Generic master’s course curriculum on land consolidation and land banking

STUDY AND RECOMMENDATIONS
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ISBN 978-92-5-138341-4
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Foreword

In recent years, the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Europe and Central Asia (REU) has supported 12 countries in the region by introducing land consolidation instruments and building up national land consolidation programmes. Training and capacity development have been important components of these projects and often a key determinant of project success. Building technical and administrative capacities of professionals working with land consolidation is one of the five minimum preconditions of an operational and sustainable land consolidation programme (alongside policy, legal, institutional frameworks and funding). Additionally, it has proven to be the most challenging and time-consuming aspect of the five.

Even in countries with land consolidation tradition and the ongoing land consolidation programmes, there is usually a discrepancy between knowledge provided by the universities and practice, and a need to continuously improve the skills of the specialists already working on projects. To close this gap, this study analyses the current educational programmes related to land consolidation and land banking in 14 universities from 11 European countries, examines the demand for knowledge and skills of young professionals expressed by the public agencies involved in land consolidation implementation in six countries, and proposes the structure and content of a new universal, generic course on land consolidation and land banking for Master of Science (MSc) degree programmes.
Acknowledgements

A core team of authors have prepared this study report. The lead author is Giedrius Pašakarnis, lecturer at the Faculty of Engineering, the Department of Land Use Planning and Geomatics at Vytautas Magnus University Agriculture Academy in Lithuania, with contributions and guidance by Maxim Gorgan, Land Tenure Officer, Morten Hartvigsen, Land Tenure Officer, and Bradley Paterson, Land Tenure Specialist of the FAO REU.

Land consolidation experts (User panel) who contributed to this study by giving their opinion on the knowledge and competencies that employers (land management authorities organizing the implementation of land consolidation projects) expect from Master of Science students studying land management, geodesy, and land-use planning: Erik Blaabjerg and Niels Otto Haldrup (Denmark), Kalle Konttinen (Finland), Kristina Mitic-Arsova (North Macedonia), Jan Spijkerboer (the Kingdom of the Netherlands), Fatma Tüz Zehra Gülsever and Sinan Demirbas (Türkiye).

Academia representatives contributed to this study by providing an in-depth observation of the Master’s degree programmes of the universities they represent (Working group), where students study modules related to land consolidation and land banking: Walter Seher (University of Natural Resources and Life Sciences, Vienna (BOKU); Austria), Evelin Jürgenson (Estonian University of Life Sciences; Estonia), Kirsikka Riekkinen (Aalto University; Finland), Giedrius Pašakarnis and Audrius Aleknavičius (Vytautas Magnus University Agriculture Academy; Lithuania), Oleg Horjan (Technical University of Moldova; Republic of Moldova), Gjorgji Gjorgjiev (the University Ss. Cyril and Methodius in Skopje; North Macedonia), Jarosław Janus (University of Agriculture in Krakow; Poland), Adrianna Czarnecka (Warsaw University of Technology; Poland), Anka Lisec (the University of Ljubljana; Slovenia), Jeroen Rheinfeld (the University of Groningen; the Kingdom of the Netherlands), Ela Ertunç and Tayfun Çay (Konya Technical University; Türkiye), Taras Ievsiukov (the National University of Life and Environmental Sciences of Ukraine) and Andriy Popov (Mykolyiv National Agrarian University).
Abbreviations

BSc  Bachelor of Science
CAP  Common Agricultural Policy
CPD  Continued Professional Development/life-long learning
ECTS European Credit Transfer and Accumulation System
FAO  Food and Agriculture Organization of the United Nations
REU  FAO Regional Office for Europe and Central Asia
ISCED International Standard Classification of Education
MOOC Massive Open Online Course
MSc  Master of Science
SDG  2030 Agenda for Sustainable Development and Sustainable Development Goals
UNESCO United Nations Educational, Scientific and Cultural Organization
UNECE United Nations Economic Commission for Europe
VGGT Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security
1. Introduction

Land consolidation is a multidisciplinary land management instrument where specialists with different educational backgrounds and experiences, such as land surveyors, agronomists, and lawyers, need to work closely together and “speak the same language”. Building technical and administrative capacities of professionals working with land consolidation is one of the five minimum preconditions of an operational and sustainable land consolidation programme (alongside policy, legal, institutional frameworks, and funding) (Hartvigsen, 2015). It has proven to be the most challenging and time-consuming of the five.

During the 13th international LANDNET workshop organized by FAO in Skopje, North Macedonia, from 25 to 27 May 2022, attended by 200 land professionals from more than 30 countries in Europe and Central Asia, FAO REU launched a new initiative on capacity development for land consolidation and land banking. Universities from the region were invited to join forces and prepare a generic master’s course on land consolidation and land banking.

Aim, objectives and positioning

The initiative aims to develop a generic course curriculum for Master of Science (MSc) level on land consolidation and land banking to educate young land tenure professionals and existing specialists potentially interested in implementing land consolidation and land banking at the programme and project levels. The generic course curriculum, consisting of relevant modules/topics, can serve as indicative material for universities in Europe, Central Asia and beyond. The overall objective of this initiative has been to facilitate cooperation between universities in the region, to strengthen educational programmes related to land consolidation and land banking, and to develop the capacities of technical experts and practitioners working in land consolidation and land banking. The initiative comes as a continuation and builds upon the FAO Legal Guide on Land Consolidation (Veršinskas et al., 2020) and the FAO Land Banking Study (FAO, 2022a).

The specific purpose of the initiative has been to:

- give suggestions on how to improve existing curricula and offer an indicative “blueprint” for countries (universities) in the process of creating such a course;
- develop a generic course curriculum according to the recent needs of land consolidation professionals from relevant public agencies;
- update/off er the latest best practices in teaching by disseminating knowledge and practices;
- improve students’ employability; and
- inspire students to become enthusiastic about land consolidation and promote its multipurpose application to address various emerging challenges in rural areas.

The study analyses existing programmes and courses related to land consolidation and land banking taught to students in the selected universities in Europe and compares them with the expectations of the public agencies in charge of land consolidation for young professionals. The proposed generic curriculum does not try to change the existing organizational structure or its roles. Rather, it aims to strengthen the existing educational programmes for future land consolidation professionals.
The target audience for the developed course is divided into:

1. Primary
   a. Full-time MSc students with specializations in subjects related to land tenure such as land surveyors, land-use planners and land managers.
   b. Land tenure professionals with prior work experience wishing to update their knowledge as part of Continued Professional Development (CPD)/life-long learning joining this course as external listeners.

2. Secondary
   c. MSc students from parallel study programmes (at the same or other universities) wishing to work with land consolidation projects in the future, for instance, agronomists, rural infrastructure engineers, foresters, lawyers, joining this course as external listeners.
   d. Other existing professionals wishing to work with land consolidation projects, for instance, lawyers and notaries, civil engineers, spatial planners, agronomists and agro-consultants, land valuers, administrative staff from local public authorities, joining this course (some or all its modules) as external listeners.

The Primary target group (MSc students and CPD participants) is expected to complete the entire course. The Secondary target group will join the primary group only for selected modules (main modules will be mandatory while others will be elective). Such a course will give a clear understanding of land consolidation and land banking procedures, opportunities it offers to fulfil infrastructural, environmental, rural development and other non-agricultural objectives, and will eventually encourage them to be ambassadors in other organizations and advocate for land consolidation.

The study report structure

Section 2 presents some conceptual considerations about the potential parameters and placement of the generic course within existing educational programmes. Section 3 describes the study methodology, including data collection and analysis. Section 4 presents an analysis of public sector expectations for young professionals and proposes a classification of desired knowledge and skills into three categories. Then, Section 5 presents the actual situation in academia while Section 6 analyses how academia meets the needs of public sector professionals. Section 7 proposes a structure for a generic course curriculum on land consolidation and land banking, including a list of modules (subjects). The core content of the modules, recommendations regarding teaching techniques and useful resources are provided in Appendix 1. Finally, Section 8 provides further suggestions and recommendations to national land consolidation authorities and academia on how to improve existing study programmes and practices.
2. Conceptual considerations about placement and
the structure of the generic land consolidation and
land banking course

When developing a training programme or, in this case, a university course, it is essential to be
specific about its placement and correspondence with other existing study programmes. The
International Standard Classification of Education (ISCED) is a suitable framework in that sense.
The ISCED, developed by the UNESCO Institute for Statistics, is the reference classification for
organizing educational programmes and related qualifications by levels and fields of education,
which also allows comparison of education systems across countries (UNESCO Institute for
Statistics, 2015). After analysing the ISCED classification, we selected those programmes that
traditionally develop future land consolidation planners and, additionally, the programmes of
other specialists participating in land consolidation or land banking projects (Figure 1).

The highest priority subjects were marked in red frames, while lower priority subjects in
black frames. Subjects without a frame are those that have a minor relationship with land
consolidation and land banking such as, for example, an agricultural consultant (ISCED
code 0311), environmentalist (ISCED code 0522), or head of the municipality or local public
administration (ISCED code 0413). However, the students specializing in these subjects might
still be interested in choosing some modules from the generic course curriculum relevant for
their future work (for instance, an introductory module to gain a general understanding of land
consolidation and land banking).
This study was implemented with the vision of integrating a newly developed course on land consolidation and land banking with a list of modules (subjects) within the existing high-priority MSc study programmes such as Land Surveying/Town and Country Planning (ISCED code 0731).

The MSc full-time study programmes typically last 2 years and consist of 120 ECTS credits, or 1.5 years, consisting of 90 ECTS credits. In either case, a study semester consists of 30 ECTS credits.

In Lithuania, the MSc course for the Land management study programme (0731 Town and Country Planning) is envisaged for 2 years and requires 120 ECTS credits. Of these, 66 ECTS credits are dedicated to mandatory modules (subjects) (of which 28 credits are dedicated to research), 39 ECTS credits are dedicated to elective modules (subjects), and the remaining 15 ECTS credits are for a master’s degree thesis.

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1 The European Credit Transfer and Accumulation System (ECTS) is a standard means for comparing academic credits. One ECTS credit is equivalent to 25–30 hours.
The generic course on land consolidation and land banking is being conceptualized within a 2-year, full-time MSc study programme and is recommended to be integrated into the second semester (Figure 2).

For students and professionals from other disciplines (Secondary target group), the composition of the modules chosen will be discretionary, as shown in Figure 3.

For example, students studying civil engineering (rural infrastructure engineering) will have to pass mandatory modules (to develop a basic understanding of land consolidation and land banking). They will also choose a module on infrastructure planning in land consolidation. Table 9 in Section 7 shows potential scenarios for the Secondary target audience.
3. Methodology

The primary objective of the study is to develop a generic course curriculum at the Master of Science level that builds students’ technical and administrative capacities for implementing sustainable land consolidation programmes. It also aims to tailor a developed course to various other study programmes for students who may wish to have, at least, basic knowledge about land consolidation and land banking.

In order to reach a set objective, the study process was structured into several research stages: surveys and desk research (Figure 4). Initially, the necessary types of respondents were identified for the User panel (experts) and for the Working group (Academia).

The User panel consisted of practitioners from various countries responsible for implementing land consolidation programmes and projects. They were asked to provide a 2–3 page essay describing their organizations’ requirements and expectations for new colleagues (graduates) in terms of knowledge, practical skills and competencies. For better expression of desired competencies, each respondent had to imagine a job advertisement for a land consolidation/land banking expert position and differentiate the competencies they expect from the candidate based on how critical those competencies are in effectively fulfilling the duties. The proposed differentiation of expected knowledge and competencies was into:

1. **Required**: in-depth knowledge – meaning that these are mandatory skills each candidate must have. Without these skills, the candidates are not expected to apply for the position.

2. **Preferred**: basic knowledge – meaning that the candidates with the preferred skills are more likely to be selected since they are important to the employer, potentially saving on training and teaching costs.

3. **“Extra mile”**: valuable skills and abilities – meaning that while they are not mandatory, these skills would be providing potential employees with an added advantage.

The Working group consisted of representatives from academia. Respondents were asked to complete an in-depth, intensive, semi-structured survey form (module description template – Appendix 2) containing qualitative and quantitative questions to acquire a complete picture of the actual study programmes related to land consolidation and land banking (module content and aim, workload, necessary background, expectations, teaching organization, etc.) in their countries/universities. After the identification of how academia (“supply”) meets market expectations (“demand”), qualitative and quantitative survey data were systematized and verified by the contributors (experts and academia). Based on these findings, a generic course curriculum structure and indicative content were developed.

From a scientific point of view, theoretical and empirical research methods were applied: survey, summarization and abstraction. Six experts and 15 academic representatives from 11 countries, and 14 universities, contributed to this study (see Tables 1 and 3).

Finally, the study report was reviewed and validated by the contributions from both the Working group and User panel experts.

---

2 The 12th country is Denmark, however, two representatives of Denmark only participated in the User panel.
Develop a generic master’s course curriculum on land consolidation and land banking

The Expert panel expectations

The actual situation in academia

Qualitative and quantitative survey data systematization

Consultation and validation of the draft curriculum report

A generic course curriculum on land consolidation and land banking

Figure 4. A generic course curriculum development process
4. User panel expectations for the employees

International land consolidation experts working as civil servants at governmental institutions responsible for land consolidation programmes (some of whom are retired) were asked to express their expectations for the next cohort of land consolidation practitioners. In total, six experts from five countries contributed their perspectives (Table 1).

Table 1. Number of expert respondents in the User panel

<table>
<thead>
<tr>
<th>Participating countries</th>
<th>Denmark</th>
<th>Finland</th>
<th>North Macedonia</th>
<th>The Kingdom of the Netherlands</th>
<th>Türkiye</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Each member of the User panel prepared a description of the competencies they would expect from their new colleagues. Responses were received in three formats: essay style, a list of competencies, or a mix of both types. All answers were systemized, and a list of desired knowledge and competencies was formed into a matrix table (Table 2). In order to rank the competences, scores were assigned to the competence level and a sum of the total scores was calculated. Experts were asked to verify and approve the matrix table reliability. A prepared and verified matrix table clearly shows the required, preferred and “extra mile” competencies.

Table 2. User panel opinions on important competencies for new candidates

<table>
<thead>
<tr>
<th>A list of desired knowledge and competencies</th>
<th>Participating countries</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Denmark</td>
<td>Finland</td>
</tr>
<tr>
<td>Laws and regulations: Civil Code, law and bylaws on land, land consolidation, expropriation, cadastral, other laws</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Land consolidation planning</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Cadastral surveying</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GIS and remote sensing</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Regional and municipal spatial planning</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Land valuation</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Agronomy and agricultural production, farming, and forestry</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Land market, mortgage, easements, pre-emptive rights</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
### Table 2. (cont.)

<table>
<thead>
<tr>
<th>A list of desired knowledge and competencies</th>
<th>Participating countries</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Denmark</td>
<td>Finland</td>
</tr>
<tr>
<td>Communications, negotiations, dispute resolution, mediation, moderation</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rural infrastructure planning: roads, drainage/irrigation, erosion control</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Land banking process</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Common Agricultural Policy (CAP), EU regulation and subsidizing rural areas and farming</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Project management</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Socioeconomic issues in rural areas, sociology</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rural development</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Soil science, soil evaluation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ecology, nature conservation and biodiversity protection</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>International practice on land consolidation</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Legend of preferred level of knowledge/competence**

<table>
<thead>
<tr>
<th>Assigned score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: in-depth knowledge</td>
</tr>
<tr>
<td>Preferred: basic knowledge</td>
</tr>
<tr>
<td>“Extra mile”: valuable skills and abilities</td>
</tr>
</tbody>
</table>

By analysing Table 2, it becomes evident that the most important requirements (more than or equal to three voices) include in-depth knowledge of: “Laws and regulations”, “Land consolidation planning”, “Cadastral surveying”, and “GIS and remote sensing”.

As for the most (preferred) basic knowledge, experts wish (four voices) that new co-workers will have: “Regional and municipal spatial planning”, “Land valuation” and “Agronomy and agricultural production, farming, and forestry”.

All respondents highlighted the importance of competencies in “Communications, negotiations, dispute resolution, mediation, moderation”, but the majority of experts see it as the “extra mile” competence. All experts named “Project management” as an “extra mile” skill for potential colleagues.

Experts have no common opinion on the preference level of all other competencies such as “Land market, mortgage, easements, pre-emptive rights”, “Rural infrastructure planning: roads, drainage/irrigation, erosion control”, “Land banking process”, and “CAP, EU regulation...
The rest of the competencies can be evaluated and compared with each other according to the calculated scores.

Knowledge and competencies identified by only one expert were not included in the matrix table but are listed here for reference: knowledge of international practice in land consolidation; knowledge and ability to work with specialized cadastral GIS software called JAKO; the ability to perform surveying on difficult terrains; and basic knowledge in surveying for the mining industry.

It was also highlighted that course participants (students) should familiarize themselves with and follow the FAO Voluntary guidelines on the responsible governance of tenure of land, fisheries, and forests in the context of national food security (VGGT). This suggestion also indicates that students must be familiar with global frameworks such as the 2030 Agenda for Sustainable Development and Sustainable Development Goals (SDGs). According to the respondents, graduates should consider acquiring the aforementioned knowledge and competencies to stand out in the job market when applying for positions related to land consolidation and land banking, whether in the public or private sector.

The importance of continuous knowledge transfer was emphasized. Long-term practitioners should share their knowledge with new and young co-workers to ensure extended knowledge and up-to-date expertise. Insights on continuous developments were recently expressed in the publication titled “Lessons learned from the introduction of land consolidation in North Macedonia during 2014–2023” (Hartvigsen et al., 2023). The paper emphasizes the need for continued capacity development, both through in-service training of professionals working on projects and through the education of young land consolidation professionals at universities.

Knowledge of the national language is an unconditional requirement to work in the field. It is usually set as a requirement by the legal acts (especially for governmental bodies – civil servants) as during the land consolidation process, the project planner must communicate orally and in written form with many project parties. In cases where land consolidation projects are implemented in ethnic minority communities, knowledge of other languages, for example, of ethnic minorities, might be an advantage.
5. The actual situation in academia

Right after FAO announced a new initiative on capacity development for land consolidation and land banking, LANDNET participants from the academic sector were invited to participate and contribute to the study. The first academic participants joining the initiative were from Lithuania, Estonia, Moldova, Ukraine, and North Macedonia. Additional universities from the Kingdom of the Netherlands, Finland, Türkiye, Austria, Poland, and Slovenia joined the initiative later in 2022. The final list of 15 lecturers working with land management subjects was formed (Table 3) and started to be collectively referred to as the Working group. They agreed to share information about the study programmes and their relationship with land consolidation and land banking.

Table 3. Number of academic respondents (members of the Working group)

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>Participating universities</th>
<th>Number of respondents per country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Austria</td>
<td>University of Natural Resources and Life Sciences, Vienna (BOKU)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Estonia</td>
<td>Estonian University of Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Finland</td>
<td>Aalto University</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Lithuania</td>
<td>Vytautas Magnus University Agriculture Academy</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Moldova</td>
<td>Technical University of Moldova</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>North Macedonia</td>
<td>The University of Ss. Cyril and Methodius in Skopje</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Poland</td>
<td>University of Agriculture in Krakow</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warsaw University of Technology</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Slovenia</td>
<td>The University of Ljubljana</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>The Kingdom of the</td>
<td>The University of Groningen</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Netherlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Türkiye</td>
<td>Konya Technical University</td>
<td>2</td>
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<tr>
<td>11</td>
<td>Ukraine</td>
<td>Mykolaiv National Agrarian University</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lviv National Environmental University</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>State Biotechnological University</td>
<td></td>
</tr>
</tbody>
</table>

In order to obtain reliable information about relevant study programmes from the Working group members’ academic institutions, members were asked to fill out a semi-structured survey form (or a module description template, see Appendix 2). It was requested that the survey form be filled in with as many details as possible about each module (subject) related to land consolidation and land banking. Respondents were the lecturers of these modules, or these modules were taught by their colleagues from the same university. All universities’
websites contain information in English about study programmes and only basic information about component modules.

In analysing the survey data, it was noticed that all three universities from Ukraine and the University of Ljubljana in Slovenia offer their study programmes in the national language and English. In Finland, modules related to land consolidation are only taught in English, while other participating countries’ universities offer their modules only in the national language.

Analysis of all survey forms revealed the university with the oldest module related to land consolidation – the “Agrarian Law” module at the University of Groningen (the Kingdom of the Netherlands) – started in 1910 and last updated in 2022. One more module, “Land Consolidation”, started last century (in 1980) at the Warsaw University of Technology in Poland (last updated in 2020). All other universities have started their modules within this century.

Survey responses showed that land consolidation and land banking as a module (subject) or a lesson (topic) could be found in three study programmes within participating universities (Table 4).

Table 4. Land consolidation and land banking were found within three MSc study programmes

<table>
<thead>
<tr>
<th>No.</th>
<th>IESCD code</th>
<th>The study programme at the University</th>
<th>Title of the module</th>
<th>ECTS credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0421</td>
<td>Agrarian Law</td>
<td>Agrarian Law</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>0731</td>
<td>Land Surveying, Property and Land Management, Spatial Planning, Geodesy and Geoinformatics</td>
<td>Agro-landscape Arrangement of the Territory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cadastre and Land Legislation (in the domain of agricultural land consolidation)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consolidation of Agricultural Land Using the GIS Technique</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Contemporary Cadastre</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Economics of Land Use and Land-use Planning</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expert Monetary Valuation of Land Plots</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Forecasting and Planning the Use of Land Resources</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Geographic Information Systems</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>GIS in Cadastral Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Conflicts Administration</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Consolidation</td>
<td>3–6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Consolidation and Rearrangement for Land Surveyors</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Consolidation and Rearrangement for Spatial Planners</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Consolidation Project</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Management</td>
<td>4–6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Management of Land Resources</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Market Land Relations (Tenure)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Negotiations and Communications</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 4. (cont.)

<table>
<thead>
<tr>
<th>No.</th>
<th>IESCD code</th>
<th>The study programme at the University</th>
<th>Title of the module</th>
<th>ECTS credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0732</td>
<td>Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering</td>
<td>Land Consolidation Project</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Management</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rural Arrangement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Land Reallocation Methods in Land Consolidation</td>
<td>3</td>
</tr>
</tbody>
</table>

| 71 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Normative and Expert Valuation of Land                           | 3 |
| 72 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Normative Monetary Valuation of Lands for Various Purposes       | 6 |
| 73 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Planning Theory and Methods                                      | 4 |
| 74 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Practical Training in Real Property and Land Management          | 10 |
| 75 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Real Estate Valuation                                            | 6 |
| 76 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Real Estate Valuation and Market Analysis                        | 6 |
| 77 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Regional Development and Regional Politics                      | 5 |
| 78 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Regional Land Use and Protection Programs                        | 6 |
| 79 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Regulation of Land Planning                                      | 6 |
| 80 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Regulation of Land Relations Within the Framework of Agricultural Land Consolidation | 5 |
| 81 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Rural Development and Land Consolidation                         | 6 |
| 82 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Rural Landscape Management                                       | 6 |
| 83 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Scientific Foundations of Land Management Design                 | 3 |
| 84 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Spatial Management in Rural Areas                                | 4 |
| 85 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Spatial Models and Analysis                                      | 6 |
| 86 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | A Special Course in Land Cadastre and Land Information Systems   | 4 |
| 87 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | A Special Course in Land Management and Cadastral Procedures     | 4 |
| 88 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | A Special Course in the Law of Property                          | 4 |
| 89 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | A Special Course in Real Estate Valuation                        | 4 |
| 90 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Statistical Methods for Geomatics                                | 4 |
| 91 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Sustainable Development of Rural Areas                          | 10 |
| 92 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Technical and Economic Justification of Project Decisions        | 6 |
| 93 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Territorial Land-use Planning                                    | 4–5 |
| 94 | 0732 | Environmental Sciences and Civil Engineering, Building and Civil Engineering, Geomatics Engineering | Valuation of Rural Real Estate                                   | 5 |

5. The actual situation in academia
Analysing the modules taught at respondents’ universities for MSc students showed that modules with the same name exist, but they appear under different study programmes, different amounts of ECTS credits are assigned, and module selection differs (Table 5).

### Table 5. Differences observed when teaching the same module

| No. | Module                               | IESCD code | ECTS credits | Module selection | University                                      | Country  
|-----|--------------------------------------|------------|--------------|------------------|-------------------------------------------------|----------  
| 1   | Land Consolidation                    | 0731       | 6            | Mandatory        | Warsaw University of Technology                  | Poland   
|     |                                      |            |              | Elective         | University of Agriculture in Krakow              | Poland   
|     |                                      |            |              | Elective         | Lviv National Environmental University           | Ukraine  
|     |                                      |            |              | Elective         | Mykolayiv National Agrarian University            | Ukraine  
| 2   | Land Management                       | 0731       | 4            | Mandatory        | Lviv National Environmental University           | Ukraine  
|     |                                      |            |              | Mandatory        | Mykolayiv National Agrarian University            | Ukraine  
|     |                                      |            |              | Elective         | State Biotechnological University                | Ukraine  
|     |                                      | 0732       | 6            | Elective         | Aalto University                                  | Finland  
| 3   | Territorial Land-use Planning         | 0731       | 5            | Mandatory        | Lviv National Environmental University           | Ukraine  
|     |                                      |            |              | Mandatory        | Mykolayiv National Agrarian University            | Ukraine  
| 4   | Land Consolidation Project            | 0731       | 4            | Mandatory        | Estonian University of Life Sciences             | Estonia  
|     |                                      | 0732       | 3            | Elective         | University of Natural Resources and Life Sciences, Vienna (BOKU) | Austria  

One module – “Rural Development and Land Consolidation”, having 6 ECTS credits (on a mandatory basis), is almost identical in two countries – Lithuania and Ukraine. The reason is that Vytautas Magnus University Agriculture Academy (Lithuania) partners with State Biotechnological University (Ukraine) with the same study programme (IESCD code 0731) and offers students an MSc double-degree Diploma programme.

A list of 37 mandatory modules was identified (Table 6) and 17 elective modules (Table 7) for MSc students. Although the module names are the same, the distribution of ECTS credits and workload for students differ.

### Table 6. List of mandatory modules for MSc students

<table>
<thead>
<tr>
<th>No.</th>
<th>Mandatory modules</th>
<th>ECTS credits</th>
<th>Workload distribution in %</th>
<th>Workload distribution in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agro-landscape Arrangement of the Territory</td>
<td>3</td>
<td>31</td>
<td>69</td>
</tr>
<tr>
<td>2</td>
<td>Consolidation of Agricultural Land Using the GIS Technique</td>
<td>10</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Contemporary Cadastre</td>
<td>8</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>Economics of Land Use and Land-use Planning</td>
<td>4</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>Expert Monetary Valuation of Land Plots</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Mandatory modules</th>
<th>ECTS credits</th>
<th>Workload distribution in %</th>
<th>Workload distribution in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Forecasting and Planning the Use of Land Resources</td>
<td>5</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>7</td>
<td>Geographic Information Systems</td>
<td>5</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>8</td>
<td>GIS in Cadastral Systems</td>
<td>4</td>
<td>18</td>
<td>82</td>
</tr>
<tr>
<td>9</td>
<td>Land Conflicts Administration</td>
<td>2</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>10</td>
<td>Land Consolidation</td>
<td>6</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>11</td>
<td>Land Consolidation and Rearrangement for Land Surveyors</td>
<td>4</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>12</td>
<td>Land Consolidation and Rearrangement for Spatial Planners</td>
<td>4</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>13</td>
<td>Land Consolidation Project</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>14</td>
<td>Land Management</td>
<td>4</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>15</td>
<td>Land Management</td>
<td>4</td>
<td>37</td>
<td>63</td>
</tr>
<tr>
<td>16</td>
<td>Management of Land Resources</td>
<td>6</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>17</td>
<td>Negotiations and Communications</td>
<td>5</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>18</td>
<td>Normative Monetary Valuation of Lands for Various Purposes</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>19</td>
<td>Planning Theory and Methods</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>20</td>
<td>Practical Training in Real Property and Land Management</td>
<td>10</td>
<td>5</td>
<td>95</td>
</tr>
<tr>
<td>21</td>
<td>Real Estate Valuation and Market Analysis</td>
<td>6</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>22</td>
<td>Regional Development and Regional Politics</td>
<td>5</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>23</td>
<td>Rural Development and Land Consolidation</td>
<td>6</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>24</td>
<td>Rural Development and Land consolidation</td>
<td>6</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>25</td>
<td>Rural Landscape Management</td>
<td>6</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>26</td>
<td>Spatial Management in Rural Areas</td>
<td>4</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>27</td>
<td>Spatial Models and Analysis</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>28</td>
<td>A Special Course in Land Cadastre and Land Information Systems</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>29</td>
<td>A Special Course in Land Management and Cadastral Procedures</td>
<td>4</td>
<td>17</td>
<td>83</td>
</tr>
<tr>
<td>30</td>
<td>A Special Course in the Law of Property</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>31</td>
<td>A Special Course in Real Estate Valuation</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>32</td>
<td>Statistical Methods for Geomatics</td>
<td>4</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>33</td>
<td>Sustainable Development of Rural Areas</td>
<td>10</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>34</td>
<td>Technical and Economic Justification of Project Decisions</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>35</td>
<td>Territorial Land-use Planning</td>
<td>5</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>36</td>
<td>Territorial Land-use Planning</td>
<td>4</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>37</td>
<td>Valuation of Rural Real Estate</td>
<td>5</td>
<td>23</td>
<td>77</td>
</tr>
</tbody>
</table>
Table 7. List of elective modules for MSc students

<table>
<thead>
<tr>
<th>No.</th>
<th>Elective modules</th>
<th>ECTS credits</th>
<th>% Contact</th>
<th>% Individual work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agrarian Law</td>
<td>6</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>Cadastre and Land Legislation (Legislation in the domain of agricultural land consolidation)</td>
<td>5</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Land Consolidation</td>
<td>3</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td>Land Consolidation</td>
<td>3</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>Land Consolidation</td>
<td>3</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>6</td>
<td>Land Consolidation Project</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>7</td>
<td>Land Management</td>
<td>6</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>Land Management</td>
<td>6</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>9</td>
<td>Land Reallocation Methods in Land Consolidation</td>
<td>3</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>Market Land Relations (Tenure)</td>
<td>3</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>11</td>
<td>Normative and Expert Valuation of Land</td>
<td>3</td>
<td>69</td>
<td>31</td>
</tr>
<tr>
<td>12</td>
<td>Real Estate Valuation</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>13</td>
<td>Regional Land Use and Protection Programs</td>
<td>6</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>14</td>
<td>Regulation of Land Planning</td>
<td>6</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td>15</td>
<td>Regulation of Land Relations within the Framework of Agricultural Land Consolidation</td>
<td>5</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>16</td>
<td>Rural Arrangement</td>
<td>3</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>17</td>
<td>Scientific Foundations of Land Management design</td>
<td>3</td>
<td>33</td>
<td>67</td>
</tr>
</tbody>
</table>

Only Estonia is offering a module related to land consolidation as a Massive Open Online Course (MOOC). This module, “Special Course in Land Management and Cadastral Procedures” (4 ECTS credits), gives students the ability to work in the field of land surveying, land management, and cadastre, and it allows them to apply for the position of land surveyor. Almost all other universities already offer a hybrid teaching approach (classroom and online), and as it was commented in the survey – “the COVID-19 pandemic taught us how to adapt to the situation”.

The labour market typically prefers recruiting experienced workers with practical experience rather than only theoretical knowledge. To strengthen MSc students’ capacities, it was identified that four universities offer field trips alongside relevant modules. Such an approach may be found at:

- University of Natural Resources and Life Sciences, Vienna (BOKU) (Austria), 3 ECTS credits elective module “Land Consolidation Project”.
- Estonian University of Life Sciences (Estonia), 6 ECTS credits mandatory module “Management of Land Resources”, 4 ECTS credits mandatory module “Special Course in Real Estate Valuation”, and 4 ECTS credits mandatory module “Special Course in Land Management and Cadastral Procedures”.
- Warsaw University of Technology (Poland), 4 ECTS credits mandatory module “Spatial Management in Rural Areas”.
- University of Ljubljana (Slovenia), 4 ECTS credits mandatory module “Land Consolidation and Rearrangement” (for land surveyors and spatial planners).
6. How academia meets the expectations of the User panel

Having established a clear picture of experts’ expectations from students and what academia offers their master’s students (the raw module descriptions are in Appendix 3), it was important to identify the modules in which academia forms that desired knowledge and competencies.

6.1 How academia meets the need for in-depth knowledge

The first requirement experts wish that new colleagues have is in-depth knowledge of “Laws and regulations: Civil Code, law and bylaws on land, land consolidation, expropriation, cadastre, other laws”. However, after reviewing the content of the modules as provided by the academic respondents, it became clear that MSc students must already pass all modules on these legal acts during their BSc studies. That is why it is possible to observe that mainly elective type modules exist in MSc studies, where students analyse legal acts.

Academia teaches:

Theoretical and practical in-depth knowledge about the legal acts regulating property rights. During lectures, they investigate the legal questions related to the formation and management of real estate and land. The methods used for regulating relationships and handling land disputes are observed. Some lectures are dedicated to the state regulation of the regime of ownership (land management and land-use planning), state land cadastre and land monitoring.

The second rational requirement is for in-depth knowledge of “Land consolidation planning”. Experts wish that graduate students will be able to assist in land consolidation projects (will know all the procedures – theoretically and at some level practically).

Academia teaches:

From a theoretical point of view, universities start with the theoretical basis and main principles of land consolidation and talk about different types of land consolidation. Students are introduced to project procedures, acting actors and responsible institutions. University professors introduce the requirements for the selection of the potential project area and how to perform the feasibility study. There are dedicated lectures for land fragmentation analysis, how to calculate the economic effect of land consolidation projects using cost-benefit analysis and how to motivate landowners to participate in such projects. Students compare types of land valuation within land consolidation projects. Special lectures are dedicated to effective project management, negotiations, and conflict resolution. The content of lectures also includes methods for assessing the effectiveness of implemented land consolidation projects.

From a practical side, students usually carry out a simplified classical land consolidation project on a relatively small area. Land rearrangement is based on land valuation and the scenario in which landowners wish to swap land parcels. The project also includes minimal planning of relevant rural infrastructure (road network, drainage, erosion control, landscaping). During the practical sessions when developing a project, special attention is paid to learning how to use and apply modern IT and GIS tools.

The third in-depth knowledge requirement, expressed by almost all experts (four out of six) was in “Cadastral surveying” since land consolidation planners must be able to perform all
surveying tasks. Besides regular surveys, an expert from Finland sees the ability to perform surveys in difficult terrains as an asset, and an expert from Türkiye, surveying mines for the extraction of minerals. After reviewing the actual MSc study programme modules, it was noticed that students are already required to pass a module related to surveying during the bachelor’s study programme (in responding universities called “Land Registry”, “Cadastre”, “Cadastre and Land Use Management”, “Land Surveying”, “Public Surveying”, “Geodesy” and “Geodesy and Land-use Planning”).

The experts’ final competence preference at the in-depth level of knowledge was “GIS and remote sensing”. This requirement seems highly rational since land consolidation planners deal with many GIS data during land consolidation projects. It is necessary to highlight here that post-graduate students already undertake a GIS module in their bachelor’s study programme, but it is not directly focused on land consolidation. After reviewing modules described by academic respondents, it is possible to note that there are modules at the MSc level related to land consolidation and GIS (land consolidation centric, but with GIS tasks). Some of these modules were already mentioned in the “Land consolidation planning” demand section. Further modules are more GIS-centric but remain relevant to overall land management and planning processes. The actuality and importance of the GIS module are demonstrated by the fact that more than four credits are dedicated to it, and it is also a mandatory module.

**Academia teaches:**

| Such modules contain practical sessions on how to effectively manage land resources and decision-making support. The main focus is on spatial data management using various GIS software – develop spatial databases, perform spatial analysis and model scenarios. There are dedicated lectures for spatial data acquisition from national geoportals, land information systems, or even new data products like aerial photos from drones, 3D mesh, and Lidar. |

The desired knowledge in “Land market, mortgage, easements, pre-emptive rights” is relevant to land valuation and land banking. They are usually covered within modules like “Land Management”, “Land Valuation” and similar. It was noticed that only one university in Ukraine (Mykolaiv National Agrarian University) offers students an elective module, “Market Land Relations (Tenure)” (3 ECTS credits).

### 6.2 How academia meets the need for basic knowledge

The basic knowledge most preferred by experts for new co-workers includes: “Regional and municipal spatial planning”, “Land valuation” and “Agronomy and agricultural production, farming, and forestry background”.

During the land consolidation process, it is mandatory to follow guidelines set in the regional and municipal spatial planning documents. The land consolidation plan must correspond to these documents, which is why expert respondents emphasized the importance of their future colleagues having basic knowledge of regional and municipal spatial planning. Respondents from universities already offer such modules in bachelor’s degree study programmes, and these modules are called: “Regional Planning/Rural Development”, “Spatial Planning”, and “Sustainable Spatial Development”. Such topic is also covered during regular land management modules.
6. How academia meets the expectations of the User panel

Academia teaches:
The modules consist of an overview of types of documents, the role of state and regional authorities, factors influencing regional development, regional development processes, and experience of regional politics nationally and in different countries. During lectures, students analyse territorial land-use planning concepts, tasks and principles.

For every land consolidation project planner, it is necessary to have a basic understanding of land valuation (market price or relative value) as it directly relates to land re-allotment plan preparation. Students acquire an initial background about land valuation during the bachelor’s study programme (modules are called “Land Valuation”, “Analysis of the Real Estate Market”, “Theory and Modern Methods of Real Estate Valuation”, “Valuation of Enterprises and Agricultural Lands”, “Land Valuation” and “Valuation of Land and Real Estate”).

Academia teaches:
The students have a systemic overview of real estate appraisal, its theory, and different methodologies. Professors discuss various properties (agricultural land, forests, buildings, etc.), market characteristics and factors with students. The main focus is on the national system for real estate valuation, methodologies, laws and bylaws, but international standards are also part of the lectures. Students have practical assignments on property valuation and real estate management in simulated land consolidation project areas.

As land consolidation is mainly about agricultural land structure improvements and a better situation for farming, experts recommend that students form a basic knowledge of agronomy and agricultural production, farming and forestry in university. Understanding the basics of agricultural production is important because, during land consolidation, it is necessary to form viable land holdings, justify restructuring and convince landowners to participate and embrace changes. Knowledge of agriculture will also support students in land valuation procedures. While this knowledge is provided during the bachelor study programme, it is delivered in more specific concentrated modules in master’s degree programmes.

Academia teaches:
Students gain an understanding of agricultural production and forestry. They learn the principles of landscape ecology, measures for minimizing land degradation, and optimizing the spatial arrangement of objects of intensive agricultural production in agro-landscapes with environmental protection measures.

The desired knowledge in “Rural infrastructure planning: roads, drainage/irrigation planning, erosion control” are usually part of a broader module at the MSc level, like – “Land Consolidation Project” (in Austria) and “Land Consolidation 2 (advanced)” (in Poland, Warsaw University of Technology).

There is no specific module dedicated to “Common Agricultural Policy (CAP), EU regulation and subsidizing rural areas and farming” in the interviewed universities, as requested by the experts. However, universities have dedicated lessons about it under modules “Rural Development and Land Consolidation”, “Land Consolidation” and “Land Valuation”.

6.3 How academia meets the need for “extra mile” skills and abilities

As land consolidation is a project-based procedure, expert respondents highlighted the value of students having knowledge of “Project management”. In Lithuania, it was noticed that there is a specific module in the bachelor’s study programme for land managers – “Organization of Land Management Works” specifically dedicated to land surveying and planning projects management. All other academic respondents have not indicated having specific modules for (land) project management.

All land surveyors and planners who ever had an opportunity to deal with land consolidation will agree that knowledge in “Communications, negotiations, dispute resolution, mediation, moderation” is the most crucial and useful in everyday project implementation. Every land consolidation project planner and surveyor has had an opportunity to appear at the centre of land disputes between neighbours, to hear non-realistic wishes from landowners, and to moderate the discussions between private and public needs.

It was identified that analysed universities in Estonia and Moldova offer specific modules on such issues for their MSc students, while others incorporate several lessons on it within other modules, for example:

- In Slovenia, a topic for “motivation of participants (communication, motivation, public hearing, conflict solutions, negotiation and mediation, effective organization of teams and other resources for the implementation of land rearrangements)” is integrated into the “Land Consolidation and Rearrangement (Cadastral land rearrangements) – Adjusted to the Needs of Spatial Planners” module.
- In Ukraine (Mykolayiv National Agrarian University), topics about “Land Dispute Resolution and Peace Building” and “Land Tenure in Conflict-Affected Environments” are integrated into the “Fundamentals of Land-use Planning Theory” module.

<table>
<thead>
<tr>
<th>Academia teaches:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students analyse possible land conflicts and disputes occurring in land administration and land management.</td>
</tr>
<tr>
<td>Students gain theoretical and practical knowledge of methods and techniques for effective negotiations and communications.</td>
</tr>
</tbody>
</table>

6.4 How academia meets the need for the rest of the competencies on which there is no common opinion

It was noticed that all these indicated competencies are mainly covered within other modules at the interviewed universities.

It was noticed that there is no module on Land Fund/Bank and its activities, but lecturers from the interviewed universities talk about the “Land banking process” in modules dedicated to land consolidation, for instance, in the Lithuania module “Rural Development and Land Consolidation”.

Knowledge of “Socioeconomic issues in rural areas, sociology” sounds reasonable from the perspective of land consolidation experts, as planners must be familiar with the actual
situation in rural areas when implementing land consolidation projects. It is also important for the identification of potential land consolidation projects/areas (feasibility studies) and rural development measures.

As land consolidation is seen as an instrument of rural development, experts requested knowledge of “Rural development”. All universities talk about rural development within other modules, but some countries, like Moldova, have a specific module, “Sustainable Development of Rural Areas,” which is a mandatory module for MSc students and is dedicated to 10 ECTS credits. In Poland (Warsaw University of Technology), they even provide mandatory modules “Rural Areas Development 1 (basic)” and “Rural Areas Development 2 (advanced)”, and in Austria, there is “Regional Planning/Rural Development” for BSc students.

Knowledge of “Soil science, soil evaluation” is the basis for farming, land valuation, and soil protection. It also corresponds to a rural development measure such as afforestation of land with low soil fertility. Modules on “Soil Science” already exist in the bachelor study programme in Austria, in Ukraine (Lviv National Environmental University), and definitely in other universities.

All universities with modules in land management and planning are talking about sustainable development and measures of environmental protection. Many experts agree that knowledge of “Ecology, nature conservation and biodiversity protection” is important to some extent. Some of the universities have a specific module, like in Poland (University of Agriculture in Krakow) “Environmental Protection” for bachelors.

Only two out of six participating experts (from the Kingdom of the Netherlands and Türkiye) said that their colleagues should know “International practice on land consolidation”. From the theoretical part, universities are talking about it within their regular land consolidation modules. Also, universities invite guests to their lectures, where they share their experiences in land consolidation from other countries. However, practical experience could only be gained through exchange programmes in a foreign country that offers internships for students at organizations working on land consolidation. Such an opportunity was not found when analysing modules at the universities participating in this study.
7. A generic course curriculum development on land consolidation and land banking

Based on Section 5, which presented the analyses of the existing educational programmes related to land consolidation and land banking in 14 universities from 11 European countries and Section 6, which compared it with the requirements of public agencies (as expressed by the members of the User panel) involved in land consolidation implementation in five countries for knowledge and skill mix of young professionals, this section proposes the structure and content of a new generic course on land consolidation and land banking for a Master of Science degree programme.

When analysing the actual situation in universities, the Working group study contributors presented their study programmes as ISCED codes: 0421, 0731 and 0732. The majority of study modules presented belonged to the study programme ISCED code 0731.

A united list of modules (subjects) for a generic course curriculum was developed by systemizing the desired knowledge and competencies expressed by the User panel respondents. Academia should consider reorganizing existing MSc study programmes, especially “Land Surveying” and “Town and Country Planning” (ISCED code 0731). The existing study programmes (ISCED code 0731) are dedicated to land surveyors/land-use planners with a universal view, but after incorporating the developed one-semester course, it could be oriented towards future land consolidation and land banking professionals.

The course has the potential to become instrumental as a Continued Professional Development (CPD) or Life-Long Learning approach important to existing land surveyors or geodesists who have several years of professional experience but have not had a subject on land consolidation or who were trained only in topography, geodetic and cadastral surveying. The course would provide them with an opportunity to “shift” their knowledge and prepare to work with land consolidation projects.

When developing a generic course curriculum on land consolidation and land banking, it is necessary to focus on its universality. This approach allows for the inclusion of external listeners (students and existing professionals from other disciplines) to join the developed course during the spring semester. This is why the course was structured into separate modules. The modular structure is useful to different specialists wishing to work at some level within land consolidation projects. Such specialists can undertake and pass only mandatory modules and, if they wish – take any other modules relevant to their areas of interest.

The Primary target group (regular MSc students and CPD participants) will be required to pass the developed course to the full extent. The Secondary target group, at least, will join the primary group only for mandatory modules, and if they wish, can continue with selected modules.

It is worth mentioning that the developed course (with proposed modules) can also be used in individual countries to improve the current curriculum at the BSc level in order to prepare a good background for MSc-level study programmes.
7.1 A united list of modules (subjects) for a generic course curriculum on land consolidation and land banking

Table 8 presents the suggested structure of the generic course curriculum, including modules’ titles, the aims of each module, the content (list of topics to be covered), and skills expected to be acquired after completion of the respective module. The course consists of a total of 30 ECTS credits. An indicative amount of ECTS credits is provided for each module, but each university/country can adjust it in their way, for example:

- If the module’s “country-specific module” is irrelevant – left ECTS credits can be assigned to other modules.
- Additional modules can be added to the course.
- Modules can be merged and split.
- The content of the modules and type of assessment can be different for the Primary and the Secondary target groups.
Table 8. The generic course curriculum module list

<table>
<thead>
<tr>
<th>#</th>
<th>ECTS credits</th>
<th>Module</th>
<th>Aim of the module</th>
<th>The content of the module (topics)</th>
<th>Skills and knowledge expected after completion of the module</th>
</tr>
</thead>
</table>
| 1 | 2            | Introduction to land consolidation and land banking* | To provide a basic understanding of land consolidation and land banking instruments. | • Aims and objectives of land consolidation and land banking.  
• Main notions and definitions of key terms.  
• The role of land banking in support of land consolidation.  
• Main land consolidation approaches.  
• Phases of land consolidation projects.  
• Main principles of land consolidation.  
• An international overview of land consolidation instrument.  
• Contribution of land consolidation and land banking in achieving the SDG agenda and other global initiatives (e.g. UNCCD). | • A basic understanding of land consolidation instruments, including the aims and objectives of land consolidation and land banking (multipurpose vs single purpose), benefits, main land consolidation approaches and the difference between them, phases of a land consolidation project and principles of application.  
• Familiarity with key notions and definitions related to land consolidation and land banking and an ability to use them correctly in context.  
• Understanding of the role that land banking plays in supporting land consolidation efforts.  
• Knowledge of international perspectives on land consolidation, including examples from other countries and regions.  
• Understanding of how land consolidation and land banking can contribute to achieving global initiatives such as the UNCCD and the SDGs. |
| 2 | 4            | The land consolidation process: Feasibility phase | To provide a comprehensive understanding of the methodology and key steps of the land consolidation feasibility phase, including communication and awareness-raising activities. | • Initiation of land consolidation: identification and selection of land consolidation project areas.  
• Methodology for conducting a feasibility study.  
• Interviewing process.  
• Communication and awareness-raising activities. | • A comprehensive understanding of the methodology for conducting a feasibility study for land consolidation projects.  
• Familiarity with the key steps involved in the land consolidation feasibility phase, including the identification and selection of project areas.  
• Understanding of the interviewing process, including how to conduct effective interviews with stakeholders and landowners.  
• Knowledge of communication and awareness-raising activities related to land consolidation, including strategies for engaging with local communities and promoting the benefits of land consolidation projects. |

Note:  
* The modules marked with an asterisk are mandatory for the Secondary target group. All other modules (without an asterisk) are free to decide for the Secondary target group.
Table 8. (cont.)

<table>
<thead>
<tr>
<th>#</th>
<th>ECTS credits</th>
<th>Module</th>
<th>Aim of the module</th>
<th>The content of the module (topics)</th>
<th>Skills and knowledge expected after completion of the module</th>
</tr>
</thead>
</table>
| 3 | 4            | The land consolidation process: Re-allotment phase | To provide a comprehensive understanding of the methodology and key steps of the land consolidation re-allotment planning phase, including communication and negotiations during re-allotment planning. | • Introduction and main steps in the re-allotment planning.  
• Facilitation of the recognition and registration of legitimate ownership rights.  
• Re-allotment of parcels: main approaches and techniques.  
• Third-party rights in the re-allotment planning process.  
• The land re-allotment/consolidation plan: main components, approval and adoption.  
• Negotiations: tactics, reasoning and communicative strategies.  
• Individual and social behavioural aspects in land consolidation and ways to overcome lack of interest.  
• Problematic situations and dispute resolution mechanisms. | • A comprehensive understanding of the methodology and key steps involved in the land consolidation re-allotment planning phase.  
• Familiarity with the re-allotment approaches and techniques.  
• Knowledge of the main components of the land consolidation plan, including how it is approved and adopted.  
• Understanding of negotiations, including tactics, reasoning, and communicative strategies that can be used during the re-allotment planning process.  
• Awareness of individual and social behavioural aspects that may impact land consolidation efforts and ways to overcome lack of interest or resistance.  
• Understanding of problematic situations that may arise during the re-allotment planning process and knowledge of dispute resolution mechanisms that can be used to address them. |
| 4 | 3            | Land valuation in land consolidation | To provide a comprehensive understanding of land valuation in land consolidation as a foundation for land re-allotment planning. | • Basics of land valuation and introduction into main land valuation approaches.  
• Property market characteristics and factors.  
• The theoretical basis of land valuation in land consolidation.  
• Conducting land valuation in land consolidation projects. | • A comprehensive understanding of land valuation in land consolidation, including an introduction to the basics of land valuation and the main land valuation approaches.  
• Familiarity with property market characteristics and factors that influence land valuation.  
• Knowledge of the theoretical basis of land valuation in land consolidation, including how it relates to the re-allotment planning phase.  
• Understanding of how to conduct land valuation in land consolidation projects. |
<table>
<thead>
<tr>
<th>#</th>
<th>ECTS Credits</th>
<th>Module</th>
<th>Aim of the module</th>
<th>The content of the module (topics)</th>
<th>Skills and knowledge expected after completion of the module</th>
</tr>
</thead>
</table>
| 5  | 4            | The land consolidation process: Registration and implementation phase | To provide a comprehensive understanding of the methodology and key steps of the land consolidation registration and implementation phase. | • Registration and implementation of a land consolidation plan.  
• Cadastral surveying.  
• Registration of parcels and transfer of possession.  
• Financial settlements. | • A comprehensive understanding of the methodology and key steps involved in the registration and implementation phase of land consolidation projects, including an introduction to the main activities involved.  
• Familiarity with cadastral surveying, including its role in the registration and implementation of a land consolidation plan.  
• Knowledge of the registration of parcels and the transfer of possession, including the relevant legal and administrative procedures.  
• Understanding of financial settlements, including the calculation and distribution of compensation payments and other financial transactions. |
| 6  | 2            | The legal and institutional framework of land consolidation and land banking* | To provide a comprehensive understanding of the legal issues and regulations on land consolidation. | • The need for legal and institutional framework in land consolidation.  
• Land consolidation institutions and stakeholders.  
• Key features of land consolidation law.  
• Legitimate tenure rights and principles of land consolidation.  
• Safeguards and legal remedies.  
• Property and ownership rights related laws and regulations (civil code, land code, land law, cadastre and land registration regulations, and others).  
• Integration of land consolidation into the overall system of land management and land use planning. | • A comprehensive understanding of the legal issues and regulations surrounding land consolidation, including the need for a legal and institutional framework to support the process.  
• Familiarity with the key features of land consolidation law, including the principles of legitimate tenure rights and the legal safeguards and remedies available.  
• Understand the role of government agencies and other organizations in land consolidation, including their responsibilities, powers, and limitations.  
• Familiarity with the potential legal and property rights issues in land consolidation and ways of solving them (e.g. inheritances, mortgages, informal transactions, restrictions, third-party rights, etc.). |
Table 8. (cont.)

<table>
<thead>
<tr>
<th>#</th>
<th>ECTS credits</th>
<th>Module</th>
<th>Aim of the module</th>
<th>The content of the module (topics)</th>
<th>Skills and knowledge expected after completion of the module</th>
</tr>
</thead>
</table>
| 7  | 2            | Land banking*                               | To provide a comprehensive understanding of land banking as a land management instrument. | • Introduction to land banking.  
• An international overview of the land banking instrument.  
• Integration of land banking into land consolidation.  
• The legal and institutional framework of land banking.  
• The connection between state-owned land and land banking. | • A comprehensive understanding of the land banking instrument and its application in different contexts.  
• Familiarity with the international overview of land banking.  
• An understanding of the integration of land banking and land consolidation and how they can work together to achieve land management goals.  
• Knowledge of the legal and institutional framework surrounding land banking, including the laws and regulations that govern its use. |
| 8  | 3            | The utilization of GIS tools in land consolidation | To provide an understanding of the importance and application of GIS tools in land consolidation. | • GIS tools and their relevance in land consolidation projects.  
• Different types of GIS tools and how they can be utilized in the land consolidation process.  
• Benefits of using GIS tools in land consolidation, including their ability to improve project planning, stakeholder engagement, and decision-making processes.  
• Collecting and managing spatial data using GIS tools.  
• Maps prepared as part of a land consolidation project. | • Understand the significance of GIS tools in land consolidation projects and identify various types of GIS tools that can be used.  
• Ability to utilize GIS tools in land consolidation, such as enhancing project planning, stakeholder engagement, and decision-making processes.  
• Collect and manage spatial data using GIS tools and understand the importance of spatial data in land consolidation projects.  
• Utilize GIS tools to prepare maps as part of a land consolidation project and understand the role of maps in facilitating effective communication and decision-making among stakeholders involved in land consolidation. |
### Table 8. (cont.)

<table>
<thead>
<tr>
<th>#</th>
<th>ECTS credits</th>
<th>Module</th>
<th>Aim of the module</th>
<th>The content of the module (topics)</th>
<th>Skills and knowledge expected after completion of the module</th>
</tr>
</thead>
</table>
| 9  | 2             | Management of land consolidation projects | To provide skills related to the effective management of land consolidation projects, including cost-benefit analysis and environmental impact assessment. | • Planning land management works.  
• Organization and management of land consolidation projects.  
• Cost-benefit analysis of land consolidation projects.  
• Monitoring and evaluation of land consolidation programmes and projects, including socioeconomic impact assessment.  
• Environmental impact assessment of land consolidation projects. | • Ability to plan land management works effectively and efficiently.  
• Knowledge and skills to organize and manage land consolidation projects.  
• Competence in conducting a cost-benefit analysis of land consolidation projects to ensure their financial feasibility.  
• Proficiency in monitoring and evaluating land consolidation programmes and projects, including the ability to conduct a socioeconomic impact assessment.  
• Capability to conduct an environmental impact assessment of land consolidation projects to ensure sustainability and minimize negative impacts on the environment. |
| 10 | 2             | Rural infrastructure planning in land consolidation. | To provide an understanding of using land consolidation in combination with rural infrastructure improvement. | • Basics of rural infrastructure planning.  
• Combining re-allotment planning with rural infrastructure (improvement/construction).  
• Implementation of infrastructure and other works. | • Understand the process of rural infrastructure planning, such as roads, drainage/irrigation planning, erosion control, etc., integrated with the land consolidation process.  
• Develop road network designs for agricultural transport that consider the specific needs of farmers and local communities.  
• Plan and design effective drainage and irrigation systems that take into account the unique topography and hydrology of the area.  
• Design buffer strips and ecological land networks that promote biodiversity and environmental sustainability in the region.  
• Identify erosion control measures and implement strategies to prevent soil degradation and maintain soil fertility. |
| 11 | 2             | Country-specific module/subject (upon the decision of a university/country), i.e. Common Agricultural Policy (CAP), funding of land consolidation, special software, etc. |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                     |
For the Secondary target group, the developed generic course curriculum recommends having three mandatory modules to form a comprehensive understanding:

- Introduction to land consolidation and land banking.
- The legal and institutional framework of land consolidation and land banking.
- Land banking.

When organizing the course, it is recommended to schedule these three modules in the second part of the day, considering that such a schedule will be much more convenient for the Secondary target group.

Table 9 provides possible sample scenarios of how representatives from different professions (Secondary target group) will be selecting modules from the list.

Table 9. Scenarios for choosing modules by different professions

<table>
<thead>
<tr>
<th>Modules</th>
<th>Profession</th>
<th>Agronomist</th>
<th>Civil engineer</th>
<th>Lawyers &amp; notaries</th>
<th>Land valuer</th>
<th>Local public authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to land consolidation and land banking*</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The land consolidation process: Feasibility phase</td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The land consolidation process: Re-allotment phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Land valuation in land consolidation</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The land consolidation process: Registration and implementation phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The legal and institutional framework of land consolidation and land banking*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Land banking*</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The utilization of GIS tools in land consolidation</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of land consolidation projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Rural infrastructure planning in land consolidation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Note:
*The modules marked with an asterisk are mandatory for the Secondary target group. All other modules (without an asterisk) are free to decide for the Secondary target group.

To support university professors/lecturers, this study recommends for each of the 10 course modules a core module’s content (narrative), teaching methods and a list of useful references and other resources to supplement the module. These can be found in Appendix 1.
8. Further recommendations on the generic course curriculum

This chapter provides further suggestions and recommendations for national land consolidation authorities (lead agencies) and academia on how to improve existing study programmes or suggestions worth considering for those in the initial planning phase on capacity development.

The analysis of modules for MSc students related to land consolidation within the universities represented in the Working group showed that only Estonia is offering one module as a MOOC, while others apply a hybrid teaching approach (classroom and online). This indicates that universities should focus on how to adjust their study programmes, or at least a generic course curriculum on land consolidation and land banking to be prepared for a MOOC or digital campus approach. This could ensure a higher number of well-prepared specialists in countries with land consolidation instruments and programmes, which in turn will help attain better results within land consolidation projects.

It would be useful to establish an academic knowledge hub for sharing valuable data, such as important publications, books of acknowledged authors, presentation slides, and project data. These resources could be used as sample projects or course material.

For countries adjusting study programmes by integrating the developed course with indicative modules, it is important to ensure well-prepared content and qualified lecturers. It is important to ensure that lecturers are also improving their qualifications and skills, not only theoretical but practical as well. To ensure the quality of teaching, the lecturers should also be involved in academic research on land consolidation and land banking topics as a way to build sustainable knowledge and educate future experts. Inviting guest lecturers, may be a way to bring in, at low-cost, qualified lectures when there is still no or limited practical experience in the country. At the country level, collaboration should be established and maintained between the universities and the land consolidation authorities (lead agencies). Collaboration between universities in land consolidation research should also be supported and encouraged.

Universities in collaboration with lead agencies could provide students with a better learning experience by integrating field visits to land consolidation project sites. Students could in their assignments work with real "cases" from actual projects and do research on land consolidation using real projects as the basis, e.g. when writing their master thesis. This would offer students an opportunity to obtain hands-on experience and better understand what a land consolidation project looks like in practice. Such an approach is already applied in Austria (module “Land Consolidation Project”), Estonia (modules “Management of Land Resources”, “Special Course in Real Estate Valuation”, “Special Course in Land Management and Cadastral Procedures”), Poland (Warsaw University of Technology) (module “Spatial Management in Rural Areas”), and Slovenia (module “Land Consolidation and Rearrangement” dedicated for land surveyors and spatial planners).

Academia should advocate for governments and national lead agencies in charge of land consolidation to provide students with open access to project documentation (without private and sensitive data) and spatial data. Digital maps should be hosted and publicly accessible
through Open Data portals to ensure transparency, decision-making and influence bottom-up initiatives. Students with access to such data could measure suitability of certain areas for land consolidation, analyse implemented land consolidation projects’ impact, and use the data for scientific research production (articles, case studies and thesis).

The developed course should be monitored and frequently updated to ensure the delivery of the most relevant information for course participants. Such monitoring and even course approval could be organized, for example, jointly by academia and the national association of land surveyors. Governmental institutions could reflect on what the needs are and planned changes in legal acts affecting the procedures. Also, it is important to periodically organize surveys to acquire graduated students’ opinions upon module/course completion and interview alumni (especially those who already work with land consolidation).
References


Appendix 1.

Recommended teaching methods, support materials and core content of the teaching modules
Module 1: Introduction to land consolidation and land banking

Recommended teaching methods:

✔ Lecture
✔ Seminar
✔ Discussions
✔ Independent reading
✔ Group work
✔ Field trip

Exercises
Case study
Project development
Practice

Main recommended literature:


Further reading:


<country specific sources (legal acts, scientific articles, books, etc.)>


Other useful sources:

<other useful sources (websites, applications, media stories, interviews, etc.>>

Core module content

Land consolidation and land banking are land management instruments that are traditionally applied to support agricultural development in project areas by reducing land fragmentation and enlarging farms.

Land consolidation in the European perspective

Many countries in Western Europe have a long tradition of a hundred years or more for the implementation of land consolidation programmes and projects (Hartvigsen, 2022). The objective of land consolidation has traditionally been agricultural development by reducing land fragmentation and facilitating the structural development in agriculture towards larger and more competitive farms. During the last decades, most Western European countries have
developed land consolidation into a multipurpose instrument where the projects, in addition to the traditional objective of reducing land fragmentation and enlarging farms, also pursue non-agricultural objectives related to climate change, nature, environment or large-scale linear infrastructure.

In Central and Eastern Europe, land consolidation was introduced following the land reforms of the early 1990s, which were implemented as part of the transition towards a market economy and which resulted in farm structures with the average farm being small, often between 1 and 3 ha, and with excessive land fragmentation (Hartvigsen, 2014a). While most countries of Central and Eastern Europe have introduced land consolidation, only some have established ongoing national land consolidation programmes. The introduction of land consolidation in Central and Eastern Europe has been driven by the political aim to support agricultural development by reducing land fragmentation and facilitating a structural development towards larger farms.

The FAO *Legal Guide on Land Consolidation* defines land consolidation as:

> a legally regulated procedure led by a public authority and used to adjust the property structure in rural areas through a comprehensive reallocation of parcels, coordinated between landowners and users in order to reduce land fragmentation, facilitate farm enlargement and/or achieve other public objectives, including nature restoration and construction of infrastructure (Veršinskas et al., 2020, p. 3).

Land banking is a land management instrument that is often used to support the implementation of land consolidation projects, in particular by increasing the land mobility in the land consolidation project areas. Land banking can be defined as:

> a set of systematic activities implemented by an institution with public purpose, performing the intermediate purchase, sale, exchange or lease of land in rural areas in order to increase land mobility, to facilitate development of agricultural land markets, and to pursue public policy objectives related to agricultural and rural development, sustainable land use and implementation of public projects related to nature restoration, environmental protection, climate change and construction of large-scale infrastructure (FAO, 2022a, p. 1).

Based on the experiences of introducing land consolidation in Eastern European countries, a fully operational national programme is regarded to have five minimum requirements (Hartvigsen, 2015, p. 4):

1. The overall **land policy** has land consolidation as a land management instrument embedded within it.
2. An **operational legal framework** for land consolidation has been adopted and tested.
3. A **lead public agency** for land consolidation has been established and delegated to manage and run the national programme.
4. **Secured funding** on an annual basis allows the lead agency to plan activities for at least two to three years ahead.
5. **Technical and administrative capacity** has been developed to implement land consolidation projects in the field and to manage the programme.

Land consolidation has been implemented successfully in many projects in Europe as a standalone activity or as part of a multipurpose project. In doing so, it has brought benefits to farmers and their communities and to the wider society of the country. While land consolidation can be an effective instrument for agriculture and rural development, its implementation is not
possible or needed in every rural community. Factors that can act against the introduction of land consolidation include a low interest of farmers and landowners to participate in projects; a limited extent of land mobility (e.g. farmers in a village want to buy land and no one wants to sell; no state land is available for farm enlargement); many landowners with only one land parcel in the project area; and a high percentage of perennial crops, which can also contribute to low land mobility. In addition, some fragmentation of parcels may be advantageous, for example, if micro-climate zones allow farmers to grow different crops. The feasibility phase of land consolidation is critical in determining whether a particular area can benefit from land consolidation (see Module 2).

**Approaches to land consolidation**

A review of European land consolidation legislation and practice conducted and published by FAO in 2020 found that land consolidation in European countries is implemented in three different approaches: (i) voluntary, (ii) majority-based, and (iii) mandatory (Veršinskas et al., 2020). This is illustrated in Figure A1. Based on that review, the application of both voluntary and majority-based land consolidation approaches is recommended, with the choice of approach being dependent on the specific situation in the project area (Veršinskas et al., 2020, pp. 18–19).

![Figure A1: Approaches to land consolidation](source)

<table>
<thead>
<tr>
<th>VOLUNTARY LAND EXCHANGES</th>
<th>VOLUNTARY</th>
<th>MAJORITY-BASED</th>
<th>MANDATORY</th>
<th>EXPROPRIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulated or unregulated</td>
<td>Regulated</td>
<td>Regulated</td>
<td>Regulated</td>
<td>Imposed by state</td>
</tr>
<tr>
<td>Not facilitated by land professionals</td>
<td>Decisions are taken voluntarily</td>
<td>Land consolidation plan approved by a qualified majority</td>
<td>Land consolidation plan adopted by competent public body</td>
<td>No voting</td>
</tr>
<tr>
<td>Land market transactions</td>
<td>Facilitated by land professionals</td>
<td>Facilitated by land professionals</td>
<td>Facilitated by land professionals</td>
<td>Compensation in money</td>
</tr>
</tbody>
</table>

In a voluntary approach, the project includes only the land of landowners who provide their written consent to the land consolidation solution they are offered.

In a majority-based approach, the project includes all the agricultural land in the project area, provided that a qualified majority of the landowners vote for the land consolidation solution that is offered. Safeguards are put in place to ensure that all landowners, even those who vote against the proposed land consolidation solution, are at least as well off after the land consolidation project as compared with before it.
In mandatory land consolidation (sometimes also referred to as statutory or compulsory land consolidation), the landowners have no right to vote on the land consolidation solution that will be implemented even if they are consulted by the relevant authority that executes the project. FAO does not recommend such approaches where the landowners do not have the opportunity to approve the land consolidation solution that will be implemented (Veršinskas et al., 2020, p. 8).

Voluntary land exchanges are considered to be normal land market transactions and not land consolidation.

The selected approach to land consolidation defines the process of the re-allotment phase, which is the second of the three generic phases of a land consolidation project (see Module 3). The processes of re-allotment planning for voluntary and majority-based land consolidation are illustrated in Figure A2 and Figure A3. As indicated, the process of voluntary land consolidation is simpler than the process for majority-based projects. The outcome of the re-allotment phase is referred to as the Re-allotment Plan or Land Consolidation Plan (and from here on it is referred to as the Plan). It shows the parcel layout after the consolidation of parcels.

In majority-based land consolidation, a qualified majority (usually around 70 percent of all landowners) must approve the Plan by voting. This means that a small minority of the landowners who do not vote for the Plan may still have to accept that it will be implemented. They will not lose their rights to land but will receive land in the project area of at least the same value as the parcels they had before the project. It is a key principle that all landowners are at least as well off after the land consolidation as compared with before it (Veršinskas et al., 2020, pp. 52–53).

This means that several safeguards will need to be in place in majority-based land consolidation. Land valuation is an integral part of the re-allotment planning and it is conducted at the beginning of the re-allotment phase to establish the base for the re-arrangement of the parcels and the value of each parcel that enters the land consolidation process. Detailed procedures for land valuation must be included in the legal framework. Several factors usually determine the value of the individual parcels, such as production value (e.g. soil quality and access to irrigation), distance from village, and others. Another safeguard is that the Plan must be on public display before the landowners vote on its approval. After the public display, the Plan is revised based on the comments and complaints received. This can be repeated if needed before the voting by landowners. After the Plan is approved by the landowners, it is adopted by the public institution responsible for land consolidation (the lead agency for land consolidation) or approved by a land consolidation commission, depending on the framework of the country. The adoption or approval of the Plan is the basis for the registration in the land registry of the new landownship and parcel layout after land consolidation.
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Figure A2: The re-allotment planning process in voluntary land consolidation projects

Figure A3: The re-allotment planning process in majority-based land consolidation projects

Phases of a land consolidation project

Land consolidation projects are usually implemented in three generic phases: (i) the feasibility phase, (ii) the re-allotment phase, and (iii) the registration and implementation phase (see Figure A4).
Figure A4: Three generic phases in land consolidation projects

Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

The feasibility phase is the preparation of the project. A landownership map is prepared based on data on formal landownership from the land registry (this landownership map of the situation at the start of the project is sometimes referred to as “Plan 1”). The next step is for all landowners to be individually interviewed about their interest in land consolidation and how they would like to participate (e.g. sell land, exchange land or purchase additional land). In order to be successful, land consolidation must be demand driven, so the strong interest and support from the landowners and farmers in the project area is crucial. The main result is a recommendation on whether land consolidation is feasible or not, and if feasible, then whether it should be implemented in a voluntary or majority-based approach. During this first phase, it should also be possible to prepare a detailed budget for the full implementation of the project. Ideally, the discussions in the feasibility phase with each landowner and farmer should be as concrete and detailed as possible so that at the beginning of the re-allotment phase, the project team already has a clear understanding of the wishes of each of the participants. When land banking is used in connection with the land consolidation project, the information about potential sellers that is collected during the feasibility phase can be applied immediately, and the land bank can begin to purchase privately-owned land available on the market. Depending on the size of the area and the number of landowners, the feasibility phase usually takes 6–10 months. More detailed information on the feasibility phase is provided in Module 2.

The re-allotment phase is the core phase of any land consolidation project and the main result is the Plan with the land rights and the parcel layout as they will appear after the project. (The Plan is sometimes also referred to as “Plan 2” as a comparison with the landownership map (“Plan 1”) that is prepared during the feasibility phase. “Plan 1” and “Plan 2” together represent the “before” and “after” pictures of the land consolidation project. The difference between “Plan 1” and “Plan 2” is the impact that land consolidation has on the project area.

The re-allotment planning usually begins with a public meeting where all landowners are invited but the meeting is also open to all members of the community where the project is implemented. At the meeting, the benefits of land consolidation are explained together with the land consolidation process, and information is provided on the detailed procedures, schedule, etc. In some countries, a Stakeholder Committee is elected at the public meeting to represent the general interests of the landowners and farmers. The committee should comprise representatives of the different types of landowners.

One of the first steps at the start of the re-allotment process is to follow up the initial wishes of the landowners from the feasibility phase. In particular, it is important to identify potential sellers of private land and to clarify the availability of state land at the beginning of the re-allotment process. The amount of land available for the process defines the land mobility in the area (Hartvigsen, 2014b). If the land mobility is low, it will be very difficult to successfully implement voluntary land consolidation, but it will also be difficult for majority-based projects to have land available for the enlargement of farms and the improvement of infrastructure.

Land valuation is another key activity at the beginning of the re-allotment planning as it establishes the value of each parcel for the re-allotment (see Module 4).

The skeleton of the Plan is the existing and planned agriculture infrastructure in the project area. If new infrastructure is to be constructed and integrated with the land consolidation project, then the detailed technical design of the infrastructure (usually irrigation channels, field and access roads, and drainage channels) must be ready at the beginning of the re-allotment planning. This allows the project area to be divided into blocks defined by natural boundaries.
(e.g. waterbodies or forest lines) and by the location of the infrastructure. The lead agency is usually responsible for conducting all control functions to ensure that all arrangements included in the Plan can be registered and implemented. This means, for example, that all necessary permissions must be obtained before the Plan is approved by the landowners and adopted by the lead agency.

The Plan is built up step-by-step and block-by-block through negotiations and consultations with the landowners. When the draft Plan is ready, it is put on public display. After comments, suggestions and complaints are received from the participating landowners, the Plan is revised. Finally, the Plan is ready for approval. As mentioned, participation in voluntary land consolidation is usually through the written consent of the landowners, while in majority-based land consolidation, a qualified majority of the landowners approve the Plan by voting. If land banking is applied in connection with the project, the land that was purchased in the feasibility phase by the land bank is sold in the re-allotment phase, thereby catalysing the re-allotment process. Depending on the size of the area and the number of landowners, the re-allotment planning usually takes 10–18 months. More detailed information on the re-allotment phase is provided in Module 3.

The registration and implementation phase follows after the Plan is approved by the landowners and adopted by the lead agency responsible for land consolidation. Activities include the necessary surveying and staking out of new boundaries in the field and the registration of the new landownership after the project by the land registry. The Plan is registered as “one plan” with all the under-laying arrangements and agreements. If the construction of infrastructure or other works in the field are included in the Plan, this can now be done. Finally, the landowners and farmers take their new land into possession, which normally occurs between the agricultural seasons. Any construction works should, to the extent possible, also be done between seasons. More detailed information on the registration and implementation phase is provided in Module 5.

Stakeholders in a land consolidation project

Many different stakeholders are or can be involved in the implementation of land consolidation projects. The main beneficiaries of the land consolidation are the landowners and farmers in the area and they are the key stakeholders in the projects. However, other right holders need to be involved as well. They include different types of holders of partial rights, such as tenants who have lease rights in the project area; banks and credit institutions that have mortgage rights; and those who hold relevant rights protected by the registration of servitudes. The broader community members in the project area should also be considered as stakeholders who need to be informed about the project.

Several public institutions are usually also involved in land consolidation and they have important responsibilities.

The lead agency responsible for the land consolidation programme and overseeing the implementation of field projects is a key stakeholder.

The land registry/cadastre agency has two important functions. At the beginning of the project, it provides the data on landownership in the project area (e.g. digital cadastre map, information about each land parcel and ownership data), which underpins the preparation of the landownership map in the feasibility phase (“Plan 1”). At the end of the project, it is
responsible for registering the new landownership after the project, as represented by the Plan (or “Plan 2”).

The institution responsible for the management and privatization of state-owned agricultural land must be involved in the process.

The different elements of the field work in land consolidation projects, for example, negotiations with landowners and farmers, organization of community meetings, land valuation, land surveying/staking out, etc., can be done mainly by the lead agency, by the land registry/cadastre agency, or by the private sector depending on the type of work and the situation in the country.

The local government plays an important role in the project implementation, in particular in the initial steps when the project area is selected, in awareness raising, in supporting the implementation in general, and also in ensuring that the objectives of the project are aligned with existing municipal spatial development plans.

Depending on the objectives of the project, relevant civil society organizations should be involved such as local farmers organizations and other local non-governmental organizations.

The potential for multipurpose land consolidation

Many countries in Western Europe have developed land consolidation into a multipurpose instrument in recent decades (Hartvigsen, 2022). Multipurpose land consolidation means that a land consolidation project can have several specific objectives to pursue. Agricultural development, the traditional objective of land consolidation, often remains the purpose in some parts of the project area, while in other parts of the project area there can be other aims, often related to nature restoration, improved environmental conditions, climate change adaptation and mitigation, or construction of large-scale linear infrastructure. The possible objectives in multipurpose land consolidation are illustrated in Figure A5.

![Figure A5: Possible objectives in multipurpose land consolidation](image)

Module 2: The land consolidation process. Feasibility phase

Recommended teaching methods:
- ✔ Lecture
- ✔ Seminar
- ✔ Discussions
- ✔ Independent reading
- ✔ Group work
- ✔ Field trip
- ✔ Exercises
- ✔ Case study
- ✔ Project development
- ✔ Practice

Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.>>

Further reading:


Initiation of land consolidation: identification and selection of land consolidation project areas

Launching a land consolidation project without evaluating its potential benefits and negative impacts can lead to the loss of investment as well as causing harm to the participants, society and environment. It is therefore vital that the needs for land consolidation and the interest of landowners, farmers and other stakeholders are thoroughly assessed before initiating any land re-allotment process. Land consolidation projects should always begin with a feasibility study to provide an initial assessment of the positive and potentially negative impacts of the proposed project. Country practice shows that while feasibility studies are an integral part of land consolidation projects, the depth of the studies vary. Ideally, feasibility studies should be relatively simple, quick and inexpensive, compared with the cost of implementing the full land consolidation project. They may show that a proposed project is, in fact, unfeasible and further implementation unadvisable. At the same time, it is important to remember that the criteria for assessing feasibility will vary according to the objectives of the project.

The feasibility phase begins with the submission of a request for a land consolidation project. Depending on the land consolidation approach applied, the practice varies in different countries as to who can request a land consolidation project – not only landowners. In order to encourage a multipurpose approach to land consolidation, it is recommended to provide flexibility on this issue and allow different actors to apply, including other public authorities with vested interests in transportation, environment or rural development.

Also, the lead agency must have a right to start land consolidation projects upon its own decision, for example, based on a country-wide assessment in order to identify those areas deemed most suitable for land consolidation.

In order to pre-assess applications prior to the feasibility study, countries often establish certain minimum quantitative thresholds. When the objective is to promote agricultural development,

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a minimum number of landowners requesting the initiation of a land consolidation project should be defined. However, it is recommended that the minimum size of a project area should not be defined. Although the size of the land consolidation project area could be one of the selection criteria, when prioritizing the project proposals, it should be taken into account that projects covering small areas may still be valuable for other reasons, for example, in the case of small wetlands restoration.

If the request for a land consolidation project meets the criteria and the budget is available, then the lead agency can launch the feasibility study. The Agency will define the project area based on request or upon its ex-officio decision. As mentioned, the feasibility study should be relatively simple, fast and inexpensive. Its conclusions provide the basis for the lead agency to determine whether to continue and launch the re-allocation phase.

**Methodology for conducting a feasibility study.**

The study should reveal the actual ownership situation, the current land use, and assess the interest of the landowners in the project. In-depth interviews should be conducted with all landowners and land users. The main outcome will be a Feasibility Study Report with a set of maps and a narrative assessment. Depending on the project’s objective, the content may differ.

A feasibility study is a key technique in land consolidation to help identify local farmers' needs and constraints and pave the way for future intervention. The key instrument during the feasibility study is questionnaire-based interviews with every single landowner in the project area. Interviews are conducted within initially defined geographic boundaries, usually coinciding with the administrative or cadastral boundaries. The feasibility study should confirm or adjust the limits for the project-based intervention proposed originally. Land consolidation will usually be implemented together with land banking, and thus intervention areas of both instruments will coincide.

The Land Consolidation Law should identify the persons who are entitled to perform the feasibility study; however, the two main models are that feasibility studies are conducted only by the private sector (service providers) or by both private sector private and the lead agency. In all cases, the lead agency should guarantee the quality and impartiality of the feasibility study.

At the beginning of the feasibility phase, information from existing spatial and development plans, including environmental protection, is collected. The formal cadastral and registration records are obtained from the Land Registry and analysed. A Land Ownership Map, based on the formally registered ownership rights in the Land Registry and based on an initial assessment of the non-formalized but still legitimate rights, is prepared (see Module 6). This Map later constitutes the foundation for the launching of the re-allocation planning. In cases of a high prevalence of non-formalized rights, separate Land Ownership Maps of both formal and non-formalized ownership may be prepared. In areas with a high share of leased agricultural lands, it may be convenient to prepare a map showing actual land users in the project area.

Once the Land Ownership Map is prepared, the first public meeting is organized to inform the landowners and the broader community about the purpose and procedures of the study and to provide information on the subsequent stages of the land consolidation project. The Land Ownership Map serves as a support for the discussions with the landowners, land users and the wider community during the first public meeting.
Following the first public meeting, interviews should be conducted with all identified formal landowners and informal landowners and users (when and if they are identified). The collected information is then analysed and, based on that, the Feasibility Study Report is prepared. It includes, amongst other things, an assessment of the feasibility of the project, the interest of the landowners, the potential improvements in the agricultural infrastructure, a recommendation on the land consolidation approach to be applied (majority-based or voluntary), and the project objectives to be achieved.

Content of the feasibility study

The content of a feasibility study will depend on specific projects’ objectives and context (e.g. multipurpose or single purpose projects).

A Feasibility Study Report should provide, in addition to recommendations about the overall feasibility of the project, a tentative assessment of costs required to implement the project, and a preliminary technical design of the envisaged rural infrastructure and its costs (if any infrastructure works are envisaged). The Report should cover all other necessary aspects for deciding whether to proceed with the next phase of the project, for example, agro-technical measures to address abandoned lands (re-cultivation), soil erosion, salinity or waterlogging. In each specific case, the feasibility study may recommend applying either one or several land management instruments/measures, thus complementing each other and supporting the attainment of the objectives set forth for a given area.

The Feasibility Study Report describes the formal landownership situation, but it should also reveal uncertainties concerning land ownership, such as errors in land registration and other problems related to property rights. It is important to gather as much information as possible concerning these questions as they could potentially hinder or complicate project implementation. Only after an analysis of the formal registration records and following interviews with landowners and other right holders, will it become clear how far the situation on the ground matches the official registration records. In some cases, the Report may conclude that a systematic adjudication and update of cadastre and Land Registry should be integrated into the land consolidation process.

The Feasibility Study Report should identify all non-formalized but legitimate tenure rights in the project area, which must be taken into account, thus providing an accurate basis for land re-allotment. In line with the VGGT provisions, the process of identification of the right holders should consider not only formally registered right holders but also those who have legitimate rights, even if not registered. In countries where informal or unregistered rights are widespread, the clarification of ownership and the formalization of legitimate tenure rights is one of the core additional functions of the land consolidation process. This may concern non-formalized rights, like non-formalized inheritance. However, in some cases, the registration of rights may not be required by law, for instance, short-term land lease agreements. It is strongly recommended that the Land Consolidation Law takes all legitimate rights into account, and when it is relevant, includes a formalization process.

In addition to the right holders, the Feasibility Study Report should also identify other potential project stakeholders. Depending on the purpose of a land consolidation project, this could include, for example, professional organizations, environmental organizations, women’s organizations and cultural heritage protection organizations. It is recommended to post and publish a general public notice on the initiation of the land consolidation project and convene the stakeholders to take part in the first public meeting that inaugurates the start
of the feasibility study in a given area. All relevant stakeholders should be identified during the feasibility study and subsequently involved in the re-allotment phase of the project. As regards the environmental impact of land consolidation projects, this arises from either the re-allotment of parcels and the effects of planned rural infrastructure or other physical works. Projects without rehabilitation or construction of drainage and irrigation systems do not usually result in any negative impact on nature and the environment. However, land consolidation may lead to intensification of land use, which in turn may lead to loss of biodiversity. This may be mitigated if new biotopes such as shelter belts are planted in the new parcel boundaries. Therefore, a proper environmental impact screening should be conducted in the re-allotment phase, before approval of the land consolidation plan, in order to avoid or to alleviate unintended adverse impacts. The feasibility study should include an initial assessment of the potential negative environmental impacts and propose mitigation measures for such negative impacts, as previously mentioned. If such impacts may not be mitigated, the project should be considered unfeasible.

In some cases, a feasibility study might have a dual purpose. For example, because in Denmark land consolidation is mainly focused on nature restoration and environmental protection their feasibility studies often have a combined purpose. In projects with a nature restoration objective, initial negotiations with landowners who have land in the nature project area are performed during the feasibility study, where the interest and need for land consolidation is assessed. Such a feasibility study will encompass both an assessment of the nature project and the land consolidation itself, for instance, assessing whether landowners are interested in receiving land in compensation or would prefer to sell their land in the project area, whether land mobility is sufficient enough to implement the land consolidation project.

Once the Feasibility Study Report is accomplished, the lead agency takes a decision on the feasibility of the requested land consolidation project. If approved, then this forms the basis of the decision to launch the re-allotment phase (see Module 3). In such cases, the results of the feasibility study are presented in a second public meeting, organized at the beginning of the re-allotment phase. In cases where the lead agency considers the proposed project unfeasible, it will inform the applicants individually and make a public announcement about the results of the feasibility study and their decision not to proceed.

Depending on the outcomes of the feasibility study and envisaged level of participation among landowners, the availability of funding, policy priorities, and other factors, the land agency will decide on the continuation of activities. It may as well be the case that a feasibility study will conclude that implementation of land consolidation and/or land banking is unfeasible (e.g. because of low interest among landowners or envisaged adverse impact on the environment), and activities will not continue. If a feasibility study shows the need for both land consolidation and land banking, the next phase in the process is preparation of the land re-allotment plan using a range of techniques and data sources, including the baseline data collected during the feasibility study.

Communication and awareness-raising activities.

Participation is a prominent feature in many planning and decision-making processes. Among its proclaimed benefits is its potential to strengthen public support and involvement. Participation unavoidably involves (i) decisions about who should be involved and about the space for negotiation, (ii) about the issue at stake, and (iii) expectations about what the outcome of participation should be and how the participants are expected to behave (Turnhout et al., 2010 quoted in FIG, 2022).
The analysis of trends in European policies (such as Collective Awareness Platforms for Sustainability and Social Innovation (CAPS) projects) has revealed that active contribution of citizens to the decision-making process is both desirable and important. Public participation is essential in spatial planning as it is regarded as a good way to engage citizens and facilitate an open dialogue between citizens and spatial planners, who are often part of governmental bodies responsible for spatial planning. Like spatial planning, land consolidation’s complex and dynamic nature requires flexible and transparent decision-making that embraces a diversity of knowledge and values (Veršinskas et al., 2020). In the past, the so-called “top-down approach”, where land consolidation projects were often enforced, where the landowners’ involvement in decision-making was limited and where projects were paired with several negative impacts, caused a negative connotation of citizens to this essential rural development instrument.

The active participation of landowners and other relevant stakeholders in land consolidation process obtained an essential place among rural policy instruments in Western Europe since the 1970s, and later on, since the 1990s additionally in CEE countries and beyond (Bullard, 2007; Hartvigsen, 2014a; Lisec et al., 2014; Thomas, 2011; quoted in FIG, 2022). This refers not only to the prominence of public participation, but the context of land consolidation has also changed significantly in these last decades (Haldrup, 2015; Hartvigsen, 2014a; Janus and Markuszewka, 2017; Pašakarnis and Maliene, 2010; van Dijk, 2003; Vitikainen, 2004; quoted in FIG, 2022).

The role which land consolidation can play in sustainable rural development clearly originates from international legal acts and documents that define its respective goals and principles, such as the 2030 Agenda (UN, 2015) and Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests – VGGT (FAO, 2022b). Sustainability should be ensured both at the project and land consolidation programme level. It is therefore clear that nowadays not only registered landowners and right holders should decide on the directions of development of rural areas where various economic, environmental, habitat or recreation and leisure-related interests collide, but also other persons and entities, such as local interest groups, farmers’ and women’s organisations, local governance bodies and specialized organisations can contribute and benefit. Ensuring inclusiveness in project consultation and participation is very important so that different rights and interests are safeguarded and represented by guaranteeing equal rights of women and men and gender equality (FAO, 2013; FAO, 2018; see also FAO, 2022b: VGGT – Paragraph 3B.4). One of the solutions promoting gender equality may be fixing minimum thresholds of the percentage of representatives of both genders that should be elected to bodies of right holders (Veršinskas et al., 2020). For all these reasons, public participation in land consolidation decision-making has been increasingly sought and embedded in professional agendas and national policies.

The level of public engagement depends on the form of land consolidation, where the public’s potential influence should be the primary consideration in designing participatory processes (Table A1).
When land consolidation involves all land right holders in a delimited area, and when those rights constitute the pool of redistribution rights, then there is not automatically a process whereby all those land rights are exchanged. The requirement is that sufficient safeguards must be provided to all who are involved. Consequently, participation techniques should provide adequate and authoritative safeguards to ensure that all right holders are not negatively affected by or during the land consolidation process. Ultimately, each of the affected parties should at least maintain their current benefit or become better positioned. A more formal form of land consolidation is often safeguarded by supportive legislation to ensure a legitimate, fair, transparent, and inclusive process. Regulations regarding participation may entail the publication and public inspection of essential decisions, including the underlying documents. In a land consolidation project where land right holders partake voluntarily, participation takes shape differently as ultimately, each right holder can withdraw at any moment until the exchange has been formalized. As the reallocation of land rights has a strong interdependent character, a late withdrawal of one participant affects other participants immediately. The withdrawal may lead to an alternative allocation plan at best or might even be cancelled. Therefore, it is still recommended to agree on the procedure and set some ‘rules of the game’ to align expectations and a professional attitude of all involved. It is therefore also recommended to assign an independent third party in case of the need for mediation or a second opinion. Participation in voluntary projects may be organized around a facilitator that talks individually to each participant or at the other end of the spectrum may be facilitated in a way that all participants together design (co-creation) the reallocation plan (Louwsma et al., 2014 quoted in FIG, 2022).

How participation takes shape and who is involved, is related to the land consolidation phase. In preparation of a possible land consolidation project, a consultation with a broader group of stakeholders is recommended to seek opinions regarding the objectives and the willingness to employ land consolidation. This may include a dialogue with government agencies, private investors or holdings, interest groups, individual land right holders, local committees and so on. When a project starts, one narrows down the targeted stakeholder groups for participation to those involved, of which land right holders obviously are the largest group of stakeholders. It is the land right holders who are directly affected by any change in the allocation of land rights or the execution of engineering works. Therefore, there should be a minimum level of participation to balance the individual impact on land right holders against efforts and safeguards to ensure participation. Participation in the implementation phase can furthermore be used to verify the current land administration and mapping of parcel boundaries. As a legacy of the past, not all land administration systems are up to date, reliable or complete. Organizing a public inspection of the existing registered rights at the start of the implementation of a project can give land

### Table A1: Land consolidation form and level of public engagement

<table>
<thead>
<tr>
<th>Land Consolidation form</th>
<th>Level of public engagement</th>
<th>Decision-making criteria</th>
</tr>
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<tr>
<td>Voluntary land exchange</td>
<td>High level</td>
<td>100% consensus</td>
</tr>
<tr>
<td>Voluntary land consolidation</td>
<td>High level</td>
<td>100% consensus</td>
</tr>
<tr>
<td>Majority-based land consolidation</td>
<td>Mid to high level</td>
<td>Majority consensus</td>
</tr>
<tr>
<td>Majority land consolidation</td>
<td>Low to high level</td>
<td>Formal decision, no consensus needed</td>
</tr>
</tbody>
</table>

right holders the possibility to claim or confirm their rights. At this point in time, additional concerns can be tackled upfront. As defined in Module 1, land consolidation projects have three phases. Depending on the phase, various levels within the public participation spectrum are used depending on the purpose of participation (Table A2).

The type of stakeholder group determines which participation tools are appropriate. Right holders are directly affected by land consolidation. Therefore, land consolidator actors should involve this group of stakeholders on a personal level, besides including and informing them during general meetings. Apart from the general information, which is relevant to all stakeholder groups, right holders must have the right to be involved at the individual level due to their right for privacy. On the other hand, there is always a dependency with other right holders as it is about the exchange of land rights. So, if one right holder does not prefer a particular solution, it affects the possibilities for others. Therefore, it is crucial to balance the right for the privacy of individual right holders with the right for transparency of the entire consolidation process. Another aspect of participation is that more generic means can be used to inform or consult the general public. Their interests are not necessarily affecting personal interests, but land consolidation processes may address more generic concerns in relation to sustainable development, which obviously affects society beyond the interest of individual right holders. This typically relates to the objectives of a land consolidation project and the location of the foreseen public facilities and services.

Table A2: Land consolidation phase and participation spectrum

<table>
<thead>
<tr>
<th>Stakeholder group</th>
<th>Public participation spectrum</th>
<th>Decision-making criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>General public</td>
<td>Inform</td>
<td>Public announcements, website</td>
</tr>
<tr>
<td></td>
<td>Consult</td>
<td>Public meetings or online hearings</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Inform</td>
<td>Public announcements, website</td>
</tr>
<tr>
<td></td>
<td>Consult</td>
<td>Public meetings or online hearings, individual contact</td>
</tr>
<tr>
<td></td>
<td>Dialogue</td>
<td>Workshop, individual meetings</td>
</tr>
<tr>
<td>Right holders</td>
<td>Inform</td>
<td>Majority consensus</td>
</tr>
<tr>
<td></td>
<td>Consult</td>
<td>Public meetings or online hearings, individual contact</td>
</tr>
<tr>
<td></td>
<td>Dialogue</td>
<td>Hearings of wishes, grievance mechanisms, mediation, public and individual meetings</td>
</tr>
<tr>
<td></td>
<td>Co-create</td>
<td>Designing reallocation plan</td>
</tr>
<tr>
<td></td>
<td>Decision-making</td>
<td>Voting, advisory board, representatives committee</td>
</tr>
</tbody>
</table>

Module 3: The land consolidation process. Re-allotment phase

Recommended teaching methods:

- ✔ Lecture
- ✔ Seminar
- ✔ Discussions
- ✔ Independent reading
- ✔ Group work
- ✔ Exercises
- ✔ Case study
- ✔ Project development
- ✔ Practice
- ✔ Field trip

Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.)>

Further reading:


Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Other useful sources:
<other useful sources (websites, applications, media stories, interviews, etc.>>

Core module content

Content of a land consolidation plan

A land consolidation plan is the main outcome of a land consolidation project.² The FAO Legal Guide on Land Consolidation (Veršinskas et al., 2020, p. 16) defines a land consolidation plan as:

… a set of interrelated documents defining the re-allotment for the land consolidation project area, approved by either all (in case of voluntary land consolidation) or a legally defined qualified majority (in case of majority-based land consolidation) of landowners and adopted by the competent public institution. The land consolidation plan serves as single basis for the registration of re-allotted property rights.

Due to variations in legislative and governance frameworks across countries, different terms are used to describe the land consolidation plan, such as re-allotment plan, reallocation plan, parcelling or re-parcelling plan, development plan. These terms may not necessarily be synonyms, as this would deny the existence of variations of legal constructs in each country. In this publication the term ‘land consolidation plan’ is used as the physical or digital artefact with the administrative and geographical description of the parcels, land rights and right holders before and after the reallocation process. In a broader understanding, this also encompasses related documents underpinning the reallocation plan, such as documentation about the quality of the land to guarantee that right holders receive a similar allocation compared to the situation before reallocation. However, in some country practices, several of these related documents might entail a separate step in the land consolidation procedure – with a separate public inspection – not necessarily combined with the land consolidation plan. The land consolidation plan is the outcome of a participatory planning process and displays the new layout of land parcels and the connected land rights after the land consolidation project (Hartvigsen, 2015, p. 9). It is typically published by the responsible authority, reviewed by the public, approved by the landowners and adopted by the responsible public institution. The land consolidation plan serves as the basis for describing and establishing a new legal situation captured in the land administration system, either by a deed or by titles. Thereby, it supersedes the current registration of land rights in a land consolidation area.

The nature of the land consolidation plan can range from a complete makeover of the parcel structure in the area to an exchange of parcels with limited changes in the field. In the first situation, land consolidation may include a technical project such as improvement of local agricultural infrastructure (irrigation, roads, drainage etc.), public infrastructure, or other land use changes such as nature restoration, measures for environmental protection, climate change adaptation or mitigation. Consequently, the aim and character of the land consolidation project will also affect the nature of the reallocation plan. A project without any interventions in the field, will only require the administrative swapping of land rights, whereas a project with a completely new parcel structure requires surveying and updating the cadastral map as well.

² The content of the module is largely based on Chapter 5 of the FIG. 2022. Land Consolidation – The Fundamentals to Guide Practice. International Federation of Surveyors (FIG).
The process of developing the land consolidation plan

The development of a land consolidation plan can be broken down into several steps (Figure B1). It starts with the collection of wishes of involved right holders and defining the rules for allocation. Some of these rules for allocation might be embedded in legislation or regulations. Others can be defined by involved stakeholders, the lead agency or the land consolidation committee, all depending on the institutional setting and project management set up. The wishes are based on existing land rights, which are ideally described in the land registry and cadastre, and captured in a land administration system. The existing land administration data must be validated and in case of omissions in the registration, must be complemented. In case of severe omissions or contested information, it is advised to develop a procedure to collect the legitimate land rights to obtain a complete overview of land rights in the existing situation. Furthermore, additional information is needed about the value of the parcels (see previous chapter about valuation), the condition of the parcels (land use, drainage, size, shape, elevation, exposure, etc.), the boundaries that will or cannot be exchanged or adjusted (such as roads, villages, watercourses, forests, graveyards), and location-bound aims that require land use change (such as new areas for nature conservation or water retention).

The development of a land consolidation plan can be supported by model-based analyses – based on automated optimization algorithms (see Module 8) – about possible reallocation options or a feasibility study that has explored such options. The results of such analyses provide valuable information for the reallocation process. With information about the existing land rights, parcels, wishes from involved right holders, and spatial restrictions, options for the reallocation of land can be explored and drawn together to create the land consolidation plan in a rightful and equitable manner. To which extent right holders and other stakeholders are involved in this process depends on the type of project and how participation takes shape.

Figure B1: Developing the land consolidation plan
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

The next sections will elaborate on the rules for allocation, collecting wishes, drawing the land consolidation plan, and the publication of the land consolidation plan.

Rules for allocation

Upon drawing the reallocation plan, many considerations play a role. The establishment of rules ensures transparency and guide a fair allocation process. These rules function as a guideline for the surveyor during the reallocation and provide further safeguards for title holders involved. In line with the purpose of the land consolidation project, rules should determine who gets priority over others in case a parcel can be allocated to several holdings. Such reallocation rules could prioritize the allocation of land to particular groups of right holders such as young farmers over older farmers, to full-time farmers over part-time farmers or to specific types of farming, for example dairy farms over arable farms. It is however crucial and in line with VGGT (FAO, 2022b), that all participants are at least as well off after the project compared with before. In the Kingdom of the Netherlands for example, parcels used for perennial agriculture will not be exchanged, land for dairy farming has priority over arable farming. The rules for allocation can also hold safeguards for involved right holders, such as maintaining or improving the quality of the soil quality. All in all, the rules for allocation provide a framework for those drawing the land consolidation plan and involved in the reallocation of parcels to ensure a fair and just process for which responsible entities can be held accountable.

Collecting wishes

The collection of preferences of involved right holders occurs in different ways. In a systematic manner all right holders are formally invited to share their preferences regarding the location of their land in the new situation. In case the land administration shows some issues regarding quality or quality, this phase can also be employed to verify the existing administration of land rights. This may both involve administrative issues related to land rights, as well as geographical issues related to the parcel boundaries. Deviations between the situation in the field and the registration in the land administration should ideally be solved first before the reallocation of land rights starts. It is important to have a reliable description of the existing situation because these determine the rights for allocation in the new situation. If all landowners and farmers in the project area are individually interviewed during the feasibility phase, the project team can have an initial understanding of the wishes of the participants, for example, about sale, exchange and purchase and also on preferred location of consolidated land. However, the process is dynamic, and the preferences of the participants may change during the process as the re-allotment planning develops and they need to be regularly consulted throughout the process. An important step in the re-allotment planning process is land valuation (see Module 4). With the land valuation, those landowners who consider selling some or all their land in the project area can be informed about the market price corresponding with the outcome of the land valuation. It is important that the planning team has an overview of the available “land pool” and the land mobility in the project area (Hartvigsen, 2014b). In addition to land sold by involved landowners during the land consolidation process, it is also possible to buy land on the market before the start of the land consolidation project or privatize available state land. All three means can be used to create a land pool to ease the reallocation process in land consolidation. This allows, in addition to consolidation of fragmented into larger regular shaped parcels, also for increase of holding and farm sizes for those interested to enlarge their business or to realize location-bound public aims that require the conversion of land use. The latter mostly involves agricultural land that is taken out of production for the improvement of
the area or in the overall general interest such as for example the protection of biodiversity or sustainable water management.

**Drawing the land consolidation plan**

Drawing a new allocation plan is a big optimization puzzle. How to incorporate the wishes from involved title holders and other stakeholders, the planned public works, and other land use interventions? The following general strategy for the reallocation plan could act as guideline, although it also depends on the form of land consolidation chosen:

- Within the area under reallocation, first draw or copy all parcel boundaries that will not change, such as infrastructure, water bodies, buildings and so on. The parcel boundaries are often based on topographical boundaries in the field. Similarly, all parcels not eligible for exchange can be marked. We refer to these as fixed parcels and boundaries. Together they provide a skeleton for further reallocation.
- Then map the location of new public facilities, insofar this has not yet been determined, and delineate the parcel boundaries for these.
- Lastly, optimize the parcellation for the involved right holders. For agriculture, first consider the parcels that belong to a holding and then narrow it down to individual shares or rights within the holding.
- Check and balance the current land allocation against the allocated land for each individual right holder. Ensure that the at least as well-off principle is applied. Value, size and condition of the parcel are all relevant indicators to assess this.

In a voluntary land consolidation, the involvement of right holders might be more profound. The draft land consolidation plan is then built up in continuous consultation and through facilitated negotiations with the participating right holders, where one land exchange leads to the next in a chain of exchanges. The re-allotment process must be transparent and can be guided by pre-established “rules of the game”.

**Publication of the land consolidation plan**

The draft land consolidation plan is usually published for public inspection where comments and objections are collected. Based on these, the plan is typically revised one or more times based on the filed comments and objections from the participants. Not only the person who uttered the comment or objection is heard, also involved right holders have the opportunity to be heard. Especially in this phase, any objection against the proposed reallocation will in most cases inevitably involve also other right holders, since land rights are exchanged. All potentially involved right holders should be heard in case an objection is filed. Based on this input and the rules for allocation, a final decision can be reached on whether to adjust the land consolidation plan. In a voluntary land consolidation approach, only those right holders who provide written consent with the plan are included, while in majority-based or mandatory land consolidation, the plan is approved by respectively a qualified majority or responsible authority. The approved plan in majority-based land consolidation can then also be adopted by the public authority responsible for the land consolidation program.

**The role of land tenure professionals in developing the land consolidation plan**

Land surveyors have an active role throughout all the phases of a land consolidation project, despite the fact that their role is perhaps only apparent during the development of the land consolidation plan. The development of the land consolidation plan is usually seen as the task
of a small multidisciplinary team. Land tenure specialists or land surveyors are indispensable members of the team, since they bring in tenure and land administration knowledge to guarantee legal certainty for all right holders involved and their expertise concerning boundary and areas measurements and calculation. Surveyors typically have an independent position in the project team, since they are not administratively responsible as the government agencies conducting the land consolidation projects are, and they are not involved as a right holder. Some claim that the ideal land consolidation planner is one-third land surveyor, one-third agronomist, and one-third lawyer. From a practical perspective, the land surveyor assists the responsible authority in setting up a project database to manage all administrative and geographic data related to land administration within the land consolidation project. The land consolidation project runs parallel to the normal land administration system to avoid any interdependencies and unwanted interaction between the two processes (the regular land administration process and the land consolidation process). There must be a fixed point in time at which the spatial and ownership data are frozen or fixed, the so-called reference date. A copy of the information from the land administration system can be loaded into the project database (see Module 8). The project database holds all project related information and does not affect the land administration system. The reallocation plan is drafted based on the information on the reference date and will also describe the new allocation on this date. Once the reallocation plan is approved, a new formal situation arises by either the registration of the land consolidation deed in the system, or by issuing new titles for the involved right holders (this depends on the type of tenure system, for instance, deed-based or title-based). During the project, regular transactions are registered in the land administration system. Since the reallocation plan describes the old and new situation on the reference date, regular transactions on the land market – that were recorded in the land administration system – have to be taken into account administratively in order to update the reallocation plan with all changes caused by these regular transactions in between the reference date and the registration of the deed or issuing of titles. All regular land transactions before the reference date have to be included in the reallocation plan. All regular land transactions recorded in the land administration system after the reference date, if applicable, have to be included in the land consolidation plan.

To ease this process and prevent the registration of land transactions that cannot be implemented, communication with stakeholders in the region and with key partners in the real estate sector such as notaries, is essential. Both right holders and other parties involved in land transactions should be aware of the consequences of transactions and inform the potential buyer. Especially the period between the reference date and the drafting of the reallocation plan is important, since in this situation it is not yet clear if the land rights will be reallocated and if so, where the location of the new parcel is. The potential buyer buys the ‘right to be allocated’ whereby the location of the allocated land is uncertain until the reallocation plan has been published and approved. Some countries have attached a specific notification to all parcels involved in a land consolidation project to automatically warn professionals when the information is retrieved from the land administration system.

A systematic process for keeping track of the land administration component in the project is essential for land consolidation projects covering a large area, incorporating multiple aims, or involving many right holders. Given the complexity of this, it is necessary to follow a structured approach with a reference date based on which situation the land consolidation plan can be developed, a procedure to handle regular transactions and a procedure to feed the new allocation back into the land administration system. For simple voluntary projects with few participants and a short implementation time, it might be possible to keep the overview manually.
Module 4: Land valuation in land consolidation

<table>
<thead>
<tr>
<th>Recommended teaching methods:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔ Lecture</td>
</tr>
<tr>
<td>✔ Seminar</td>
</tr>
<tr>
<td>✔ Discussions</td>
</tr>
<tr>
<td>✔ Independent reading</td>
</tr>
<tr>
<td>✔ Group work</td>
</tr>
</tbody>
</table>

Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.>>

Further reading:


Other useful sources:

<other useful sources (websites, applications, media stories, interviews, etc.>>
Core module indicative narrative

The valuation of land parcels and other property in the project area is fundamental to all land consolidation projects.\(^1\) It facilitates the implementation of the “at least as well off” principle (see Module 6) and provides the basis for identification of the value of parcels before and after the implementation of the project. In addition, it is the basis for compensations when the values are not exactly the same. The modality of land valuation varies depending on whether the land consolidation is voluntary or majority-based. The valuation may not be limited to the land parcels. In rare cases, land with assets, such as an irrigation system, an orchard, a forest or a farm building, is also exchanged. In these cases, specific value assessments need to be made to settle finances between the old and new owner.

Purpose of land valuation

In voluntary land consolidation projects, a combination of a market-based approach and a relative value method is often applied, with the objective to guide negotiations between landowners. The outcome is a map with values and a list of owners with the respective land values of their parcels. Based on this, the landowners eventually, when the options are clear, decide whether to participate in the project or not and what preferences they have for the exchange with others, and/or the selling or purchasing of parcels. In majority-based land consolidation, the method of relative value of land is often applied, since the valuation process is aimed at ensuring that landowners are allocated parcels of an equivalent value compared to the situation before the project. Majority-based land consolidation usually has legal limits for under- and over-allocation, as well as a deduction of a few percent for the implementation of public facilities (see Module 1 and Module 10). For both situations, the value of the land sets the minimum and maximum deviation for each specific landowner. In order to facilitate the enlargement of farms, voluntary sales–purchase agreements are also to be facilitated in the process. In these cases, the valuation may be used to determine the market value.

Roles and responsibilities for land valuation

The valuation process needs a combination of expert knowledge and local knowledge. In most of the countries analysed it is typically performed by agricultural experts, land valuers and representatives of the right holders, guided by the land consolidation planner. The lead agency is responsible for organizing the process and to mobilize the right expertise. In some cases, it may have knowledge ‘in house’, but in most cases, it will contract or compensate the experts, valuers and/or local people that perform the land valuation.

It is recommended to involve several persons or bodies in the land valuation process in order to guarantee the quality of the valuation. Representation of the landowners ensures transparency and trust in the process. Where it is necessary to value property other than land, specialized valuers could be called in. For example, the valuation of orchards, forests or buildings needs to be carried out by a professional valuer with knowledge in that respective field.

Method of land valuation

The method of land valuation is dependent on the type of land consolidation. An important principle is to use the same method throughout the project. In voluntary land consolidation,
all participants freely participate in the process, which gives more flexibility on the type of valuation to be used, as long as all participants agree. The valuation method in voluntary land consolidation could be pre-defined in the Land Consolidation Law or be left to the lead agency and/or participants of the project. Often a comparison approach is followed, which is linked to sales market transactions in the region.

![Figure C1: Land valuation map prepared for the FAO land consolidation pilot project in Dračevo village, Bosnia and Herzegovina](image)

Figure C1: Land valuation map prepared for the FAO land consolidation pilot project in Dračevo village, Bosnia and Herzegovina

Note: This voluntary land consolidation pilot project (TCP/BIH/3402) was implemented in the period 2011–2015. A simplified methodology was applied with a few categories of land value—the best land has relative value 100, the second best has relative value 90, etc.


Majority-based land consolidation requires a “heavier” legal framework since all landowners participate if the Land Consolidation Plan is adopted, regardless of whether they have voted in favour or against. The legal framework needs to protect all ownership rights and provide an objective basis to ensure that the “at least as well off” principle is followed correctly. Usually, the valuation in majority-based land consolidation is based on comparing the productive capacity of the land. Issues like accessibility, shape and size of parcels, and added value due to assets, are not taken into account while making the Plan. This would make the exchange system too complicated (too many categories, too many differences, and too much work to determine the value of assets that may not be exchanged after all). Besides this, a factor such as accessibility is subjective and can change after the construction of new infrastructure. Another reason is that legal limits for under- and over-allocation are applied. It would not be fair to take
subjective factors and/or investments in land into account since, in these cases, it would also influence the maximum area to be over- or under-allocated. Likewise, legal limits for deduction for public infrastructure are applied uniformly and should not take into account subjective factors and investments (e.g. if an owner has an expensive irrigation facility, their deduction would be higher). In case land with assets is exchanged, separate procedures for compensation are maintained.

**Approval of the conducted land valuation**

The results of the land valuation have an important effect on the process of re-allotment. In the case of voluntary land consolidation, the land valuation serves as guidance for potential participants (sellers and buyers). In majority-based land consolidation, the land valuation outcome serves as a basis for the re-allotment of parcels and subsequently, the financial settlements with and between the landowners. It is key that the landowners trust the land valuation and that the re-allotment has a sound methodological and legal basis.

Different mechanisms for the control of the quality of valuation are used by different countries. The use of local knowledge by involving landowners and other right holders in the land valuation process is an important mechanism to ensure quality and to build trust. This can be done via representatives like the Committee of Landowners in Denmark or via local groups like the Valuation Sub-committee in Serbia. As practised in many countries, checks and balances can be built in to the process to ensure that landowners have the right to make proposals and objections regarding the land valuation outcome, either during public meetings and/or directly to the re-allotment planner. In majority-based land consolidation, as for example, in North Macedonia, landowners can vote on the approval of the Land Consolidation Plan, which is based on the conducted land valuation. In addition, in both majority-based and mandatory land consolidation, landowners usually have the right to appeal against the Land Consolidation Plan, including the underlying valuation results (e.g. the Kingdom of the Netherlands, Germany and North Macedonia). Strong safeguards are required to ensure transparency of the land valuation process, such as allowing voting and appeal procedures on the Plan and valuation results since this forms the basis for the entire re-allotment procedure.

In the case of voluntary land consolidation, the involvement of representatives in the valuation is usually sufficient since the land valuation outcome is only a guidance for the landowners and leaves them free to decide on the conditions for the re-allotment of their parcels.
Module 5: The land consolidation process: Registration and implementation phase

Recommended teaching methods:
- Lecture
- Seminar
- Discussions
- Independent reading
- Group work
- Exercises
- Case study
- Project development
- Practice
- Field trip

Main recommended literature:


Further reading:

Other useful sources:

Core module content

Once the Land Consolidation Plan is adopted, the registration and implementation phase begins. This is the third and final phase of the land consolidation project. It consists of the following key elements, whose implementation sequence may vary in different countries:

i) implementation of cadastral surveying works;
ii) registration of parcels in the Land Registry and transfer into possession of the new owners;
iii) implementation of the financial settlements provided for in the Land Consolidation Plan; and
iv) implementation of the field works (if included) provided for in the Land Consolidation Plan.

Cadastral surveying

In order to formalize the new legal situation, the new parcel structure approved with the Land Consolidation Plan must be marked on the ground and the necessary data related to the newly formed parcels, must be entered into the Land Registry. Cadastral surveying in the registration and implementation phase of land consolidation projects includes surveying works, necessary to mark the new boundaries of parcels and have them registered, as well as the actual marking of the boundaries. The Land Consolidation Law should require that cadastral surveying works are conducted as necessary, and only in case of any change to boundaries or for other
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

necessary technical reasons, such as deviation between the situation in the Land Registry and on the ground. In countries where the functions of the lead agency are performed by the national land administration authorities in charge of cadastre and registration, such as Finland, the lead agency also ensures the cadastral surveying and registration of properties. In countries where the role of the lead agency is performed by entities other than the national land administration authorities (usually under the Ministry of Agriculture), the cadastral surveying and registration of properties is usually a shared responsibility between the lead agency and the land administration authority (or authorities – in the case of dualistic land registration systems, like in Germany and Denmark). Therefore, the Land Consolidation Law and the legal acts regulating the Land Registry should provide for a distribution of respective functions between the lead agency and the authorities in charge of the Registry, also providing for the cooperation between these institutions. In most countries, cadastral surveying can only be performed by licensed professionals, such as land surveyors and geodetic engineers.

In some countries, cadastral surveying in the registration and implementation phase of land consolidation projects is a technical exercise implemented by the professionals without involving the landowners, their neighbours or other stakeholders. For example, in Denmark, landowners are only informed after the final registration is implemented. However, landowners may be invited to participate in the process should they be interested to do so. Some countries involve the landowners in the cadastral surveying process. For example, in Lithuania, cadastral surveying is performed by a certified land surveyor in the presence of the owner(s) of the parcel and the owners of the neighbouring parcels. Also, in Türkiye, owner(s) of the parcel, as well as owners of the neighbouring parcels, are invited to participate in the procedure of the on-field determination of the new boundaries.

The participation of landowners and neighbours in the cadastral surveying process should depend on the specific situation in the country as well as in the project area. Since all land consolidation works should be fully transparent, landowners should be allowed to participate if they wish. Their participation could also be a tool to prevent future conflicts and eliminate or mitigate other risks, such as corruption. This is of particular relevance in a majority-based land consolidation, where most of the initial parcels are reshaped.

Registration of parcels and transfer of possession

The administrative decision of the Land Consolidation Commission or other body adopting the Land Consolidation Plan should be the sole basis for the registration of the landownership and other land-related rights deriving from the Plan, as opposed to normal bilateral land market transactions. Since the Plan is adopted by an administrative act of the lead agency or Land Consolidation Commission, there is no additional need for notarization. The Land Consolidation Law should provide for cost-effective registration of the changes to the property rights through the submission of the adopted Plan as the basis for registration, rather than through the submission of many separate documents like in normal land market transactions. The Land Consolidation Law should empower the lead agency or the Land Consolidation Commission to submit the Land Consolidation Plan directly for registration at the Land Registry. Subsequently, the Registry is updated based on the Plan and it takes full legal effect. The lead agency or the Land Consolidation Commission must ensure that no legitimate rights deriving from the Land Consolidation Plan are lost or disregarded in the registration process. This is of particular importance because the actual registration of the re-allotted properties is usually performed without the involvement of the landowners and other right holders. Particular attention should be paid to gender issues, ensuring that the ownership rights of spouses for the matrimonial property are fully taken into account and ensure registration of both spouses in the Land Registry in all situations where the legal framework allows it.
There is a time gap between the date of adoption of the Land Consolidation Plan and its registration in the Land Registry. In some countries, this is overcome by a temporary ban on transactions, while in others, transactions that took place between the adoption and registration of the Plan are included shortly before its registration. Especially in larger mandatory and majority-based projects, it is not feasible to prohibit transactions. For example, in the Kingdom of the Netherlands, the Land Registry ensures that all transactions performed in between the reference date and registration of the Re-allotment Plan in the Registry are taken into account. In these cases, the new owners receive their new parcels in the places allocated to the old owners in accordance with the Plan. Because all parcels in the land consolidation project area are notified in the Registry, new owners are aware of this procedure when they buy the land. An important aspect, which should be envisaged in the Land Consolidation Law, is the transfer of parcels into possession of the new owners. The modalities of the transfer of parcels into possession and the time frame should be part of the Land Consolidation Plan, while the actual responsibility for the transfer should belong to the lead agency. The transfer of possession should be performed after the implementation date of the Plan, however, based on individual arrangements between the landowners, the date of transfer of possession may differ.

**Financial settlements**

The adoption of the Land Consolidation Plan leads to the need to settle a number of financial issues with and between the participants.

First, this relates to small changes in area or value before and after the re-allotment. It is often impossible to ensure that as a result of the land consolidation project, a landowner receives one or more new parcels whose value is completely identical to the value of their parcels before the project. Such minor over- and under-allocation of land to the project participants is regular practice in majority-based land consolidation. This can be caused both by practical obstacles in the field, known and included in the Land Consolidation Plan, and by small adjustments needed to harmonize the Plan with the situation in the field after the cadastral surveying is done. It usually has a legally defined maximum percentage range, and requires financial settlement based on the outcome of the conducted land valuation, which can be indexed in case average prices in the region increase between the time of the valuation and the financial settlement. In voluntary land consolidation, there is no need to fix a range of over- and under-allocation since it is up to the landowners to agree on the conditions of the re-allotment, and they are free to decide whether to accept any difference in value between their old and new land parcels. However, in practice, the same mechanism is applied if there is a deviation in value (above a threshold) after surveying and registration.

Second, enlargement of holdings and farms, as described in Module 3, leads to over-allocation beyond the legally defined percentage as mentioned above. Such transactions should also be part of the financial settlements. The land consolidation project should actively pursue the potential to enlarge holdings and farms besides reduction of the number of parcels. Landowners and farmers who want to retire or are already not using their land or who live abroad, should be actively encouraged to sell their parcels voluntarily so that other farms can be enlarged. In voluntary land consolidation, such buying and selling is part of the negotiations of the re-allotment planning process. Based on these negotiations, the enlargement and its compensation will be included in the financial settlement.

In majority-based land consolidation, such enlargement is organized during the elaboration of the Land Consolidation Plan. Since this would exceed the normal limits of over- and under-
allocation, as explained above, the Land Consolidation Law should facilitate this by allowing voluntary over- and under-allocation above the limits and by setting the financial arrangements for this. For example, in the Kingdom of the Netherlands, a value difference of more than 5 percent is only possible with the permission of the landowner (and/or leaseholder). A practical approach often applied in the Kingdom of the Netherlands is that the land bank (see Module 7) acquires such land and makes it available for farm enlargement. In that way, sellers can be paid immediately and do not have to wait until the Re-allotment Plan and the list of financial arrangements are finalized. When drawing up the Re-allotment Plan, it is known what the land bank will contribute, and on the basis of this (and the preferences of the landowners), enlargement with land from the land bank can be planned. The land bank is then 100 percent under-allocated. Farm enlargement of more than 5 percent is usually settled directly by monetary payment, so before the approval of the list of financial settlements. This is recorded by making an appointment with the landowner regarding the over-allocation.

Third, as explained in Module 3, majority-based land consolidation generally has the opportunity to deduct a few percent from the value of each landowner to accumulate extra space for the improvement of local infrastructure, if public land is not available. Such deduction requires due compensation and is equally applied to all landowners. There are two ways for compensating the deduction. The first option is to compensate based on the valuation, like in minor under-allocations. The second option is to settle the partial loss of land in return for improvements that will increase the value of their property after the project, as explained in Module 10, for example, by providing access to irrigation. A landowner then receives smaller but more valuable replacement land that has been developed by the project itself.

And finally, as discussed in Module 3, land with buildings like barns or storage facilities or other assets like orchards, vineyards, and irrigation or drainage facilities, may occasionally be exchanged. In such cases, the financial settlement is done between the old and new owner via the lead agency. A general principle is that land with buildings and other capital-intensive assets are not exchanged and should be avoided where possible. In rare cases when this is needed, and a willing buyer is available, the specific value needs to be assessed by a valuer who is specialized in the particular object of valuation (buildings, orchards, forests, irrigation facilities). The Land Consolidation Law should define that this is subject to prior agreement between the old and new owner. The outcome should be included in the list of financial settlements, as described below, and arranged via the lead agency.

In conclusion, monetary settlements with and between the landowners are an integral part of the land consolidation process and should be regulated by the Land Consolidation Law. The list of financial settlements constitutes an integral part of the Land Consolidation Plan. Like the re-allotment planning in general, the financial settlement is guided by the principle that all participants are at least as well off after land consolidation, and therefore, the settlement is open to administrative and judicial appeal in majority-based land consolidation for those not satisfied with the outcome (see Module 6). Ensuring that all financial settlements between the landowners are arranged is the responsibility of the body adopting the Land Consolidation Plan, like the lead agency or the Land Consolidation Commission. This means that all the settlements are made via the lead agency or the Land Consolidation Commission instead of directly between the participants in the project. Different financial mechanisms are used to guarantee this, like payments prior to the registration, a system with bank guarantees if the amount exceeds a certain threshold or via a system of guaranteed payment after finalizing the process.
In the Danish system of voluntary land consolidation, the landowners transfer the funds or provide respective bank guarantees to the lead agency as the secretariat of the Land Consolidation Commission, which then distributes the funds in accordance with the list of financial settlements, which is prepared before the Land Consolidation Plan takes legal effect and adjusted if necessary after cadastral surveying. Guarantees ensuring that respective payments will be made should be required from the landowners designated as payers in the list of financial settlements in cases where the payment exceeds the threshold of DKK 10,000 (around EUR 1,100). Such guarantees should be received by the lead agency before the judgement of the Land Consolidation Commission adopting the Land Consolidation Plan. Otherwise, since the Land Consolidation Plan is irrevocable, there would be a risk that the payer does not pay the received additional value.

In the mandatory land consolidation projects in the Kingdom of the Netherlands, a list of financial settlements is prepared after all appeals to the Land Re-allotment Plan have been heard by the court and after the Re-allotment Plan is finalized and registered. After this moment, the Land Re-allotment Plan cannot change anymore and has entered into force. The handing over of parcels is now done since the financial settlement follows a separate procedure, which does not delay the new situation entering into force. The settlement includes all financial arrangements for under- and over-allocation and deduction for infrastructure, as described above, as well as settlements for farm enlargement and settlements in cases where land with buildings or other assets is exchanged. Moreover, it includes a system of distribution of common costs based on the benefits of the land consolidation project. Monetary settlements are made by immediate payment, following the same procedure as provincial tax payments or returns (following taxation law).
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Module 6: The legal and institutional framework of land consolidation and land banking

Recommended teaching methods:

- ✔ Lecture
- ✔ Seminar
- ✔ Discussions
- ✔ Independent reading
- ✔ Group work

Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.)>

Further reading:


Other useful sources:

<other useful sources (websites, applications, media stories, interviews, etc.)>
Core module content

Land consolidation regulations are closely related to the key aspects of each legal system, such as ownership rights, land registration, valuation, mortgages, tenancy, state land management and others.\(^5\) It is also related to the overall political and economic development in the country. Context plays an essential role in integrating the land consolidation instrument into the national legal framework. As mentioned in the introduction of the guide, this is a dynamic and continuously evolving process, depending on the evolutionary stage of the specific country as well as the international environment. Countries with varying traditions and systems have integrated land consolidation into their national law, which demonstrates that this depends more on political will than on legal techniques. Thus, while drafting the national Land Consolidation Law, the key question is how, rather than if, land consolidation can be integrated into a national legal system. The introduction of the legal framework should be transparent and involve a wide range of public and private stakeholders. The legislation would optimally be drafted in simple and comprehensive terms, avoiding over-regulation, and be accompanied by appropriate secondary legal acts providing for detailed implementation. Land consolidation relates to different branches of law, from human rights law and constitutional law to civil and administrative law. It should also be underlined that the national regulatory framework for land consolidation should be harmonized with the general international and supra-national legal acts such as the *Universal Declaration of Human Rights*, the *Convention on the Elimination of All Forms of Discrimination against Women* (CEDAW), specifically stipulating the equal treatment of women and men in land and agrarian reforms, and the *European Convention for the Protection of Human Rights and Fundamental Freedoms* and its Protocols. Furthermore, it is advisable for the land consolidation regulatory framework to consider the harmonization with the specific supra-national and international legal acts. For example, land consolidation could be used to attain the objectives defined under certain European Council Directives, specifically, the *EU Water Framework Directive of 2000*, the *EU Nitrate Directive of 1991*, the *EU Habitats Directive of 1992* and the *EU Birds Directive of 2009*.

Principles of land consolidation

Land consolidation principles should be reflected in the legislation and regulations as a whole, without a separate section or article to list them. However, it is good practice to enumerate the key principles that should guide the actions and can help in the interpretation of the Law.

Land consolidation principles serve as the core structure for all respective regulations, starting with the Land Consolidation Law and ending with the lowest level implementing secondary legal acts. These principles originate in part from national law, but also from international instruments such as the VGGT and others. Based on the country and international experience, several main principles of land consolidation can be identified. The following fundamental principles are considered in this guide:

- respect for and protection of legitimate tenure rights
- the “at least as well off” principle
- sustainability and environmental protection
- consultation and participation
- transparency
- gender equality

\(^5\) The content of the module is largely based on Section 2.3 and Chapter 9 of Veršinskas, T., Vidar, M., Hartvigsen, M., Mitic Arsova, K., van Holst, F. and Gorgan, M. 2020. Legal guide on land consolidation. Based on regulatory practices in Europe. FAO Legal Guide No. 3. Rome, FAO.
Human rights and legitimate tenure rights

The Land Consolidation Law should conform to human rights, and the very nature of the instrument presupposes improvements in land tenure. The fundamental rights of all those involved must be fully ensured. Therefore, while drafting Land Consolidation Laws, Articles 1 and 2 of the Universal Declaration of Human Rights should be taken into account, namely that “all human beings are born free and equal in dignity and rights” and that “everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.” Furthermore, Articles 7 and 8 provide that “all are equal before the law and are entitled without any discrimination to equal protection of the law” and “everyone has the right to an effective remedy by the competent national tribunals for acts violating the fundamental rights granted him by the constitution or by law.”

Private property is also protected in Article 17, which states “everyone has the right to own property alone as well as in association with others” and “no one shall be arbitrarily deprived of his property.” The right to work and to freely choose one’s employment is also a protected human right and is found in Article 23; it states “everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment”. The right to an adequate standard of living, including food and housing, found in Article 25, is also particularly relevant to agricultural projects and farmers.

Myriad international and regional instruments ensure that these rights are legally binding for states in Europe and beyond.

As a consequence, a land consolidation regulatory framework must ensure, amongst other things, the non-discrimination of the stakeholders, the respect of their properties, and other relevant rights.

Gender equality is one of the key issues that may arise in land consolidation practices. Equal access to land for women and respect for their rights with regard to land tenure are not fully ensured across the globe. Not all societies are equally respectful of the property rights of both genders, even if legal acts do not provide for direct discrimination. As a result, legal mechanisms promoting gender equality should be introduced in land consolidation and should address not only land tenure but also contribute to the general advancement of gender equality in the respective country. Ensuring gender equality is one of the key principles in land consolidation, which is discussed in more detail in Section 3.2.6.

One of the principles of the VGGT relates to gender equality and aims to:

- ensure the equal right of women and men to the enjoyment of all human rights, while acknowledging the differences between women and men and taking specific measures aimed at accelerating de facto equality when necessary. States should ensure that women and girls have equal tenure rights and access to land, fisheries and forests, independent of their civil and marital status (VGGT, Paragraph 3.B.4).

Respect for legitimate tenure rights requires ascertaining the legitimacy of rights beyond registries and cadastres. The VGGT do not define legitimate tenure rights but recommend that states institute processes to make such determinations (Paragraph 4.4) for rights not currently recognized by law, with a view to legalizing them. The concept of legitimacy includes on the one hand, formal legality, but extends in addition to rights that are considered socially legitimate, for instance, through long-term customary usage (FAO, 2016). This is of particular relevance for
land consolidation, as the process provides an opportunity to formalize and register legitimate, but non-formalized, rights of participants. On this issue, the process should be keenly gender sensitive, for example, recognizing the acquisition of land rights through long-term use by both partners in a relationship, married or otherwise, or taking into account instances where informal land transactions have taken place without the consent or knowledge of the spouse.

The VGGT urge states to “provide legal recognition for legitimate tenure rights not currently protected by law” (Paragraph 4.4). This alludes to the fact that there may be tenure rights that are socially legitimate or “extra-legal”. This is a different issue from formalization of legally recognized but unregistered or non-formalized rights. A Land Consolidation Law would normally not go as far as according legal recognition to such socially legitimate rights, as it has to take account of what rights are capable of being registered (FAO, 2017a) or formalized. Its scope is to provide certain exceptions to other laws, including registration laws, specifically for the purpose of more efficient procedures for land consolidation. Therefore, the reforms needed would go well beyond the scope of land consolidation. If there were such rights at stake in a proposed project area, it might be preferable not to undertake land consolidation there.

Integration with the strategic and spatial planning framework

A strategic approach is essential for ensuring overall efficiency and consistency of land consolidation in a given country, and the adoption of a national land consolidation strategy is one of the key instruments supported by FAO. Land consolidation should also be integrated into relevant national development strategies, such as the development of agriculture and environmental strategies.

The development of national land consolidation strategies is strongly recommended by FAO as a way of integrating the practice into the overall land policy of the country. Development of national land consolidation strategies has been supported by FAO in several countries in Central and Eastern Europe (Hartvigsen, 2019), for instance (in order of sequence of support), in Serbia, Lithuania, Albania, Moldova and Azerbaijan. Besides other aspects, the strategy development is important to clarify target groups and the type and scale of land consolidation to aim at in the country. However, a number of countries with a long history of land consolidation do not have such strategies, thus, even if recommended by FAO, there is no single standard that such strategies should be adopted. For example, there is no separate land consolidation strategy in Denmark or Spain (Galicia), and such a strategy has only recently been adopted in Finland. Country practice demonstrates that there is no universally accepted approach with regard to either the form or content of a land consolidation strategy.

The land consolidation policy should be reflected in a legal act or in a strategic document or in both. There is no universally accepted approach to the level of a legal act or document that establishes the land consolidation strategy. In Lithuania, approval is brought about by a Government Resolution (No. 81 of 2008), whereas in Finland, the strategy has no status as a legal act and is approved only at the ministerial level. As a result, the specificity of local situations in each country should be evaluated to determine at what level the strategy should be adopted. At the same time, the need for periodic reviews and/or amendments should not be overlooked, and this will usually require a respective administrative effort.

Land consolidation strategies should have time limits and undergo periodical revision. In practice, certain countries adopt strategies for 5 years, such as Finland (strategies for 2008–2013 and 2015–2020) and Lithuania (strategy for 2008–2013 – not updated but still applicable).
However, it is recommended that the strategy should be adopted for a longer period of 10 to 15 years, otherwise the risk is that a new strategy will not be adopted or reviewed when the term expires. In this case, land consolidation would continue without any proper strategic background, which could negatively impact its efficiency in the country.

The first land consolidation strategy in the country should “pave the way” for the introduction of a Land Consolidation Law and the accompanying regulatory framework. It should define the key objectives of land consolidation and establish the monitoring instruments and evaluation criteria whereby success of the land consolidation in the country could be measured. The objectives should coincide with higher strategic objectives concerning general social and economic development, rural development, land management, environmental objectives, and others. The strategy should also establish how the objectives of land consolidation should be attained. It may provide the criteria to identify priority areas for implementation, focusing on areas where land consolidation could best contribute towards strategic objectives. The strategy should further indicate the main methods and tools as well as the respective financing sources. In addition, it could identify key supporting instruments, such as the use of state and municipal land in land consolidation projects, land banking, the promotion of voluntary parcel exchanges.

Land consolidation instruments should also be harmonized as well as be integrated into other strategic documents, including the ones related to general national development, agricultural development, rural development, environmental protection and restoration, climate change adaptation and mitigation, and spatial planning policy documents.

In Türkiye, which has one of the largest national land consolidation programmes in the world, land consolidation is part of the National Development Plans (latest one: 2019–2023) and in the National Rural Development Strategy (adopted in 2014). In Denmark, Lithuania, Spain (Galicia) and others, land consolidation is supported by the Rural Development Programmes.

At a project level, the Land Consolidation Plan must comply with the respective spatial planning documents, for example, in the case of land-use changes resulting from a land consolidation project. On one hand, the Plan should take into account spatial planning documents, on the other hand, the implementation of the land consolidation project may cause changes in other spatial planning documents. The implementation of the land consolidation projects may stimulate in parallel the process of territorial planning.

Integration with different branches of national law

Typically, land consolidation is regulated by a specific Land Consolidation Law, a respective chapter in a more generic law such as a land code or land law, and in the implementation of secondary legal acts. The land consolidation instrument strongly depends on other legal acts regulating other areas, such as state property, land market transactions, land valuation, protected areas, spatial planning, environment, taxation, property and other land rights, and family and inheritance issues. It is not enough for the Land Consolidation Law to be well drafted; its integration into the entire legal framework, including amendment of other relevant legal acts, should be part of the process. At the same time, it should be kept in mind that land consolidation necessarily creates exceptions to normal procedures to allow for smooth and coordinated implementation of projects. Thus, land consolidation should not follow standard procedures for change in boundaries or ownership of land parcels.

In many countries, the Constitution establishes the guiding principles for the legal framework and must be taken into consideration. The situation will naturally depend on the legal
regulatory environment of each particular country. However, in order to avoid eventual legal difficulties, its conformity with the Constitution should be considered beforehand. The identification of clear constitutional foundations for land consolidation legislation would avoid subsequent legal difficulties when applying this instrument.

One example of the constitutional dimension of land consolidation can be seen in the case of a majority-based land consolidation approach. In this case, constitutional issues may arise where participants are obliged to participate even without their consent. Legal issues of constitutional order could be raised, for instance, regarding the protection of private property or the freedom to perform business activities. Furthermore, the issue of public interest in land consolidation, as well as the necessity for strong safeguards, could be invoked and the public interest nature of land consolidation challenged.

The general importance of land consolidation should be translated into a legal category. For example, the respective legal acts could state, as found in Turkish laws, that the implementation of land consolidation projects is in the category of public interest. From a legal point of view, this would lay a strong foundation for land consolidation. This aspect is of particular interest, as it legitimates majority-based land consolidation while reiterating the need for appropriate safeguards.

Land consolidation regulation is closely related to property and family law, including where national legislation provides for domestic partnerships and other forms of relationships in addition to marriage, including same-sex partnerships and marriages. In such cases, both partners may have legitimate tenure rights deriving from that partnership. These issues are gender issues but are distinct from discrimination against women. As properties change in land consolidation projects, naturally, the issues related to transfer and/or exchange must be integrated into the general land and other property regulations. Also, issues concerning rights such as mortgages, usufructs, servitudes, property seizure and others must be either considered in the Land Consolidation Law or the respective harmonization on the matter should be ensured between the Land Consolidation Law and other legal acts regulating the aforementioned aspects. Land consolidation also has implications for co-ownership, joint ownership, inheritance and other issues in this category. As land tenure is closely related to the law of obligations, the implications for contractual rights, such as a lease, purchase rights and other situations, must be taken into account. It is essential that issues of property rights and contractual obligations affected by land consolidation are connected to administrative law. In most countries, the land consolidation process is based on administrative procedures, and an administrative body adopts the Land Consolidation Plan, which impacts the aforementioned rights and obligations.

For legal interpretation purposes, Land Consolidation Laws or Chapters would normally be considered lex specialis and, as such, have precedence over more general provisions in other laws. In fact, they should provide for specific regimes with their own procedures applying to land consolidation only.

The introduction of land consolidation might also require amending the existing administrative institutional framework. It might be necessary to establish separate administrative entities or other types of public bodies, for example, institutions performing functions such as land banking. Such changes could involve not only national but also regional or municipal levels.
The land consolidation process must be integrated with the mechanisms of efficient administrative and judicial review. It may even be necessary to adopt certain administrative and judicial review mechanisms to the specificity of land consolidation, as described in Section 6.3 and Chapter 9 of this guide.

Form of the regulatory framework for land consolidation

The analysis conducted in the selected countries demonstrates that there is no common formula for the regulation of land consolidation. While some countries (for example, Denmark and Germany) have adopted laws specifically dedicated to land consolidation, in other countries, provisions governing land consolidation have been integrated into laws with a wider scope of application, such as the Law on Land (No. I-446, 1994) in Lithuania, the Real Estate Formation Act in Finland, the Law on the Improvement of Agrarian Land Structures of Galicia in Spain, or the Law on Agricultural Land in Serbia. It is also quite feasible that several laws are dealing with land consolidation in different projects (for example, this is the case of the Real Estate Formation Act and the Highways Act in Finland). In addition, land consolidation regulations may be provided at the national or subnational level for legal acts (as is practised in Germany or Spain). The Kingdom of the Netherlands has introduced a rather unique approach, that is, the integration of the numerous legal acts and hundreds of regulations for land use, residential areas, infrastructure, the environment, spatial planning, and nature and water, into a single Environment and Planning Act. Thereby, the land development legislation that includes the regulation of the land consolidation instrument will become part of the Environment and Planning Act by 2022.

Although country practice varies, the practical experience preparing for national land consolidation programmes clearly advocates for the adoption of a separate law (or separate chapter in a broader law) dedicated exclusively to land consolidation. The concentration of land consolidation related provisions in one law provides for a better understanding of the concept for project participants and other stakeholders.

Moreover, the introduction of a separate Land Consolidation Law would facilitate the eventual amendments of the Law. Changing a land law or another law of a broader scope rather than a specific law for land consolidation could generate a need for additional legislative efforts and, therefore, lead to potential political resistance. Thus, when dealing with land consolidation regulation, this guide refers to Land Consolidation Law as a single legislative act, even if, in practice, countries may adopt other forms of regulation of land consolidation.

Legal remedies

Legal remedies related to land consolidation play a fundamental role in safeguarding the process. Taking into account the specific nature of land consolidation, which includes a large number of interested parties, the sensitivity of issues tackled and the time pressure to conclude the projects, legal remedies must be organized accordingly. However, countries must find efficient ways to ensure the aforementioned safeguards, so that the implementation of the projects is not jeopardized or unnecessarily delayed.

Countries have different approaches in ensuring the necessary safeguards. There are examples where the judiciary branch is closely involved in the process. In Norway, all land consolidation is dealt with by a special court (Sky, 2015), while in Denmark, a judge chairs the Land Consolidation Commissions. However, in most countries, land consolidation is an
administrative process, and the Land Consolidation Plan is adopted through an administrative decision. Accordingly, administrative process rules apply, including administrative remedies. This is the case in North Macedonia, where the land consolidation process is safeguarded by the opportunity to lodge complaints in several different phases of the re-allotment planning, including the valuation and draft Land Consolidation Plan. The approved Land Consolidation Plan, after the adoption through administrative procedure, may be subject to judicial review before entering into force.

Despite different approaches, in all countries, the land consolidation process is based on consultations and inclusion of a wide range of stakeholders, like landowners and other right holders. Landowners and land users are consulted individually as well as during public meetings and through the representative bodies. This means that they must be heard and their positions must be considered. The process must be organized in a way that the majority of issues could be solved by the Land Consolidation Commission or other competent body as the project advances. Those unsatisfied with the respective solutions should have a right to lodge an appeal to a higher administrative authority, if the land consolidation is organized as part of an administrative process.

Administrative remedies not only allow to better ensure the safeguards, but they also diminish the number of potential ulterior complaints in the courts. Administrative remedies should suspend the implementation of the project only in exceptional cases. For example, in majority-based land consolidation, administrative appeals against the land valuation results could delay the re-allotment planning, since the re-allotment would not be feasible without a fully finalized land valuation. On the contrary, appeals against the proposed re-allotment of specific parcels should not delay the advancement of the project. Such appeals could be dealt with in parallel with the ongoing re-allotment of parcels. However, in all cases, administrative remedies should guarantee that project stakeholders have a possibility to be heard and receive a reasoned decision on the matter from the respective administrative body.

Only upon exhaustion of the administrative remedies should the interested parties have a right to lodge a complaint to the court. The approaches with regard to the judiciary review of the process vary. For example, in Denmark, where only voluntary land consolidation is applied, there is no possibility to lodge an appeal against the adoption of the Land Consolidation Plan or any other decision made by the Land Consolidation Commission. The only option is to launch a judiciary action against the lead agency (the Ministry of Environment and Food) and claim damages resulting from the land consolidation project.

Country practice illustrates that different approaches to legal remedies may be applied, and each country should elaborate mechanisms which best suit their situation. In all cases, the Land Consolidation Law should provide that the final control of the land consolidation project should be performed by the courts. The prior administrative process should diminish the number of judicial claims, and the legal remedies should be organized in a way so as not to hinder and/or suspend the implementation of the land consolidation projects. To this end, the Land Consolidation Law could define who has the right to submit claims and thereby limit the scope of issues that could be appealed to the court. Respective legal actions should not suspend implementation unless there is a fundamental necessity for such a measure due to misuse, abuse of power, corruption, or other aspects. For example, the implementation of the project could be suspended by the court, if due to misuse the project threatens to inflict serious environmental damage, or the process is abused to serve the private interests of only a number of the landowners.
Moreover, legal acts regulating judicial review of the process could require that all appeals related to the land consolidation project are dealt with in the same court. This could ensure a more speedy judicial procedure and uniform final judgement by a single court, with the subsequent eventual cassation in the upper court. Relevant legal acts could also provide for specific speedy procedures of judicial review applicable to land consolidation.
Module 7: Land banking

Recommended teaching methods:

- ✔ Lecture
- ✔ Seminar
- ✔ Discussions
- ✔ Independent reading
- ✔ Group work
- ✔ Exercises
- ✔ Case study
- ✔ Project development
- ✔ Practice
- ✔ Field trip

**Main recommended literature:**


- <country specific sources (legal acts, scientific articles, books, etc.>>

**Further reading:**


**Other useful sources:**

- <other useful sources (websites, applications, media stories, interviews, etc.>>


**Core module content**

**Concept and definition of land banking**

There is no universally accepted definition of land banking. Moreover, the notion encapsulates different types of activities that may be performed by land banks or land funds, established at the national, regional or even local level. Based upon the practical application of the instrument in different European countries, FAO proposes the following working definition of land banking:
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

(FAO, 2022b):

Land banking is a set of systematic activities implemented by an institution with public purpose, performing the intermediate purchase, sale, exchange or lease of land in rural areas in order to increase land mobility, to facilitate development of agricultural land markets, and to pursue public policy objectives related to agricultural and rural development, sustainable land use and implementation of public projects related to nature restoration, environmental protection, climate change and construction of large-scale infrastructure.

Thus, the core of land banking activities consists of buying, selling and/or leasing land from and to landowners by the public institution (land bank or land fund). This activity must be carried out according to a clear public purpose. The management of state-owned agricultural land by the land bank could also be considered as one of the additional land banking activities. Such activities are guided by the need to increase land mobility, facilitate rural land market development, reduce land abandonment and attain other public objectives.

For the purposes of this Module (Course), land banking should not be understood as a private interest driven commercial activity. Land banks or land funds are not the institutions dealing with the provision of credit or any other types of commercial or investment banking services. If the contents of land banking are not clearly explained and understood by the farmers, it may raise negative connotations, such as being an instrument for speculation or limiting access to land for the farmers. It may be the case that “land banking” only remains a term used among professionals, while in other communications, more complex and explicative terms, such as the acquisition and sale of agricultural land for public purposes are used. Furthermore, the notion of a land bank or land fund may vary in different countries and regions, like in Latin America, where land banks (banco de tierras) were used as instruments to implement market-based agrarian reforms.

In this Module, land banks or land funds (the two terms are sometimes used as synonyms) will be understood as public entities implementing land banking activities to attain public purpose objectives. Although the precise legal form of land banks may vary and their activities may also be of benefit to private stakeholders, this study does not include privately owned land banks set up for private purposes.

The diversity of the activities presupposes that there are different kinds of land banking. For example, some land banks primarily engage in buying and/or selling land for public purposes, whereas others concentrate on lease facilitation instruments. Others again combine all or parts of these functions. Land banks may also perform activities that cannot, as such, be considered as core land banking activities but are closely related to their mandate. For example, a land bank may monitor the use of agricultural land, be charged with the management of state-owned land reserves, or act as a lead agency in land consolidation projects (Veršinskas et al., 2020).

Land banking as an integrated land management instrument in Western Europe

In many Western European countries, land banking is well-known and enjoys a long tradition. In some countries, the focus might be on specific functions, for example, in Spain (Galicia), lease facilitation is at the heart of the activities of the Galician Land Bank. By contrast, in Denmark, the emphasis is mainly on supporting the implementation of land consolidation projects. Others might prefer a combination of approaches, as in France, where acquisition, sale and lease facilitation are all within the remit of the land banks (SAFERS). The competences related
to land banking also evolve with the objectives of land management. For example, until 2015, the Kingdom of the Netherlands had a centralized land banking system performing activities throughout the country. Now, these functions are delegated to the provincial governments, alongside the competencies related to the implementation of land development projects. The practice in Western European countries shows that land banking is a useful land management tool, facilitating agricultural and rural development, infrastructure, environmental and other public policy objectives. However, the necessary preconditions must exist to safeguard land banking from abuse of the process, like corruption and conflicts of interest. In order to identify good European practices of land banking, this study analyses the application of the instrument in Western European countries: Denmark, France, Germany, the Kingdom of the Netherlands, and Spain (Galicia). Each country offers its own unique experience in the matter, which may provide different points of relevance for the countries currently introducing land banking. This study also provides a brief overview of the situation in Croatia, Czechia, Hungary, Latvia, Lithuania, Poland and Slovenia to illustrate the land banking status in Central Europe.

Two main types of land banking are applied in European countries, one operating with the private ownership rights (acquisition-sale of agricultural land) and one operating with the use rights (lease facilitation). Both types of land banking operate based on the land market mechanisms and civil law transactions.

Land banking operating with the ownership rights are functioning in Denmark, France, Germany (Mecklenbourg-Vorpommern) and the Kingdom of the Netherlands (FAO, 2022a). The land is purchased on the land market either in open competition or using a pre-emption right. The acquired land is used for the installation of public infrastructure, re-allocated in land consolidation projects, sold to supported groups (e.g. young farmers) or used for other public purposes. If the acquisition aims to facilitate public projects, it takes place either before or during the implementation of the project. The acquisition initiative comes either from the land bank or from public institutions implementing land demanding projects. In connection with land consolidation projects, voluntary purchase of land from private owners increases the land pool, and in this way, the land mobility and the re-allotment options in the project area. It also provides land for spaces to be used for public purpose objectives and/or for the enlargement of farms. The Land banking instrument is also used to impact the agricultural land market in a more general manner, for example, through prevention of speculation in agricultural land.

For example, in the context of the creation of significant development projects (e.g. the creation of a new railway line), a combination of land consolidation and land banking will make it possible to limit the impact on agricultural activity and to avoid leaving small unusable plots (Figure D1).
Acquired land is usually leased out for a short term until it is sold again with a strategic purpose, allowing it to generate additional revenues and keep land in proper condition. During the interim period, the land may also undergo improvements (e.g. clearing of bushes and self-grown trees, parcel restructuring, installation of agricultural infrastructure) and/or other transformations (e.g. change in the use type). The funds received from the sale of land are reinvested into new acquisitions, supporting the continuity of the land banking activities.

Many countries with an active land policy apply the derivative land banking functions, such as the support of farmers through the purchase and lease-back of their land. For example, in Latvia, ALTUM performs acquisitions of agricultural land with the aim of subsequently leasing it back to the seller, also providing for a buy-back option. This way, the land bank supports farmers, necessitating the stabilization of their cash flows and/or further development of their activities.

In Mecklenburg-Vorpommern, Germany, Landgesellschaft Mecklenburg-Vorpommern mbH (LMV) also acquires agricultural land on demand of the farmers leasing land from the landowners. This allows the tenant farmers to continue farming on the same land, even if they are financially unable to purchase the land when it comes up for sale on the market. The LMV may also acquire agricultural land on demand from landowners in difficulty and lease this land back to the same person for up to 6 years. This mechanism helps farmers overcome hardship periods using the sale and lease-back mechanisms.

To facilitate access to land for young farmers, the regional council of Occitania (France) and SAFER, starting from 2022, introduced a similar support measure by which the price of land is being deferred in case of land acquisition by young farmers (Gorgan et al., 2023).

**Lease facilitation**

A lease facilitation instrument is applied in some European countries (Spain, Galicia), Italy, France and Portugal) with the overall objective to connect owners of agricultural land that are not farming their land with active local farmers interested in renting more land. Lease facilitation is usually understood as a variation of land banking (FAO, 2022a).
Lease facilitation can be described as a facilitated process of conclusion of lease agreements between landowners and farmers. The process is facilitated by a public authority acting as an impartial intermediary, and where the parties do not necessarily directly interact (FAO, 2022a).

The lease facilitation instrument can transfer land from landowners who are not interested in or able to cultivate their agricultural land to active farmers interested in farming more land. Land lease facilitation can help address one of the common situations in many countries in the region when individuals neither farm the land themselves, nor lease it out to other farmers, but keep their agricultural land as passive capital. In such cases, mediation by a trusted, impartial intermediary (or a so-called honest broker) between the landowners and the active local farmers would benefit both parties.

Lease facilitation usually implies i) the existence of a public institution facilitating the conclusion of lease agreements between private owners of agricultural land and local active farmers interested in farming more land, and ii) the existence of a legal framework, although simplified lease facilitation is also possible without a specific legal framework.

The key instrument in the process is an updated and accurate database of land plots (a web-based information system) available for rent and sale and under which conditions. The information in the database should be frequently (at least once a week) updated, with new land plots becoming available for lease or sale but also showing which plots have been rented out.

The purpose of lease facilitation is usually to develop the land use market, reduce land abandonment and strengthen local food production by connecting owners (often absent from the village where the land is located) and local farmers, including to provide access to land for new entrants and young farmers. The lease market facilitation and development can improve the farm structures, spur efficiency and enlarge farms without major investments, and actively contribute to mitigation of land abandonment.

Better regulating and stimulating of the lease markets can be an alternative for low land mobility in the sales markets. Lease facilitation can offer stronger guarantees to the owners of not losing ownership over land, being paid according to the lease contract, as well as recovering the property in normal conditions for its use after the contract has ended. For the tenants, it provides land under long-term, secure lease agreements, allowing them to invest and reap the benefits of the investment.
Module 8: The utilization of GIS tools in land consolidation

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<td>Group work</td>
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Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.>>

Further reading:


Other useful sources:

<other useful sources (websites, applications, media stories, interviews, etc.>>

Core module content

GIS and other digital tools in land consolidation

Land consolidation is a complex process to manage. Countries with a tradition in land consolidation use digital tools to aid with data management throughout the project. These tools encompass a range of technologies and methods of Geographic Information Systems

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6 The content of the module is largely based on Section 6 of the FIG. 2022. *Land Consolidation – The Fundamentals to Guide Practice*. International Federation of Surveyors (FIG).
(GIS) and Information and Communications Technology (ICT) to capture, store, handle, analyse, and display geographical and administrative data. For simplicity, these technologies and methods of GIS and ICT are from here on referred to as GIS tools. The use of GIS tools has become commonplace for implementing land consolidation projects in large areas that involve numerous parcels and multiple right holders.

Throughout the land consolidation process, there is a need to map and manage the data necessary for the execution of projects. Initially, the project database is populated with the cadastre and land registration data. As the project progresses, new data is produced and added, resulting in the creation of various spatial and non-spatial data products and maps (e.g. landownership maps, lists of right holders, information on rights and restrictions, valuation maps), which lead to the preparation of the Plan. Countries with a history in land consolidation have undergone the transformation from analogue to digital approaches, including the conversion of land administration practices using analogue systems to digital ones. This shift offers advantages such as process automation, reduced risk of human error and improved efficiency. By using GIS tools, land consolidation projects can benefit from improved efficiency, streamlined processes, and enhanced data management and analysis capabilities.

GIS tools can be used in various instances in land consolidation such as:

i. Custom-built or turnkey solutions can offer assistance during the feasibility phase. Project staff can conduct interviews with landowners using tablets and digital interview forms, and so avoiding paper forms and thereby increasing the overall efficiency of the process.

ii. The preferences of landowners collected during the interviews, together with land valuation, serve as building blocks for the design of the Plan. The use of GIS tools can support the re-allotment planning, including providing alternative solutions. However, it is not feasible to prepare the Plan in an automatic process as it depends on interaction with landowners in a dynamic way. Their wishes may change as new proposals are presented, and ultimately the Plan depends on their approval.

iii. The creation of digital platforms can strengthen the management and administration of land consolidation programmes while increasing interoperability, usability and data exchange between different institutions and stakeholders involved in the process. These platforms support workflow management, monitoring and evaluation of projects.

iv. GIS tools facilitate the creation of registration data in accordance with applicable standards and automate the preparation of various thematic maps in land consolidation projects.

The complexity of the applied tools varies from standard GIS software and customized tools to assist land consolidation tasks and activities, to integrated solutions aiming to manage the entire land consolidation project workflow. Most western European countries implementing land consolidation have such GIS tools, customized to the country context, available. China and Türkiye are countries with the biggest land consolidation programs in the world, and are also known to have developed GIS tools for this purpose. The design of the land consolidation plan is the heart of a land consolidation project. It is divided into two parts: (1) an administrative component, and (2) a geographical component. Optimization algorithms were introduced to help the surveyor drawing the land consolidation plan by optimizing the allocation for involved right holders (Demetriou et al., 2012; Lemmen et al., 2012).
Preconditions to use GIS tools in land consolidation

GIS tools are indispensable for data management during a project. However, data management also requires knowledge about how to handle the data, available metadata, authoritative data sets, and applicable data policies and regulations. In Europe, for example, the General Data Protection Regulation, the Data Protection Law Enforcement Directive and other rules concerning the protection of personal data do apply. This means that, in principle, no personal data may be published publicly. Another important set of regulations relate to the use and re-use of available public data. Re-use of data requires the cooperation of involved authorities. Furthermore, specific conditions for use may apply. Since the implementation of land consolidation projects often requires data from multiple authorities, securing privacy and handling sensitive data with appropriate care is a point for consideration and a potential concern.

Apart from such general rules and regulations related to data management, other preconditions for the use of GIS tools in land consolidation may apply, which include:

- Cooperation between responsible authorities to decide on standardization, data sharing protocols and implementation of system architecture. These requirements are very similar to spatial data infrastructure guidelines like the INSPIRE Directive in Europe (European Union, 2007). It aims to improve the interoperability, usability, and exchangeability of available data.
- Reliable digital land administration data, both cadastre and land registry. Reliable refers to the quality, completeness, and accuracy of the data as well as to the legal certainty of registered rights. In some countries, the land administration system does not reflect the situation on the ground regarding unregistered rights, informal rights, unknown right holders, or disputed land rights for example. Additional data acquisition may be needed.
- A set of rules and regulations for the land consolidation software, which ensure a transparent, fair and just process.

Land consolidation, as an instrument dealing with tenure rights, requires legal clarity. The rule of ‘rubbish in, rubbish out’ also applies for any GIS tool. However, it is possible to improve the data during the land consolidation project in the GIS system. Adjudication of land-related rights and correction of errors can be a vital part of the land consolidation process, either integrated into it or carried out in parallel. For the non-exhaustive list of legal and registration problems and the possible solutions see Veršinskas et al. 2020 (pp. 103–108).

Main maps prepared as part of a land consolidation project

The use of maps greatly supports the re-allotment planning. The following main types of maps are prepared as part of a land consolidation project:

a. Land Ownership Map – based on the formally registered ownership rights in the Land Registry and based on an initial assessment of the non-formalized but still legitimate rights, is prepared. This Map later constitutes the foundation for the launching of the re-allotment planning. A Land Ownership Map is a thematic map where land parcels belonging to the same property/landowner are shown with a unique combination
of colour and signature and labelled with a unique serial number attributed to the
landowner. In cases of a high prevalence of non-formalized rights, separate Land
Ownership Maps of both formal and non-formalized ownership may be prepared. In
areas with a high share of leased agricultural lands, it may be convenient to prepare a
map showing actual land users in the project area.

Figure E1: Land ownership map from FAO land consolidation pilot project in Dračevo, Bosnia and Herzegovina


b. Land Mobility Map – a thematic maps showing potential movement (mobility) of land parcels between farmers through sales or exchanges (or leases). The Map is prepared based on wishes and plans collected through direct interviews with landowners as part of the questionnaire-based survey during the feasibility study (see Module 2). Together with the Land Ownership Map and Land Valuation Map, the Land Mobility Map represents the foundation for the negotiations and planning. It provides visual support to the land planners during the re-allotment planning process. It also represents a very efficient communication tool and support during negotiations with landowners. An example of a Land Mobility Map is presented in Figure E2.
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Figure E2: Land mobility map


Land Consolidation Map – reflects the landownership situation after the project, or is the result of the planning process. It is also sometimes referred to as Plan 2 (while Land Ownership Maps as Plan 1). Similar to the Land Ownership Map, the Land Consolidation Map shows the parcels with a unique combination of colour and signature and labelled with a unique serial number attributed to the landowner during the feasibility phase of the project. Thus, a unique colour and pattern assigned to a particular landowner and used on Plan 1 should be maintained and used on the Plan 2 map to allow for a visual comparison of the improvements.
d. Land Valuation Map – shows value (monetary or relative) of each parcel or general price level of a field or area. The map is an outcome of the land valuation process (see Module 4) with values and a list of owners with the respective land values of their parcels.

Figure E4: Land valuation map prepared for the FAO land consolidation pilot project in Dračevo village, Bosnia and Herzegovina

Note: This voluntary land consolidation pilot project (TCP/BIH/3402) was implemented in the period 2011–2015. A simplified methodology was applied with few categories of land value – the best land has relative value 100, the second best has relative value 90, etc.

Module 9: Management of land consolidation projects

Recommended teaching methods:

- ✔ Lecture
- ✔ Exercises
- ✔ Seminar
- ✔ Case study
- ✔ Discussions
- ✔ Project development
- ✔ Independent reading
- ✔ Practice
- Group work
- Field trip

Main recommended literature:


Other useful sources:

<country specific sources (legal acts, scientific articles, books, etc.)>

Further reading:


Other useful sources:

<other useful sources (websites, applications, media stories, interviews, etc.)>

Core module content

Monitoring and evaluation of land consolidation programmes and projects

Land consolidation projects and programmes should require regular monitoring and evaluation and assessment of their socioeconomic impacts.® Such practices would ensure that the projects and programmes attain their pre-defined objectives and provide recommendations about the eventual future changes at the programme and/or project level. Considering the amounts of

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money spent on land consolidation programmes and projects, especially in countries with a long tradition, it is remarkable how few efforts have been made and how limited the funds are to evaluate the outcome of the projects and their socioeconomic impacts (Hartvigsen, 2015). Monitoring and evaluation refer to a regular and systematic examination of the resources, outputs and results of the activities during their implementation. For this, a set of indicators, tools and processes are used to measure to what extent a project or programme has been implemented according to the plan (monitoring) and is having the desired result (impact evaluation). To understand monitoring and evaluation, there should first be a clear distinction between i) monitoring of the ongoing projects included in the national land consolidation programme as a tool for the responsible authority to supervise the process, ii) evaluation of individual projects, including socioeconomic impact assessment and iii) evaluation of the land consolidation programme. One of the most common ways to build a monitoring and evaluation system is using the logical framework approach (LFA). The LFA has found wide acceptance as a powerful results-based management tool which stresses the positive and measurable developmental outcome and impact derived from activities and resource investment. The LFA can be applied at different levels of planning and decision-making, for instance, policy or programme and project levels. The log frame is developed in the planning phase, following the logic which starts from the expression of a development goal which is broken down into objectives (or purpose); then into outcomes (or results) and outputs (and activities). In terms of monitoring and evaluating this plan, monitoring will relate to effort or the work that goes on in relation to the activities and outputs; evaluation relates to outcomes or the results of these efforts, and impact relates to changes in peoples’ lives that relate to these results. Monitoring and evaluation should be an embedded concept and constitutive part of every project or programme design, while impact assessment is carried out only on the selected number of projects depending on the volume of the programme and resources available. An impact assessment tries to assess what has happened as a result of the intervention (intended and unintended effects) and what may have happened without it.

Programme evaluation

At the programme level, many countries implement large land consolidation programmes without having clear evidence of the impact of the funds allocated. However, there are countries that assess the respective effects which land consolidation produces. Finland evaluates land consolidation with a long-term perspective. The National Land Survey of Finland surveyed 25 project areas, evaluating such criteria as the number of farms, cultivated area, leased area, number of parcels, average parcel size, and farming distance from farmhouse to parcel by road. One of the results of the evaluation study was that the “parcel structure has not deteriorated in areas where land consolidation was completed 15 years ago. (…) Investigation of older land consolidation projects showed that over 100 years have not much changed the Finnish parcel structures” (Veršinskas et al., 2020). The study also found that the average parcel size remained almost the same in some areas and demonstrated small growth in other areas over the period of 100 years after the completion of respective projects. The EU Member States, which fund land consolidation projects from the national Rural Development Programmes (RDP) with EU co-financing, are required to evaluate the land consolidation measure as part of the EU programme cycle evaluation according to the EU Regulation No. 1305/2013 on support for rural development. The mandatory EU evaluations provide an overview of how the funding under the RDP was spent, including on measures funding land consolidation projects. However, the EU evaluations should complement and not replace more detailed and technically focused evaluations conducted at the initiative of the responsible authority.
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Project socioeconomic impact assessments

To assess the positive and negative impacts of land consolidation projects, it is recommended to select, on a regular basis, several projects for a more in-depth socioeconomic impact assessment. How many such assessments should be conducted would depend on the volume of the national programme and the variety in scope of land consolidation projects. The selected projects should represent practice to be able to assess the impact, draw respective conclusions and recommend improvements.

The responsible authority should be required to prepare brief annual reports as well as a more detailed programme evaluation every 3 or 5 years following standard programme evaluation principles.

Socioeconomic impact assessments results may also, together with the evaluation of each project, serve as evidence for the responsible authority convincing new governments and decision-makers about the positive outcomes of land consolidation, showing that it is worth the investment. The results of such assessments may also be useful in raising awareness about the benefits of land consolidation among farmers and landowners.

A full and detailed socioeconomic impact assessment of a selected implemented project requires significant funding, therefore, only the impact of some 5–10 percent of the implemented land consolidation projects could be fully assessed. From 2017, the National Land Survey of Finland performs such ex-post impact assessments, even though this is not mandatory. In Serbia in 2018, impact assessments have been performed in seven projects in south-eastern Serbia, implemented with German support by GIZ, and three in the Autonomous Province of Vojvodina.

A well-implemented impact assessment requires a good baseline, for instance, detailed socioeconomic data for the pre-land consolidation situation to compare with the situation after. The assessment should not only look into increased productivity because of consolidation of land parcels (e.g. larger and better shaped parcels, reduced transportation and fuel costs, reduced emission of greenhouse gasses) but it should also assess a broader range of envisioned, as well as unenvisioned, impacts over the stakeholders, including gross and net farm income, changes in land use and catalysed private investments (e.g. establishment of new orchards and vineyards, installation of on-farm irrigation system, etc.). Such baseline indicators should ideally be established during the feasibility phase of the project. Socioeconomic impact assessments of projects should be carried out earliest 2–3 years after the land consolidation project ended to capture all the different impacts.

Environmental impact assessment

Land consolidation can directly or indirectly influence nature, climate, and the environment through its impact on water, air (atmosphere), soil, biodiversity, landscape or cultural heritage. Already during the feasibility phase of the project (see Module 2), an initial assessment should determine if the project could result in negative impacts on nature and the environment. As indicated in Module 3, once the Land Consolidation Plan is drafted and before its adoption and implementation, legal acts should require an environmental screening or even a full environmental impact assessment (EIA). The European Union’s EIA Directive and the respective national legal acts implementing the Directive regulate this aspect for its member countries. The same rules would also apply in accession countries, while other countries may or may not have similar provisions.
In the Kingdom of the Netherlands, the requirements of the aforementioned European Union EIA Directive have been included in the national Law on Environmental Management and the Decree on Environmental Impact Assessment. Land consolidation projects must comply with Annex II of the European Union EIA Directive, which means that the national legislation defines whether environmental impact screening is needed to determine whether a full EIA is necessary (hence, the full EIA is not automatically required in all cases). This screening is required when land consolidation leads to: i) a change of the (spatial) function of water, nature, recreation or agriculture in an area larger than 125 ha; or (ii) the establishment of a glasshouse area or flower bulb production area larger than 50 ha. In Germany, the EIA is a regular and integral part of the Plan for Common and Public Facilities and its public approval.

Other countries may have a slightly different approach to environmental screening procedures. However, it is essential to evaluate the possible impact of the land consolidation project on nature and the environment to ensure that there will not be a negative impact. This should be done when the solutions proposed by the Land Consolidation Plan are clear. Therefore, the legislation of the country should require that environmental screening is undertaken before the adoption of the Land Consolidation Plan. All the necessary procedures should be established in the relevant legal acts regulating environmental issues, depending on the type of environmental screening required, which could necessitate the intervention of an independent institution that is usually appointed by the ministry responsible for the environment. This should be addressed in the Land Consolidation Law only if a country does not have existing legal provisions on EIA or screening.
Appendix I. Recommended teaching methods, support materials and core content of the teaching modules

Module 10: Rural infrastructure planning in land consolidation

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<td>✔ Group work</td>
<td>✔ Field trip</td>
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</tbody>
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Main recommended literature:


<country specific sources (legal acts, scientific articles, books, etc.>>

Further reading:


<other useful sources (websites, applications, media stories, interviews, etc.>>

Core module content

Rural communities often have many more development constraints than land fragmentation, and small holdings and farm sizes and the re-allotment of parcels is often not the only purpose of land consolidation projects (see Module 1). Land consolidation projects may include the improvement of local agriculture and other infrastructure in the project area (new field and access roads or their improvement, irrigation, drainage, wind breaks, power lines, village renewal and recreational areas) and be linked to broader community needs. Through an inclusive and participatory process, community development plans could be prepared and integrated with the land consolidation project, as is the standard practice of FAO in countries

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where the organization is supporting the introduction of land consolidation (Hartvigsen, 2019), for example, North Macedonia and Azerbaijan.

Integrating land consolidation with irrigation rehabilitation can be a particularly effective type of multipurpose project. In particular, land consolidation can play a critical role in the agriculture–water–land nexus. Experiences in Central and Eastern Europe show that farmers have a strong interest in participating in land consolidation projects that include irrigation improvements.

The relevance of land consolidation to irrigational rehabilitation

Land consolidation can bring benefits to farmers and society through its potential for reducing fragmentation and enlarging farms (see Chapter 5). The rehabilitation of irrigation systems (primary, secondary and tertiary) also brings benefits to farmers where irrigation is essential for agriculture. In addition to providing water for irrigation purposes, the rehabilitation can contribute to climate change adaptation by modernizing irrigation systems to improve their efficiency and reduce the water loss within the existing systems. Combining land consolidation and irrigation rehabilitation can provide even more benefits than when they are implemented alone.

A land consolidation project in a village where the irrigation systems are working only partially will be limited in its ability to find many solutions for farmers. For example, farmers whose parcels are served by a functioning irrigation system are not willing to exchange parcels with farmers who have land where an irrigation system is not working. A land consolidation project with such conditions will achieve much greater success if it is integrated with irrigation rehabilitation so that all parcels are served by functioning irrigation systems.

An irrigation rehabilitation project can provide much needed water to the parcels in a village but increases to agricultural production can still be limited if the existing farm structure is one of small farms with fragmented parcels, many of which are often poorly shaped for modern agriculture. Land consolidation can result in increased agricultural productivity, which in turn can lead to increased investments by farmers, some of which might result in the more efficient use of water such as a move from irrigation through surface flooding to the use of sprinklers, drip irrigation and irrigation robots (Kvistgaard with Hartvigsen, 2015, p.12).

Integrating irrigation rehabilitation with land consolidation allows the detailed technical design of the irrigation and drainage infrastructure to be coordinated with the design of the new parcel layout that occurs in the re-allotment phase of the land consolidation component. The irrigation infrastructure, both existing and new, serves as the skeleton of the Plan that is developed in the re-allotment phase, and its design must be completed before that phase begins. The integration also allows for the coordination of the construction of the irrigation infrastructure with the demarcation of the new parcels and the registration of the new land rights in the registration and implementation phase of land consolidation (see Module 5).

Integration of land consolidation with irrigation rehabilitation usually requires the use of the majority-based approach, as all the agricultural land in the project area should be included in the preparation of the Plan, thereby ensuring that the new layout of all parcels fits well with the irrigation rehabilitation and that all parcels have access to irrigation water. In a voluntary approach, only the parcels of participating landowners are included in the Plan. The use of a majority-based approach should not cause problems, as farmers are typically enthusiastic about participating in a land consolidation project that includes irrigation rehabilitation.
Importantly, improving irrigation and the parcel layout of farms can increase their resiliency to extreme weather conditions such as floods and droughts, and their ability to address climate change adaptation. For example, in North Macedonia, two large projects that are currently being prepared will support the integration of land consolidation with climate change adaptation through the large-scale rehabilitation of the existing poor irrigation system (where about 70 percent of the water is lost before it reaches the fields in some of the irrigation systems), and with the introduction of climate-smart agricultural practices (Hartvigsen et al., 2023).

Further benefits become available to farmers and the community if a multipurpose project of land consolidation and irrigation rehabilitation includes the construction and rehabilitation of field roads as that can improve access to parcels (including during times of heavy rains) and help to reduce travel costs.

**Combining re-allotment planning with improvement of rural infrastructure**

Besides identifying the construction and/or rehabilitation of local infrastructure as an objective of land consolidation, the Law should authorize the respective institutions to use their budgetary resources or other financing sources for works relating to rural infrastructure. Works may be funded from other sources, such as municipalities or sector agencies responsible for roads or water management. Such local infrastructure solutions should be integrated with the re-allotment of land parcels. Secondary legal acts should provide for planning principles, according to which, amongst other things, the users of the land would have an optimal access to the local infrastructure. For example, it is necessary to plan the project area in such a way that each parcel has access to a public road or eventual waterway. Keeping in mind the discussion in Module 3 on the practical re-allotment planning, the planned improvement of local rural infrastructure (roads, canals, etc.) is the skeleton upon which the re-allotment planning is conducted.

In majority-based land consolidation, some countries allow for the possibility to deduct up to a certain percentage of the value or area of private land, for improvement of the rural infrastructure. Such deduction provides extra space with which to widen roads, for drainage or irrigation canals or to construct new infrastructure to the benefit of the farmers in situations when public land is not sufficiently available. In the Kingdom of the Netherlands and North Macedonia, the limit is 5 percent. In practice, such deduction is often smaller than the limit of 5 percent, either because less space is needed, or because public land is available or could be acquired by land banking. In the example of the Olst Wesepe land consolidation project in the Kingdom of the Netherlands, the deduction is 0.4 percent. In Spain (Galicia), the contributions of the owners in the land consolidation may be subject to a maximum deduction of 9 percent of the total value. The deduction for rural infrastructure is a maximum of 6 percent of the total value and 3 percent for readjustments. An extra 2 percent can be reduced if measures for nature conservation or special infrastructures are needed.

Such deduction must be distributed equitably and the effect of the deduction of land may not infringe the “at least as well off” principle. Like in under- and over-allocation, the principle is that loss of land is either financially settled as explained in Module 5, or the partial loss of land is settled and accepted in return for improvements that will increase the value of the property after development. A landowner then receives smaller but more valuable replacement land that has been developed by the project itself. An example of this approach is land consolidation in combination with irrigation, where affected farmers relinquish rainfed
land for a smaller portion of irrigated and more productive land. It can only be applied if the Land Consolidation Law permits such a deduction to fit in improvements of infrastructure. In that case, the maximum percentage preferably should not be higher than 5 percent and the deduction should be equally applied to all landowners.

Local needs for improvement of rural infrastructure in the project are initially assessed during the feasibility phase (see Module 2). If such improvements of rural infrastructure are decided to be included in the project, a detailed technical design is prepared in the re-allotment phase in parallel with the re-allotment planning (see Module 3).
Appendix 2.

Module description template
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Do you already have a course – on or related to land consolidation?  
☐ Yes  
☐ No

A separate “card” must be prepared for each course unit/module

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☐ Elective |
| Which department offers this course unit/module? |  |
| When was the course unit/module started? | <year> |
| When was the course unit/module last updated? | <year> |
| Course unit/module is dedicated for: | ☐ BSc – first study cycle  
☐ MSc – second study cycle |
| Course unit/module language |  |
| Format of the course unit/module | ☐ Classroom  
☐ Distant/Online  
☐ Hybrid |
| Is the course unit/module at the MOOCs (Massive Open Online Courses) platform? | ☐ Yes  
☐ No |
| The number of teaching staff for the course unit/module? |  |
| The aim of the course unit/module | the student must be able to... |
| Teaching methods/techniques | ☐ Lecture  
☐ Seminar  
☐ Discussions  
☐ Independent reading  
☐ Group work |
### Teaching methods/techniques (cont.)
- ☐ Exercises
- ☐ Case study
- ☐ Project development
- ☐ Practice
- ☐ Field trip

### The content of the course unit/module
- ...
- ...

### Distribution of workload for students

<table>
<thead>
<tr>
<th></th>
<th>Contact</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td></td>
<td>%</td>
</tr>
</tbody>
</table>

### Course unit/module assessment method. Structure of cumulative score and value of its constituent parts

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>i.e.</th>
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</thead>
<tbody>
<tr>
<td>Test</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Essay</td>
<td>&lt;30%</td>
</tr>
<tr>
<td>Project (practical work, individual work)</td>
<td>&lt;30%</td>
</tr>
<tr>
<td>Project (group work)</td>
<td>&lt;20%</td>
</tr>
</tbody>
</table>
Appendix 3.
Filled out module description templates
### I. Sample modules on Laws and regulations

<table>
<thead>
<tr>
<th>Module</th>
<th>Type</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Estonia “Special Course in the Law of Property” (Mandatory, 4 ECTS credits)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>The legal issues of land and property are the topics of the module. The students will get theoretical and practical in-depth knowledge about the legal questions of real estate and land. The students will learn the administrative procedure in a system of three court instances. They will become aware of the procedural codes in the sector of land and real estate. The students will analyse, explain and solve the legal issues of land and property. They will examine and evaluate the cases involved with the land and property. It provides an overview of the current court system, court procedure, and proceedings. The procedural codes are treated in the field of land and property.</td>
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</tr>
<tr>
<td>In Moldova “Cadastre and Land Legislation (Legislation in the domain of agricultural land consolidation)” (Elective, 5 ECTS credits)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>The objectives of the program are the training of a performance specialist who will be able to appraise everything new and viable in jurisprudence so that later, applying the obtained knowledge contribute substantially to the creation of the state of law not only “de jure” but also “de facto”. After graduating the subject student will be familiarized with the basic legal institutions that define the complex relationships of land and cadastral legislation. Will know how to use the current information aiming at the treatment of the legislation of these branches of law which regulate the legal relations in the field of land consolidation and sustainable rural development. The treatment of land and cadastral legislation is carried out in the context of the radical changes that have occurred and are currently taking place in the legislation of the Republic of Moldova in the field of sustainable rural development and land consolidation. The student will know the methods used to regulate relationships and settle the land and cadastral law disputes. The content of the module: 1. Introductory considerations regarding land and cadastral legislation 2. Ownership and other real rights over the land 3. Legal circulation of land 4. System of land management entities and their attributions 5. The law regarding the activity of real estate evaluation 6. The law on state regulation of the regime of land ownership (land management and land use planning), state land cadastre, and land monitoring 7. Legal liability for violation of land and cadastral legislation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the Kingdom of the Netherlands “Agrarian Law” (Elective, 6 ECTS credits)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>The module aims to provide an understanding of the legislation that is relevant to agriculture and rural areas. This module will focus on several subfields in agricultural law: lease, land use planning, and land consolidation and market regulation (direct payments). Agricultural law is a functional area of law, including a cross-section of all kinds of classical areas of law. In the module, a general introduction is given, in which the special features of agricultural law are treated. Subsequently, the land use right (lease) and the legislation on land use are discussed in more detail.</td>
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</tbody>
</table>
### I. Sample modules on Land consolidation planning

- **In Austria “Land Consolidation Project” (Elective, 3 ECTS credits)**

  This module introduces students to the planning process of a land consolidation scheme. Students carry out a simplified land consolidation project based on their surveys in the field (around 70 ha within a land consolidation scheme in operation). The project includes planning of relevant infrastructure (road network, drainage, erosion control, landscaping), but does not include the land reallocation process.

  The content of the module:
  1. Introductory unit to the planning process of a land consolidation scheme (classroom)
  2. Field survey within a land consolidation scheme in operation (in cooperation with a land consolidation authority) with assigned tasks for the students (e.g. survey of unsuitable farming structures, the survey of landscape elements)
  3. Elaboration of the simplified land consolidation project in group work (3–4 students)
  4. Presentation and discussion of the project: the focus is on how students can defend their planning proposals

- **In Estonia “Land Consolidation Project” (Mandatory, 4 ECTS credits)**

  The module focuses on the design of the land consolidation project. The specific feature of the project is that some land in the project area is acquired for public needs (e.g. road construction).

  The content of the module:
  1. Theoretical basis and main principles of land consolidation
  2. Land consolidation-related legislation
  3. Formation of the area for the land consolidation project
  4. Evaluation of the properties of the project area
  5. Compilation of the reallocation plan
  6. Drafting the project-related maps
  7. Assembling the project-related documentation

- **In Lithuania “Rural Development and Land Consolidation” (Mandatory, 6 ECTS credits)**

  After graduating the subject, a student will know rural development measures financed under the Rural Development Program and the financing requirements for land consolidation projects. Will deepen the knowledge about the concept of land consolidation in different countries. Will know different levels of land consolidation projects and projects completed in Lithuania. Will be able to calculate the economic effect of land consolidation projects using cost-benefit analysis. The student will know what the land consolidation project’s economic factors are and how they are calculated. Will know the theoretical requirements for the selection of the area of these projects.

  The content of the module:
  1. The concept of rural development and the Lithuanian rural development strategy
  2. Objectives, directions, and priorities of rural development
  3. The concept of land consolidation in different countries
  4. Support and conditions for land consolidation projects
  5. Land consolidation projects implemented in Lithuania
  6. Land consolidation works in Western European countries
  7. Different levels of land consolidation projects
  8. Types of land valuation within land consolidation in different countries
9. Economic justification of land consolidation projects
10. Economic factors of land consolidation projects
11. Selection of territory for land consolidation projects
12. Implementation (infrastructure development) of land consolidation projects

• In Moldova “Regulation of Land Relations within the Framework of Agricultural Land Consolidation” (Elective, 5 ECTS credits)

After graduating the subject, a student will understand the importance and the current state regarding the regulation of land relations within the framework of agricultural land consolidation. Will know the terminology, concepts, principles, and requirements of the regulation of land relations, methods, and basic techniques that form the content of the discipline. Will know the contents of the course unit contribute to the realization of a formative character of future specialists in the field of consolidation of agricultural lands (understanding the role and complexity of regulation of land relations in solving the problems of land consolidation and sustainable rural development under the conditions of the competitive economy, acquiring the methods and techniques of regulation of land relations between different participants.

The content of the module:
1. The content and structure of the land relations regulation mechanism within the framework of agricultural land consolidation
2. The fields of application of the state regulation of land relations within the framework of agricultural land consolidation
3. The methods of regulating land relations within the framework of agricultural land consolidation
4. The basic requirements and principles of the regulation of land relations
5. The legal mechanism for regulating land relations within the framework of agricultural land consolidation
6. The economic mechanism for regulating land relations within the framework of agricultural land consolidation
7. The administrative mechanism for state regulation of land relations within the framework of agricultural land consolidation
8. State control over the use and protection of land
9. The formation of the land market and the experience in the field of the regulation of land relations in the framework of the consolidation of agricultural lands in other countries

• In Poland (Warsaw University of Technology) “Land Consolidation 1 (basic)” + “Land Consolidation 2 (advanced)” (Mandatory, 3+3 ECTS credits)

During the module, students obtain skills in the scope of preparation of surveying documentation drafted in consolidation proceedings: selection of project solutions depending on the environmental-landscape conditions; development of models of individual agricultural farms; economic analysis of consolidation works.

Project: Conducting study analyses for the development of the concept of a land consolidation project for an existing object; Research on land use structure and ownership structure in existing research objects; Preparation of analyses of spatial structures of agricultural farms, including analyses of the area structure of agricultural farms, land fragmentation, and geometry of registered plots; Preparation of individual characteristics of agricultural farms – analysis of land layout for selected agricultural farms.

Preparation of project proposals for existing objects in the scope of shaping a functional agricultural transport road network, the division into project complexes, and allocation of land for building development and public purposes. Preparation of surveying documentation related to the necessity of issuing the decision on the environmental conditions of the implementation of consolidation investments. Consideration of design
concepts regarding the design of buffer belts along water streams and melioration ditches, design of tree stands and shrubs along rural transportation, and technological roads. Implementation in the concepts of consolidation projects of solutions resulting from the provisions of the planning documentation of the commune. Application of the SWOT analysis in the assessment of a land consolidation project. Determination of post-consolidation works.

**In Poland (University of Agriculture in Krakow) “Land Consolidation” (Elective, 3 ECTS credits)**

The module aims to significantly increase students’ knowledge of land consolidation compared to BSc graduates. In particular, students learn about a number of current legal regulations, as well as about the technical requirements related to the development of land surveying documentation necessary to update the cadastral and land and mortgage registers. The module content also includes methods for assessing the effectiveness of land consolidation projects. Students will also learn about modern IT tools used at various stages of the implementation of land consolidation projects in Poland.

The aim of the module is also to provide basic knowledge about the process of land consolidation for students who completed their studies at the BSc level at other faculties/universities, where this subject was not included in the study program.

The content of the module:

1. **Lectures**
   a. Legal and technical aspects of the implementation of land consolidation in Poland
   b. Characteristics of the key stages of land consolidation projects
   c. Issues with updating the cadastral database and land and mortgage registers after the completion of land consolidation
   d. Evaluation of the effectiveness of land consolidation projects
   e. Characteristics of modern IT tools used in the implementation of the land consolidation project
   f. Selected aspects of spatial data acquisition and data processing for the implementation of consolidation projects
   g. Use of modern land surveying techniques in land consolidation projects

2. **Practical classes (computer lab)**
   a. Practical aspects of obtaining data from cadastral databases and their processing for the land consolidation project
   b. Using the latest versions of IT tools used in Poland to support the implementation of land consolidation projects
   c. Getting acquainted with selected activities performed during the consolidation with the use of real data of land consolidation projects
   d. Assessment of the effects of the land consolidation project in terms of changes in land fragmentation indicators as well as in economic terms
   e. Practical examples of the use of aerial photos, satellite (remote sensing) data, and UAV measurements for the land consolidation project

**In Slovenia “Land Consolidation and Rearrangement” (for Geodesy and geoinformatics dedicated more for land surveyors) (Mandatory, 4 ECTS credits)**

1. **Objectives:**
   a. Understanding of the concept of active land policy and its role in sustainable spatial development
   b. Understanding of interdisciplinarity and complexity of land consolidation procedures and other land rearrangement measures
c. Getting knowledge of land consolidation procedures and other forms of land rearrangements in the rural and urban space

d. Getting knowledge on the use of tools for multicriteria and multi-attribute decisions in GIS for land rearrangement, critical use of real property, and other spatial public data evidences

2. Competences:

a. Basic knowledge and understanding of basic terms in the fields of active land policy, land consolidation, and rearrangements

b. Basic knowledge and understanding of basic terms in the fields of multicriteria and multi-attribute decisions in GIS using data from real property and other spatial databases

c. Understanding and ability to conduct land consolidations and other land rearrangement measures in rural and urban areas, land surveying, and updating land evidences

d. Ability to balance different interests in the space at land consolidation and other forms of land rearrangements

The content of the module:

1. Land management, sustainable paradigm, active land policy, modern guidelines

2. Legal framework, administrative and contract land consolidations (procedures, actors, responsible institutions); problem analyses; land valuation; public hearing of surveying documentation (current situation, consolidation plan, land valuation); the arrangement of legal regimes at consolidation; implementation of the consolidation plan up to the final realization (entry into legal evidences)

3. Legal restrictions in land consolidation (land rights and their changes during realization of spatial planning acts, real property rights, easements)

4. Historical background in Slovenia (agrarian reform, nationalization/restitution); land policy in Slovenia; land rearrangements (of real property units, land plots) for construction: subdivision plan; land rearrangements (of real property units, land plots) at agrarian operations: land exchange; agro- and hydro-melioration. Actors and institutions in charge in the field of land rearrangement

5. The motivation of participants; conflict resolution

6. Systems of land restructuring, spatial and land databases; land information system (LIS) as support for spatial decisions, multicriteria, and multi-attribute decisions; computer-assisted land management; public infrastructure arrangements using LIS; cadastral registration of land consolidation; regulation by real property legislation

7. Optimization of processes and transaction costs; system of land use control based on spatial databases; land/real property rights and their changes by the realization of spatial planning acts in Slovenia (real property rights, easements)

• In Slovenia “Land Consolidation and Rearrangement” (Cadastral land rearrangements – adjusted to the needs of spatial planners) (Mandatory, 4 ECTS credits)

1. Objectives:

a. Understanding of the concept of active land policy and its role in sustainable spatial development

b. Understanding of interdisciplinarity of cadastral land rearrangements

c. Getting knowledge of cadastral land rearrangement procedures

d. Understanding and critical use of data from real property and other records from the public spatial data infrastructure at land rearrangement procedures

2. Competences:

a. Basic knowledge and understanding of basic terms in the fields of active land policy, land consolidation, and rearrangements

b. Basic knowledge and understanding of basic terms in the fields of multicriteria and multi-attribute decisions in GIS using data from real property and other spatial databases
c. Understanding and ability to conduct land consolidations and other land rearrangement measures in rural and urban areas, land surveying, and updating land evidences

d. Ability to balance different interests in the space at land consolidation and other forms of land rearrangements

The content of the module:

1. Historical background of land policy in Slovenia (agrarian reform, nationalization/restitution, current land policy)
2. Cadastral (re)arrangement for construction: land subdivision plan and restrictions; land consolidation
3. Cadastral (re)arrangement for agrarian operations (land amalgamation and subdivision, consolidation, subdivision for infrastructure projects, expropriation, easements, and other legal regimes in the cadastral system), the importance of road network and other objects in the agrarian landscape
4. Procedures of mass cadastral rearrangements (management of mass data on land plots and their owners, development of a new land plot structure plan using the concepts of optimization), analyses of the current and planned situation; assessment of benefits
5. Stakeholders and institutions in charge of the field of land rearrangement; motivation of participants (communication, motivation, public hearing, conflict solutions, negotiation and mediation, effective organization of teams, and other resources for the implementation of land rearrangements)
6. Legal restrictions of cadastral land rearrangements (land rights and their changes during realization of spatial planning acts, real property rights, easements); sustainable development and influence of land rearrangements using land operation measures
7. Spatial data infrastructure (SDI) for land rearrangement in Slovenia and EU, land information system (LIS), and software solutions to assist land rearrangements in the Republic of Slovenia. Assessment of data suitability for their use in the procedures of land rearrangements (data quality, logical consistency, topologic and geometrical control). Controlling data quality and procedures of land rearrangements; system of harmonization of land cover and planned land use based on updated spatial data and GIS technology

In Türkiye “Rural Arrangement” (Elective, 3 ECTS credits)

This module teaches the purpose and benefits of Rural Area Arrangement: its technical, legal, and economic aspects. In addition, the conceptual foundations and implementation procedure of land consolidation are discussed with all its legal and technical aspects. In land consolidation, inheritance, sales, planning of roads and irrigation channels, and combining the divided dispersed land parcels are examined. In rural areas, some topics such as tourism, protection of natural and cultural values, development of agriculture and small industry, water economy, regulation of settlement in rural areas, and its environment are evaluated.

The content of the module:

1. Definition of rural area and its history
2. Rural and urban area arrangements and relationships
3. Rural area planning principles
4. Rural area arrangements and cadastre relations
5. Measurement methods and their importance in rural area arrangements
6. Economic, technical, and legal examination of rural area arrangements
7. Village settlement area planning and applications
8. Application principles and problems of blocks
9. Land arrangement and information system relationship
10. Pasture law and practice
### In Türkiye “Land Reallocation Methods in Land Consolidation” (Elective, 3 ECTS credits)

Students are tutored in land consolidation, reallocation studies, optimization methods, and fuzzy logic. It teaches the reallocation methods (traditional and modern methods) applied in land consolidation and how these methods are applied in the reallocation phase.

The content of the module:
1. Definition, purpose, and benefits of land consolidation
2. Process steps of land consolidation
3. Reallocation studies in land consolidation
4. Optimization and linear programming
5. Optimization studies in land consolidation
6. Interview-based reallocation method
7. Simplex Method based delivery method
8. Block priority-based reallocation method
9. Fuzzy Logic based reallocation method
10. Comparison of reallocation methods

### In Ukraine (Lviv National Environmental University) “Land Consolidation” (Elective, 3 ECTS credits)

The module aims to teach the theory, goals, procedure, and European experience in land consolidation.

The content of the module:
1. Scientific and methodological principles and historical context of land consolidation
2. Analysis of the foreign experience of land consolidation
3. The main goals of land consolidation for the development of rural areas in Ukraine
4. Land consolidation as a tool for the development of rural areas
5. The land consolidation procedure
6. Stages of land consolidation
7. Valuation of land plots for land consolidation
8. Design the social and public infrastructure
9. Re-allotment of land use during land consolidation
10. Designing landscape protection measures
11. Development of land consolidation measures in the field of organic agriculture

### In Ukraine (Mykolayiv National Agrarian University) “Land Consolidation” (Elective, 3 ECTS credits)

The aim of the module is the formation of higher education students’ knowledge of solutions to particular stages of land consolidation and managing the design process in theory.

The task of the module is to study the definition of land consolidation and rural land re-allotment; the purpose, types, and multifunctionality of land consolidation; the historical development, legal background, and organization of land consolidation in European countries; choice of land consolidation territory; the land consolidation proceeding; the complex land re-allocation: principles and methods; assessment of land consolidation results.

The content of the module:
1. Definition of land consolidation and rural land re-allotment
2. Goals, types, and multifunctionality of land consolidation
Appendix III. Filled out module description templates

3. Historical development, legal background, and organization of land consolidation in European countries
4. Prerequisites for land consolidation
5. The procedure of land consolidation
6. Land evaluation in the land consolidation area
7. Erosion protection in land consolidation area (design the field shelterbelts and other anti-erosion measures)
8. Design the rural roads in the land consolidation area
9. Land re-allotment (Land Re-allotment Plan)
10. Optimal layout of suggested land plots
11. Assessment and analysis of land consolidation results

- In Ukraine (State Biotechnological University) “Rural Development and Land Consolidation” (Mandatory, 6 ECTS credits)

The students study theoretical and legal principles and measures for the development of rural areas financed under the Program for the Development of Rural Areas, as well as the requirements for funding land consolidation projects; deepening knowledge about the concept of land consolidation in different countries at different levels, choosing methods and approaches to their implementation, performing calculations of the economic effect of implementing land consolidation projects. The purpose of the educational discipline is to deepen knowledge and develop skills in the preparation of land consolidation projects. To be able to connect the practice of these projects with possible rural development measures.

The content of the module:
1. Concept and strategy of village development
2. Goals, directions, and priorities of village development
3. The concept of land consolidation in different countries
4. Support and conditions for land consolidation projects
5. Realized land consolidation projects
6. Land consolidation works in the countries of Western Europe
7. Different levels of land consolidation projects
8. Economic justification of land consolidation projects
9. Economic factors of land consolidation projects
10. Selection of territory for land consolidation projects
11. Implementation of land consolidation projects

III. Sample modules on GIS and remote sensing

- In Estonia “Geographic Information Systems” (Mandatory, 5 ECTS credits)

The module will develop the student’s knowledge and skills for working with GIS. The students will improve their knowledge of vector GIS data and will obtain basic experience in working with raster GIS data. This knowledge and skills will enable students to implement GIS for solving spatial-related problems.

The content of the module:
1. Geographic information, analysis, and GIS
2. The creation of GIS and possible problems
3. Introduction ESRI ArcGIS software
4. The main principles and tools for working in ArcGIS
5. The methods and tools for data processing in geoinformatics
6. Spatial analysis, its different meanings, aspects, and implementation
7. The possibilities of raster and vector graphics for spatial analysis
8. Topology – nature, and implementation in geoinformatics
9. Classification – nature, and implementation in geoinformatics
10. Map algebra and its implementation
11. Filters – concept, types, and implementation
12. Modelling in geoinformatics
13. GIS and remote sensing
14. Data exchange, cross referencing and transformations in geoinformatics
15. Spatial data management, geo databases, and their creation

- **In North Macedonia “Spatial Models and Analysis” (Mandatory, 6 ECTS credits).**

The module Spatial Models and Analyses is essentially a continuation of the GIS course from the bachelor level, where content and topics are expanded and studied in-depth. Students obtain more extensive knowledge in spatial data modelling based on different data sources. The module is presenting the different spatial models together with their pros and cons. The module content incorporates discussions about ongoing trends and needs of the geospatial industry for the students to be familiar with the latest industry development.

The content of the module:
1. Spatial data models: types, needs, and characteristics
2. Characteristics of vector and raster data, possibilities and limitations
3. Spatial databases
4. Contemporary data acquisition technologies in the context of spatial modelling
5. Point cloud processing
6. Digital Elevation Models, data formats, and interpolation models
7. Spatial analysis and implemented algorithms

- **In Ukraine (Mykolayiv National Agrarian University) “Geographic Information Systems in Cadastral Systems” (Mandatory, 4 ECTS credits)**

The module is aimed at the formation of deep knowledge and practical skills in using GIS technologies for solving applied problems of monitoring, analysis, forecasting, and support of making managerial decisions in the field of land resources and the environment.

The content of the module:
1. Basic concepts of GIS systems
2. GIS systems of the European countries
3. Software of cadastral systems (GIS, ESRI)
4. Possibilities of mapping services
5. Basics of working with the specialized software Geographic Information System 6
6. Working with projects in the Geographic Information System 6
7. Calculations in the Geographic Information System 6
8. Working with the map in the Geographic Information System 6
9. GIS software for working with spatial data
10. Practical issues of GIS implementation
### IV. Sample modules on Land valuation

**• In Estonia “Special Course in Real Estate Valuation” (Mandatory, 4 ECTS credits)**

The students will provide a deep and systemic overview of real estate appraisal, its theory, and development trends. To build up sufficient preconditions of genesis for the interdisciplinary connections between the real estate appraising or value and society with the help of the design and use of the different valuation theories and models.

The module is based on real estate valuation using different methodologies. All approaches are based on the full description of their theoretical bases. The real estate markets analysis and its connection with the real estate value are observed too. Explanation of the bases real estate research is based on them.

**• In Lithuania “Real Estate Valuation and Market Analysis” (Mandatory, 6 ECTS credits)**

The subject aims to provide students with the opportunity to deepen their knowledge and develop skills by analysing, comparing, and applying national (Lithuanian) and international practices: a) Real Estate markets analysis; b) Mass valuation; c) RE value and valuation theory; d) RE valuation methods and application.

The content of the module:
1. Real estate value and valuation theory
2. Real estate evaluation methods and their peculiarities in Lithuanian and International practices
3. Real estate market fluctuations and factors
4. Agricultural property market characteristics and factors
5. Residential property market characteristics and factors
6. Industrial property market characteristics and factors
7. Office property market characteristics and factors
8. Retail market characteristics and factors
9. Leisure market characteristics and factors
10. The principles and methodology of mass valuation applied in Lithuania
11. Theoretical and practical peculiarities of mass valuation in International practice

**• In Moldova “Valuation of Rural Real Estate” (Mandatory, 5 ECTS credits)**

The objectives of the module are the training of a high-performance specialist who will be able the use knowledge in the field of cadastre, land use planning, land resource management, and legislation related to agricultural land consolidation. The students have to be able after pursuing the course to critically analyse, evaluate and synthesize new ideas in the field of sustainable development in rural areas and agricultural land consolidation. Students synthesize and evaluate the international experience in the field of property valuation, land use planning, cadastre, land resource management, cadastre and land law.

The content of the module:
1. Real estate value and valuation theory
2. Real estate evaluation methods and their peculiarities in Lithuanian and International practices
3. Real estate market fluctuations and factors
4. Agricultural property market characteristics and factors
5. Residential property market characteristics and factors
6. Industrial property market characteristics and factors
7. Office property market characteristics and factors
8. Retail market characteristics and factors
9. Leisure market characteristics and factors
10. The principles and methodology of mass valuation applied in Lithuania
11. Theoretical and practical peculiarities of mass valuation in International practice

• In North Macedonia “Valuation of Rural Real Estate” (Elective, 6 ECTS credits).

The Real estate valuation module has theoretical and practical parts, where students are learning types of values, principles of valuation, basic valuation approaches, valuation technics, real estate cycles, and value factors. The national system for real estate valuation is discussed, methodologies, laws and bylaws, but also international standards and organizations such as IVSC and TEGOVA are part of the course lectures. The mass valuation approach is also taught in this module.

The content of the module:
1. Differences between cost, price, and value, and different real estate value types
2. Factors influencing real estate value
3. Real Estate market cycles
4. Real Estate valuation process
5. Real Estate valuation approaches
6. Cost approach
7. Comparison approach
8. Income valuation approach, discount cash flow, and direct capitalization methods
9. Structure and content of valuation reports
10. Practical exercises on the valuation of different real estate properties
11. TEGOVA and IVSC valuation standards
12. Mass valuation vs single property valuation

• In Ukraine (Mykolayiv National Agrarian University) “Normative and Expert Valuation of Land” (Elective, 3 ECTS credits)

The aim is to strengthen the theoretical knowledge and practical skills in the valuation of agricultural land, methodological approaches, methods, and evaluation procedures with the analysis of various evaluation situations regarding land plots with and without improvements.

The content of the module:
1. Theoretical foundations of land valuation
2. Legal principles of land valuation
3. Normative monetary valuation of agricultural lands
4. Determining the amount of land tax and rent
5. General provisions of expert monetary land valuation
6. Basic methodical approaches to expert monetary land valuation
8. Expert monetary valuation of agricultural land using the method of capitalization of net income

• In Ukraine (State Biotechnological University) “Expert Monetary Valuation of Land Plots” (Mandatory, 6 ECTS credits)

The purpose of the educational discipline is to deepen theoretical knowledge and form professional skills in the field of land and other real estate valuation, particularly the specifics of expert monetary valuation of land plots and rights to them.
The study of the theoretical and legal principles of carrying out expert monetary valuation of land plots is expected; deepening of knowledge and formation of professional skills of a future specialist in the evaluation of real estate objects, expert monetary valuation of land plots, selection of methods and approaches to the evaluation of land plots, implementation of evaluation procedures, etc. is foreseen.

The content of the module:
1. Basics of carrying out an expert monetary valuation of a land plot
2. A methodological approach to capitalizing net operating or rental income
3. A methodological approach to comparing the sale prices of similar land plots
4. A methodological approach to the valuation of land improvement costs
5. Valuation of built-up land plots
6. Valuation of land plots used as agricultural land
7. Evaluation of land plots covered with forest vegetation intended for forest cultivation
8. Evaluation of land plots of water bodies
9. Evaluation of other land plots and rights to them
10. Peculiarities of valuation of land plots included in land consolidation projects

In Ukraine (State Biotechnological University) “Normative Monetary Valuation of Lands of Various Purposes” (Mandatory, 6 ECTS credits)

The purpose of the educational discipline is to deepen theoretical knowledge and form professional skills in land valuation for various purposes and functional uses, in particular, the peculiarities of the normative monetary valuation of land plots and the application of its results.

The study of the theoretical and legal foundations of the normative monetary valuation of land plots of various purposes and functional use is expected; deepening of knowledge and formation of professional skills of the future specialist in real estate valuation, selection of methods and approaches to valuation of land plots, implementation of valuation procedures and application of valuation results is foreseeing.

The content of the module:
1. General principles of carrying out a land plot normative monetary valuation
2. Segmentation of the area during the land valuation
3. Normative monetary valuation of agricultural lands
4. Normative monetary valuation of land for residential and public development
5. Normative monetary valuation of forestry lands
6. Normative monetary valuation of nature-reserved and other nature conservation lands, lands for recreational purposes, and lands of historical and cultural purpose
7. Normative monetary valuation of water fund lands
8. Compilation of technical documentation on the regulatory monetary valuation of land plots and an electronic document
9. Use of data of normative monetary valuation of land plots

V. Sample modules on Regional and municipal spatial planning

In Estonia “Regional Development and Regional Policy (Mandatory, 5 ECTS credits)

(Mandatory for those who select the real estate and land management module)

This module aims to give an overview of regional development processes, factors influencing regional development, and experience of regional policy in Estonia and different countries.

The content of the module:
1. The essence of regional development, the nature of changes in different countries, including Estonia
2. Regional problems and regional differences as a result of regional development processes
3. Factors and processes influencing regional development
4. Types and development of problem areas
5. The development and basic methods of regional policy
6. The bases of regional development activity

- **In Lithuania “Regulation of Land Planning” (Elective, 6 ECTS credits)**

The subject of land planning regulation is prepared for MSc students of land planning specialty. After the course, students should apply acquired knowledge in preparing territorial planning documents, which establish obligatory and recommended regulations for land planning.

The content of the module:
1. Documents regulating Lithuanian land relations
2. Strategic planning of land management
3. Analysis of land management projects and their procedures
4. Economic, social, and environmental justification for the arrangement and formation of land plots
5. Works on changing the composition of land use and their connection with rational land use planning
6. The scientific analysis and legal justification and issues to plan a rational layout of land plots, agricultural land, and forests

Seminar topics:
1. Historical development of land management works in Lithuania
2. Comparative analysis of land consolidation projects
3. Analysis of general plans and land management schemes

- **In Ukraine (Lviv National Environmental University) “Territorial Land-use Planning” (Mandatory, 5 ECTS credits)**

The module aims at the formation of theoretical knowledge, practical skills, and abilities to plan and organize land use on scientific and technological progress and rational use of land.

The content of the module:
1. Concepts, tasks, and principles of territorial land-use planning
2. Powers of state authorities and local self-government bodies in the field of land-use planning
3. Types of land-use planning documentation, its customers, and developers
4. Land consolidation as a tool of territorial land-use planning
5. Development of a land-use planning scheme, technical and economic justifications for land use and protection
6. Spatial development peculiarities of the preparation of a comprehensive plan for the territory of the administrative units
7. Establishing the boundaries of the territories of the administrative units
8. Peculiarities of the formation of land use and the arrangement of objects of the nature reserve fund, nature protection, recreational and health purposes
9. Justification of the planned measures regarding the rational use and protection of land
### In Ukraine (State Biotechnological University) “Regional Land Use and Protection Programs” (Elective, 6 ECTS credits)

The purpose of the educational discipline is to provide the future specialist with engineering knowledge for the selection of methods, techniques, and technical means to apply the latest technologies in the performance of design and research works and the necessary technical maintenance of land management solutions in the process of developing regional land management schemes and land management schemes of administrative-teritorial units, a compilation of project schemes, calculation of land areas and distribution according to different categories, design of nature protection objects; the ability to analyse the internal and external environment, making adequate management decisions.

The study of the theoretical and normative-legal foundations and measures for the development of the territories of administrative-territorial formations is expected; deepening of knowledge regarding the development of schemes and programs for the use and protection of land in different countries at different levels, the selection of methods and approaches to their implementation, the implementation of calculations of the economic effect of their introduction is foreseeing.

The content of the module:
1. General characteristics of lands and soil cover of Ukraine
2. Land use and protection programs
3. Planning schemes of the territory of Ukraine and its administrative and territorial entities
4. Application of GIS technologies during the development and implementation of land use and protection schemes and programs
5. Economic stimulation of rational use and protection of land in Ukraine

### VI. Sample modules on Agronomy and agricultural production, farming, and forestry

#### In Poland (Warsaw University of Technology) “Spatial Management in Rural Areas” (Mandatory, 4 ECTS credits)

During the module, students gain knowledge in the field of shaping the space in rural areas through arrangement and agricultural works, in particular the regulation of the agro-forest border. The course acquaints the student with the process of consolidation and division of real estate and forest land management.

Lecture:
1. Selected agricultural and arrangement works as an element of shaping space in rural areas in Poland and selected European Union countries
2. The role of the local spatial development plan in the area is subject to arrangement and agricultural works
3. The process of dividing agricultural real estates, merging and dividing real estates as well as merging and dividing real estates as tools for shaping the land for development (mainly housing) in areas excluded from agricultural and forestry production
4. Fundamentals of forest land management, in particular, the forest management plan and the simplified forest management plan, regulation of the agro-forest border

Project:
The use of Project-Based Learning, where students develop comprehensive design solutions for the research area, both taking into account the ownership and spatial structure of plots, as well as landscape aspects, analysed for the same research area within the subject of Shaping landscape, using the additional knowledge gained in other subjects and during the meeting with residents and field inventory.

The detailed content of the project is:
1. Analysis of the ownership, spatial structure, and use of registration plots based on materials obtained from geodetic and cartographic resources
2. Initial assessment of the current state
3. Getting to know the problems of spatial management in a selected commune during a meeting with employees of the commune office, councillors, and other interested people. Inventory of the use, investment status, and development of research facilities in the field

4. Development of an up-to-date map of use and photographic documentation based on fieldwork

5. Development of the concept of the functional and spatial division project for the selected area (precinct), taking into account the available data and local needs. Proposing remedial tools for the spatial structure and governance structure that will allow for rational, respecting the principles of sustainable development, and development of the area

6. Discussion on the solutions used in the projects in a group of students, and then the presentation of the projects and discussion with the residents

- **In Ukraine (Lviv National Environmental University) “Agro-landscape Arrangement of the Territory” (Mandatory, 3 ECTS credits)**

  The module aims to study the methods of arranging land use based on the principles of landscape ecology, optimizing the spatial arrangement of objects of intensive agricultural production in agro-landscapes with environmental protection measures.

  The content of the module:

  1. Scientific and methodological principles of agro-landscape planning in the context of sustainable development
  2. Landscape and ecological arrangement of the territory: problems and prospects of implementation
  3. Land zoning as a mechanism for the formation of ecologically safe and economically efficient land use within rural areas
  4. Land consolidation as a tool for improving the structure of agricultural landscapes
  5. Land-use planning works to achieve a neutral level of land degradation
  6. Formation of environmental land use based on the concept of ecological networks
  7. Justification of the agro-landscape planning: economic, ecological and social aspects

- **In Estonia “Land Conflicts Administration” (Mandatory, 2 ECTS credits)**

  The students will be provided with theoretical and practical advanced knowledge about the administration of land conflicts.

  The module focuses on the essence of conflict and its rising mechanism. Particularly the module handles land conflicts, their rising mechanism, and solving possibilities. The module gives the students to ability to work in the field of land administration and land management.

- **In Moldova “Negotiations and Communications” (Mandatory, 5 ECTS credits)**

  After graduation, the student will know the contents of the course unit contribute to the realization of a formative character of future specialists in the field of professional training – Consolidation of agricultural lands (understanding the role and complexity of communication and negotiation in solving the problems of land consolidation and sustainable rural development under the conditions of the competitive economy, acquiring the methods and techniques of communication and business negotiation with different partners; developing skills to obtain calculation results as close as possible to the real situation).

  The content of the module:

  1. Human communication
  2. Proxemics in business and interpersonal relationships
  3. Oral communication
4. Neuro-linguistic programming and message perception in the communication process
5. General characteristics of negotiations
6. Reasoning in negotiations
7. Preparation of negotiations for the conclusion of the agreement
8. Strategy and style in negotiations
9. Tactics and tips in negotiations
In recent years, the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Europe and Central Asia (REU) has supported 12 countries in the region by introducing land consolidation instruments and building up national land consolidation programmes. Training and capacity development have been important components of these projects and often were key determinants of project success. Building technical and administrative capacities of professionals working with land consolidation is one of the five minimum preconditions of an operational and sustainable land consolidation programme. Furthermore, it has proven to be the most challenging and time-consuming aspect of the five.

Universities play a key role in educating future land consolidation professionals as well as in updating the skills of specialists already working on projects through life-long learning programmes. With the overarching goal of strengthening educational programmes related to land consolidation and land banking and fostering cooperation among universities in the region, this study analysed the current educational programmes related to land consolidation and land banking in 14 universities from 11 European countries, examined the demand for knowledge and skills of young professionals among the public agencies in charge of land consolidation in six countries, and proposed the structure and content of a new universal, generic course on land consolidation and land banking for Master of Science degree programmes.

FAO Regional Office for Europe and Central Asia
20 Kalman Imre utca
H-1054 Budapest
Hungary
https://www.fao.org/europe/en

Food and Agriculture Organization of the United Nations
Budapest, Hungary