SRC+

www.srcplus.eu

SRC+ PROJECT FINAL REPORT

SHORT ROTATION COPPICE (SRC) FOR LOCAL BIOENERGY SUPPLY CHAINS

Authors: Juan-Manuel Ugalde, Dominik Rutz, Christian Epp, Aurelie Leplus, Jacques Bernard, Ioannis Eleftheriadis, Aivars Žandeckis, Željka Fištre, Biljana Kulišić, Tomas Perutka, Dagnija Lazdina, Naumche Toskovski, Gordana Toskovska, Jannis Dimitriou

Images: Cover image Juan Manuel Ugalde, SRCplus harvest, France 2015.

Co-funded by the Intelligent Energy Europe Programme of the European Union

CONTENTS

INTRODUCTION

Biomass plays a key role among renewable energy sources (RES), accounting for almost 70% of European renewables, and showing steady growth. In the future, the demand for wood as fuel for heating, power and as construction material or for biomaterials is expected to increase rapidly. This will be mainly driven by market forces and supported by the targets of the national and European energy policy. Solid biomass from Short Rotation Coppice (SRC) or Short Rotation Woody Crops (SRWC) could contribute to Europe's 2020 targets.

SRWC are woody fast-growing tree species, such as poplar, willow, acacia, eucalyptus or paulownia, which are cultivated with the aim to produce high biomass yields in a short period that can be used for energy purposes. SRWC are harvested after a short period (3-20 years) and have to be either re-planted after harvest (sometimes practiced for e.g. eucalyptus or robinia) or grown as coppice (usually practiced for e.g. poplar and willow).

"Coppice" is characterised by the ability of the selected tree species to re-grow with new sprouts after the plant is cut down. The SRCplus project mainly focuses on the cultivation of trees in coppice cultivation.

The countries in Europe that have currently the largest areas of SRC for energy are Sweden, UK and Poland. In other European countries, the production of SRCs is limited and takes place at very small scale, but there are plans and the political will to increase SRC in the near future. Therefore, there is a need to implement actions triggering and accompanying the implementation of local supply chains of SRC in other European countries.

The SRCplus project promoted a sustainable production of SRC in eight target regions in seven different countries: Croatia, Czech Republic, France, Germany, Greece, Latvia and Macedonia.

This publishable summary report presents the main results, achievements and lessons learnt of the SRCplus project.

Figure 1: „Traditional coppice“ as it was a frequent management practice in the past for e.g. willows (in the front) and „modern coppice“ of a short rotation poplar plantation (in the background of the image)

PROJECT OVERVIEW

The SRCplus project was co-funded by the Intelligent Energy for Europe Programme of the European Union from March 2014 to February 2017. The SRCplus project supported concrete implementation of local supply chains of SRC. Thereby synergies with other agricultural uses and especially with ecosystem services and nature conservation measures have been used. The general objective was to promote the most efficient energy conversion processes of SRC, namely heat and combined heat and power production (CHP).

SRCplus was implemented by a consortium of 11 partners, whereas the project was coordinated by WIP Renewable Energies (Germany): Centre for Renewable Energy Sources and Savings (Greece), Ekodoma (Latvia), Energy Institute Hrvoje Požar (Croatia), Energy Agency of the Zlín Region (Czech Republic), LSFRI Silava (Latvia), Swedish University of Agricultural Sciences (Sweden), Secondary School of Agriculture Car Samoil – Resen (Macedonia), Biomassehof Achental GmbH & Co. KG (Germany), Association d'Initiatives Locales pour l'Energie et l'Environment (France) and Community of towns of Trièves (France) (who withdrew from the project in May 2015).

Figure 2: SRC harvest of a SRC plantation in Bavaria

SRCplus Work Plan

The work plan of the project focussed on implementing various capacity building measures and regional mobilisation actions for the key actors in local supply chains. The SRCplus actions were expected to deliver the following key outputs:

- Promotion of sustainable agricultural practices for SRC cultivation in order to create synergies between bioenergy production, nature conservation and ecosystem services.
- Knowledge transfer on SRC supply chains between 7 target countries (DE, CZ, EL, FR, HR, LV and MK), Sweden and other European countries (handbook, good practices, information on markets) as well as in selected regions of these countries.
- 68 capacity building events for the main target groups in the SRC supply chains: 14 training courses for farmers, 14 seminars for public land owners, 7 information days and 14 workshops for small and medium users of woodchips, as well as 10 local site visits, 1 international study tour, 7 national workshops to involve further regions, 1 European Workshop at the end of the project enabling these target groups to start sustainable SRC production in 7 target regions and beyond.
- Regional mobilisation actions to stimulate the implementation of SRC supply chains in the target countries and regions and beyond.
- Dedicated cooperation activities with the industry involved (seedling providers, agricultural equipment suppliers, boiler manufacturers) in the supply chains in order to disseminate practical experiences to the target groups.
- Promoted sustainable practices in the SRC supply chains in order to create and highlight especially the environmental benefits of SRC in comparison to other (annual) crops. Thereby, the project cooperates with environmental protection associations (beekeepers, hunters, ornithologists' nature conservation, water supply, fire protection), to exploit synergies with other agricultural uses and ecosystem services.

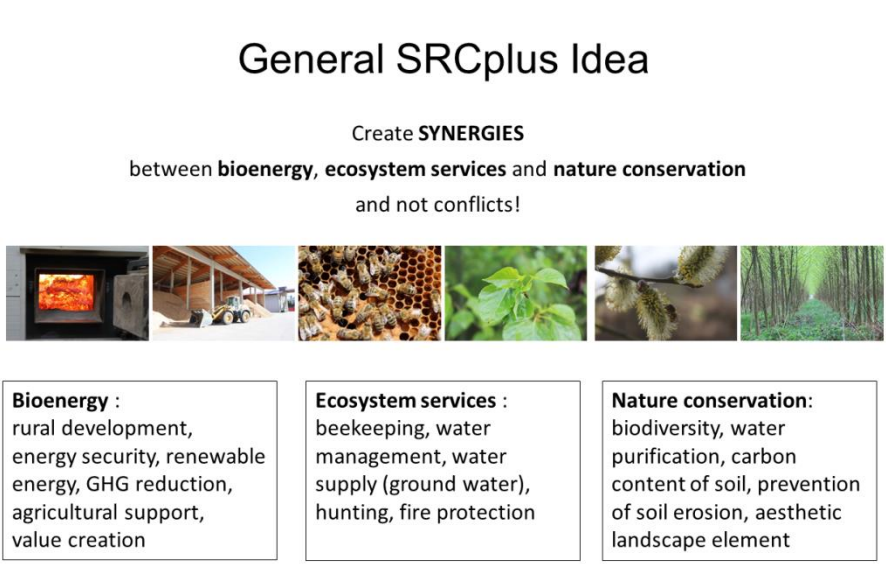


Figure 3: Core idea of the SRCplus project: promote synergies between bioenergy, ecosystem services, and nature conservation

Target Groups

The SRCplus project implemented activities specific to the target groups and adapted the situation in different countries/regions. SRCplus was addressed to the following main target groups:

Farmers were one of the target groups due to most of them did not grown SRCs on their lands. In particular, for this target group is not easy to recognise that SRC is a very promising alternative source of income by cultivating fast growing tree-species as a sustainable source for bioenergy. SRCplus developed training events for farmers to include them in project activities to increase the number of SRC plantation within the target regions. Experience from farmers that already grew SRCs in a sustainable way were highlighted and disseminated as good practice examples to other farmers in the region and elsewhere.

Public land owners (communes, towns, municipalities, districts) were targeted within the project to their capacity to grow SRCs on the available public land. Normally, public land owners are not familiar with growing SRCs and lacked know-how in this field. Therefore, the project provided them with the necessary knowledge, and involving them in regional mobilisation activities. The possibility to establish SRCs on set-aside land for compensation measures is also a highly interesting tool for public land owners.

Small and medium users of woodchips (small utilities of heat and CHP, woodchip traders) represent the users of woodchips in the local supply chain. The SRCplus project addressed to promote the utilisation of woodchips from SRCs, by providing trainings on the quality and standardisation issues, to enable this target group to be part of the woodchip utilisation business from SRCs.

The involvement of **key actors** was essential to create synergies, implemented project actions and achieved the expected SRCplus results within the complex bioenergy sector composed by many stakeholders. SRCplus' key actors were mainly different associations and local authorities, considering: associations and chambers of farmers; training providers for agriculture and energy; associations of public bodies and local/regional development; associations of energy production; associations for nature

conservation and ecosystem services (nature protection, ornithology, biodiversity, fire protection, hunting, beekeeping, water supply); and industry involved in the SRC supply chain

The involvement of such key actors facilitated the exchange of experiences, information about the market situation, best practices examples, and sustainability issues.

Target Countries and Regions

The target regions of the SRCplus project are located in 8 regions within 7 countries:

- Upper Bavaria region/Achental (Germany)
- Eastern Croatia (Croatia)
- Vidzeme (Latvia)
- Rhone-Alps (France)
- Brittany (France)
- Zlin (Czech Republic)
- Kentriki Makedonia (Greece)
- Prespa (Macedonia)

Sweden is a best practice country that transferred know-how and experience on local supply chains of SRC to the target regions.

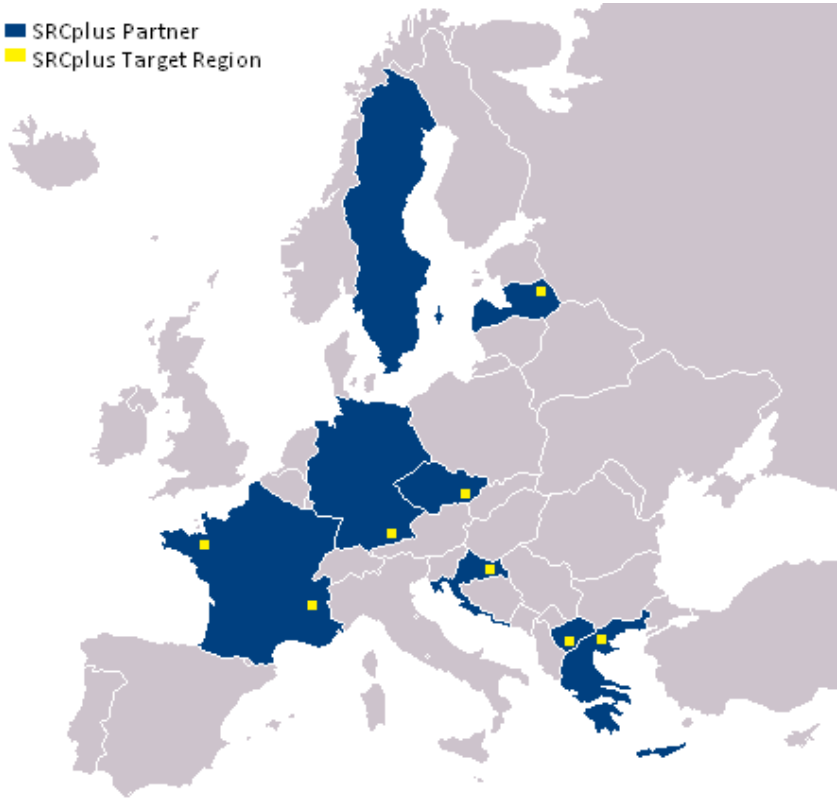


Figure 4: SRCplus target countries and regions

RESULTS IN THE TARGET COUNTRIES

Croatia

In Croatia, one of the main current barriers for SRC development is the long duration in the legislation development which commenced in 2014 and, due to the external consequences, it is still ongoing. Therefore, EIHP was engaged in involving relevant Ministries, and other relevant stakeholders responsible for policy framing on SRC system characteristics and possibilities with SRC implementation. Many representatives participated actively at SRC activities, and SRCplus team gave an appropriate feedback on draft policy documents. One of the major questions was on which type of land should it be allowed to grow SRC. This issue will determine the development potential of SRC markets and supply chains. The project provided the insight in the lucrativeness of establishing a SRC plantation in Croatia, given the different type of land and practice, which was the main material to verify the effectiveness of the future Law on SRC and economic potential of SRC for Croatia.

Furthermore, the SRCplus project calculated real costs for the establishment of SRC plantations under national conditions, using reference prices given by the Agriculture Extension Service, and compared them to other cultivation options for Croatian farmers. This information is important as such transparent and unbiased calculations were lacking for Croatia. The results were presented at project events (training, workshops, seminars, conferences) and at the 5th Central European Biomass Conference. The main conclusions were:

- Planting SRC plantations on agricultural land is an attractive option for farmers to generate more income in comparison with land lease and land sales.
- In average, planting SRC plantations cannot compete with conventional crop farming, but it is a worthy option in comparison to land lease and

land sale. Yet, if a farmer is to retire from an active crop production, SRC is the second best option.

- Higher biomass yields from intensive SRC plantations justify higher investments and exceptions from green agricultural payments, in comparison to extensive SRC plantations.
- As a rule of a thumb, establishing SRC plantations on marginal land increases the investment cost by 2.5 and decreases the biomass yield by half. Reducing the land suitable for SRC plantations only to marginal land means that additional measures are needed to unlock the technical potential of SRC in Croatia.
- A combination of low input SRC with animal farming seems to be a promising option.

Figure 5: Croatian Ministry of Agriculture, Mr Romic

Czech Republic

Figure 6: SRCplus target region in Czech Republic

In the area of Králov near Uhersky Brod, the interest of a private investor considers a long-term strategy to grow SRC. The potential of the area is up to 500 ha of farmland. In Bánov, 20 ha plantations were planted and in 2014 further 20 ha have been planted at an altitude of 350 m. The SRC woodchips from this plantation were planned to be an export product to some large-scale boilers belonging to companies outside the Zlín Region.

In 2013, the partnership cooperation in the SRCplus project was established with the aim to set up a supply chain within the Zlín Region.

Based on the long-time cooperation between the Energy Agency of the Zlín Region (EAZK) and the district heating systems (DHS) of the Zlín Region, the closest 3 DHS to the plantation were contacted during the SRCplus project

and options for the value chains were discussed. As a result of this cooperation, the harvesting in the Bánov plantation was implemented in February 2017 with the presence of representatives of all 3 DHS, and other relevant stakeholders. Altogether, 17 ha of SRC were harvested in 4 days. The 3 DHS in Hostětín, Slavičín and Brumov-Bylnice produced 23 tons of SRC each to use it in their boiler rooms for heating. The aim of this action was to establish the supply chain within the Zlín Region and to develop formal and informal networks between the stakeholders. All DHSs are located within a 30 km radius from the plantation. There is a high chance that in the next years the harvest of the 23 ha SRC plantations will be exclusively used for the Zlín Region.

Figure 7: The city of Zlín, Czech Republic

France

Figure 8: Landscape of Le Mené Community in Brittany

Le Mené community in Brittany (France) is a recent unification of 7 villages aimed to become a "zero net energy" territory by 2025, meaning a territory producing all the energy that it consumes. Today, five biomass boilers contribute to the energy mix in the municipality with 1MW total installed capacity. Biomass comes from local wood and hedges. As it may not be sufficient in the future to supply the local needs of wood, the community launched a programme for planting SRC. The community planted 30 ha of SRC in partnership with farmers. The community and farmers involved locally in SRC development hosted the SRCplus meeting project in February 2016, to exchange their experience and questions on SRC development with the other Regions' partners. The SRCplus project focused on cooperation and kick-off activity with Le Mené Community in order to help them organising new SRC plantations. At the end of the project, Mené Community is looking for new sites to double SRC production.

While planting SRC on agricultural lands in rural territories is possible, other strategies should be considered for urban areas - it is being experimented in Lorient, Brittany – a city of 60,000 inhabitants. The city targets to reach 50% of renewable energy share in building stock by 2020. The City operates four biomass boilers and developed its own woodchips platforms, collecting wood from different sources. To contribute to the long-term management of the resource, the City launched a "20,000 trees programme" for planting trees on the 11 hectares of unexploited public land, such as on land along roads. SRC are part of the tree plantation programme. Wood energy production from the unexploited areas could contribute to 10% of the City's wood energy's needs. The SRCplus project has enabled cooperation between AILE and Lorient's City. A training session on SRC has been organised for the Lorient City representatives (elected bodies and staff) and allowed SRC to be part of the tree plantation programme.

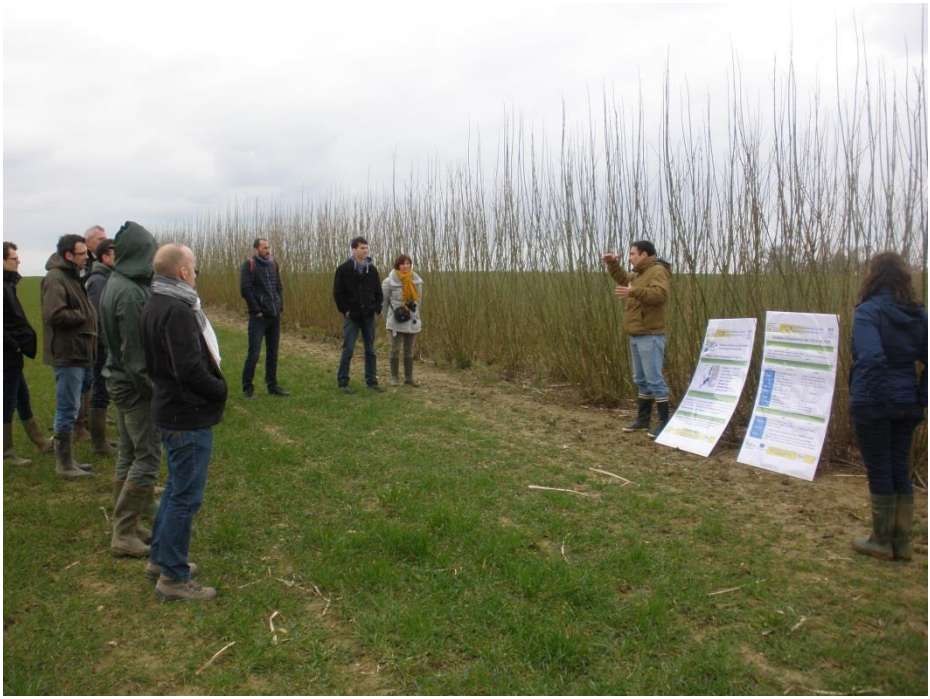


Figure 9: Promoting SRCplus in Belleville en Caux, France

Germany

Figure 10: SRC plantation in Achental, Bavaria, Germany

A main finding of the SRCplus project is the high potential for SRC in niche sectors with significant environmental benefits. BAT managed in the SRCplus project to implement a first Best Practice for this by planting energy crops in the river catchment of the lake Waging, which is highly affected by nutrients washed into the water by precipitation. These plantations will hold back the rainwater and support bacteria cultivation, which pre-treats the water before it flows into the lake. In this way, the SRC at “Waginger See” will contribute to the regional energy autarky and support the safeguard of surface water at the same time.

BAT demonstrated the harvesting of a 3 ha SRC plantation in the region, which was planted on a very wet soil of marginal quality. The moisture in the ground is a big challenge for the harvesting technology, particularly in the present times of climate change, when the soil does not freeze every winter.

The first half of the field was harvested with a newly designed harvesting gear, which has a lighter weight and broader tires. The second half was harvested with chipping arm machinery, which provided more protection to the ground. Testing both harvesting technologies on one SRC has produced a very informative insight into the best way to harvest SRC on marginal wetland.

BAT has been able to mobilise actors at all links of the regional mobilisation chain, starting with the Achental farmers and forestry organisations, followed by all actors for biomass processing like the lenders of harvesting and operators of chipping machinery, rounding up with the biomass consumers from the public and private sector. These newly forged alliances will lay the ground for enhanced SRC activities in the region in future.

Greece

The research on cultivation of fast growing forest species (SRF or SRC) started in Greece during the sixties', aiming to support the production of wood products of biomass for energy, or even for other purposes. The region of Kentriki Makedonia has been one of the target regions for the cultivation of such species (mainly poplars). In the framework of the national programme for rural development (http://www.agrotikianaptixi.gr/) more agricultural areas are covered by fast growing (mainly black locust) and other forest species. Currently, ca 2,000 ha of poplar and robinia plantations on agricultural lands had covered the region, creating a good background for biomass production, potentially available for further exploitation in the sectors of bioenergy and bio-products. Additionally, due to its policy for environmental and landscape recreation, the Public Power Corporation (PPC) established two decades ago a robinia plantation in an area of 2,000 ha in a former lignite mining area in Dytiki Makedonia region. Considering that existing power plants in the region are coming to an end of their operational lifetime, PPC has plans for the installation of biomass CHP or biomass DH, as power plants are currently heating providers. PPC participated in the SRCplus workshop organised outside the target region, presenting the current state of plantations and its future plans for bioenergy production. The company participated in the SRCplus workshop organised outside the target region promoting its work on woody plantations, and also presenting the successful establishment of woody crops, restoration of marginal lands and cooperation with farmers. In the framework of SRCplus project the company asked CRES for a contribution on exploitation of their crops (mainly harvesting and handling of raw material) for bioenergy production, as well as, the continuation of their plans for the establishment of new 5 years rotation robinia crops in new lands.

Figure 11: Harvesting poplar and residues (private farm, Kentriki Makedonia region)

The 'Eucalyptus' company aims to provide required biomass volumes to the energy producers. The main objective of the company is to provide the necessary raw material to potential investors with stable prices. The company also targets the cultivation of 4,000 ha in the country (southern and central Greece) by contracting farmers. In order to support its future plans, the company will create groups of skilled employees to provide expertise in the fields of plantation, harvesting and transportation of raw material, aiming to overcome possible barriers in production and handling of wood chips, promoting also the cultivation of Eucalyptus species and important environmental benefits. The staff of the company participated in the first training seminar for farmers, by providing input and promoting their current experience in growing planting material, the establishment of woody crops and the current and future plans for cooperation with farmers. The company formerly supported the proposal submission of SRCplus project providing a letter of support.

Latvia

Figure 12: SRCplus plantation in Latvia

The country's main success is related to the increased number of interested stakeholders to grow SRC, such as willows, poplars and grey alders. Since the beginning of the project, a project area of Populus sp. increased significantly from 31 to 174 ha, while areas of willow plantations increased from 370 ha within the recent years to 514 ha in 2016. Grey alder is the less popular species, though it increased from 11 to 14 ha. The SRCplus project focused on the kick-off activities and cooperation with different stakeholders in order to help them to organise new SRC plantations. This contribution resulted in more than 64 ha of new SRC plantations, where 38 ha were planted during the project lifetime.

Several important dissemination activities organised in Latvia were accompanied by filming crews from several television companies. Contributions of the filming crews have been broadcasted on regional and national television. A video on Best Practice visits in Skrīveri and Ventspils was broadcasted in channel LTV7. Material about workshops for small and medium users of woodchips organised in Valmiera region were broadcasted on Vidzeme Television and Latvian Television channels. The second part of

the national workshop held in Olaine, was accompanied by the Latvian Television crew, broadcasted in channel LTV7. Video materials are still available on the LTV7 YouTube channel, Silava's website, and broadcasting companies. Moreover, information about SRCplus activities and its results have been published in several regional newspapers and in the agricultural magazine *Agro Top and forestry magazine Baltijas Koks* (*Baltic Timber*). Media and press activities ensured efficient dissemination of ideas and outcomes of the project within a wide audience. People who did not manage to participate in SRCplus activities had an opportunity to gain information about aspects related to SRC cultivation.

The printing of handbooks was very successful – 2,000 copies were printed. So, far at least 500 copies have been distributed within participants of the events (seminars, workshops, training, meeting, etc.) and partners of the project. Also, handbooks have been sent to the main libraries, universities, forest and agriculture related NGOs. The handbook is available in the libraries of LFRI Silava and SIA Ekodoma; information about the handbook's publishing is posted on LFRI Silava's website, under the actualities.

Researchers from LFRI Silava participated in several meetings at the Latvian PEFC Certification Council in order to present and discuss aspects related to cultivation of SRC. Researchers took an active part in the elaboration of local FSC standard for Latvia. As a result, the SRC plantations activities are now included in the Latvian PEFC standard and can be certified according to PEFC certification scheme.

Figure 13: SRCplus timber collection after harvest

Macedonia

Figure 14: Prespa Lacke, Macedonia

Biomass has an important place in the energetic balance in Republic of Macedonia. It contributes with 166 ktoe (1,930 GWh; 6,950 TJ) or 11.5% of the total produced energy. Burning biomass represents 59% in the usage of renewable sources of energy and it is present in households with 33% of its total energy needs. Approximately 76% of the households in Macedonia use biomass for heating. Macedonia has experience in waste biomass treatment (around 380 GWh), especially the biomass from cutting forests and processing trees industry, which is used for heating and for combined production of heat and electricity. Planting and growing SRC, which was promoted in the SRCplus project, as an agricultural practice is a new opportunity and challenge for the farmers, public landowners and businesses. Low-input in agricultural practice and an increased demand of solid wood biomass in the regional markets are part of the national strategy

for energy efficiency. The SRCplus project identified that the SRC production has a high potential in Macedonia.

The SRCplus project was implemented in the region of Prespa (south-west part of Republic of Macedonia) and promoted sustainability in cultivation in order to inform interested stakeholders on how to set-up and manage SRC plantations in a best sustainable approach. The SRCplus project helped to increase awareness for SRC crops through project training events. More than 150 participants, representatives of farmers' organizations, authorities and users of woody biomass, owners and concessionaires of public land, enterprises from the Prespa region and beyond were involved in training sessions. Several local farmers were motivated to establish SRC plantation on approximately 20 ha of poplar.

GENERAL RESULTS

Overview on SRCplus Achievements

The SRCplus project contributed significantly to knowledge transfer and capacity building on short rotation coppice, both in the target countries, but also beyond. The following list summarizes the most important achievements.

- A report on "Sustainability criteria and recommendations for SRC" was compiled with the aim to provide a general overview on the sustainability of SRC cultivation in order to inform plantation owners and interested stakeholders on how to set-up and manage SRC plantations in a best sustainable manner. The report was translated in the target country languages and adapted to the national framework conditions.
- A comprehensive Handbook on Sustainable Short Rotation Coppice (104 pages) was compiled in order to present appropriate agricultural SRC practices in Europe, whereas the different framework conditions, such as climate, are considered. The handbook was written in English and was translated into the national languages of the target countries.
- SRCplus participated and promoted SRC at 14 agricultural trade fairs
- 14 meetings with farmers associations were organised
- 14 training events for farmers were organised; the training courses were evaluated by the participants with a questionnaire.
- 9 best practice visits were organised

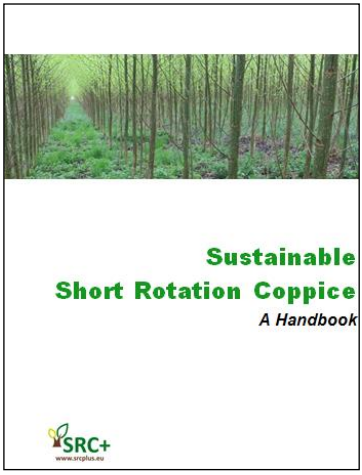


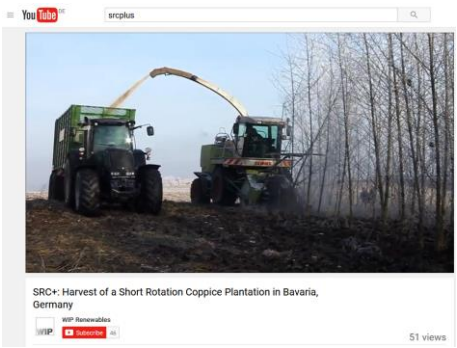
Figure 15: SRCplus Handbook

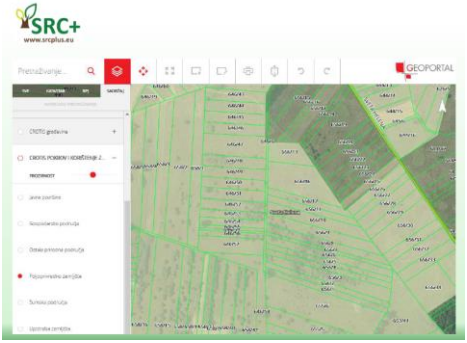
- SRCplus cooperated with the relevant industry (seedling providers, SRC service providers, machinery manufacturers, etc.).
- Contacts to 191 municipalities and other associations were established in order to promote SRC
- The SRCplus project was promoted by the consortium at 24 events of public landowners, decision makers and associations
- 14 seminars for public landowners were organised with more than 270 participants trained. The seminar material was prepared and made available to interested stakeholders. Furthermore, the project partners discussed how to integrate SRC into regional strategies and development plans.
- More than 700 individuals participated in 21 events organised for small and medium users of woodchips.
- Individual strategies and implementation concepts to set-up new SRC sites were elaborated for each target region. They were discussed with relevant stakeholders.
- 7 workshops beyond the target region, on national level were organised

Figure 16: SRCplus label

- In total 17 round table discussions and 49 one-to-one meetings were organised during the project.
- As a result of these activities 32 letters of commitment were collected by the partners from key actors who confirmed to establish new SRC plantations.
- The SRCplus project implemented an exhaustive promotion and dissemination campaign, including the set-up of a website (English and target country languages) and the use of social media. The project website had 7,302 page views and was visited from 111 countries.

- The project issued 5 newsletters in English, translated in national languages; these were broadly disseminated within WIP's stakeholder database and other regional partners' databases.
- The cooperation with nature conservation and ecosystem service associations was crucial for the development of the project; these associations participated directly in the capacity building activities and training events.
- An international study tour of an SRC planation was organised in Sweden.
- A final dissemination workshop in Brussels presented the main results of the project.


srcplus
SRC+: Harvest of a Short Rotation Coppice Plantation in Bavaria, Germany
WIP Renewables
Subscribe
51 views


SRC+
www.srcplus.eu
GEOPORTAL


Informirali o KKO preko 350 dionika u RH i šire






Figure 17: SRCplus implementation activities

Identified Barriers

The Objective of SRCplus was to reduce barriers and to support the establishment of SRC. Although this was achieved, several barriers still exist and need to be tackled in the future. The following list highlights some of the most important barriers:

- In many countries or regions good practice examples of SRC plantations and SRC value chains are missing. It would be important to support pilot plantations in order to show them to interested stakeholders.

- Potential SRC producers (farmers, public land owners) generally lack knowledge on SRC as this is a new cultivation type, usually established for 20 years or more. This is a key difference to annual crops.

- Depending on the legislation, SRC is usually cultivated on land that is classified as arable agricultural land. However, in some countries, it is classified as forest area, or it is not yet classified yet. Legislation usually regulates on which land SRC can be grown. Sometimes, it is forbidden to grow SRC on a certain land type, even if it would create positive environmental impacts.

- Users of SRC wood chips (heat producers, traders) so far mainly focus on woodchips from the forestry sector, as SRC is relatively new for them. They lack knowledge on woodchip production from SRC and their specific characteristics.

- There is a lack of awareness on the potential advantages from sustainable SRC production, especially the environmental advantages compared to annual crops

- The establishment of a SRC is related to large initial investment costs at the initial phase of the plantation.

- In some regions, the suitable equipment for planting or harvesting is absent. There exists a chicken or egg problem between machineries and plantations.

- The Common Agricultural Policies recognizes SRC, but does not support it appropriate enough in order to have a significant increase of new plantations.

- Generally, biomass heating systems suffer from the currently low oil price, although biomass fuels are usually cheaper than fossil oil.

- Stakeholders may have concerns about the sustainability of SRC, especially if it is related to larger plantations. However, the environmental impact always depends on the former land use on the specific plot. Compared to annual crops, the environmental performance of SRC generally performs well.

Arguments for SRC

The cultivation and use of SRC source can be generally valuated positively, as it presents a renewable energy source with a relatively short and closed life cycle, in comparison to fossil fuels.

However, the main constraint is the potential conflicts with other land uses, either for the production of other agricultural commodities or for nature protection goals. Thus, the impact of the land use change is an important issue that needs to be assessed individually for each new planned SRC plantation and can be optimised as described in the SRC report on "Sustainability criteria and recommendations for short rotation woody crops". Often, the result will be very positive, especially when SRC is cultivated on highly intensive agricultural land and landscapes. However, on several locations and in several situations, the establishment of SRC may have also negative impacts and these shall be avoided or minimised.

It has to be recognised that any new SRC plantation (as any cultivation change) is confronted with trade-offs. The challenge is to identify those areas that have the smallest negative impacts and that maximise the positive ones.

Besides environmental issues, the following arguments can be given for interested stakeholders (farmers) to invest in new plantations:

- On large fields, the cultivation of SRC can act as wind break reducing wind erosion. SRC on steep slopes can reduce water erosion. The soil is the main asset of a farmer as it is the basis for fertility and high yields.

- Doubts exist often about the re-cultivation of the plantation (removal of stumps and roots) after the life time of the plantation. Nevertheless, machinery exists that can easily re-cultivate former SRC plantations in arable land. After re-cultivation, the soil is usually fertile not contaminated with pesticides and very suitable for annual crops or grassland again. However, the costs for re-cultivation must

be considered already in the beginning of the new project, in the economic calculation.

- SRC can be applied as „agroforestry“ system in which SRC together with annual crops or even with animals can be cultivated in one system and thus creating multiple positive impacts.

- SRC plantations usually require lower inputs and lower staff efforts. SRC may be very suitable for farmers that want to generally reduce working efforts. However, especially during the establishment and harvest, personnel is needed.

- SRC can be a good option to lower the input costs of conventional agriculture in areas with significant share of non-utilised agricultural land. Namely, non-utilised agricultural land is not only a question of idle resource but also a source of uncontrolled pest and weed seed production. SRC plantation is easily converted to crop land when demand for conventional cropping appears.

- SRC may be especially suitable for smaller plots and can be economically very attractive if the biomass is self-consumed by the plantation owner.

More information:

www.srcplus.eu

https://www.facebook.com/groups/716265301749562/

https://twitter.com/srcplus2014

Contact:

juan-manuel.ugalde@wip-munich.de

dominik.rutz@wip-munich.de

SRC+
www.srcplus.eu

WIP Renewable Energies, Germany

Biomassehof Achental, Germany

Secondary School Car Samoil - Resen, Macedonia

Swedish University of Agricultural Sciences, Sweden

Latvian State Forest Research Institute Silava, Latvia

Association of Local Initiatives in the field of Energy and Environment

EIHP, Croatia

EKODOMA, Latvia

CRES, Greece

Energy Agency of the Zlin region, Czech Republic

Co-funded by the Intelligent Energy Europe Programme of the European Union