACOTLA	Employment	35	MAZATLAN	MAZATLAN	962.5	3
Mesa Redonda	Employment	58	MUNICIPALITIES	MUNICIPALITIES	725	3
EL POTRERO DE IXTAPAN	Employment	20	COMMUNITY	COMMUNITY	150	3

Source: Own elaboration

Figure 14. Access indicator table for employment

c. Education: As shown in Figure 15, the communities of Santa Maria de Picachos, Mesa Redonda and El Hermitaño have the highest Access Indicator (AI) value for three schools located in the same communities. Therefore, these low-income rural communities should be addressed immediately to solve the problem of student access to primary education.

Community	Service	FN/SN	Name/Type	Place	Access Indicator (AI)	Priority
SANTA MARIA DE PICACHOS	Education	70	BENITO JUAREZ	SANTA MARIA DE PICACHOS	4900	2
Mesa Redonda	Education	52	IGNACIO ZARAGOZA	MESA REDONDA	390	2
EL HERMITAÑO	Education	30	JOSE MARIA MORELOS	EL HERMITAÑO	375	2

Source: Own elaboration

Figure 15. Access indicator table for education service

d. Rural roads: Finally, in terms of rural road infrastructure, it is the community of Estutempan where efforts should be focused on improving the road surface and technical characteristics of rural roads, as well as the mobility of rural residents, as shown in Figure 16 below.

Community	Service	FN/SN	Name/Type	Place	Access Indicator (AI)	Priority
ESTUTEMPAN	BAD RURAL ROADS	175	Distance	ESTUTEMPAN	NA	1
ESTUTEMPAN	BAD RURAL ROADS	175	Transport facilities	ESTUTEMPAN	NA	2
ESTUTEMPAN	BAD RURAL ROADS	175	Mobility (Means of transport)	ESTUTEMPAN	NA	3

Source: Own elaboration

Figure 16. Communities to be served in relation to rural roads

Finally, and with the interest and support of the International Labor Organization, from May 29 to June 2, 2022, a training course on the Integrated Rural Access Planning (IRAP) methodology was presented to officials of the Ministry of Labor and representatives of the State of Kasala in Sudan, with a total of 26 participants. The course was held at the Petronas complex, headquarters of the offices of the International Labor Organization in Sudan.

This training course consisted of the following topics and activities:

1. Presentation of the IRAP methodology and exercise with the IRAP questionnaire.
2. Presentation of the IRAP system and exercise
3. Presentation of the validation workshop and exercise
4. Presentation of digital mapping and exercise
5. Presentations of the elaboration of interventions and how to implement the proposed solutions.

This course was designed to be 100% practical and was based on Mexico's experience in the use of the IRAP, thus, the course is part of the South-South Cooperation.

5. CONCLUSIONS

Access is an important factor in rural development; therefore, the lack of access to basic goods and services is perceived as one of the main factors of poverty, particularly in rural areas of developing countries.

Therefore, the methodology and development of the IRAP System allows those interested in rural development (national and local authorities, non-governmental organizations, researchers and the rural inhabitants themselves) to obtain empirical information for the analysis of the multisectoral problem of the access needs of men, women and children to the points of supply of basic goods and services available in rural micro-regions.

As previously explained, the main contribution of the *IRAP System* proposed in this paper is to strengthen phases 2 and 3 of the ILO IRAP methodology. Indeed, this system significantly accelerates the capture and processing of field information and simultaneously generates immediate results that show the basic services with the greatest access problems by micro-region and community.

In fact, in the case study presented in this article, it was possible to clearly identify the sectors that ten rural communities consider to be priorities and in which 77% of the access problems are concentrated (few services concentrate the greatest access problems: Pareto's law). In addition, the access problems were prioritized towards the supply points of basic goods and services, and several low-cost and feasible solutions were proposed.

On the other hand, by knowing the priority sectors in combination with the access indicator (AI) and with the support of maps, local resources (human, material and financial) can be efficiently directed to reduce or eliminate accessibility problems in the most affected rural communities. Indeed, the **IRAP System** generates the required results immediately and at the community, micro-region or municipality level, supporting in an agile way the activities and decision making of rural development planners.

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