GRANULAR

GOOD PRACTICE

Finland: Indicator to follow Subjective Wellbeing (SWB) development of the rural population during the CAP programming period

Mikko Weckroth & Michael Kull (Luke)

The Natural Resources Institute Finland (LUKE) has been actively involved in the planning of Finnish CAP plans as a policy support provided to the Ministry of Agriculture and Forestry (MMM). In earlier work, LUKE has utilised **datasets on subjective wellbeing** (SWB), which include exact location indicators, enabling detailed spatial analysis. Hence, LUKE was commissioned to develop a measure for evaluating one specific aim in Finnish CAP plan. For that end, LUKE researchers developed a novel **indicator to follow development of SWB of the rural population during the CAP programming period 2023-27**.

Technically, this indicator was created by merging a large (N=38 000) annual FinSote Survey (currently Healthy Finland Survey) collected by the Finnish Institute for Health and Welfare (THL), to 7 classes urban–rural classification system constructed by the Finnish Environment Institute, based on 250 X 250 m statistical squares.

SWB of the rural population is measured by the standardised Mental Health Index MHI5 and a single item question on perceived loneliness. More specifically, the index on SWB of the rural population is adjusted by age and gender (by estimated marginal means), in order to control for changes in socio-demographic composition in rural areas. Additionally, the index is adjusted to national mean of SWB to control for national level changes in SWB and thus to reflect only the relative changes of SWB in the rural population. The indices generated from the data are processed and stored in LUKE's database and published in LUKE's indicator portal.

Researchers at THL and LUKE, as well as civil servants from MMM involved in the project, see this as inspiring case and example of cooperation between sectoral research institutes and affiliated ministries. However, the institutional structure that allows data availability is rather fragile, since it is based on double affiliation of single researcher.

COSTS

Development Costs

The responsible investigator for this project at LUKE (Mikko Weckroth) has an affiliation with THL. The survey data itself is collected by THL and budgeted on the basis of the agreement with the responsible Ministry of Social Affairs and Health. However, in a case there would not be a researcher with shared affiliation, the whole procedure would require involvement of the Finnish Social and Health Data Permit Authority (Findata) that grants permits for the secondary use of social and health care data (https://findata.fi/en/). The pricing for creating this dataset and giving permits would need to be estimated by Findata but would most likely be 8.000 – 12.000 €. In sum, the survey data is collected by THL - not for the purpose of developing this indicator but was utilised for its development.

The project represents an inspiring pilot on using a large Subjective Wellbeing dataset in CAP policy evaluation.

Data governance & management costs

None for the user. However, for the development of the indicator, expertise in statistics and data management, particularly in the field of (subjective) wellbeing is needed. Data analysis expertise is also needed, e.g. calculating indexes and linking responses to urban-rural classification.

Data accessibility for users: Indexes are free at Agrigaattori portal for users.

Data infrastructure costs: None for the user.

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GRANULAR

GOOD PRACTICE

Finland: The Rural Barometer

Hilkka Vihinen & Michael Kull (Luke)

The aim of the Rural Barometer is to shed light on **how Finnish citizens, public decision-makers, business decision-makers, the media and rural experts perceive the countryside**. It includes themes such as: elements of the good life, images of rural areas, regional identity, multi-local living, entrepreneurship and livelihoods, rural development, opinions on policy measures and the future of rural areas. The Rural Barometer provides a statistically representative sample of the **Finnish people's views on the state and future of rural areas.** The 4th Rural Barometer is currently conducted and continues the series of Rural Barometers done in 2009, 2013 (published 2014) and 2020. The Barometer is commissioned by The Rural Policy Council (MANE) and implemented by LUKE and subcontractors, e.g., the survey is designed and interpreted by LUKE.

COSTS

The Rural Barometer 2020 – Approach

Responses were collected through an online survey (Finnish-speaking population) and a telephone-informed survey (Swedish-speaking population). Overall, there were 1788 respondents, that is Finnish citizens aged 15-79.

The Rural Barometer 2020 – Selected Findings

A place for the good life" - The image of a good life is much or very much associated with the countryside by 61% of Finns. More positive images are associated with rural than urban areas.

"I am both rural and urban" - 37% of Finns have a double-identity: they consider themselves both rural and urban.

"The countryside is the land of dreams" - 20% of young urban dwellers consider the countryside to be the place of their dreams.

"Rural development should be based primarily on the needs of rural people." - 39% of Finns strongly agree with this statement.

The Rural Barometer provides a statistically representative sample of the Finnish people's views on the state and future of rural areas.

Development, governance & management costs

In the beginning, when the whole survey is drafted, about 6 PM (senior experts) are needed, depending on how wide-ranging the survey is supposed to be as to different dimensions, and how many respondent groups there will be. After the first run, about 3 PM should be enough for updating / improving questions and lists of specific respondents. Senior experts on rural studies for the substance, and if possible, professional survey companies to run the citizen sample with the help of their permanent panels. In Finland, the survey (covering two languages and the above-mentioned different respondent groups) costs about € 42-45,000. For one language only it would be €30-35,000.

Data analysis, infrastructure processing & visualisation

The planning of work and interpretation was done by a rural studies experts; in our case about 5 PM. Much depends on how many “mobile” parts the survey has, and on the quality of reporting. If PowerPoint presentations and newsletters are sufficient, it is possible to do it with 1-1,5 PM. A proper scientific report needs 3-4 PM. We use the Finnish social science data archive (FSD)), a national infrastructure with open access and a part of CESSDA (PAN-EUROPEAN RESEARCH INFRASTRUCTURE). FSD is funded by the Ministry of Education and Culture, and it is free to preserve the barometer data there.

Data repositories & storage

Data is stored in the Finnish social science data archive (FSD), a national infrastructure with open access and a part of CESSDA (PAN-EUROPEAN RESEARCH INFRASTRUCTURE). FSD is funded by the Ministry of Education and Culture. There are no costs to preserve the barometer data there.

Costs for data documentation and assistance in data use

Data is stored in FSD. In most cases, policy-makers or the media use the interpretations and presentations we have made available in the Barometer report or on the website of MANE. Depending on quality and quantity, costs vary between one to six PM.

Data security costs

Included in the costs of the survey company and in our own budget. Data security costs have increased a lot during the last 10-15 years, so it is wise to include them in the budget and PM.

The Barometer requires, by definition, repetition. Interval of two to three year would be optimal. It is also important to design the survey really well in the beginning, since the value of the Barometer decreases each time any change is made. In Finland, we have decided to have approximately one “mobile” section among the six themes of the barometer – a set of questions that changes depending on what is regarded as current or urgent interest.

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GOOD PRACTICE

France: Monitoring mobility and road traffic at local scale – Case Conseil Départemental des Pyrénées-Orientales (CD66)

Louise Chasset, Lenaïc Depontailler (Pays Pyrénées Méditerranée) & Jean-Claude Balagué (Département des Pyrénées-Orientales)

The *Département des Pyrénées Orientales (CD66)* has set up a system for **observing and monitoring traffic levels on the roads it manages.** As a local authority in the South of France, the CD66 is responsible for a network of 2,154 km of roads, serving an area of over 4,000 km² with a population of 480,000 (source: INSEE 2020).

The system for observing and monitoring traffic levels helps understand traffic trends, design road projects and adapt measures taken in terms of worksite operations.

COSTS

BUDGET OF THE WHOLE INITIATIVE

A total of around €165,000 per year in operating costs for the whole department. This include human resources (€100,000/year), costs of replacing and maintaining meters (€ 62,000 / year) including ROUTE+ software maintenance (€3,300 / year) and costs for acquisition and training (€ 30,000).

To help manage its road network, CD66 produces this data with several **objectives** in mind:

- **To understand traffic trends** and help decision making for long term general studies,
- **To design road projects**, in particular for sizing pavement structures,
- **To adapt measures taken in terms of worksite operations**, for example by choosing the time slots with the least impact on traffic during roadside mowing operations.

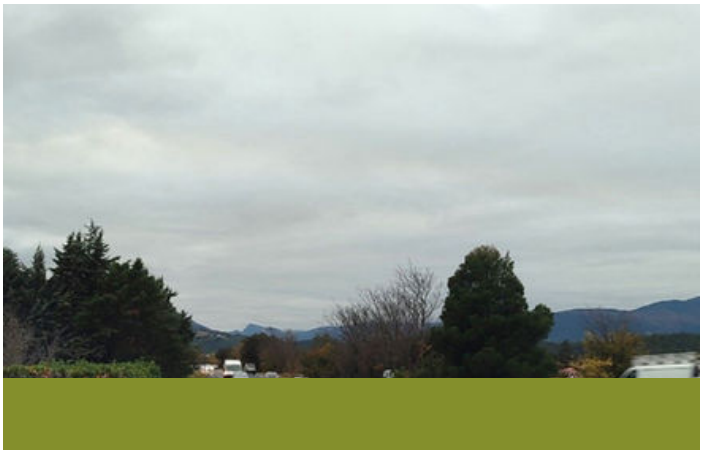
CD66 is responsible for all the stages involved in producing this data: from the installation and maintenance of the meters to the collection, consolidation, and analysis of the data, and making the information available on open data platforms. Two operators and one data administrator are working on this system, which relies on a network of permanent, rotating and on-demand meters, as well as the ROUTE+ software and a virtual server.

DATA GOVERNANCE & MANAGEMENT COSTS

***Staff costs*:** around €100,000 per year.

***Costs for Data analysis*:** The processing and display of the data is carried out in house by the department's civil servants, whose salary costs are aggregated.

Consolidation of collected data: the software draws attention to aberrant results, on the basis of which the operators and the data administrator check it. The director of the roads department finally validates the data. Data cleansing is carried out internally by the department's civil servants, whose salary costs are globalised.



Data infrastructure costs

SOFTWARE: The system is based on the ROUTE+, which costed around €30,000 to acquire (+ agent training). Annual maintenance costs €3,300 excluding VAT/year.

HARDWARE: The system is based on meters, the hardware replacement and maintenance cost is approximately €62,000/year.

Data repositories / storage: The data is stored on one of the 700 virtual servers of the Conseil Départemental des Pyrénées-Orientales.

Costs for data processing & visualisation

The processing and display of the data is carried out in house by the department's civil servants, whose salary costs are aggregated. Processing the data and making it available on the open data platforms takes around 12 working days.

Data security costs

The data is stored on one of the CD66's virtual servers, protected by a firewall. Data access is allocated manually. Costs are therefore considered negligible today.

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GOOD PRACTICE

Galicia – Spain: Telecare for the elderly at home in the rural areas of Ourense

María Isabel Doval Ruiz & Breixo Martins (University of Vigo)

Home telecare is an uninterrupted **telephone service with specific communications and computer equipment, especially designed for elderly people, who live alone, and in order to pay immediate attention in the event of an emergency.** The system consists of an alarm unit carried by the person, a telephone terminal and a computerised switchboard that receives the calls and is located in the Care Centre. The service allows users to communicate with the center, which is staffed by specialised personnel, in the event of any emergency situation by simply pressing the button on the device elderly people carry with them. This system is specific to rural local authorities (under 20,000 inhabitants). It is worth noting that only one local entity, out of a total of 92, exceeds this number of inhabitants.

The service aims to provide an **immediate response** that allows communication between the user and the care center 24 hours a day, 365 days a year. This offer is complemented by a diary-reminder service for certain tasks, such as the control of chronic medication or medical and social consultations. **Other systems related to home automation and care for the elderly are also being implemented.** An example of this is the system for detecting the opening of the doors of these people. Through a centralised system, it is possible to know the number of times a person opens their door per day and if the opening range falls below a certain number, specific protocols are activated.

The service allows users to communicate with the center, which is staffed by specialised personnel, in the event of any emergency situation by simply pressing the button on the device elderly people carry with them.

COSTS

The extracted data

The background that allows for a strong territorial analysis of this health care or welfare system is the continuous internal system of data collection. The data collection has both a statistical and a territorial level. On the one hand, a large amount of information is collected for each procedure performed by each user. Depending on the year, the number of users varies between 2000 and 3000 people, and the amount of information is large.

Every time the user presses the emergency button, the duration of the call and even, through a qualitative system, information on the reasons for each of the emergencies can be collected. This analysis has led to preliminary internal conclusions that one of the main causes of emergencies is motivated by unwanted loneliness in the last stage of life.

On the other hand, perhaps the most innovative information collection is implemented from a territorial point of view. This is due to the geolocation of each of their users. In other words, there is the possibility of generating maps of user points which, together with the above statistics and the geolocation of the service centers, can generate very useful cartographic information systems. For example, by combining the number of emergency vehicles and users, we can create maps of the flow of emergency vehicles throughout the province with wide-ranging densities that allow us to draw relevant conclusions. On the other hand, it would allow us to obtain information on the distortion between the location of services and users, areas of service reinforcement, areas of social exclusion or even distortions of services in relation to the degree of urbanisation or rural-urban areas.

Visualisation and opening of data

As far as the visualisation system is concerned, it is difficult to implement due to the high degree of protection of the data processed. While it would be possible to display purely statistical data in an anonymised form, this would be very complex in terms of the territorial representation of the data.

This is due to the fact that all mobility and service-user distortion flows are based on the exact location of each user and therefore, the very location of the households eliminates the anonymity of the users. In any case, our Living Lab is starting to collect this data in order to analyse it and then, if possible, develop appropriate reports or visualisation systems.

Budget Estimate

The estimated budget of the whole initiative is complex as, in practice, it depends on different administrations. Potential travel is carried out by regional institutions and the telecare program is funded by the provincial authority.

Similarly, data analysis is carried out by the university in collaboration with the provincial administration. In any case, on the basis of the call for tenders in 2021, the contract is estimated to be at around €1,300,000.

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GOOD PRACTICE

Poland: Functional and spatial diagnosis for social revitalization at the local (municipal) level

Agnieszka Kurdys-Kujawska (TU Koszalin)

Employees of the Faculty of Economics at KUT (Małgorzata Czerwińska-Jaśkiewicz, Ph.D.; Patrycjusz Zarębski, Ph.D.), collaborated with the Science for the Environment Foundation in their research on the creation of a revitalisation program in the communes of the West Pomeranian Voivodeship located in the Special Exclusion Zone.

The primary objective of this investigation was to identify a degraded area through an objective and comprehensive assessment of social, economic, technical, environmental, and spatial issues. Based on the research, **a model** (including diagnostic instruments) **for socio-economic diagnosis** was created, **and a model for implementing social revitalisation** was proposed.

To assess degraded areas in the commune, 22 indicators were used to describe the intensity of the phenomenon within a given commune. These indicators were grouped according to their nature and information content into social, economic, structural, spatial-functional, and environmental indicators.

Data were obtained from public statistical portals, including the Local Data Bank of the Central Statistical Office, the Commune Office, the District Labor Office, and the Commune Social Welfare Center. The indicators adopted for evaluation were also optional, which was helpful in considering the specific features of a given area, and the internal diversity of the analysed analytical units. The nature of these indicators was also determined. The indicators describing the phenomena were assessed according to the principle that they indicate a crisis when their value exceeds the median for the entire set of analysed units. On this basis, a critical indicator was built. It is the basis for defining a degraded area, i.e. in a state of crisis due to the concentration of negative social phenomena and negative phenomena of a different nature, i.e. economic or environmental, spatial-functional or technical.

The model for diagnosing socio-economic structures and the original concept of implementing social revitalisation in rural areas were used to develop 18 Local Revitalisation Programs and 108 investment projects.

Problem phenomena and the causes of their occurrence were identified through an in-depth diagnosis based on direct interviews, questionnaires, and focus group interviews. **Revitalisation areas were designated based on an indepth diagnosis using four research methods**: (1) individual direct survey - with village heads in the commune; (2) IDI – Individual In-Depth Interview, i.e. an individual in-depth interview – with people in power in the commune (mayor); (3) FGI (focus group Interview) – with local leaders in the commune; (4) interviews, animations, and research walks with residents of villages. Field research was carried out by appropriately selected and instructed interviewers - mostly representatives of commune residents. These were people selected in terms of competencies, skills, and personal predispositions, with good knowledge of the local environment.

The high usefulness of statistical data was ensured by the **inclusion of local animators and independent mediators** in the research process, who, on the one hand, were responsible for social activation in a specific region on an ongoing basis (and knew it well), and, on the other hand, were independent experts looking at a given area objectively. The designation of revitalisation areas took into account the participation of residents and local leaders.

Statistical diagnosis was made based on a set of 14 independent indicators. The revitalisation area was designated in places where, as a result of statistical analysis, an accumulation of problem phenomena was observed. In a further stage of research, the development potential and the most urgent areas of intervention were considered. For this purpose, various tools and methods of collecting information were used: interviews (based on a survey questionnaire); direct animation meetings with various stakeholders; preparation of maps of resources and needs directly by residents with the support of the Local Animator, as well as tutors and external specialists; focus meetings.

The model for diagnosing socio-economic structures and the original concept of implementing social revitalisation in rural areas were used to develop 18 Local Revitalisation Programs (e.g.https://bip.dobragmina.pl/strony/menu/139.dhtml) 108 investment projects were implemented in municipalities based on Local Revitalisation Programs with the total amount of PLN 6,000,955 (appr. 1,390,000 €). 720 residents (direct participants of revitalization projects) from 18 communes of the Special Inclusion Zone (including 490 people at risk of social exclusion) were covered by substantive and animation support in the field of revitalisation. Three projects used the diagnostic research methodology to delimit degraded areas and implemented the social revitalisation model.

Revitalisation projects were implemented in 2016-2021 by the Koszalin Regional Development Agency S.A., the Koszalin Science for the Environment Foundation, Aktywa Plus, and 4C from Szczecin. These projects were supported by funds from the European Social Fund and the state budget under the Regional Operational Program of the West Pomeranian Voivodeship for 2014-2020 and in communes located in the Special Exclusion Zone (based on the developed Local Revitalization Programs).

COSTS

Data management and management costs: None for the user.

Indicator development: specialist knowledge in statistics and data management was needed, especially in the field of social, economic, spatial-functional, technical, and environmental phenomena in rural areas. Knowledge of data analysis is also necessary.

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GOOD PRACTICE

Scotland: Scottish National Islands Plan Survey (2020): results explorer

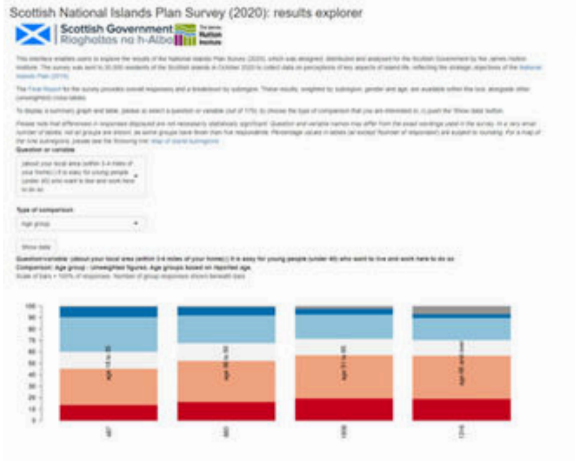
Jonathan Hopkins and David Miller (Hutton)

In 2020, researchers at the James Hutton Institute were contacted by the Scottish Government to design, implement and analyse the National Islands Plan Survey, which collected data from residents of Scotland's islands on **perceptions and opinions on island life**, which were aligned with strategic objectives of the National Islands Plan.

The survey implemented a customised subregional geography to inform both survey sampling and the reporting of results, in order **to identify diversity in lived experiences beneath the level of local authority regions**; these regions have subsequently been developed into an official geography for Scotland through further work by National Records of Scotland and the Scottish Government. The survey achieved 4,347 responses from 59 islands.

COSTS

The project involved a team of six researchers with one leading on the tool development and publication. The tool utilised existing skills in R/Shiny programming. Data hosting costs for the tool are currently zero, through a free account at shinyapps.io, although a subscription was taken out for that account previously. The value of the whole contract for the Survey was approximately €70,000.



However, in order to expand the volume of results reported, a simple interactive tool was published, enabling end users to generate graphs and data summaries for 179 variables and tabulations with geographical, demographic and economic characteristics of respondents. **The tool demonstrates holistic experiences of island life and illustrates variations in these between people and regions**, and highlights the extended evidence base for a type of geography for which there was limited data available.

The tool was published in 2021 and was developed as part of a short research project, using the Shiny package within R. Cross-tables and weighted results summaries were pre-generated for the tool, with reproducible code produced for their calculation. Some results showing figures for island regions, and the islands overall, were weighted by island region, age group and gender cohorts in order to account for differences in response rates. Data provided to the tool were screened, with variables and values redacted in places, to avoid the disclosure of data for low numbers of people.

The tool demonstrates holistic experiences of island life and illustrates variations in these between people and regions, and highlights the extended evidence base for a type of geography for which there was limited data available.

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GOOD PRACTICE

Nordic Countries: The Nordic Service Mapper

Mats Stjernberg (Nordregio)

Nordic Service Mapper is an interactive o**nline web-mapping tool that visualises the proximity to different services across the Nordic Region**. It covers the territories of Denmark, Finland, Iceland, Norway, and Sweden as well as the Faroe Islands and Åland. The tool includes four different types of services, namely grocery stores, pharmacies, libraries, and schools. The tool was published in 2021 and it reflects the situation in December 2019. The tool shows **street-based proximity for the population to various service categories at different geographical levels**.

Various data aggregation and normalisation options are provided in the tool, including access to services at regional and municipality level, according to the Eurostat Degree of Urbanisation at municipality level (cities, intermediate, rural), and at a more spatially detailed grid-level and based on a freehand selection of areas.

COSTS

The Nordic Service Mapper tool was developed by Nordregio in collaboration with Ubigu. The tool was created by commission of the Nordic Thematic Group on Sustainable Rural Development (2017–2020) as part of the project Regional disparities and the geography of service within the Nordic countries. Mats Stjernberg and Oskar Penje at Nordregio led the project and the accessibility calculations were carried out in-house at Nordregio. The work to create the web-mapping platform was led by Ubigu.

Nordic Service Mapper also includes an infographic tool which allows for visualising service accessibility according to selected territories and service types in the form of charts.

The calculations are based on spatial analysis carried out in ESRI´s Network Analyst (closest facility). Bridges, ferry links, road hierarchies and one-way restrictions were considered and included in the calculations. All network calculations have been done without considering national borders, which also enables for cross-border analysis.

The data sources used include data on service locations which were purchased from HERE Technologie, population data on 1,000m × 1,000m grid-level and road network data from OpenStreetMap.

Nordic Service Mapper is an interactive online web-mapping tool that visualises the proximity to different services across the Nordic Region, covering Denmark, Finland, Iceland, Norway, and Sweden as well as the Faroe Islands and Åland.

Data costs

The main costs were the costs for purchasing data on service points from Here technologies as well as for working hours for carrying out the accessibility calculations and developing the web-mapping platform. The costs for purchasing the service point data was around € 12.000.

Data analysis, processing & visualisation

The number of PM for the carrying out the calculations and data harmonisation including different methodological considerations was around four months. The development of the web mapping platform also required around four months of work.

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GOOD PRACTICE

EU: Integrating text-to-image and image-to-text techniques to enhance accessibility and understanding of rural land-use data - Cross Modality Framework

Pallavi Jain (IAMM)

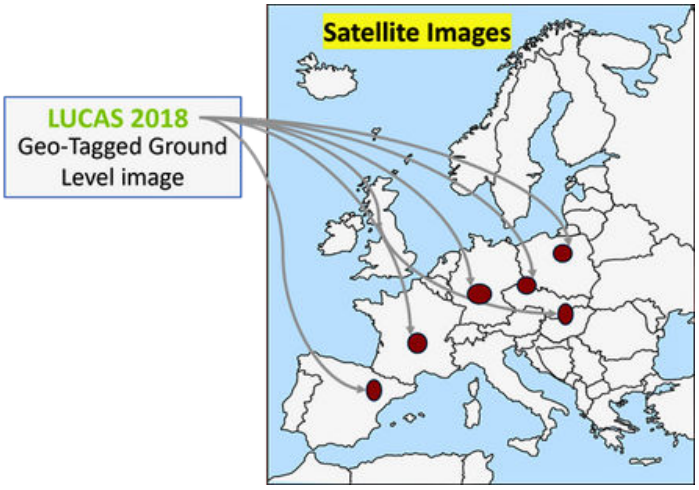
The t**ool integrates text-to-image and image-to-text techniques to enhance accessibility and understanding of rural and-use data**. It enables efficient retrieval, association, and analysis of specific land use categories or features within satellite imagery using textual queries or visual analysis.

The tool currently utilises sophisticated vision-language models to link ground-level images with satellite imagery, providing crucial **context for understanding rural land use dynamics**. It utilises geolocations from LUCAS survey data to gather satellite imagery from Bing and Sentinel-2 sources.

COSTS

Data Collection

The project initially uses LUCAS 2018 survey data to acquire ground-level visual context across Europe. Bing Aerial (15cm resolution) and Sentinel-2 (10m & 20m resolution) data are collected from Microsoft Bing and Planetary Computer API services, amounting to 230,000 location images obtained so far.



Furthermore, the textual modelling aspect enables the implementation of Text-to-Image and Image-to-Text search methods, establishing essential connections between textual descriptions and visual representations. These methodologies enable seamless interaction between textual and image data domains, enhancing the project's comprehensive approach.

Through the comprehensive insights gained from the visual-language approach, the tool aims to empower policymakers, researchers, and land managers. This support **facilitates well-informed decisions in land use planning, conservation strategies, and resource management.** The ultimate goal is to leverage these advanced models to effectively understand, monitor, and manage rural land use.

The ultimate goal is to leverage these advanced models to effectively understand, monitor, and manage rural land use.

Hardware Infrastructure

For model training, four GPUs are utilised to support the computational requirements. The estimated cost for the infrastructure is €8,000.

Data Costs

As of now, Bing and Planetary Computer services from Microsoft offer free APIs for data collection. However, downloading 230K images takes nearly a week.

Total Costs

The development of the algorithm is estimated at 24 PM. The foundational expenses for the tool would encompass creating a user interface, an API, and backend infrastructure, along with utilising online cloud servers like AWS, Google Cloud, or Microsoft Azure for model deployment. Additionally, there might be additional API fees associated with utilising satellite image retrieval services.

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GRANULAR

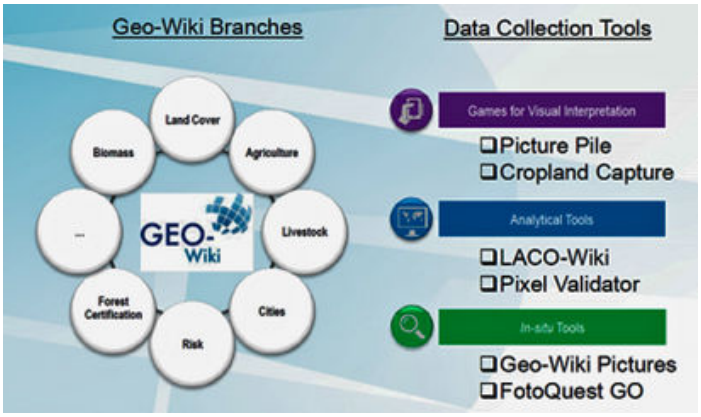
GOOD PRACTICE

Global: Geo-Wiki Earth Observation & Citizen Science

Ivelina Georgieva (IIASA)

The Geo-Wiki platform **provides anyone with the means to engage in monitoring of the Earth's surface by classifying satellite, drone or ground-level imagery**. Data can be input via desktop or mobile devices, with campaigns and games used to incentivise input. These innovative techniques have been used to successfully **integrate citizen derived data sources with expert and authoritative data to address pressing policy-related questions** (e.g. European environmental policy, SDG indicators and more). Geo-Wiki was established in 2010 in the Novel Data Ecosystems for Sustainability research group, part of the Advancing Systems Analysis Program at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria.

Since its inception, Geo-Wiki has grown rapidly, with currently over 22,000 registered users having contributed more than 18 million image classifications from around the world. Furthermore, the Geo-Wiki toolbox has expanded to include numerous applications which help to address a variety of global challenges (e.g., land use change, food security, pollution and more).



Since its creation, multiple citizen science campaigns in the form of competitions have been carried out, asking volunteers to perform visual interpretation of VHR satellite imagery in the Geo-Wiki platform on topics related to land use and land cover changes. Some of the recent campaigns include defining the drivers of tropical forest loss, validating the global human settlement layer, and defining the human impact on forests. Within these campaigns we have involved hundreds of volunteers from more than 20 countries worldwide who had interest to contribute to science and become part of the growing Geo-Wiki community.

To facilitate the process of visual interpretation, volunteers have access to specifically defined (for the validation task at hand) Geo-Wiki functionalities. The principle set of tools which the platform includes are implemented features like Sentinel Hub time series imagery, an NDVI tool for measuring the Normalized Difference Vegetation Index and Google Earth history imagery. The quality of contributions has been controlled from a group of experts during and after the campaigns and scientific publications are used to share the data, which are later uploaded in public repositories to ensure transperancy of the entire process.

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GRANULAR

COSTS

Main development costs

Initially, an early beta-version of Geo-Wiki was developed in partnership with the University of Freiburg, Germany and the University of Wiener Neustadt, Austria, as part of the Geobene project. The development of the first, betaversion lasted 6 months and the further development of the Geo-Wiki v.1. required around 1,5 person per year of work.

There have been ongoing feature developments and improvements since 2011. In 2013 the first big refactoring of the Geo-Wiki platform happened, which lasted approximately 10 months. This included database refactoring, as well as moving to newer technologies and frameworks. Furthermore, we moved to using a content management system (CMS), e.g. user management.

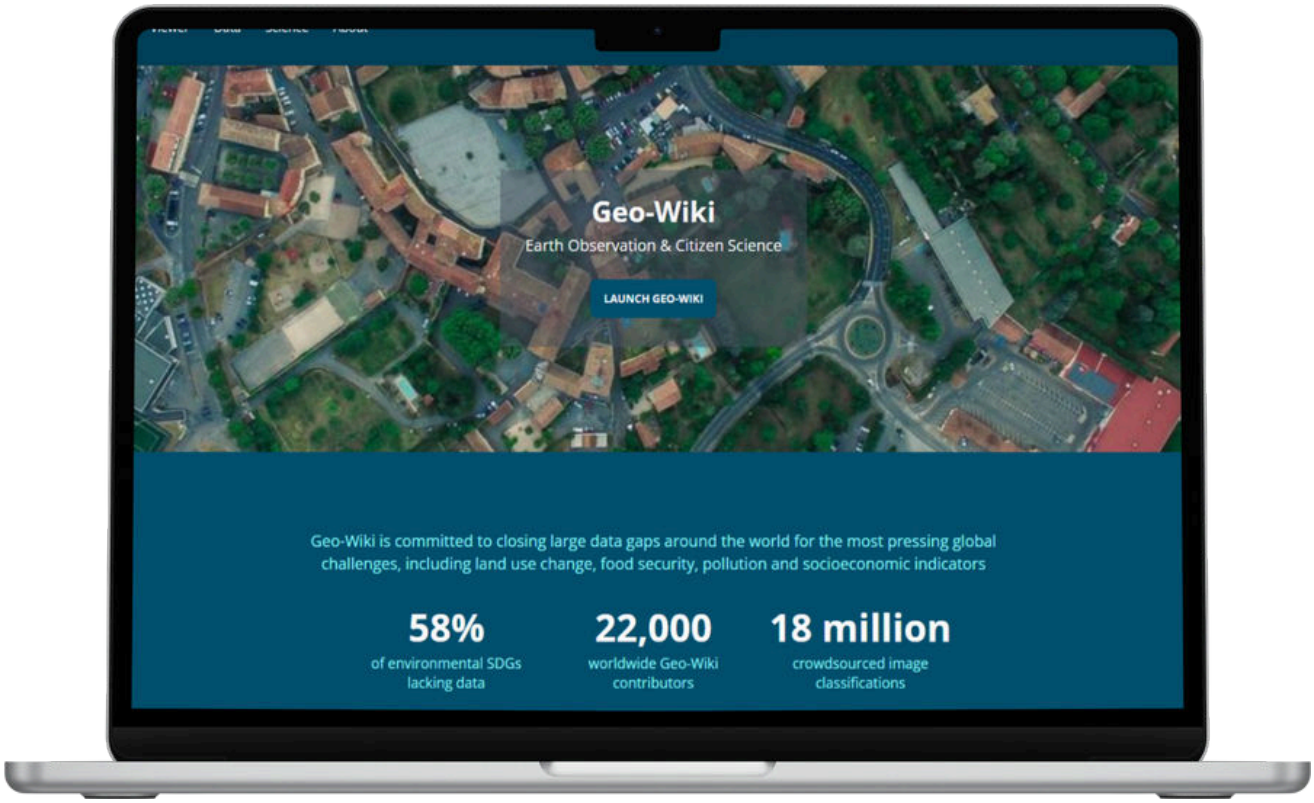
Hosting costs

Costs for servers and services needed for hosting the Geo-Wiki system from 2011 until now: total of 35.000€ (Nov 2011 - Oct 2023)

- Initial costs in Nov. 2011: 70€/month.
- Current costs in Oct. 2023: 500€/month (the monthly hosting costs increased because of more collection tools & platforms & more servers and services were needed).

Software costs

No software costs, as we are only using open source and free software.



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