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ENVIRONMENTAL REVIEW CHECKLIST FOR IDENTIFYING POTENTIAL ENVIRONMENTAL IMPACTS OF PROJECT ACTIVITIES AND PROCESSES

for: Agriculture Entrepreneurship Incubator

Implemented under: Sustainable Local Development Project (SLDP)

DCN: 2013-SRB-022

Prepared by: Chemonics International Inc

ENVIRONMENTAL REVIEW CHECKLIST FOR IDENTIFYING POTENTIAL ENVIRONMENTAL IMPACTS OF PROJECT ACTIVITIES AND PROCESSES

The Environmental Review Checklist for Identifying Potential Environmental Impacts of Project Activities and Processes (ERC) is intended for use mainly by implementing partners to: assess activity-specific baseline conditions, including applicable environmental requirements; identify potential adverse environmental effects associated with planned activity(s) and processes; and develop environmental mitigation and monitoring plans (EMMPs) that can effectively avoid or adequately minimize the identified effects. This ERC can also be substituted for other ERC versions that may have been attached to project initial environmental examinations (IEE). If implementing partners are in doubt about whether a planned activity requires preparation of an ERC, they should contact their Contracting Officer's Representative (COR)/Agreement Officer's Representative (AOR) for clarification. *(When preparing the checklist, please indicate "not applicable" for items that have no bearing on the activity.)*

A. Activity and Site Information

Project Name: ***(as stated in the triggering IEE)***	Sustainable Local Development Project (SLDP)
Mission/Country:	**Republic of Serbia**
DCN of Triggering IEE:	*2013-SRB-022*
Activity/Site Name:	Agriculture Entrepreneurship Incubator
Type of Activity:	Facility Assessment and Design
Name of Reviewer and Summary of Professional Qualifications:	Jelena Vujadinovic Colic, Environmental Compliance Specialist
Date of Review:	October 12, 2013
Date of 2nd Review	December 13, 2013

B. Activity Description

B.1.Activity purpose and need

The USAID Sustainable Local Development Project (SLDP) is a five-year program designed to improve the capacity of Serbian municipal governments, business advocacy groups, and civil society organizations in creating and implementing policies, procedures, and projects that will contribute to area-based economic development and good governance. By promoting inter-municipal collaboration in area-based programming and in the delivery of joint services, SLDP will increase the efficiency and transparency of local government operations by helping create mechanisms for public input into the local government decision-making process and increasing opportunities for youth to become engaged in the economic and political life of their communities.

SLDP includes the following components:

1. Inter-Municipal Cooperation Programming
2. Public Administration Reform
3. Youth Development and Participatory Mechanism

Under the component 1, SLDP supported establishment of Inter-Municipal Cooperation (IMC) between the City of Zrenjanin and municipalities of Kikinda and Novi Becej and developed the Program named "Diversification of Agriculture - New Jobs for Rural Youth". Keystone of the proposed Program in Zrenjanin-led IMC area is to increase the variety of regionally produced high-value vegetable crops, which are more suitable to small parcels of land and have a market demand, as a way to boost creation of new farm businesses and employ rural youth.

As part of the Program, SLDP is supporting establishment of Agricultural Incubators in three municipalities from Zrenjanin-led IMC area, to help limited resource and unemployed young people to start their own farm business. Agricultural Incubators will provide the land, infrastructure and plastic, polyethylene high tunnel greenhouses for the production of off-season vegetables, as well as education and mentoring for incubator tenants. Agricultural Incubators program is designed to reduce the time and cost of establishing farm start-up businesses and it features greater support to new young farmers during the early stage of development, and phased out support as their farm matures.

The first phase includes short training program for unemployed youth interested to start farming business, as a first step towards selection of the tenants of agricultural incubators. The training program offers very basic and general knowledge on legal framework for a farm start-up, registration of agricultural household, business plan preparation, farmers' networking, marketing and sales of vegetables, and how to plan production costs in a small-scale vegetable growing.

At this stage, the training is not designed to provide in-depth information and learning experience to participants, such is detailed vegetable growing techniques and application of all agro-technical measures. The purpose of these initial trainings is to provide participants with sufficient information to enable them to choose the most profitable vegetables for the production in greenhouses and develop a business plan for the new farm business.

The best candidates for entry in incubators and the use of greenhouses will be selected through a business plan competition. Before and during their work in greenhouses, selected tenants of Agricultural Incubators will have advisory assistance from professional mentors on best agricultural techniques for vegetable production in closed environment. Advisory assistance to young farmers will be provided by the experts from local agricultural extension centers (vegetables growing agronomists and crop protection specialists) and agricultural associations and cooperatives.

Description of requested assistance

SLDP has been requested to provide support to the IMC Zrenjanin area by procuring plastic greenhouses of 8m x 30m x 3,6m size to be installed at three locations: in Novi Becej, Zrenjanin and Kikinda. Local authorities of all three cities will provide free of charge land and infrastructure required for the establishment of the Incubator greenhouses, including, electricity and water supply, preparation of the land for greenhouses' installation, proper storage for pesticides, and physical safeguarding of the Incubators. Also, local authorities will provide instructors for the initial agribusiness entrepreneurship and business planning trainings of unemployed youth, as well as mentors and experts that will provide advisory services to incubator tenants when Agricultural Incubators become operational.

SLDP will procure up to 40 plastic greenhouses depending on the number of selected candidates meeting the criteria for the incubator tenants. Construction and installation of greenhouses will be done by the contractor selected by SLDP, depending on whether the preconditions are met for effective and sustainable implementation of the Program. The activity will take place at three locations: Zrenjanin, Novi Becej and Kikinda where up to 20 greenhouses will be installed in Zrenjanin, 8 in Novi Becej and 12 in Kikinda.

Travel distances between these three sites are:

- Zrenjanin - Novi Becej (00h43, 37 km),
- Novi Becej - Kikinda (00h47, 37 km),
- Zrenjanin - Kikinda (00h59, 59 km)

Detailed requirements of the greenhouses specification / design are defined in "E. Engineering Safety and Integrity", pages 21-23.

B.2.Location of activity

Zrenjanin (20°23' long and a latitude of 45°23') is the biggest city of the Serbian part of Banat and it is its political, economic, cultural, and sports center representing crossroad of major inland routes and waterways; 50 kilometers away from Novi Sad, 75km from Belgrade, and 50km from the Romanian border. Road network at the territory of Zrenjanin City consists of highway, regional and local road network. The most important road routes are as follows:

Zrenjanin-Novi Sad
Regional road, connecting the motorway E75

Zrenjanin-Belgrade
Regional road, connecting to the motorway E70

Zrenjanin-Timisoara
International road to Ukraine and Moldova

Zrenjanin has a port on Begej River which is the part of Danube-Rein–Mein waterway network system connecting the North Sea to the Black Sea. Zrenjanin is situated on the western edge of the Banat loess plateau, at the place where the canalized River Begej flows into the former water course of the River Tisza, 80 meters above sea level.

The city of **Novi Becej** (Latitude: 45 35' 07" and Longitude: 20 14' 28'') covers 286.5 km² and has 13,123 inhabitants (2011census) with a density of 45.80 inhabitants per km².The average altitude is 80 m. Novi Becej is 65 km away from Romania, 115 km away from Croatia and 95 km away from Hungary. Road network is well developed, connecting the city to the motorway E75 and providing it a broad regional access.

In the territory of the City of Zrenjanin there are 23 rural local communities. Among them, the settlements of Zlatica and Muzlja are specific. Zlatica is a separate local community, but it functions as a part of the village of Lazarevo, while the settlement of Muzlja, a suburb, functions as an integral part of the City of Zrenjanin. The rural local communities have a total population of 52,000 inhabitants. The biggest village is Melenci (6,563 inhabitants), and the smallest one is Lukino Selo (595)

The city of **Kikinda** is located in the province of Vojvodina representing the administrative center of North Banat District. The town has 38,065 inhabitants, while the municipality has 59,453 inhabitants. The city is connected by rail to Subotica as well as to Belgrade (via Zrenjanina) Regional roads connect Kikinda with all the neighboring cities and villages, while the Danube-Tisa- Danube Canal provides waterway connection to the city. The municipality's seat is in the City of Kikinda which lies on 82 m altitude. It stretches over 13,5 square kilometers and is a typical Pannonia town.

The location of all three sites planned for installation of greenhouses is in sub-urban/rural area of Zrenjanin, Novi Becej and Kikinda, being publicly owned land and it is within the boundaries of General Spatial Plans of cities.

Figure 1. Project vicinity in Novi Becej

Figure 2. Project vicinity in Zrenjani

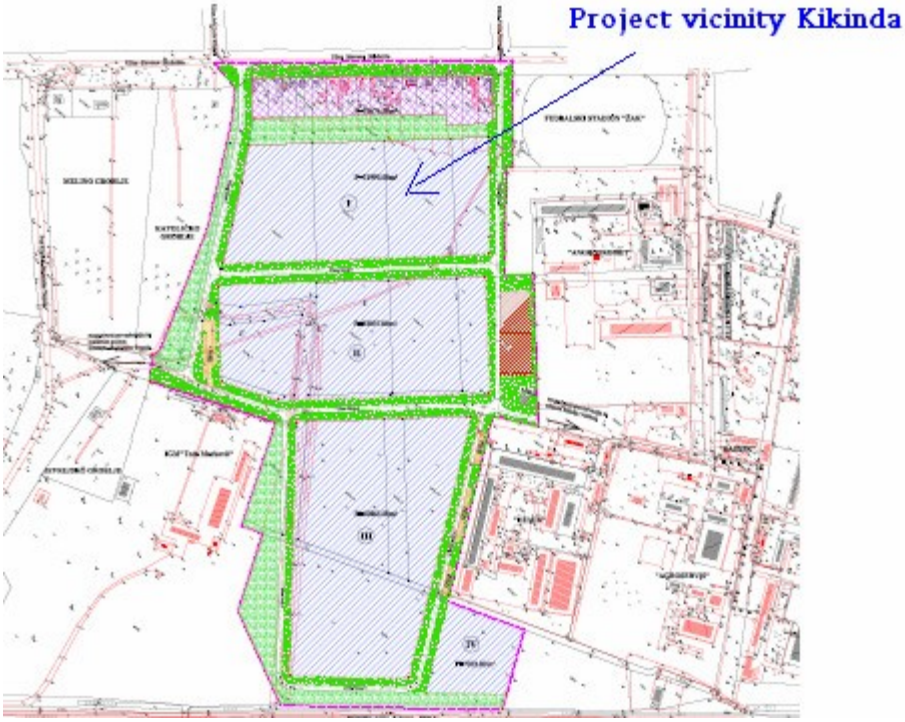


Figure 3. Project vicinity in Kikinda

The area under greenhouses will be as follows:

- Zrenjanin - 4864 m²,
- Novi Becej - 1945,6 m²,
- Kikinda - 2918,4 m²

Photo 1. Kikinda - project location in Agro-industrial zone

Photo 2. Novi Becej - project location

C. Activity-Specific Baseline Environmental Conditions

C.1 Population characteristics

Zrenjanin

The population of the Zrenjanin municipality is composed of:

- Serbs = 91,579 (74.24%)
- Hungarians = 12,350 (10.01%)
- Roma = 3,410 (2.76%)
- Romanians = 2,161 (1.75%)
- Slovaks = 2,062 (1.67%)
- Yugoslavs = 592 (0.48%)

Settlements with Serb ethnic majority are: Zrenjanin, Banatski Despotovac, Botos, Elemir, Ecka, Klek, Knicanin, Lazarevo, Lukicevo, Melenci, Orlovat, Perlez, Stajicevo, Taras, Tomasevac, Farkazdin, and Centa. Settlements with Hungarian ethnic majority are: Lukino Selo and Mihajlovo. Settlement with Romanian ethnic majority is Jankov Most. Ethnically mixed settlements are: Aradac (with relative Serb majority) and Belo Blato (with relative Slovak majority).

Table 1. Population gender-age statistic

Population according to sex and age			
Age	Total	Male	Female
0 – 4	5,831	3,002	2,829
5 – 9	6,717	3,415	3,302
10-14	7,720	3,961	3,759
15-19	8,542	4,367	4,175
20-24	9,387	4,823	4,564
25-29	8,965	4,639	4,326
30-34	8,323	4,272	4,051
35-39	9,035	4,549	4,486
40-44	9,475	4,628	4,847
45-49	11,321	5,662	5,659
50-54	10,779	5,227	5,572
55-59	7,278	3,421	3,857
60-64	7,979	3,637	4,342
65-69	7,875	3,459	4,416
70-74	6,217	2,520	3,697
75-79	3,795	1,222	2,573
80-84	1,650	582	1,068
85-89	529	158	371
90-94	171	47	124
95 and over	27	7	20
unknown	415	190	225

Novi Becej

The town has a population of 13,133, while Novi Becej municipality has 23,925 inhabitants. According to the 2011 census, the Novi Becej municipality had the following ethnic groups:

- 16,132- Serbs (67.43%)
- 4,319 -Hungarians (18.05%)
- 1,295- Roma (5.41%)
- 2,179 -Others and undeclared (9.11%)

Kikinda

Most of the settlements in the municipality have an ethnic Serb majority, while one settlement has a Hungarian ethnic majority, Sajan. Ethnic groups are as follows:

- Serbs = 44,846 (75.43%)
- Hungarians = 7,270 (12.23%)
- Roma = 1,981 (3.33%)
- Others and undeclared = 5,356 (9.01%)

C.2. Geography & Climate

Vojvodina consists of 45 municipalities and seven districts whose seats are Subotica, Zrenjanin, Kikinda, Pancevo, Sombor, Novi Sad and Sremska Mitrovica. Vojvodina is intersected by three big navigable rivers: the Danube, Tisa and Sava. They divide its territory into three clearly visible units: Banat in the east, Backa in the north-west and Srem in the south-west. All three regions are characterized by fertile arable land, economic and cultural development, high population density and demographic variety. The relief of Vojvodina is primarily flat except for Srem which is dominated by the Fruska Gora Mountain and the south-east of Banat with its Vrsacki Breg hill. The river Danube with its tributaries has nowadays the biggest hydro potential. It is also the most important waterway and the most significant strategic route in Europe. The Danube flows 588 kilometers through Serbia, primarily through Vojvodina and is navigable along the whole length. Its tributaries Tisa (168 km), Sava (206 km) and Begej (75 km) are navigable too. They are connected with a water irrigation system. The entire length of the irrigation system is 939 kilometers, 673 of which are navigable.

Banat stretches along the eastern part of Vojvodina. In the northsouth direction its position is between the Mures and the Danube rivers, and in the west-east direction between the Tisza River and the state border of Romania. The area is in the central part of mild climatic zone, significantly distant (about 2,000 km) from the main source of humidity, the Atlantic Ocean. Also, Banat is isolated from direct penetration of the cold, continental air, by the Carpathian Mountains and it penetrates only under special weather conditions. In winter, the most of the territory in Banat is dominated by the southeast wind, what is the consequence of the distribution of barometric depressions in the west part of the Mediterranean on one hand and on the other the anticyclone above the south parts of Ukraine and Besarabia. Thus, Kosava is the wind of the highest frequency.

Zrenjanin

In Zrenjanin, the climate is warm and temperate. The average annual rainfall is 595 mm. The driest month is March with 35 mm. Most precipitation falls in June, with an average of 78 mm (Figure 4). The average annual temperature in Zrenjanin is 11.5 °C. The warmest month of the year is July with an average temperature of 21.6 °C. In January, the average temperature is -0.1 °C. It is the lowest average temperature of the whole year (Figure 5).

The most distinctive wind of this region is "košava". The speed of "kosava" is very changeable. It blows at the speed of 5-11 m/sec. But sometimes its gusts reach the speed of even 28 m/sec (100 km/h). "Košava" blows from south-eastern or eastern direction and brings relatively warm and mostly dry air masses. The second important wind in this area is beneficial wind from north-western direction. It regularly brings rain and snow and supplies the whole of Vojvodina with enough quantities of moisture. The third important wind is the northern wind "severac". It is cold and often, pretty strong wind. During winter it snows on the average for 18 days. Zrenjanin has annually from 2000 to 2200 sunny hours, the least number of sunny hours it has in December – 42.5 and the most in July – 314.

A general characteristic of all climate elements of this region reflects in big amplitudes in annual paces and in big value variations during the year. According to its seismological – geological characteristics, the area of the town and municipality of Zrenjanin belongs to the region of rare and moderate earthquakes. The whole municipality region belongs to V00 seismic zone.

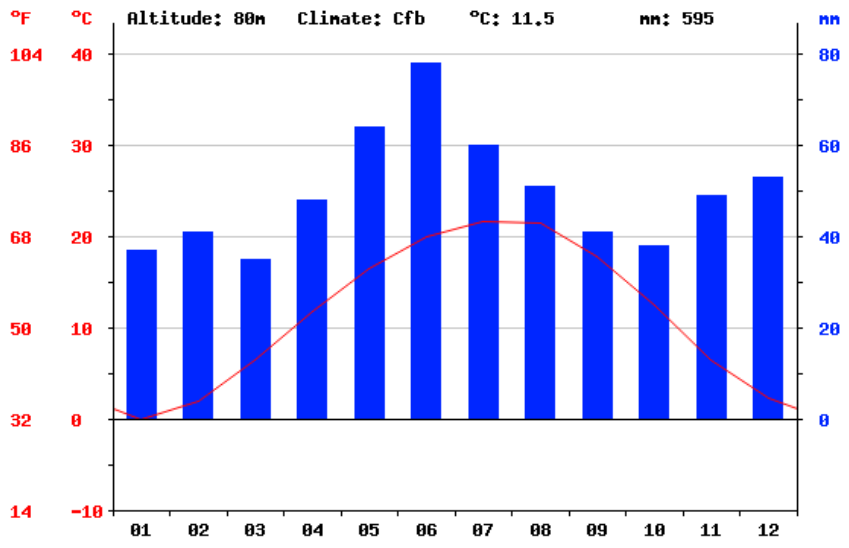


Figure 4. Precipitation in Zrenjanin

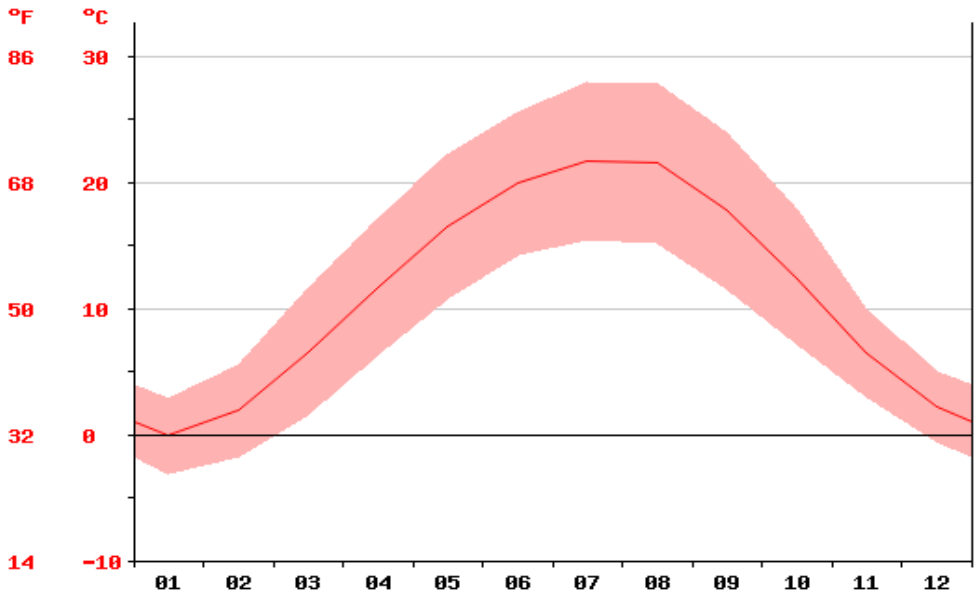


Figure 5. Average temperature in Zrenjanin

Novi Becej

The climate is warm and temperate in Novi Becej. The average annual rainfall is 579 mm (Figure 6). The driest month is March with 35mm. Most precipitation falls in June, with an average of 75mm. The average annual temperature in Novi Becej is 11.3 °C. The warmest month of the year is July with an average temperature of 21.5°C. In January, average temperature is -0.4°C. It is the lowest average temperature of the whole year.

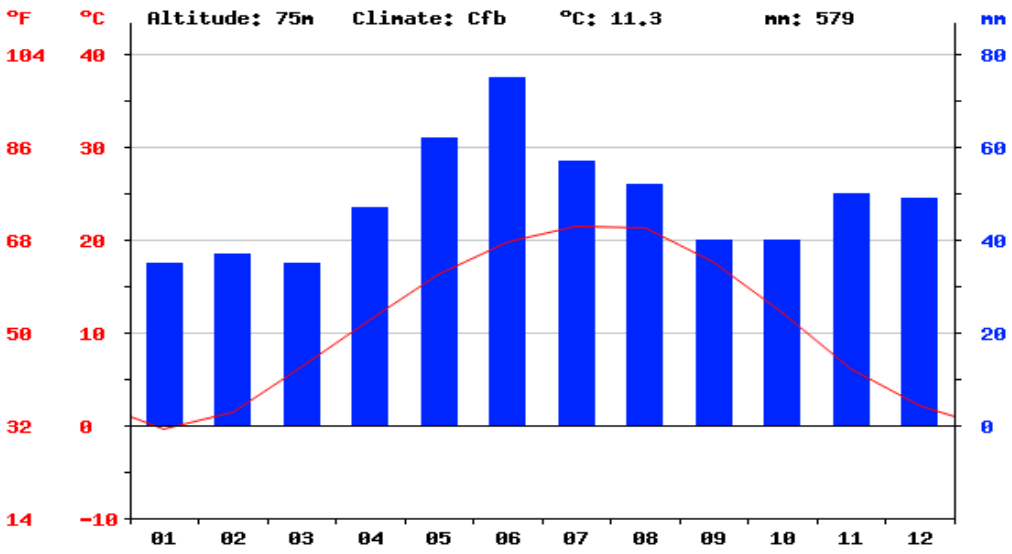


Figure 6. Climate graph-Novi Becej

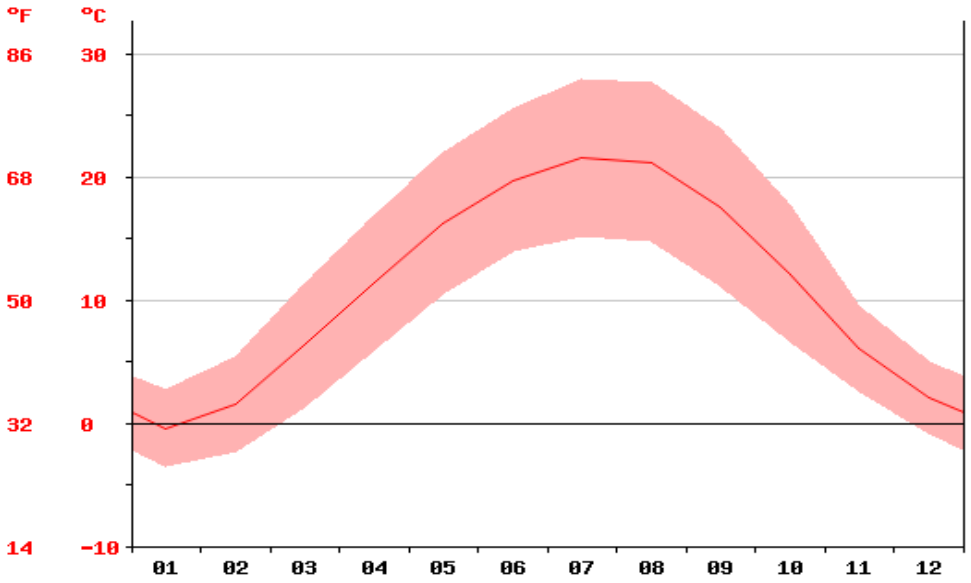


Figure 7. Temperature graph-Novi Becej

Kikinda

In Kikinda, the climate is warm and temperate. The average annual rainfall is 559 mm. The driest month is March with 33 mm. Most precipitation falls in June, with an average of 75 mm. The average annual temperature in Kikinda is 11.1°C. The warmest month of the year is July with an average temperature of 21.1 °C. In January, the average temperature is -0.7 °C. It is the lowest average temperature of the whole year.

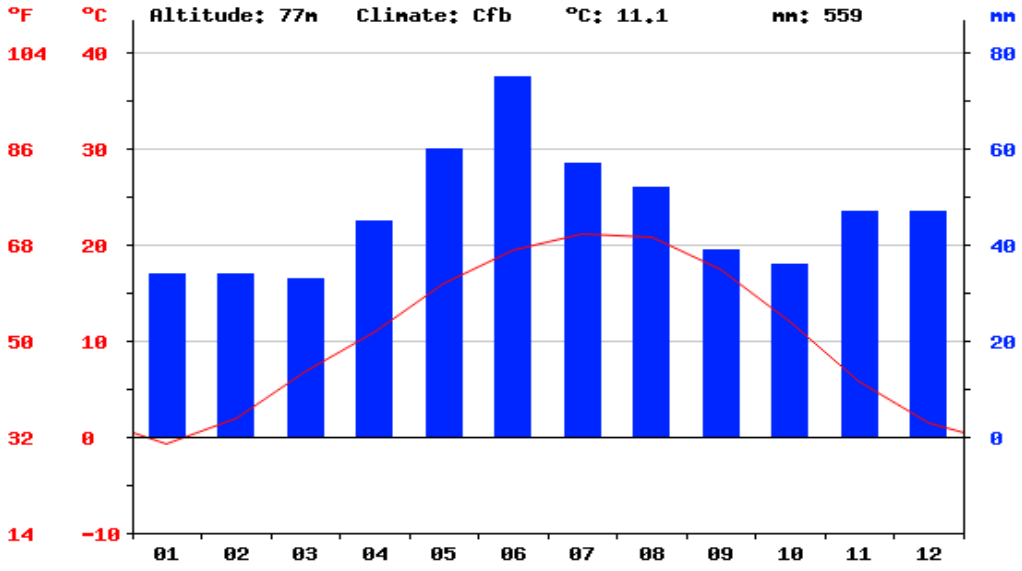


Figure 8. Climate graph-Kikinda

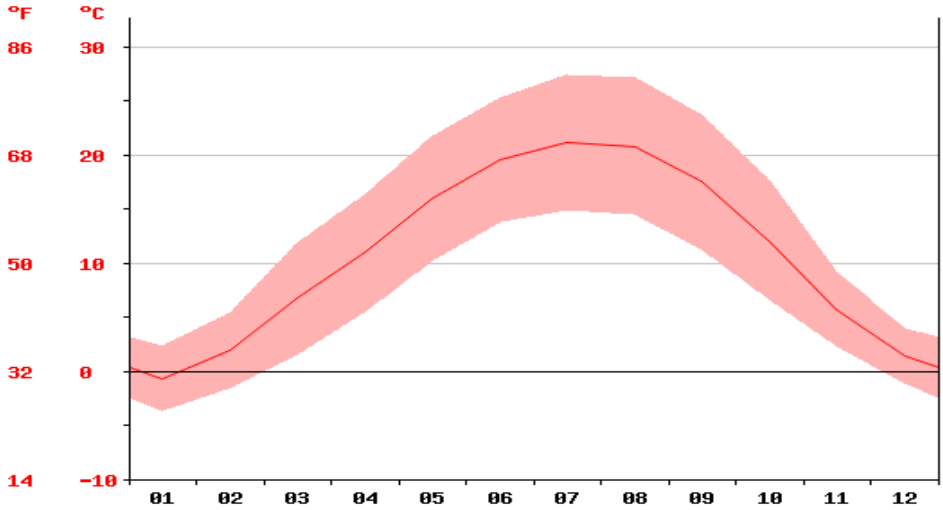


Figure 9. Temperature graph-Kikinda

C.3. Natural resources, e.g., nearby forest/protected areas, ground and surface water resources

The area of Zrenjanin Municipality is the densest river and canal hub in Europe, where in the circle of 30 kilometers run the rivers Begej, Tamis, Tisa, Danube and Canal net DTD (Danube-Tisa-Danube). The river Begej springs in the Carpathian region of Romania and runs through Banat as the left tributary of the river Tisa. It flows into the river Tisa at the residential settlement of Perlez. The river is 254 km long, but only 76 km is in Serbia. From Temisoara to Zrenjanin and further on to its mouth, it has been turned into a navigable, so called, the Begej canal. The old Begej canal, canalized riverbed, is 97 km long, and the new one is 83 km long (up to Temisoara).

The river Tisa is the longest tributary to the Danube (966 km, river basin area 157,186 km2). It springs in Carpathians, in Ukraine, at 1800 meters above the sea level and runs through the Panonian basin – it is formed by the Bela and the Crna Tisa. The river course is 1070 km long. Its largest part belongs to Hungary, and through Serbia, up to its outflow into the Danube near Slankamen, it runs in the length of 207 km. At Perlez place in Zrenjanin Municipality, the Begej flows into the Tisa. The Tisa partially forms administrative border between Zrenjanin Municipality and the district of Middle Banat. The river Tamis springs in Romania, in the region of Transylvanian Alps. It flows into the Danube through several by-channels, and the main one empties at Pančevo. The river length through Serbia is 123 km, and its whole course is 352 km long. It is navigable near its mouth. The main port is at the town of Pancevo.
The river Danube is an international river. It springs in Schwarcwald (Germany), and flows into the Black sea. It runs through Germany, Austria, Slovakia, Hungary, Serbia, Bulgaria, Romania and Russia. It enters our country at Mohač, and flows in the length of 591 km, and leaves it at the outflow of the river Timok. Furthermore, it is navigable throughout its whole course through Serbia. Canal DTD takes an important part

in the development of both Backa and Banat economy, and of the wider area.
Hydro system DTD has a complex purpose:

1. Acceptance and conducting of foreign water (water which flow in from the territories of other countries), about 3.0 billion m3/a year;
2. Acceptance and diverting of water from drainage system of agricultural and other soil. That area amounts to 1,085,000 hectares;
3. Supplying water for the needs of irrigation systems, fish ponds, farms, industry and residential places, about 270 million m3/a year;
4. Acceptance, conducting and dilution of waste water from industry, farms and residential places 1.0 billion m3/a year;
5. Navigation on canals for the vessels of capacity from 200 to 1,000 t;
6. Flood defense;
7. Fishing, recreation and tourism.

In the range of hydro system DTD there are 694 km of canals (out of which 600 kilometers are navigable), 25 locks (water scooping, regulation and safety), 17 shipping channels, 5 pumping stations, etc. Besides natural, Zrenjanin Municipality also possesses artificial accumulations. A lake system named "Begejska petlja"("Begej loop"), consists of three lakes, two filtering stations (primary and secondary) and distributional pipe system. The Lake 1 is meant for recreational fishing, the Lake 2 for swimming and the Lake 3 for water sports. Natural lakes ("Peskara"complex) appeared after sand exploitation and for the time being they are unofficial bathing places where the officials have periodically noted negative physical and chemical indicators.

Population and larger part of economy in Zrenjanin Municipality get their water supplies from the basic water complex of Banat and Bačka, which is an integral part of geological and hydro geological whole of the Panonian basin. The shallower (30 – 75 meters) and deeper (90 – 135 meters) groundwater is characterized by high mineralization, high content of iron, ammonium, manganese, sodium, organic materials, arsenic, disturbed organoleptic qualities. They are poor in oxygen and loaded with dissolved sulfur hydrogen and methane. On the basis of these facts it can be said that ground waters in Zrenjanin area have extremely unfavorable physical characteristics.

Based on the data from the Spatial plan of Vojvodina, Zrenjanin Municipality region has been placed into 1st zone of richness in timber, and that means that forests cover 0.30% - 3.00% of its total area. In the course of making analytical documentations' basis for the spatial plan of Zrenjanin Municipality, we came up with the data on 2.50% of soil covered with forests. Zrenjanin Municipality is distinctively agricultural area and the soil is intensively cultivated. Most part of the forests is therefore situated in the rivers' area, in the form of plantations and cultures. An insignificant part makes afforested areas in the cultivated fields.

On the basis of Urban plan of Zrenjanin Municipality, it has been confirmed that, regarding small afforesting, known climate and edaphical conditions, as well as spatial possibilities, at the end of the period covered by the plan, 6.00 % out of the total territory of Zrenjanin Municipality should be covered with forests.

Biodiversity or biological diversity is a term which implies diversity and diffusion of the plant and animal world. Biological diversity implies diversity of living organisms which inhabit land and water, as well as diversity within different species, between species and ecosystems. Special nature preserve "Stari Begej - Carska Bara'' is the Ramsar site (under the UNESKO protection), lake-swamp Okanj and Rusanda Spa, are planned to be placed under the protection , but not currently included into special nature protection regime, belong to Zrenjanin municipality area.

Area of Carska bara, also belonging to Zrenjanin municipality area, is characterized by the relief thickly woven by rivers, canals, lakes and swamps, while the colors change from blue lakes, over green and brown forests, all the way to pale yellow and the white of the salty marshes. This area used to be covered by the multitude of larger and smaller marshes. Today, this area is characterized by meanders of the Stari Begej and by swamps.

Flora of Carska Bara is represented by numerous autochthonous species, some of which are rare. Special concern is given to the following plant species: water groats, water fern, white water lily ; in meadow vegetation there are stopple, yarrow, mallow, absinthe, meadow sage; and in swamp vegetation: groups of reeds, sweet grass, swamp blue grass. Areas covered with forests occupy important parts of the Preserve. Birds are represented with 240 species bringing to the area a status of a Ramsar site. Some of the rare birds that can be seen here are: white tailed eagle, swamp harrier, meadow harrier, sparrow hawk, buzzard, white spoonbill heron. The Government of Republic of Serbia declared this region as the Special Nature Preserve "Stari Begej - Carska bara".

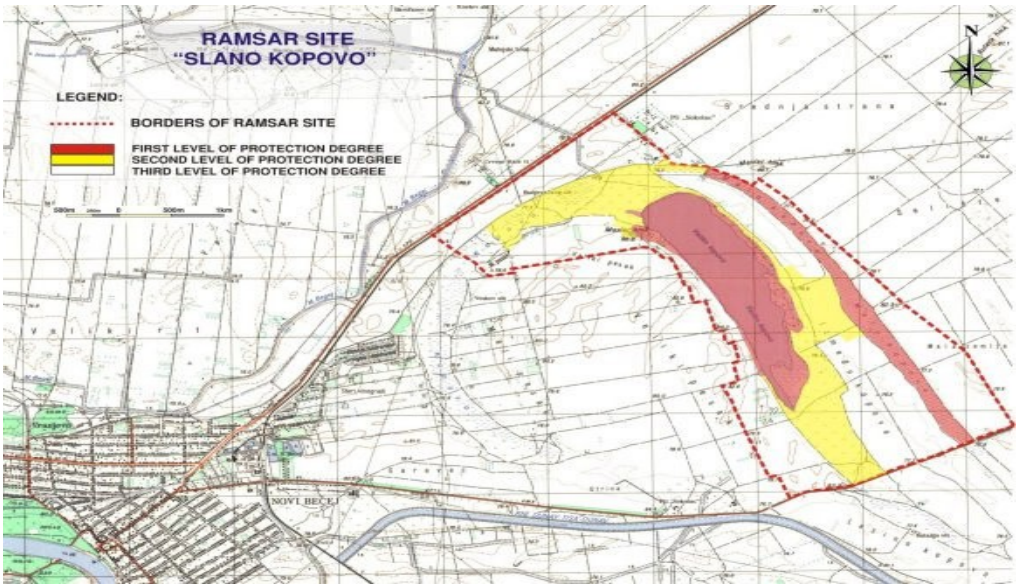
Photo 3. Great Bustard (Otis tarda)

At the territory of Kikinda municipality the Special Nature Preserve "Otis Tarda Pastures" (Pašnjaci velike droplje) exists as of 1997 when Republic of Serbia has put the area under special regime of nature protection. Total surface area of entire nature preserve is 980 ha, out of wich 680 ha belongs to Kikinda municipality administrative area.

RAMSAR site, Slano Kopovo, belongs to Novi Becej municipality. The area has three levels of protection. It is one of the last preserved salt marshes in Serbia. It features unique Pannonian habitats typified by salty, muddy ponds and lakes or their occasionally dry beds. Slano Kopovo is a priceless centre of salt-marsh habitats which is threatened with complete disappearance.

In the distant past, the river Tisa was subject to frequent changes of course and Slano Kopovo is one of its ancient meanders, emerging after the marshes were drained and dykes were built in the 17th and 18th century. The increased evaporation and withdrawal of water from the lowest-lying areas have led to the accumulation of a salt layer somewher several centimeters thick. Increased heating of the air above the lake and the temperature difference with the surrounding fields creates an optical and meteorological phenomena such as mirages and spectacular wind phenomena.

A unique salt-marsh community has been preserved at Slano Kopovo. The majority of the vegetation here grows on a solonchak (salty) topsoil which has almost disappeared from the Pannonian region. The most important species are glasswort, annual seablite and pannonic seablite – rare species protected by law. Major mammal species are the European ground squirrel, harvest mouse and the steppe polecat.



North Banat, an area of about 2329 km2 administered by six municipalities, is the extreme northeastern part of the Republic of Serbia and located in the southeastern margin of Pannonia depression. Drinking water is supplied under artesian or sub artesian pressure of Lower Pleistocene or Upper Pliocene confined aquifers. Tapped water-bearing beds in Banat dip from northeast to the south, reaching a depth of some 300 m at surrounding of Kikinda. The parameters of chemical characteristics of groundwater's in Kikinda area are given in Table 2.

Table 2. Chemical characteristics of groundwater

Parameter	Unit	Medium values	Maximum values	Minimum values	Values of drinking water parameters according to regulations
Water temperature	K	295,16*	295,66	294,66	281,16-285,16
Odour	-	On sulphide*	On sulphide	On sulphide	Without odour
Turbidity	NTU	1,6*	1,8	1,4	1,0
Colour	°C_0-Pt	28,0*	32	24	5
pH value	-	8,2	8,2	8,1	6,8-8,5
Dry residue (105°C)	mg/dm³	485	550	448	
Consumption of $KMnO_4$	mg/dm³	28,5*	31,0	26,8	8,0
Dissolved O_2	mg/dm³	0,0	0,0	0,0	
Conductivity (20°C)	µS/cm	945	989	791	do 1000
Redox potential	mv	-40	-49	-31	
Total hardness	mg$CaCO_3$/dm³	28,6	30,43	26,85	
Total alkality	mg$CaCO_3$/dm³	422,4	451,8	398,6	
p- alkality	mg$CaCO_3$/dm³	0,0	0,0	0,0	0,0
Free CO_2	mg/dm³	2,5	2,6	2,3	
H_2S(free)	mg/dm³	0,19*	0,20	0,17	bez
UV extintion (254nm)	1/m	31,4	32,4	29,6	
Total α -radioactivity	Bq/ dm³	0,087	0,088	0,085	0,1
Total β -radioactivity	Bq/ dm³	<0,037	0,039	0,034	1,0
NH_3	mgNH_3/ dm³	0,58*	0,72	0,49	0,1
Ca	mg/dm³	10,2	12,0	8,6	200,0
Mg	mg/dm³	2,74	3,1	2,4	50,0
K	mg/dm³	0,93	1,1	0,8	12,0
Na	mg/dm³	219*	225	205	150,0
Fe (total)	mg/dm³	0,12	0,18	0,09	0,3
Mn(total)	mg/dm³	0,03	0,04	0,02	0,05
Zn	mg /dm³	0,007	0,0079	0,0064	3,0
Cu	mg /dm³	0,0090	0,011	0,0083	2,0
Cd	mg /dm³	<0,0001	<0,0001	<0,0001	0,003
Pb	mg /dm³	<0,002	<0,002	<0,002	0,01
Ni	mg /dm³	<0,001	<0,001	<0,001	0,02
Cr (total)	mg /dm³	<0,001	<0,001	<0,001	0,05
As	mg /dm³	0,012	0,014	0,011	0,01
Hg	mg /dm³	<0,0002	<0,0002	<0,0002	0,001
Nitrates	mgNO_3/ dm³	0,015	0,023	0,010	50,0
Nitrites	mgNO_2/ dm³	0,004	0,006	0,002	0,03
Sulphates	mg/dm³	1,12	1,18	1,09	250
Chlorides	mg/dm³	4,45	4,60	4,21	200
Phosphates (orto)	mgP/ dm³	0,053	0,057	0,050	0,15
Cyanides	mg/dm³	<0,005	<0,005	<0,005	0,05
Fluorides	mg/dm³	0,5	0,6	0,4	1,2
Silicates	mg/dm³	12,4	13,2	11,8	
Total organic carbon	mg/dm³	13,2	13,8	11,2	-
Detergent (anionian)	mg/dm³	<0,005	<0,005	<0,005	0,1
Phenoles (4-A method)	mg/dm³	<0,002	<0,002	<0,002	0,001
Total oils and fats	mg/dm³	0,019	0,0199	0,0186	0,1
Mineral oils	mg/dm³	<0,010	<0,010	<0,010	0,010
Polycyclic aromatic hydrocarbon					Σ 0,0002
Fluoroanthene	mg/dm³	0,06	0,07	0,04	
Benzo-3,4fluoroanthene	mg/dm³	xnd			
Benzo 3,4-pyrene	mg/dm³	nd			0,00001
Benzo 1,12 perylene	mg/dm³	nd			
Indeno(1,2,3,cd)pyrene	mg/dm³	nd			
Halogen Organic Compounds					
Chloroform	mg/dm³	nd			0,04
Dibromochloromethane	mg/dm³	nd			0,0015
Dichlorobromomethane	mg/dm³	nd			
Bromoform	mg/dm³	nd			

Parameter	Unit	Medium values	Maximum values	Minimum values	Values of drinking water parameters according to regulations
1,2 dichloroethane	mg/dm³	nd			0,003
Carbon tetrachloride	mg/dm³	nd			0,005
1,1,1trichloroethane	mg/dm³	nd			2,0
Trichloroethilene	mg/dm³	nd			0,07
Tetrachloroethilene	mg/dm³	nd			0,04
Organic Chlorides Insecticide					
Lindan	µg/dm³	nd			0,2
DDT(DDE+DDT)	µg/dm³	nd			1,0
Aldrin/ Dieldrin	µg/dm³	nd			0,03
Triazine herbicide					
Atrazine	µg/dm³	nd			0,1
Simazine	µg/dm³	nd			0,1
Prometryn	µg/dm³	nd			0,1
PCB	mg/dm³	nd			0,0005

C.4.Current land use

According to the pedological chart of Vojvodina, the Zrenjanin town area is macroscopically divided into only two pedological categories: carbonate chernozem in the upper part of "lesna terasa" (loose yellowish soil of rock origin) and "solonjec" – salt -springs in the Begej valley. However, according to some local pedological researches which were conducted for certain detailed urbanistic solutions and according to general acquaintance with the situation, it is more probable that the areas marked on the mentioned table as "solonjec", actually represent variation of marshy dark, fertile humus soil "crnica", and "smonica" (dark soil full of clay). Out of the total area of Zrenjanin Municipality, 82.5 % are agricultural areas. Proportional representation of the soil types, on the basis of the research conducted in 2002 and 2003, is shown in the following table.

Type of Soil	Percentage %
Chernozem	35,7
Alluvium	1,8
Carbonated meadow humus	4,7
Noncarbonated meadow humus	2,2
Carbonated marshy humus	10
Noncarbonated marshy humus	7
Marshy "smonica"	17,3
Soil that is becoming salted	8,8
Salted soil	12,5

("crnica" – humus- dark fertile soil, "smonica"- dark soil full of clay)

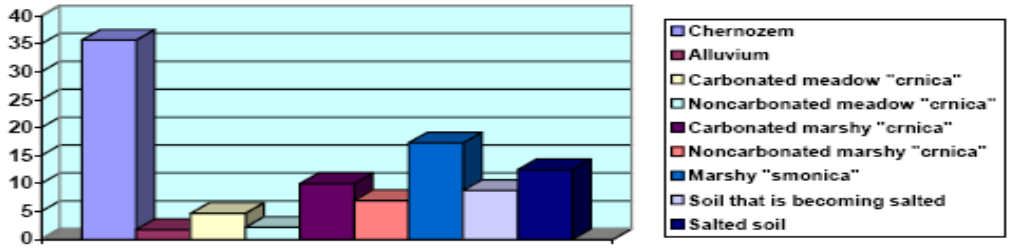


Figure10. Soil Type in Zrenjanin

Zrenjanin Municipality has at its disposal 132,849 ha of the entire land, out of which 86,382 ha are arable, and 46,467 ha is not. Out of all arable surfaces, 67 % is owned by rural estates, while 33 % is owned by agricultural enterprises and farm cooperatives. The average size of the estate owned by individual farmers is about 4 ha, while a very small number is larger than 10 ha. At the territory of Zrenjanin Municipality dominates crop husbandry on arable land. Basic husbandry crops are grains (corn and wheat), industrial plants (sugar beet and sunflower), while vegetables as the most intensive cultures cover only about 5% of the land.

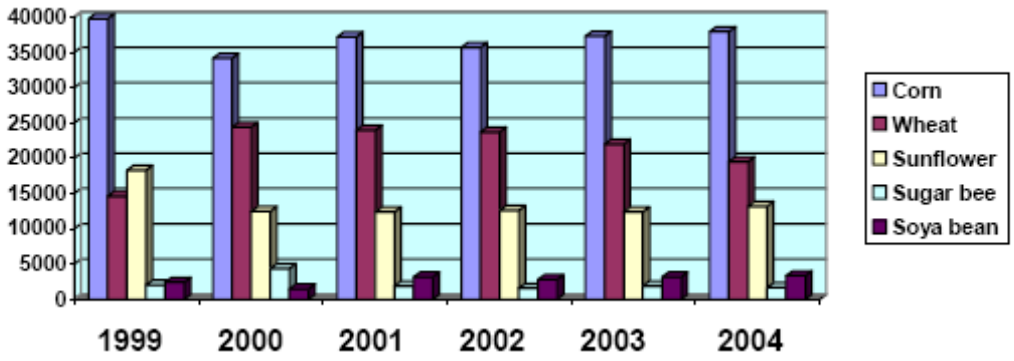


Figure 11. Crop production

Ord. No.	NAME	1991.	2002.
1.	Cattle	9,958	14,543
2.	Pigs	56,120	46,737
3.	Sheep	32,166	4,762
4.	Poultry	468,744	350,400

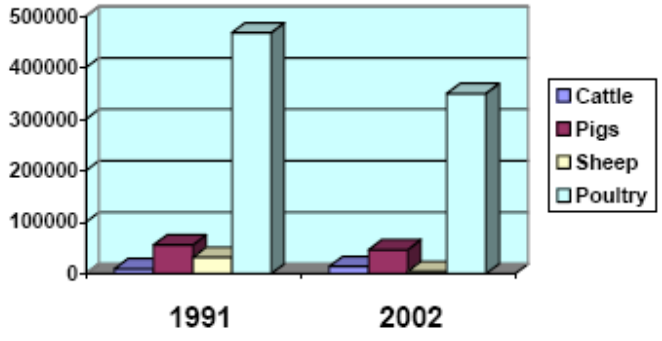


Figure 12. Livestock production

D. Legal, Regulatory, and Permitting Requirements

D.1. National environmental impact assessment requirements for this activity

The set of environmental legislation in Serbia comprises more than 100 laws, by-lows and regulations. Legislative, executive and judicial powers are mostly exercised within the legally prescribed scope of competence of the Republic's authorities. According to the law, certain competences are delegated to the autonomous province and the local authorities. The "new" legal framework for environmental protection was introduced in Serbia in 2004 by the Law on Environmental Protection; Law on Strategic Environmental Assessment; Law on Environmental Impact Assessment and Law on Integrated Pollution Prevention and Control (Official Journal of Republic of Serbia, No. 135/04).

Significant issues addressed by the Law on Environmental Protection include the management and protection of natural resources, measures and conditions of environmental protection, environmental programs and plans, industrial accidents monitoring and reporting, financing of environmental protection, inspection services and fines. The new laws are harmonized with the EU Directives on Environmental Impact Assessment (85/337/EEC), Strategic Impact Assessment (2001/43/EC), IPPC (96/61/EC) and Public Participation (2003/35/EC). No specific legislation exists in Serbia regarding soil and groundwater contamination and criteria for remediation. There are only Regulations on permitted amounts of hazardous and harmful substances in soil and water for irrigation and methods for their testing. (Official Journal of Republic of Serbia, No. 23/94)

The entire scope of the activity that will be supported by SLD Project includes design / detailed technical specification, procurement, and installation of greenhouses equipment, and SPU (safe pesticides use) trainings for incubator tenants. Preparatory land works, and infrastructure required for establishment of agricultural incubators (water and electricity access for greenhouses, safe pesticides storage rooms) will be provided by municipalities of Zrenjanin, Novi Becej and Kikinda. There are no EIA assessment requirements for the design, procurement and installation of greenhouses.

1. Applicable National or local permits for this activity, responsible party, and schedule for obtaining them:

Permit	Responsible party	Schedule
Zoning	-	
Building/Construction	-	
Source Material Extraction	-	
Waste Disposal	-	
Wastewater	-	
Storm Water Management	-	
Air Quality	-	
Water Use	-	
Historical or Cultural Preservation	-	
Wetlands or Water bodies	-	
Threatened or Endangered Species	-	
Other		

Design and procurement of construction elements and glazing of greenhouses does not require any of the above mentioned permits.

2. Additional National, European Union, or other international environmental laws, conventions, standards with which the activity might be required to comply:
    a. Air emission standards
    b. Water discharge standards
    c. Solid waste disposal or storage regulations
    d. Hazardous waste storage and disposal
    e. Historical or cultural preservation
    f. Other

E. Engineering Safety and Integrity

(for Sections E. and F., provide a discussion for any of the listed issues that are likely to have bearing on this activity)

1. Will the activity be required to adhere to formal engineering designs/plans? Y

SLDP plans to hire a technical specialist to prepare adequate technical specification of the greenhouse construction covered with polyethylene foil. Based on this specification, selected service provider for the construction and installation of greenhouses will need to provide engineering design of the greenhouses and installation works. Greenhouses are frames of inflated structure covered with a transparent material, in this case plastic, polyethylene foil, in which crops are grown under controlled environment conditions. Greenhouses for controlled environment plant production are associated with the off-season production of high value crops in cold climate areas where outdoor production is not possible during the off-season period. The design of the greenhouse should be based upon sound scientific principles which facilitates controlled environment for the vegetable growth.

In Vojvodina due to the weather conditions and scale of the production, the most common type of greenhouse production is carried out in low and high arched plastic tunnels. Typical vegetable farm has several plastic greenhouses of those two types, depending of the type of produced crops. In the last 10 years a lot of greenhouse suppliers adopted constructions and designs of high tunnel, one-aisle double-arch greenhouses. This type of the greenhouse brought much stronger construction that can hold more weight of the crops, and possibility to install double polyethylene foil (outer and inner) to increase thermal insulation and extend period of production of vegetables in the off-season. It is easy for transport and installation, and provides best utilization of the inner space. Also this construction type has the high ability to endure difficult weather conditions which may occur sporadically in Vojvodina (mainly wind and snow). The profile of this type of greenhouse secures reduced snow accumulation.

The size of the each greenhouse that will be procured and installed at the three locations in Novi Becej, Zrenjanin and Kikinda, will be 8m x 30m x 3,6m. This will be a typical double-arch greenhouse construction of 240 m^2 of the production area, suitable for the variety of

the plants and easy for maintenance and work. The type and the size of greenhouses are proposed by local governments, in consultations with the experts from local agricultural extension centers and producer organizations from that area. The following parameters needed to be taken into consideration when planning the greenhouse:

1. **Minimum of construction elements with greatest possible freedom from supports** – This requirement will be fulfilled with the proposed type of the greenhouses that will be procured (high tunnel double-arch construction), which does not require any supports and poles inside the working area.
2. **Maximum UV utilization with greatest possible thermal insulation -** It is recommended to use for the transparent cover of a greenhouse, quality, UV stabilized, multilayer, double polyethylene foils (outer and inner), with minimum light transmittance of 80%.
3. **Maximum corrosion protection of the load-bearing structure by permanent humidity** will be provided by required galvanized steel construction.

The greenhouses are to be designed for necessary safety, serviceability, general structural integrity and suitability. The structure should be able to take all the necessary dead, live, wind and snow loads.

Dead load: Construction designed to hold weight of all permanent constructions and installations (cladding, heating and cooling equipment, water pipes and all fixed service equipment to the frame) with min. 20 kg/m2. Greenhouses should be properly constructed and installed to fulfill this requirement. Supplier will choose quality material (steel, wires, welding system, etc.) and will be obliged to prove this in the equipment warranty terms and conditions.

Live load: Structure is designed, but should be properly constructed and installed to hold the weight of the plants and yields with min. 22 kg/m^2, supplier of the plastic greenhouses will be obliged to prove this in the equipment warranty terms and conditions.

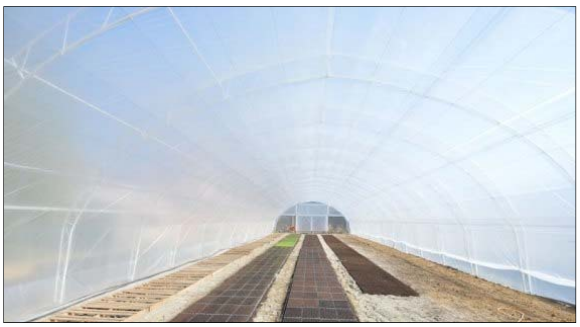
Wind load: In Central Banat (Zrenjanin and Novi Becej) and North Banat (Kikinda), an average annual wind speed during the period from 1981-2010 was between 10-14 kilometers per hour (km/h), but the extreme wind speed of „kosava“ can reach up to 100 km/h. Therefore, the greenhouse structure should be specified and designed to withstand winds in Central and North Banat region of maximum 100 km/h and maximum 60 kg per square meter of wind pressure. Greenhouse structure should be properly constructed, installed, and covered with plastic foil by supplier in order to fulfill these requirements. Selected supplier of the plastic greenhouses will be obliged to prove this in the equipment warranty terms and conditions. Also, a critical point for withstanding strong winds is proper procedures and timelines for opening/closing the doors of the plastic greenhouses during the farming operations. These procedures will be developed prior to the installation of greenhouses, by the local agricultural extension service experts in each municipality and the technical specialist that will be hired by SLDP.

Snow load: In Central Banat (Zrenjanin and Novi Becej) and North Banat (Kikinda), an average snowing days during the period from 1981-2010 were between 22-30 days. The greenhouse structure should be properly specified and designed to hold maximum snowfall

in Banat region of 50 cm or withstand maximum 75kg of snow load per square meter. Structure should be properly constructed, installed and covered with plastic foil by supplier in order to fulfill these requirements. Selected supplier of the plastic greenhouses will be obliged to prove this in the equipment warranty terms and conditions. Also, a critical point for holding a maximum snowfall is proper procedure to remove snow from the plastic greenhouses within a period of 8 hours after snowfall started. These procedures will be developed prior to the installation of greenhouses, by the local agricultural extension service experts in each municipality and the technical specialist that will be hired by SLDP.

Rain fall: In design and construction of plastic greenhouses this is not a relevant factor. During preparatory land works for the installment of greenhouses, canals for collecting and drainage of storm water runoff around greenhouses should be made.

The greenhouse should be able to take dead load plus live load or dead load plus wind load plus half the live load.



Photos 6, 7, 8, and 9 - Examples of standard high-tunnel, double-arch greenhouse construction (8m x 30m x 3.6m), covered with double polyethylene foil

The proposed type of the greenhouse is typical standardized greenhouse structure regularly used for vegetable production in Vojvodina, and as such does not requires a special, tailor made design and technical specification. The design and technical specification of the greenhouse should address its standard components:

1. Type of structure**:** high tunnel - one aisle double-arch construction
2. Dimensions/sizes: 8m x 30m x 3.6m (240 m^2)
3. Construction: galvanized steel
4. Arch construction, fixing among arches, distance between arches grid construction,

5. Front/back side, doors and ventilation.
6. Column: vertical structure member carrying the green house structure
7. Purlin: a member who connects cladding supporting bars to the columns
8. Ridge: highest horizontal section in top of the roof
9. Trusses
10. Ground posts
11. Bracings: To support the structure against wind
12. Foundation pipe: Connection between the structure and ground
13. Span: Center to center distance of the gutters in multispan greenhouses
14. Transparent cover of a greenhouse (roof and walls), cladding material: outer and inner UV stabilized low density polyethylene foil, number of foil layers, light transmittance, minimal thickness (micrometers), and infrared effect. This foil has a high maintenance features and minimum three to five years of durability.
15. Outer shadow net
16. System for irrigation and fertilization**:** drip irrigation (application capacity lit/m, drop irrigation tape length), hanging sprinklers (application capacity lit/hour, number of sprinklers per irrigation area m^2/sprinkler), and fertilization package (venturi pipe, filter, and pressure regulators).

2. Have these been or will they be developed by a qualified engineer? Y

SLD Project is to procure services of qualified technical specialist to propose the design and detailed technical specification of the greenhouses. Final engineering design for the construction and installation of greenhouses will be provided by qualified engineer of selected service provider for the construction and installation works.

3. Do designs/plans effectively and comprehensively address:

a. Management of storm water runoff and its effects? Y
b. Reuse, recycling, and disposal of construction debris and by-products? Y
c. Energy efficiency and/or preference for renewable energy sources? Y
d. Pollution prevention and cleaner production measures? Y

No specific measures are required for the management of storm water runoff if the land on which plastic film greenhouses are to be placed is porous enough. Planned greenhouse locations in Zrenjanin, Novi Becej and Kikinda have the porous soil, there are no high ground waters (depth to groundwater is approximately 300m), and there is no risk of flooding the area. SLDP will hire a STTA consultant to prepare the plan of a layout of greenhouses within the Agricultural Incubators at each location. The layout of greenhouses will take into consideration, their position, orientation, proper distance between greenhouses, including canals for collecting and drainage of storm water runoff from the greenhouses. This will be done when the final number of selected incubator tenants is known, and accordingly the number of greenhouses that will be installed. Based on this plan, preparation of the land for the greenhouses and installation of greenhouses will be adequately done. Usage of plastic, polyethylene foil will ensure that greenhouses are energy-efficient and the interior is heated on any sunny day in summer or winter. The impact of pollution prevention and cleaner production measures is insignificant since there are no any pollution hazards in the construction processes and materials for this type of the greenhouse. However, the design specification will take into consideration that no natural resources of important

biodiversity value or materials that contain pesticides, asbestos and lead, shall be used as the construction materials. Technical specification of the greenhouse construction and installment will request from supplier of greenhouse equipment to take responsibility of disposal and recycling of any construction debris that may occur during the construction and installment of procured plastic greenhouses. During the bidding process SLDP will try to select those equipment suppliers that will implement a product take back policy, to collect and recycle end-of-life products.

e. Maximum reliance on green building or green land-use approaches? N/A
f. Emergency response planning? N/A
g. Mitigation or avoidance of occupational safety and health hazards? Y
   The design has to be prepared in a way to include necessary safety, serviceability, general structural integrity and suitability.
h. Environmental management of mobilization and de-mobilization? N
i. Capacity of the host country recipient organization to sustain the environmental management aspects of the activity after closure and handover? Y

4. Are there known geological hazards, e.g., faults, landslides, or unstable soil structure, which could affect the activity? N
If so, how will the project ensure structural integrity?

5. Will the site require grading, trenching, or excavation? Will the activity generate borrow pits? If so, how will these be managed during implementation and closure? M

The local SLD Project's partners, municipalities of Zrenjanin, Novi Becej and Kikinda are in charge of all preparatory land works for installation of greenhouses. This is defined in the Agreement on the implementation of Agribusiness Incubator Program, signed between the SLDP and three partner local governments, as one of their duties and obligations in the project and prerequisite for the supply and installation of greenhouses. Therefore, preparation of the land will be adequately done prior to the construction of greenhouses at the designated locations of Agricultural Incubators. SLDP will supply construction elements, covering of greenhouses and installation works. Preparatory land works will be done based on the plan of a layout of greenhouses at each location, made by SLDP STTA consultant, and it will include canals for collecting and drainage of storm water runoff from the greenhouses. The STTA consultant will also monitor and report on the quality and progress of all required preparatory land works for the installation of greenhouses.

6. Will the activity cause interference with the current drainage systems or conditions? Will it increase the risk of flooding? N

7. Will the activity interfere with above- or below-ground utility transmission lines, e.g., communications, water, sewer, or natural gas? N

8. Will the activity potentially interfere with vehicle or pedestrian traffic? N

9. Does the activity increase the risk of fire, explosion, or hazardous chemical releases? N

10. Does the activity require disposal or retrofitting of polychlorinated biphenyl-containing equipment, e.g., transformers or florescent light ballasts? N

F. Environment, Health, and Safety Consequences

1. Potential impacts to public health and well-being

a. Will the activity require temporary or permanent property land taking? **N**

b. Will activities require temporary or permanent human resettlement? **N**

c. Will area residents and/or workers be exposed to pesticides, fertilizer, or other toxic substances, e.g., as a result of farming or manufacturing? **Y**

If so, how will the project:

i. Ensure that these chemicals do not contaminate ground or surface water?
ii. Ensure that workers use protective clothing and equipment to prevent exposure?
iii. Control releases of these substances to air, water, and land?
iv. Restrict access to the site to reduce the potential for human exposure?

According to the local Laws and regulations for the minimum requirements of pesticide storage at the farm, legal entity and private person which handles hazardous materials are required to plan, organize and implement all preventive, assurance and mitigation measures which will make risk for environment and human health on minimum level. The specific safeguards for proper usage and storage of pesticides, and disposal of pesticide wastes, will be ensured through trainings and mentorship provided to incubator tenants by SPU certified trainers and mentors before and during greenhouse operations. Also, each municipality will secure minimum legal requirements for safe pesticide storage and waste disposal at the locations of greenhouses.

Trainings - In the first phase of the project, local authorities will select and provide reputable trainers for an initial short training program for unemployed youth (basic introduction into farming business) for the purpose of a business planning competition and selection of the tenants of agricultural incubators. These trainings will have business oriented nature and the content of the training, providing basic knowledge on the legal framework for a farm start-up, registration of agricultural household, business plan preparation, and a brief information on vegetable growing in the terms of planning the investment and production costs for a farm start-up, marketing and sales, and selection of the most profitable vegetable crops with high market demand. At this stage, the training will not provide in-depth information on a detailed usage and handling of pesticides and crop protection chemicals.

The second part of educational component will provide more specialized training and advisory services in vegetable growing techniques for selected group of young people, tenants of Agricultural Incubators. These will be provided by selected reputable experts as mentorship assistance to selected tenants of incubators. The experts will be selected by local authorities from local agricultural extension centers and producer organizations specialized in greenhouse vegetables growing. Vegetables growing agronomists will provide advisory and practical trainings in the greenhouse vegetable production. Crop protection experts of regional agricultural extension centers trained by the USAID

Agribusiness Project and certified by the Ministry of Agriculture of Republic of Serbia, will provide advisory and practical trainings in proper usage, storage and waste disposal of pesticides.

In 2010-2012, the majority of Serbian crop protection experts from local agricultural extension centers have undergone Safe Pesticides Use trainings through USAID Agribusiness Project, and have been certified by the Ministry of Agriculture of Republic of Serbia for providing SPU trainings. All trainers and mentors selected by SLDP to provide advisory and practical trainings in proper usage, storage and waste disposal of pesticides, will be SPU certified by the Ministry of Agriculture of Republic of Serbia. SLDP will organize an SPU training that will be delivered by these certified trainers for all incubator tenants before the start of Agricultural Incubators program.

Greenhouse operations - Prior to installment of greenhouses at three locations, local authorities will secure minimum legal requirements and SPU good production practices for the safe pesticide storage and waste disposal, based on planned scale of operations at each production site. They will provide the storage facility / room, locked, dry and ventilated, with metal or plastic shelves for proper storage of different packages of pesticides that are not exposed to direct sunlight. Stored pesticides will be kept in small quantities, due to good planning of crop protection and spraying dosages. Plastic bags or plastic barrels should be provided for temporary short-safe storage of the used packages before delivery to supplier of the pesticides. According to the local law of waste collection, supplier of the pesticides (agriculture pharmacy) is obliged to continuously collect from farmers at the farm gate, all empty pesticides package waste stored in plastic bags or plastic containers. Empty packages should contain original declarations for easy tracking of origin of the package. In addition, local authorities responsible for the management of Agricultural Incubators will provide protection clothes for safe pesticides application for the users of incubators (rubber boots, waterproof clothes, protection gloves and masks). Also, as preventive measure, a bucket of sand, brush and small shovel will be provided in case that pesticide is scattered so can be cleaned properly according to usage protocol.

Detailed procedures and protocols will be developed prior to the installation of greenhouses, by the SPU certified local agricultural extension service experts and the technical specialist that will be hired by SLDP. Following are some of basic recommended actions:

- Contract signed between Agricultural Incubators, final users, and regional agriculture extension centers, on instructions on proper crop protection applications, and monitoring of the crop protection measures applied in greenhouses, according to the application guidance and proper usage protocols. These will be provided by SPU certified experts of agriculture extension centers.
- Contract signed between Agricultural Incubators, final users and pesticides suppliers - agricultural pharmacies, for collection of returned used pesticide packages.
- Pesticide storage inventory record sheet and pesticides application record sheet should be developed, kept up to date, and easy accessible.
- The pesticide storage area should be plainly labeled as a pesticide storage area.

- Only SPU trained persons could prepare and apply pesticide dosages in greenhouses according to the developed application guidance and proper usage protocols.

d. Will the activity generate pesticide, chemical, or industrial wastes? Could these wastes potentially contaminate soil, groundwater or surface water? **N**
e. Will chemical containers be stored at the site? **N**
f. Does the activity remove asbestos-containing materials or use of building materials that may contain asbestos, formaldehyde, or other toxic materials? Can the project certify that building materials are non-toxic? If so, how will these wastes be disposed of? **N**
g. Will the activity generate other solid or hazardous wastes such as construction debris, dry or wet cell batteries, florescent tubes, aerosol cans, paint, solvents, etc.? If so, how will this waste be disposed of? **N**
h. Will the activity generate nontoxic, nonhazardous solid wastes (subsequently requiring land resources for disposal)? **N**
i. Will the activity pose the need to handle and dispose of medical wastes? If so, describe measures of ensuring occupational and public health and safety, both onsite and offsite. **N**
j. Does the activity provide a new source of drinking water for a community? If so, how will the project monitor water quality in accordance with health standards? **N**
k. Will the activity potentially disturb soil contaminated with toxic or hazardous materials? **N**
l. Will activities, e.g., construction, refurbishment, demolition, or blasting, result in increased noise or light pollution, which could adversely affect the natural or human environment? **N**

2. Atmospheric and air quality impacts

a. Will the activity result in increased emission of air pollutants from a vent or as fugitive releases, e.g., soot, sulfur dioxide, oxides of nitrogen, volatile organic compounds, methane. **N**
b. Will the activity involve burning of wood or biomass? **N**
c. Will the activity install, operate, maintain, or decommission systems containing ozone depleting substances, e.g., freon or other refrigerants? **N**
d. Will the activity generate an increase in carbon emissions? **N**
e. Will the activity increase odor and/or noise? **N**

3. Water quality changes and impacts

a. Will the activity disturb wetland, lacustrine, or riparian areas? **N/A**
b. What is the depth to groundwater at the site? **App. 300 m**
c. Will the activity result in increased ground or surface water extraction? If so, what are the volumes? Permit requirements? **N**
d. Will the activity discharge domestic or industrial sewage to surface, ground water, or publicly-owned treatment facility? **N**
e. Does the activity result in increased volumes of storm water run-off and/or is there potential for discharges of potentially contaminated (including suspended solids) storm water? **N**
f. Will the activity result in the runoff of pesticides, fertilizers, or toxic chemicals into surface water or groundwater? **N**

g. Will the activity result in discharge of livestock wastes such as manure or blood into surface water? **N**

h. Does the site require excavation, placing of fill, or substrate removal (e.g., gravel) from a river, stream or lake? **N**

4. Land use changes and impacts

a. Will the activity convert fallow land to agricultural land? **M**

Local SLD Project partners, municipalities of Zrenjanin, Novi Becej and Kikinda, have completed necessary zoning and permitting for change in use of a land at locations selected for installation of greenhouses.

b. Will the activity convert forest land to agricultural land? **N**

c. Will the activity convert agricultural land to commercial, industrial, or residential uses? **N**

d. Will the activity require onsite storage of liquid fuels or hazardous materials in bulk quantities? **N**

e. Will the activity result in natural resource extraction, e.g., granite, limestone, coal, lignite, oil, or gas? **N**

f. Will the activity alter the view shed of area residents or others? **M**

The activity implemented by local partners includes installation of greenhouses at 3 locations. Through the process of regulatory permitting and zoning of areas planned for creation of agricultural incubators, all potential scenic impacts are already addressed and mitigated, according to Serbian lows and regulations.

5. Impacts to forestry, biodiversity, protected areas and endangered species

a. Is the site located adjacent to a protected area, national park, nature preserve, or wildlife refuge? **N**
All 3 locations are distant to nature protection areas.

b. Is the site located in or near threatened or endangered (T&E) species habitat? Is there a plan for identifying T&E species during activity implementation? If T&E species are identified during implementation, is there a formal process for halting work, avoiding impacts, and notifying authorities? **N**

c. Is the site located in a migratory bird flight or other animal migratory pathway?

d. Will the activity involve harvesting of non-timber forest products, e.g., mushrooms, medicinal and aromatic plants (MAPs), herbs, or woody debris? **N**

e. Will the activity involve tree removal or logging? If so, please describe. **N**

4. Historic or cultural resources

a. Are there cultural or historic sites located at or near the site? If so, what is the distance from these?
What is the plan for avoiding disturbance or notifying authorities? **N**

b. Are there unique ethnic or traditional cultures or values present in the site?
If so, what is the applicable preservation plan? **N**

G. Further Analysis of Recommended Actions

☐ **1. Categorical Exclusion:** The activity is not likely to have an effect on the natural or physical environment. No further environmental review is required.*

☒ **2. Negative Determination with Conditions:** The activity does not have potentially significant adverse environmental, health, or safety effects, but may contribute to minor impacts that can be eliminated or adequately minimized by appropriate mitigation measures. EMMPs shall be developed, approved by the Mission Environmental Officer (MEO) (and the BEO if required by the IEE) prior to beginning the activity, incorporated into work plans, and then implemented.

☐ **3. Positive Determination:** The activity has potentially significant adverse environmental effects and requires further analysis of alternatives, solicitation of stakeholder input, and incorporation of environmental considerations into activity design. A Scoping Statement must be prepared and be submitted to the BEO for approval. Following BEO approval an Environmental Assessment (EA) will be conducted. The activity may not be implemented until the BEO clears the final EA. For activities related to the procurement, use, or training related to pesticides, a PERUSAP will be prepared for BEO approval.

☐ **4. Activity Cancellation:** The activity poses significant and unmitigable adverse environmental effects. Adequate EMMPs cannot be developed to eliminate these effects and alternatives are not feasible. The project is not recommended for funding.

* Note regarding applicability related to Pesticides (216.2(e): The exemptions of §216.2 (b) (l), and the categorical exclusions of §216.2 (c) (2) such as technical assistance, education, and training are not applicable to assistance for the procurement or use of pesticides.

H. EMMPs

1. Activity-specific environmental mitigation plan

Processes	Identified Environmental Impacts	Do the Impacts Require Further Consideration?	Mitigation Measures	Monitoring Indicators
Establishing project design / greenhouse technical specification minimum standards	Engineering Safety and Integrity Occupational safety Environmental Management Risk assessment	*The activity is required to adhere engineering designs / YES* *There is no foreseen significant adverse impact. No further environmental review required.* It is recommended the following parameters to be taken into consideration when planning the greenhouse technical specification and design: 1. Minimum of construction elements with greatest possible freedom from supports 2. Maximum UV utilization with greatest possible thermal insulation 3. Maximum corrosion protection of the load-bearing structure by permanent humidity 4. Ability to endure variations in seasonal weather conditions (wind and snow).	Use established design and specification standards for the proposed type and size of the greenhouse. Ensure that the design take local climatic conditions in cool and hot seasons and seasonal variation in precipitation and winds into account. Use local materials, if possible. Project design should take into account: 1. Scientific principles which facilitates controlled environment for the vegetable growth. 2. The size of the single greenhouse - 8m x 30m x 3,6m - 240 m^2 of the production area. 3. Type of the greenhouse: high tunnel, one-aisle double-arch, galvanized steel construction, covered with polyethylene outer and inner foil. 4. The structure should be able to take all the necessary dead, live, wind and snow loads. Dead load of min. 20kg/m2, live load of min. 22kg/m2, wind load of min. 60kg/m2 to withstand wind of maximum 100km/h, snow load to hold max. 50cm or 75kgm2.	Verification of the greenhouse technical specification, design, and the plan of the layout of greenhouses at each location.

Processes	Identified Environmental Impacts	Do the Impacts Require Further Consideration?	Mitigation Measures	Monitoring Indicators
			5. Environmentally friendly covering material used and, pollution prevention and cleaner production measures applied. No natural resources of important biodiversity value shall be used as the construction materials, as well as materials that contain pesticides, asbestos and lead. This impact would be insignificant since there are no any pollution hazards in the construction of this type of the greenhouse. 6. Provide disposal and recycling of any construction debris during the construction and installation of greenhouses. 7. Plan should include digging of small canals in the ground around greenhouses for collecting and drainage of storm water runoff. There is no risk of storm water runoff and its effects since the land is porous without high ground waters. 8. Necessary safety, serviceability, general structural integrity and suitability. During extreme weather conditions suspend land preparation works and installation of greenhouses.	

Processes	Identified Environmental Impacts	Do the Impacts Require Further Consideration?	Mitigation Measures	Monitoring Indicators
Procurement and installment of greenhouse equipment	Greenhouse equipment use and disposal	*Will area residents and/or workers be exposed to pesticides, fertilizer, or other toxic substances, e.g., as a result of farming or manufacturing? YES* *The foreseen adverse impact is less than significant. Mitigation measures are required.* The specific safeguards for proper usage and storage of pesticides, and disposal of pesticide wastes, will be ensured by SLDP and local authorities through: 1. Trainings and mentorship provided to incubator tenants by SPU certified trainers and mentors before and during greenhouse operations. 2. Secured minimum legal requirements for safe pesticide storage and waste disposal at the locations of greenhouses. SLDP will organize for all selected incubator tenants SPU training delivered by SPU certified trainers, crop protection experts of regional agricultural extension centers. Most of these crop protection experts have undergone SPU trainings through USAID Agribusiness Project, and have been certified by the Ministry of Agriculture of Republic of Serbia for providing SPU trainings. These SPU certified trainings were intended only for crop protection experts of regional agricultural extension centers, not for other	Provide SPU training to young farmers selected for agricultural incubators. Do not use, handle, or storage a controlled hazardous product in a workplace unless the employee/incubator user has received the SPU training and information to carry out the work entrusted to him/her safely. Develop detailed procedures and protocols on proper crop protection applications, storage and waste disposal for the incubator tenants. Secure rooms/ facilities for safe pesticide storage near to the locations of greenhouses, which fulfill minimum legal requirements. Contract pesticide suppliers to continuously collect all used and empty pesticides package waste from incubator tenants. Provide personal protective equipment and clothing for users of incubator and enforce their use. Provide SPU certified crop protection specialists to be mentors for the crop protection measures in greenhouses. Try to use equipment suppliers that will take back end of life products.	Site inspection of preparatory land works for installation of greenhouses Site inspection of storage for crop protection chemicals Training on SPU completed Developed procedures and protocols on safe pesticide use, storage and waste disposal Personal protective equipment and clothing for farmers working in greenhouses provided and enforced their use Site inspection of completed installation of greenhouses

Processes	Identified Environmental Impacts	Do the Impacts Require Further Consideration?	Mitigation Measures	Monitoring Indicators
		agronomist and agricultural production specialists. During their work in greenhouse incubators, young farmers will be receiving more specialized training and advisory in vegetable growing techniques as mentorship assistance. Mentors will be reputable experts selected by local authorities, from agricultural extension centers and farmers organizations. Accordingly, all trainers and mentors that will be providing assistance in proper usage, storage and waste disposal of pesticides, must be crop protection specialists, SPU certified by the Ministry of Agriculture of Republic of Serbia. Local authorities will secure minimum legal requirements and SPU good production practices for the safe pesticide storage and waste disposal, based on planned scale of operations at each production site. They will provide proper storage room / facility, locked, dry and ventilated, with metal or plastic shelves, plastic bags or plastic barrels for temporary short safe storing of the used empty packages that will be collected by the supplier of the pesticides, protection clothes for safe pesticides application, and other as defined in SPU protocols.	Apply sustainable procurement principles in purchasing greenhouses Provide basic first aid services;	

2. Activity-specific monitoring plan

Monitoring Indicators	Monitoring and Reporting Frequency	Responsible Parties	Records Generated
Audit of equipment detailed technical specification and design, and layout of the greenhouses.	After the selection of incubator tenants and determination of final number of greenhouses for procurement;	SLDP	Detailed specification; Bid evaluation Final specification and design.
Training on SPU provided	After the selection of incubator tenants and before their entry in Incubators.	SLDP, Local authorities, Agricultural Extension Centers	Records on training completion; Procedures and protocols on safe pesticide use, storage and waste disposal
Site inspection of preparatory land works for installation of greenhouses	Prior to the construction of greenhouses at the designated locations of Agricultural Incubators; Two, weekly or biweekly, inspections, on the work progress, the quality, and work completion.	SLDP, Local authorities	Report on work progress; Report on completed works
Site inspection of storage for crop protection chemicals	Prior to the construction of greenhouses at the designated locations of Agricultural Incubators;	SLDP, Local authorities	Site inspection report
Site inspection of greenhouses installation works	Weekly reports during the installation at each location	SLDP, Local authorities	Site inspection reports
Personal protective equipment and clothing for farmers working in greenhouses provided and enforced their use	After the installation of greenhouses and before entry in Incubators.	Local authorities	Personal protective equipment and clothing provided for farmers
Equipment disposal	After a life-time of greenhouse equipment	Local authorities	Use equipment suppliers that will take back end of life products- Handover record

I. Certification of No Adverse or Significant Effects on the Environment

The undersigned certifies that all foreseeable significant adverse effects on the environment have been adequately and effectively eliminated or mitigated by the attached Environmental Mitigation and Monitoring Plans (EMMPs) to be implemented at DCN-SER-022. If new adverse effects or the need for new or improved mitigation measures are identified, I will immediately notify the USAID activity manager/COR/AOR.

Implementer Project Director/COP
Howard Ockman

02/24/2014
Date

J. Approvals:

USAID COR/AOR, Sinisa Cadjo

02/21/2014
Date

Mission Environmental Officer, Tim Donnay

02/21/14
Date

Bureau Environmental Officer, Will Gibson

02/24/2014
Date