



Republic of Serbia  
MINISTRY OF  
ENVIRONMENTAL PROTECTION



# SUSTAINABLE LAND MANAGEMENT AT THE LOCAL LEVEL IN THE REPUBLIC OF SERBIA





# **SUSTAINABLE LAND MANAGEMENT AT THE LOCAL LEVEL IN THE REPUBLIC OF SERBIA**

# **SUSTAINABLE LAND MANAGEMENT AT THE LOCAL LEVEL IN THE REPUBLIC OF SERBIA**

## **Authors**

Ajla Dorfer, Master of Forestry Policy and Economics  
Dragana Vidojević, PhD in Agricultural Sciences  
Jovana Čulibrk, Graduate economist - master  
Jovica Vasin, PhD in Agricultural Sciences — pedologist  
Milan Milutinović, MD — Hygiene and Medical Ecology Specialist  
Nadira Berbić, Master of Food Technology

## **Project Coordinator**

Aleksandra Šiljić Tomić, PhD in Environmental Engineering  
UN Environment

## **Publisher**

fea – Forestry and Environmental Action  
Bulevar Mihaila Pupina 10ž, VP 1, 11000 Belgrade

## **For the publisher**

Maja Milovanović

## **Title of the original**

Одрживо управљање земљиштем на локалном нивоу у Републици Србији

## **Reviewer**

Ratko Ristić, PhD in Biotechnical Sciences, full professor  
at the Faculty of Forestry of the University in Belgrade

## **Translation**

OD Babilon Sarajevo

## **Proofreader**

Radmila Arandelović

## **Design**

Denis Kujundžić

## **Cover photograph**

József Ispánovics

## **Printed by**

Bigraf Plus, Belgrade

## **Year**

2019

## **Copies**

100

**ISBN: 978-86-900129-3-0**

The views set out in this Brochure are those of the authors and do not necessarily reflect the views or policy of the Global Environment Facility and the United Nations, including the United Nations Environment Programme or any other institution of the Republic of Serbia.



This publication was printed on recycled paper.

# CONTENTS

<b>I</b>	<b>LIST OF ABBREVIATIONS/ACRONYMS</b>	<b>7</b>
<b>II</b>	<b>ABOUT THE BROCHURE</b>	<b>8</b>
<b>1.</b>	<b>SOIL IS A LIVING RESOURCE</b>	<b>10</b>
<b>2.</b>	<b>PRESSURES ON LAND AND DRIVERS OF LAND DEGRADATION</b>	<b>12</b>
<b>3.</b>	<b>LAND DEGRADATION</b>	<b>14</b>
<b>4.</b>	<b>SUSTAINABLE LAND MANAGEMENT</b>	<b>15</b>
<b>5.</b>	<b>LAND DEGRADATION NEUTRALITY CONCEPT</b>	<b>20</b>
5.1.	Sustainable development goal on land degradation neutrality	20
5.2.	Who should be involved in the process of achieving land degradation neutrality?	22
<b>6.</b>	<b>SUSTAINABLE LAND MANAGEMENT AT THE LOCAL LEVEL</b>	<b>25</b>
6.1.	Challenges and obstacles from the viewpoint of sustainable land management	26
6.2.	Liability for contaminated sites	28
6.3.	Steps for introducing sustainable land management at the local level	32

# LIST OF ABBREVIATIONS/ACRONYMS:

DPSIR	Driving forces - Pressures - State - Impacts - Responses
EEA	European Environment Agency
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GIS	Geographic information system
GEF	Global Environment Facility
LDN	Land Degradation Neutrality
MDGs	Millennium Development Goals
NGO	Non-governmental organisation
SDGs	Sustainable Development Goals
SLM	Sustainable Land Management
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UN Environment	United Nations Environment Programme
USD	United States Dollar

## ABOUT THE BROCHURE

This brochure was prepared within the project titled “Enhanced Cross-Sectoral Land Management through Land Use Pressure Reduction and Planning” (hereinafter: the Project) as an initiative to undertake urgent and comprehensive measures to conserve land, which include:

- (a) encouraging the transfer of science and technology,**
- (b) strengthening institutional capacities,**
- (c) developing partnerships for joint action, and**
- (d) raising awareness on integral and sustainable land management.**

The Project is funded by the Global Facility (GEF), and implemented by the United Nations Environment Programme (*UN Environment*) through its Vienna Programme Office, in cooperation with the Ministry of Environmental Protection of the Republic of Serbia.

The Brochure was prepared as a summary of the Guide for sustainable land management at the local level in the Republic of Serbia (hereinafter: the Guide) outlining main results of the analysis of the state of land resources conducted within the Project. The purpose of the Guide is to underline the value of land as a non-renewable natural resource and its sustainable management as a precondition of reaching political and social goals and achieving sustainable development at all levels.

A long-term perspective of efficient management of natural resources requires a synergy of action (inter-disciplinary approach of technical, biotechnical, natural and social sciences) at different levels of governance, with special emphasis on the local level. The main goals of sustainable land management are: (I) most rational use of available resources, (II) giving positive impulses for economic development, (III) protecting the environment, and at the same time (IV) achieving social balance of development. Successful achievement of the stated goals implies identifying proper planning and management instruments and their balanced use, as these goals are often mutually contradictory.

Specifically, the purpose of the Guide and the Brochure is to introduce decision-makers, local administrations and employees of relevant services, as well as other stakeholders in the field of natural resources management at the local level to: (a) basic notions of land degradation, (b) concepts such as Sustainable Land Management (SLM) and Land Degradation Neutrality (LDN) and most wide spread practices of sustainable land management in the region and beyond, and provide concrete and applicable steps for the implementation of the indicated concepts in the context of local self-government in the Republic of Serbia.



**"A NATION THAT  
DESTROYS ITS SOIL,  
DESTROYS ITSELF."**

- Franklin D. Roosevelt (1937)



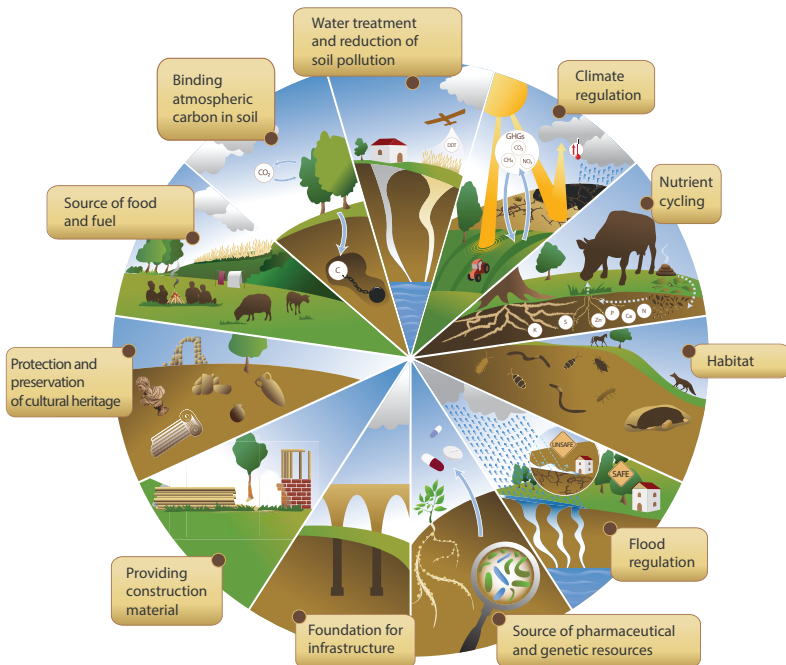
# 1.1 SOIL IS A LIVING RESOURCE

Soil is a vital natural resource, complex, living and changeable. At the same time, it is a limited and non-renewable resource that carries out many functions important for humans – ecosystem services.

## Ecosystem services

Ecosystem services pertain to all products and functions of ecosystems that benefit people either directly or indirectly. They include clean water, food, wood mass, as well as services such as pollination, natural pest control and soil fertility.

- **provisioning services:** production of food, water, wood mass, fuel
- **supporting services:** primary production of biomass, soil forming, nutrient cycling
- **regulating services:** regulating climate natural disasters, diseases, water quality, waste disposal
- **socio-cultural services:** rest, recreation, education



*Soil provides ecosystem services making life on Earth possible!*

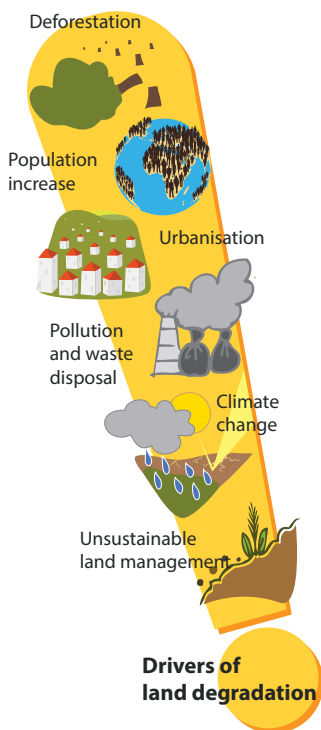


A photograph of a forest with tall, slender pine trees. The foreground is filled with a dense patch of tall, green grass. The ground is covered in a layer of brown pine needles and leaves. The background shows more trees and a bright sky. The text is overlaid on the lower left portion of the image.

**SOIL IS THE HABITAT OF  
ONE QUARTER OF ALL  
KNOWN SPECIES OF  
ORGANISMS ON EARTH!**

## 2. PRESSURES ON LAND AND DRIVERS OF LAND DEGRADATION

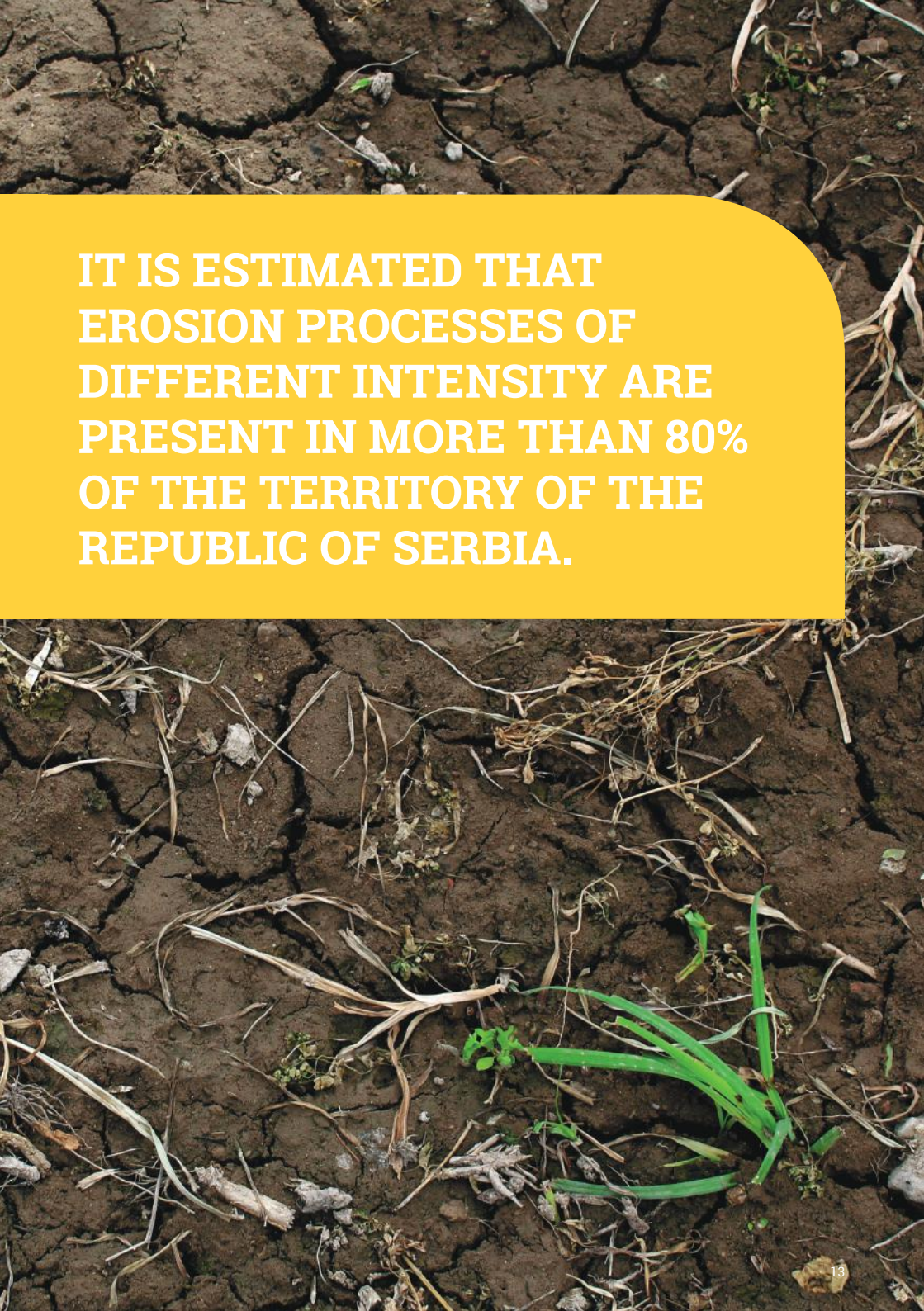
It is evident that, apart from food production, soil has other purposes as well, such as: construction of settlements, industrial plants, roads, exploitation of raw materials, waste disposal, etc. As a consequence of increasingly intensive urbanisation, industrialisation and exploitation, land resources are continuously damaged and destroyed globally, including many parts of Europe. The greatest pressures on soil in the Republic of Serbia are due to: erosion, landslides, organic matter depletion, pollution and changes in type of land use.



Application of DPSIR<sup>1</sup> model has allowed to identify the main drivers of land degradation in the Republic of Serbia. The values in 2008 and 2015 for the following indicators were compared: human population, country development, tourism, agriculture, transport infrastructure, industry/energy, mining, natural occurrences, climate change, water stress. The main conclusion to be drawn from the comparison and monitoring trends is that land conversion for the purpose of constructing transport infrastructure, mining, natural occurrences (erosion and floods) and negative effects of climate change are the main drivers of land degradation. In addition to the above, unsustainable agricultural production may, in the long run, lead to depletion of organic matter in the soil and thus have significant impact on its degradation. As a consequence of these processes, the availability of natural resources and their productivity are reduced, which directly threatens food provision and increases poverty rate. Further loss of productive soil will increase instability in the food/price ratio and lead millions of people globally to poverty. Failure to recognise these facts is one of the main causes of irresponsible relation to this extremely important resource.

<sup>1</sup>DPSIR is a causal framework for describing the interactions between society and the environment. This framework was adopted by the European Environment Agency (hereinafter: EEA). The EEA assesses "state" (S) of the environment applying "DPSIR methodology". Namely, the state (S) is the result of certain driving forces (D) and pressures (P) that can be positive or negative, which impacts (I) the environment. Responses (R) represent solutions (e.g. public policies, investments) to apply in order to improve or maintain the current state.





**IT IS ESTIMATED THAT  
EROSION PROCESSES OF  
DIFFERENT INTENSITY ARE  
PRESENT IN MORE THAN 80%  
OF THE TERRITORY OF THE  
REPUBLIC OF SERBIA.**

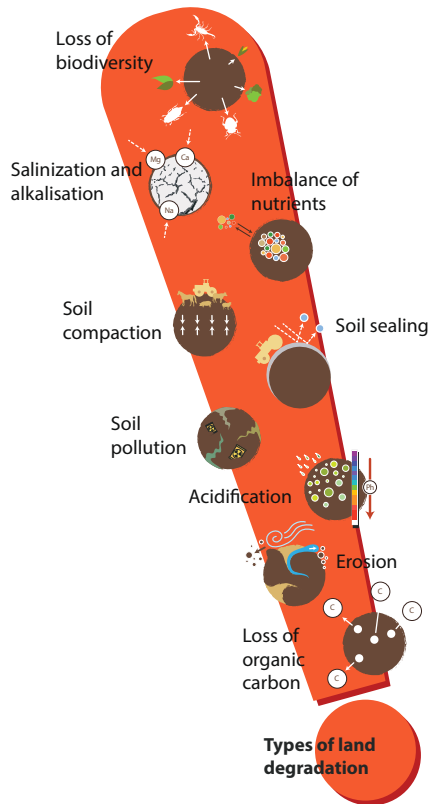
### 3. LAND DEGRADATION

Land degradation is a process of disturbing the quality and functions of land, induced either naturally or by human activity, or due to not taking adequate measures to prevent the consequences of unsustainable land management practices. Land degradation poses a threat to the environment, plants, animals and human population, in particular the part of the population whose existence depends on agricultural production. In addition, excessive exploitation and impairing the soil quality are yet another problem, which is further aggravated by negative effects of climate change.

**52 per cent of agricultural land worldwide is moderately or severely affected by soil degradation.<sup>2</sup>**

The main threats to land degradation in the Republic of Serbia listed according to intensity are:

- 1) erosion,
- 2) organic matter depletion,
- 3) disturbance of soil structure,
- 4) soil acidification,
- 5) soil pollution due to industrial activity, mining and energy,
- 6) excessive use of chemicals in agriculture,
- 7) compaction of agricultural soil.



<sup>2</sup>ELD Initiative. (2015). Facts on the economics of land degradation and climate change. Available at [www.eld-initiative.org](http://www.eld-initiative.org).



## 4. SUSTAINABLE LAND MANAGEMENT

As a response to the stated problems (pressures on land) and challenges (drivers of land degradation), the focus is placed on paradigms of sustainable development in general, and sustainable land use specifically.

Sustainable land management (SLM) is one of 17 Sustainable Development Goals (SDGs) within the 2030 Agenda for Sustainable Development adopted by world leaders in September 2015 at the UN Sustainable Development Summit. In January 2016, 17 goals of the 2030 Agenda for Sustainable Development officially came into force.

Over the next fifteen years, with these new Goals that universally apply to all, countries will mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change. SDGs, also known as global goals, are built on the success of the Millennium Development Goals (MDGs) with the aim to go further in tackling fundamental causes of poverty and universal need for development for the well-being of all.



## GOAL 15\*

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.



\*Sustainable Development Goal 15 of the 2030 Agenda for Sustainable Development

Sustainable land management combines technologies, policies and activities aimed at integrating socio-economic principles with environmental concerns so as to simultaneously achieve the following five sub-goals:

1. maintain or enhance production/services (**productivity**)
  2. reduce the level of production risk (**security**)
  3. protect the potential of natural resources and prevent degradation of soil and water quality (**protection**)
  4. be economically viable (**viability**)
  5. and socially acceptable (**acceptability**).
- **Productivity:** the return from SLM may extend beyond material yields from agricultural and non-agricultural uses to include benefits from protective and aesthetic aims of land use.
  - **Security:** management methods that promote balance between a land use and prevailing environmental conditions.
  - **Protection:** the quantity and quality of soil and water resources must be safeguarded, in equity for future generations. Locally, there may be additional conservation priorities such as the need to maintain genetic diversity or preserve individual plant or animal species.
  - **Viability:** if the land uses being considered are locally not viable, the use will not survive.
  - **Acceptability:** land use methods can be expected to fail, in time, if their social impact is unacceptable. The populations most directly affected by social and economic impact are not necessarily the same (e.g. desired economic effect may have adverse social impact).

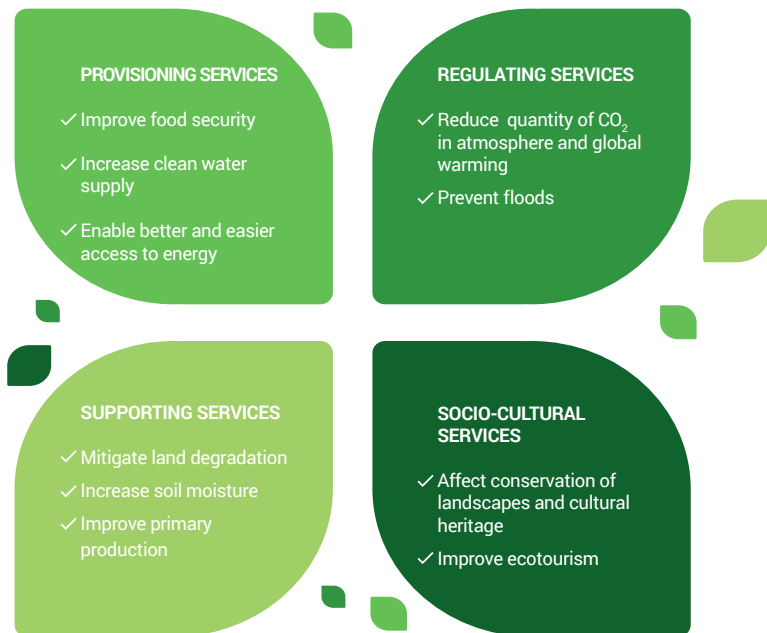


Goals of sustainable land management may be achieved by complying with the three fundamental principles:

- Increased soil productivity;
- Increased income;
- Improved state of ecosystem.

Soil management is sustainable if the ecosystem services (supporting, provisioning, regulating, and cultural services) provided by soil are maintained or enhanced without significantly impairing either the soil functions that enable those services or biodiversity. Sustainable land management increases average productivity, reduces season fluctuations in yield, provides support to diverse production and increases income.

The main focus of sustainable land management are the people taking care of the land for current and future generations. Careful land management not only ensures sustainable agriculture but also provides a precious mechanism for mitigating effects of climate change, as well as a path for safeguarding ecosystem services. A long-term perspective of efficient management of natural resources requires synergy of action (inter-disciplinary approach of technical, biotechnical, natural and social sciences) at different levels of management, with a particular focus on the local level.



*Positive effect of sustainable land management on ecosystem services*

## FACTS<sup>3</sup>:



By changing the global land management policy and creating a favourable business environment that ensures sustainable land use, USD 75.6 trillion of revenue can be generated around the world annually.



The adoption of sustainable land use practices could result in reaching 95% of potential maximum crop yields and delivering 2.3 billion tons of additional crop production per year, equivalent to USD 1.4 trillion.

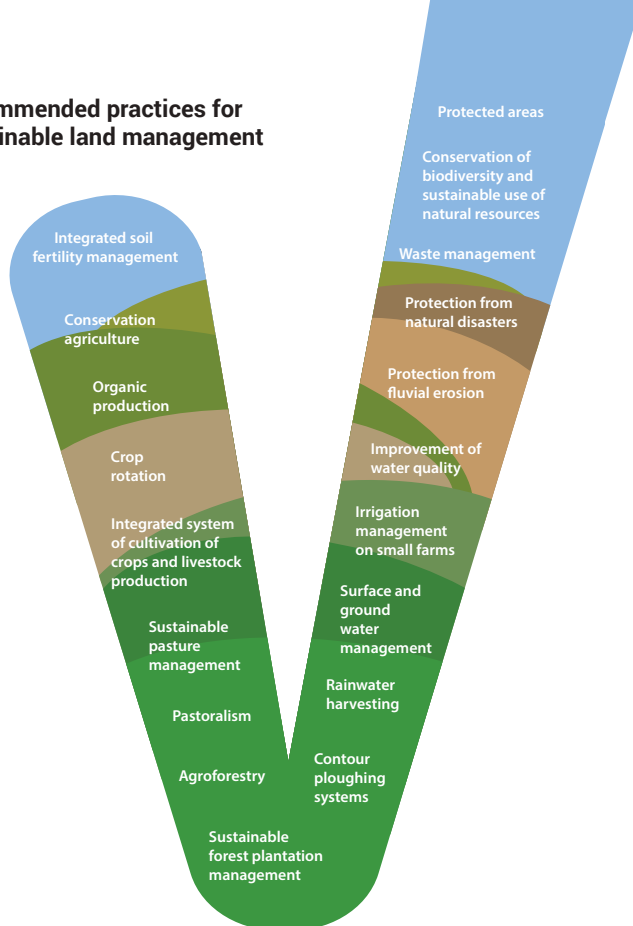


In Mali, the restoration of degraded Kelka forest land by adopting agroforestry practices has been estimated to provide for an economic return of USD 500 per hectare over a 25-year time horizon. By comparing costs and benefits in this specific case, a conclusion can be drawn that for each dollar invested, the project provides benefit of USD 5.2.

<sup>3</sup>ELD Initiative. (2015). Report for policy and decision makers: Reaping economic and environmental benefits from sustainable land management. Available at [www.eld-initiative.org](http://www.eld-initiative.org).



## Recommended practices for sustainable land management



In order to be truly self-sustainable, practices must be environmentally-friendly, reducing current land degradation, improving the state of biodiversity and increasing resilience to climate change. A precondition for sustainable use is the combination of measures which lead to integrated land and water management, growing agricultural crops and livestock production, soil enrichment and pest control.

The recommended practices for sustainable land management as indicated in the above image represent the solutions to the problem of land degradation. The definition of each individual practice with examples is provided in detail in the *Guide for sustainable land management at the local level in the Republic of Serbia*.<sup>4</sup>

<sup>4</sup>Forestry and Environmental Action (fea). (2019). Guide for sustainable land management at the local level in the Republic of Serbia.

## 5. LAND DEGRADATION NEUTRALITY CONCEPT

### 5.1. Sustainable development goal on land degradation neutrality

Land Degradation Neutrality (LDN) was defined as “a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales”.

Land degradation neutrality concept is the integral part of Goal 15 of the 2030 Agenda for Sustainable Development, which was adopted in 2016.

Goal 15.3 addresses a serious and current challenge: **how to produce food and meet other needs sustainably and respond to future needs without further exhaustion of limited land resources?**

The aim of land degradation neutrality is to maintain and increase the quantity of healthy and productive land resources, in line with national development priorities. Land degradation neutrality is a flexible goal, which can be achieved at the local, regional or national level. Although the process of establishing goals of land degradation neutrality is harmonised with international guidelines, in order to be successful it must be harmonised with national development priorities and build on the national sustainable development processes.

**The state of soil is determined by daily practices of population at the local level. The involvement of communities and use of local initiatives is of crucial importance for achieving the land degradation neutrality goal.**

#### GOAL 15.3

**By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.**

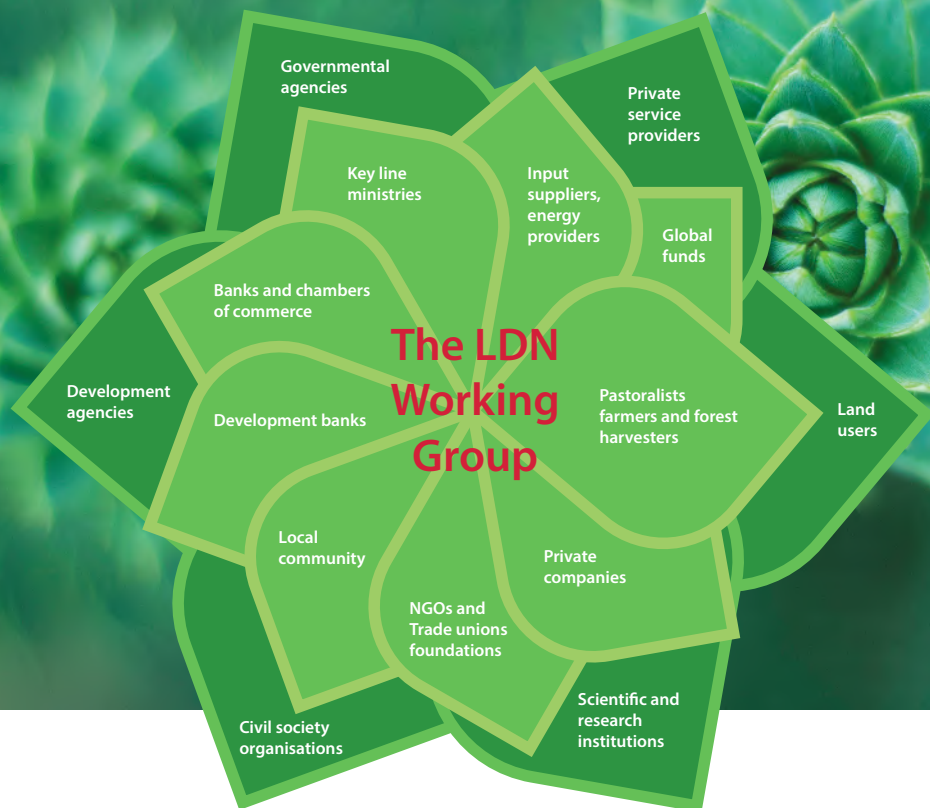
Land degradation neutrality means that quantity of land degraded annually may not exceed quantity of land restored from degradation.



A photograph of a forest floor covered in fallen leaves and tree roots. Tall, thin tree trunks stand in the background, with a bright sun shining through the trees on the right side, creating a lens flare effect.

**NOWADAYS, MORE THAN  
1.5 BILLION PEOPLE ( 74%  
OF WHOM LIVE IN POVERTY)  
DEPEND ON LAND THAT HAS  
ALREADY BEEN DEGRADED.**

## 5.2. Who should be involved in the process of achieving land degradation neutrality?



Taking into account the variety of functions of land, a wide range of stakeholders and sectors must be actively involved in LDN target setting and implementation.

Information exchange among representatives of all interested parties directly connected to land degradation processes is crucial to contribute to the achievement of LDN.<sup>5</sup>

<sup>5</sup>Global Mechanism of the UNCCD (2016). Achieving Land Degradation Neutrality at the country level. Building blocks for LDN target setting.

**Governmental agencies**

In charge of development and implementation of policies and plans on land-related issues at the national and regional level. Key line ministries in agriculture, environment, forestry, water management, mining, energy, trade and economic development can become entry points for pursuing the land degradation neutrality agenda through national focal points for the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD) and associated funds, such as Global Environment Facility (GEF) and Green Climate Fund (GCF).

**Land users**

Make direct decisions on land management based on the type of land ownership rights they hold. This diverse group includes: small and large-scale farmers/pastoralists, forest harvesters, and private companies. Many land users are active outside the agricultural sector in the mining, energy, roads and infrastructure industries.

**Private sector/  
private providers**

Support land users and are indirectly involved in land management. This diverse group includes: banks, suppliers of seed, fertiliser and machinery, energy and communication service providers, traders, producers and chambers of commerce.

**Civil society organisations**

Connect other stakeholders on all levels in addressing land-related issues; cooperate with local land users, their associations and government agencies.

**Development agencies**

Multilateral and bilateral participants providing financial and technical support to those involved in land management.

**National and international  
scientific and research  
organisations and institutes**

Provide scientific advice on good land use practices and related land management policies. They are scientific and research institutions, or universities and institutes conducting research on agricultural and other types of land.







## 6. SUSTAINABLE LAND MANAGEMENT AT THE LOCAL LEVEL

The main law containing principles of sustainable land use in the Republic of Serbia is the Law on Environmental Protection<sup>6</sup>, and its most relevant Article 22 which reads: *"Protection of soil area (land) and its sustainable use shall be achieved through the measures of systematic monitoring of land quality, monitoring of indicators for the assessment of risk of land degradation, as well as through the implementation of remediation programmes for removing consequences of land contamination and degradation, regardless if they occur naturally or are caused by human activities". According to Article 9 of the Law on Soil Protection<sup>7</sup> "prevention of land degradation is achieved through planning, spatial planning, use of natural resources and goods in line with spatial, urban and other planning documents, adopted in line with special laws".*

In the field of land management, the key competences of local self-governments are:

- **Adopting management plans and programmes, control of use and protection of soil as natural resource**

Protection of land area (soil) and its sustainable use is achieved by measures of systematic monitoring of soil quality, monitoring indicators for risk assessment of land degradation, and implementing remediation programmes for eliminating the consequences of soil contamination and degradation, whether those occurring naturally or caused by human activities. Soil protection is based on applying the principle of "soil protection mainstreaming", which implies that local self-

governments ensure integration of soil protection in all sectoral policies by implementing mutually agreed plans and programmes and implementing regulations through a system of permits, standards and norms, by funding and other measures of soil protection.

- **Liability for conducting activities that deteriorate or are likely to deteriorate the natural state and quality of soil**

Prevention of land degradation is achieved by planning, landscaping, use of natural resources and goods in line with spatial, urban and other planning documents, adopted in accordance with specific laws. Measures and conditions of soil protection, for the purpose of sustainable land use, are integral part of planning documents. Local self-governments take part in the procedure of preparation and adoption of planning documents.

<sup>6</sup>Official Gazette of the RS, no. 135/2004, 36/2009, 36/2009 - other law, 72/2009 - other law, 43/2011 – Constitutional Court decision, and 14/2016

<sup>7</sup>Official Gazette of the RS, no. 112/2015

- **Systemic monitoring of the state and quality of soil and maintaining database**
- **Public information**

Local self-governments, within their competences provided for by the law, ensure systematic monitoring of the state and quality of soil and maintaining a corresponding database, in line with the Programme of soil monitoring. A competent authority of the local self-government adopts the Programme of soil monitoring at the local level, which needs to be harmonised with the national Programme of soil monitoring. The Ministry of Environmental Protection gives consent to the Programme of monitoring which establishes a local network. The funds for the implementation of the Programme at the local level are provided from the budget of the local self-government.

Local self-governments and other authorised organisations are obliged to fully and objectively inform the public about the quality and state of soil and changes that may pose a threat to life and health of people, flora and fauna in line with the relevant laws and other legislation. The public has the right to access prescribed registers or records containing information and data in accordance with the law.

A detailed overview of competences and liabilities of local self-governments related to soil protection measures, including the principles of sustainable use and prevention of land degradation in line with the legislation, is elaborated in the *Guide for sustainable land management at the local level in the Republic of Serbia*.<sup>4</sup>

## 6.1. Challenges and obstacles from the viewpoint of sustainable land management

The challenges and obstacles from the viewpoint of sustainable land management can be grouped in four thematic problem groups:



**Social problems**



**Technical problems**



**Environmental problems**



**Legal, institutional and financial problems**

## Social problems



- Fragmentation of property;
- Lack of social security of land owners (land owners do not have safe jobs, they pay small tax on agricultural land and do not want to sell it);
- Incomplete procedure of property restoration (restitution);
- Lack of interest and motivation on the part of land owners to accept new knowledge and technologies

## Environmental problems



- Inadequate waste management;
- Unsystematic approach to contaminated sites management;
- Absence and/or inadequate monitoring of the environment;
- Climate change;
- Occurrence of natural disasters;
- Degraded ecosystems (due to mining activities, activities of the energy sector, etc.).

## Technical problems



- Inadequate working space;
- Lack of infrastructure for introduction of modern GIS technologies (hardware, software) in land management, development planning, spatial planning, cartography and infrastructural planning;
- Lack of training on the application of new technologies;
- Lack of administrative support in managing spatial data (integration, storage, editing, analysis and display of information and data in space).

## Legal, institutional and financial problems



- Absence of the green fund and/or inadequate implementation of projects funded from this and similar funds;
- Insufficient capacity for project preparation and applying to donors/funds;
- Lack of favourable credit terms;
- Inadequate taxation policy;
- Insufficient capacity of local self-governments for the preparation of plans and projects (ban on new employment in public administration naturally led to the reduction of number of employees in local self-governments);
- Lack of coordination of cross-sectoral activities;
- Inefficiency of the system of land potential management due to insufficient coordination and shared competences;
- Inefficiency of the judicial system;
- High costs of learning and transferring knowledge;
- Insufficiently innovative potential of scientific and research staff;
- Insufficient and poorly diversified offer of education modules, practical training;
- Absence of systematic reaction to threats to land at all levels.

## 6.2. Liability for contaminated sites

**Contaminated sites are sites where the presence of hazardous and harmful substances has been confirmed, caused by human activity, in concentrations that may pose significant risk to human health and the environment.**

Local self-governments will be obliged to report for the Cadastre of contaminated sites on the sites with abandoned activities (where production has ceased), sites with historical pollution, as well as the sites of companies that are bankrupt which represent an increased risk to the environment and human health.

At the local level, special attention should be paid to potentially contaminated and contaminated sites that pose a risk to human health and the environment. There does not exist a special regulation referring to environmental liabilities in the Republic of Serbia, but some provisions of Directive 2004/35/CE on environmental liability for damage are an integral part of Law on the Environmental Protection<sup>6</sup> and Regulation on the programme for systematic monitoring of soil quality, indicators for assessing the risk of land degradation and the methodology for developing remediation programmes<sup>8</sup>.

Companies and other legal entities, as well as sole traders whose activities are potential localised sources of soil pollution are obliged to report for the Cadastre of contaminated sites. The list of activities will be an integral part of the Rulebook which further governs the content and manner of keeping the Cadastre of contaminated sites, as well as type, content, forms, manner and deadlines for data submission.

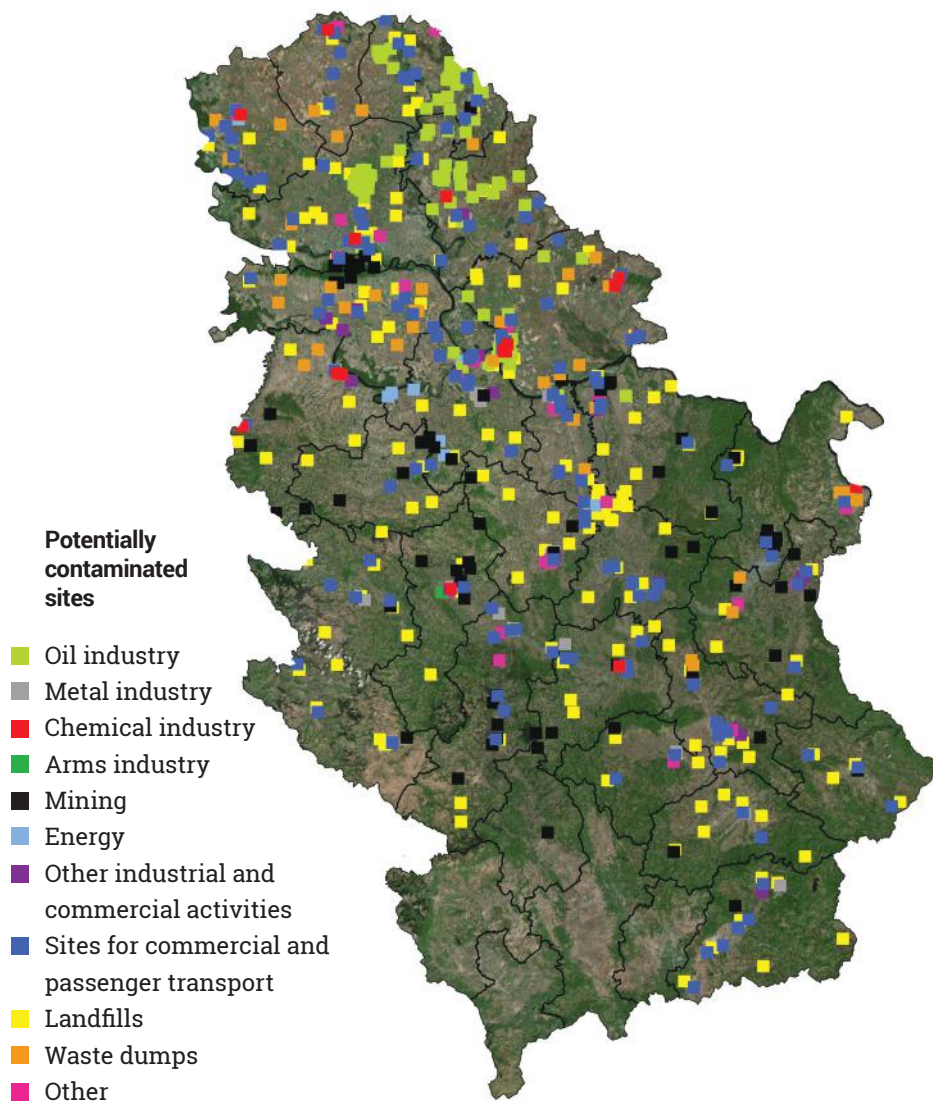
**Identification of potentially contaminated sites is the first major step in contaminated sites management.**

According to 2015 data, there are 709 potentially contaminated and contaminated sites in the territory of the Republic of Serbia.

**The biggest number of registered factors of local soil pollution belongs in the following categories: municipal waste (45.48%), industrial waste (12.31%), industrial and commercial activities (33.92%).**

The May 2014 floods in the Republic of Serbia showed the necessity of better planning and management of contaminated sites. The floods have severely damaged the environment, whereas one of the most important events with negative consequences occurred in the old and closed antimony mine – more than 100.000m<sup>3</sup> of contaminated sludge spilled out in the local stream, ending finally in the Sava River.

<sup>8</sup>Official Gazette of the RS, no. 88/2010



*Map of potentially contaminated sites*

## Impact of a contaminated site on human health on the example of industry for the production of chlorine preparations "Župa", Kruševac



**Distance from residential zone: less than 500m**



**Distance from the Rasina River: 30-50m**



**Distance from agricultural zone: less than 300m**

Locations that may have a significant negative impact on human health include the complex of industry for production of chlorine preparations "Župa" from Kruševac where, as early as fifteen years ago, macroscopically visible mercury was registered in waste water drainage channels and inside the complex. Besides mercury, which is a systemic poison for human organisms as well as for animals and microorganisms, waste carbon - disulphide (raw material for the production of artificial silk fibres) was registered on several locations. This substance is flammable, explosive and very toxic to human health, terrestrial and aquatic flora and fauna, and at the stated site it is not safely stored or protected from penetrating into soil and water (surface and groundwater).

The registered presence of mercury (macroscopically visible) in the form of mercury drops was revealed in the report of the Mobile Eco-toxicological Unit for chemical incidents of the Public Health Institute of the City of Belgrade in 2009 at the Župa industry complex in Kruševac, which used to produce chlorine and other chemical preparations, using mercury in the production process.

Mercury was detected by instrumental techniques and laboratory analyses of the sediment of a nearby stream outside the complex (waste water drainage channel) and within the complex (in containments). Even though noxious effects on human health have not been established, it was recommended that specific epidemiological studies should be conducted in the workplace and in the environment.

Mercury enters the food chain because it is bio-accumulative. Although most algae and microorganisms from the soil are not sensitive to its presence, they accumulate it. Mercury vapours are well absorbed in the lungs, reaching the brain and kidneys through the blood and causing most degenerative changes, blocking enzymatic activity and cell division. It is especially dangerous for pregnant women and their foetuses due to accumulation in the placenta. It causes acute and chronic diseases of people depending on the length of exposure and dosage. It accumulates in bones, hair and certain human tissues, especially kidneys.





## 6.3. Steps for introducing sustainable land management at the local level



### **ESTABLISHMENT OF LAND RESOURCE DATABASE**

Local self-governments are reporting entities obliged to collect and submit data and information for the purposes of the national information system of environmental protection, in line with the law. Environmental protection information system contains interrelated electronic databases and data sources on the state, pressures on the environment and landscape features, as well as other data and information of importance for monitoring the state of environment at the national level. Competent authorities of local self-governments use existing databases and information systems, creating their own databases and information system of land resources as an integral part of the environmental protection information system.

### **LOCAL ASSESSMENT AND DETERMINING CAUSES OF LAND DEGRADATION**

Based on the data from land resource database and environmental protection information system, the competent authority of the local self-government determines causes of soil degradation and makes decisions concerning the rehabilitation of degradation processes (hot spots — contaminated sites) in line with their competences.

### **PLANNING AND INTEGRATION OF SUSTAINABLE LAND MANAGEMENT IN STRATEGIC AND PLANNING DOCUMENTS**

Strategic/planning documents include creating of a vision of the future of local community, assessment of the state of environment, identifying priorities for protection, efficient emergency management, using measures for real improvement of the state of environment and human health. Local self-governments, pursuant to legislation, adopt their respective plans and programs of natural resources management, including the Environmental protection programme with local action plans and rehabilitation plans, remediation programmes, Annual soil protection programme, as well as Annual programme of protection, development and use of agricultural land. All the plans and programmes should include measures of sustainable land management.



## IMPLEMENTATION AND FUNDING

Implementation of sustainable land management means drafting and adopting of action plans at the local level. All stakeholders should take part in drafting the action plan, which includes local self-governments, experts, higher education institutions, private companies, civil society organisations, users of ecosystem services from agriculture, forestry, energy and water management sectors, as well as the local population. For the implementation of any action plan, it is necessary to ensure funds through different financial instruments such as: loans, insurance funds in case of natural disasters, grants, credits, reinsurance funds and other structural financial instruments.

## MONITORING AND EVALUATION PLAN

Monitoring and evaluation plan includes two different processes:

Monitoring the state of land resources and reporting on the state of land resources as is defined in the legal framework (from local to national level);

Monitoring the implementation of strategic and planning documents and action plan.

Both processes should be accompanied by the evaluation by national authorities and local self-governments in the process of adopting new or revising current strategic and planning documents.



\*Detailed explanation of each step in introducing sustainable land management at the local level is presented in the *Guide for sustainable land management at the local level in the Republic of Serbia*.<sup>4</sup>

## LIST OF PHOTOGRAPHS:

**Page 9:** <https://www.pexels.com/photo/yellow-and-black-butterfly-on-top-of-green-leaf-53417/>

**Page 11:** <https://www.pexels.com/photo/green-grass-near-trees-facing-the-sunlight-147329/>

**Page 13:** <https://www.pexels.com/photo/green-grass-on-dry-brown-soil-72189/>

**Page 15:** <https://www.pexels.com>

**Page 18:** <https://www.pexels.com/photo/horizon-fields-cornfield-etretat-55766/>

**Page 21:** <https://www.pexels.com/photo/grey-tree-during-sunrise-226653/>

**Page 22:** <https://pixabay.com/en/succulent-plant-green-growth-macro-1030745/>

**Page 24:** <https://pixabay.com>

**Page 29:** Environmental Protection Agency of the Republic of Serbia

**Page 31:** Environmental Protection Agency of the Republic of Serbia

## SOURCES OF IMAGES:

**Page 10:** Adapted, FAO (2015). <http://www.fao.org/3/a-ax374e.pdf>

**Page 12:** Adapted, FAO (2015). <http://www.fao.org/3/a-mn997e.pdf>

**Page 14:** Adapted, FAO (2015). <http://www.fao.org/3/a-mn997e.pdf>

**Page 16:** <https://sustainabledevelopment.un.org/sdg15>

**Page 19:** Adapted, FAO (2015). <http://www.fao.org/3/a-mn997e.pdf>

**Page 22:** Adapted, Global Mechanism of the UNCCD (2016). Achieving Land Degradation Neutrality at the country level.

**CIP- Каталогизација у публикацији  
Народна библиотека Србије**

502.173(497.11)  
502.174:502.521(497.11)  
352.073.544(497.11)

**SUSTAINABLE land management at the local level in the Republic of Serbia** / [authors Ajla Dorfer ... [et al.]] ; [translation Babilon]. - Belgrade : fea - Forestry and Environmental Action, 2019 (Belgrade : Bigraf plus). - 34 str. : ilustr. ; 21 cm

Prevod dela: Одрживо управљање земљиштем на локалном нивоу у Републици Србији. - Podaci o autorima preuzeti iz kolofona. - Tekst štampan dvostubačno. - Tiraž 100.

ISBN 978-86-900129-3-0

1. Dorfer, Ajla, 1988- [аутор]

а) Земљиште – Одрживи развој – Србија б) Локална самоуправа – Србија

COBISS.SR-ID 279387916

-----



Republic of Serbia  
MINISTRY OF  
ENVIRONMENTAL PROTECTION



The Brochure was developed by regional non-governmental network fea, in cooperation with the United Nations Environment Programme (UN Environment) and the Ministry of Environmental Protection within UNEP/GEF project *“Enhanced Cross-Sectoral Land Management through Land Use Pressure Reduction and Planning”*, as an overview of the *Guide for sustainable land management at the local level in the Republic of Serbia*.