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Traditional Food Network to improve the  
transfer of knowledge for innovation

**Strategic Research and  
Innovation Agenda for  
Traditional Sweet Fruit in  
Serbia**

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### ***Traditional Food Network to improve the transfer of knowledge for innovation***

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## INTRODUCTORY REMARKS

Respected reader,

In front of you is a text of "Strategic research and innovation agenda for traditional food," which is done on a voluntary basis within the TRAF00N project with the desire to find a strategic framework for defining necessary environment for the establishment, operation and development of innovation activities in the sector of traditional food in Serbia.

Based on the identified innovation needs that require further research, complemented by a SWOT analysis of demands of small and medium-sized enterprises during MSW (multistakeholders work shops), TRAF00N has developed national SRIA (Strategic research and innovatiion agenda) for traditional fruits in Serbia in order to inform national policy makers on the future research needs of the SMEs (small and medium sized enterprises) involved in the production of traditional fruit. Also, the general SRIA (not related to specific products) for traditional food at European level was created in cooperation with the FP7 project TRADEIT. This joint TRAF00N-TRADEIT SRIA will inform the European Commission and decision-makers at the European level on future research arising from the identified needs of SMEs in Europe.

This agenda is thematically focused on the development of segment of the national innovation system in the traditional food production in Serbia. It is based on a series of activities conducted in the past two years, applying the methodology developed under the project in combination with foresight methodology. It included a large number of social factors. It pointed out the advantages and disadvantages, opportunities and threats, quantified and ranked the priorities, identified needs and served to intensify activities on establishment of National Technology Platform "Food for Life". We expect the agenda to get the support of policy makers and provide reinforcement an enabling environment for innovation and further development of innovation activities in the sector of traditional food in Serbia.

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Authors

## ACKNOWLEDGEMENT

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## Executive Summary

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TRAF00N defines Traditional Food as “food which is produced according the gastronomic heritage by at least three generations, which shows specific feature(s) that distinguish it clearly from other similar products of the same category in terms of the use of ‘traditional ingredients’ (raw materials of primary products) or ‘traditional composition’ or ‘traditional type of production and/or processing method’. Furthermore, it is associated with a certain local area, region or country.”

Serbia, as a project partner, selected two fruits: raspberry and plum. Raspberries are one of Serbia’s best known and most widely exported fruits. Serbia is one of the biggest producers and exporters of raspberries in the world. Between 90-95% of Serbian raspberries is the Willamette variety. Raspberries from Serbia are prized worldwide for their colour, unique taste and firmness. Raspberry of Arilje has protected indication of origin in Serbian IPO. Plum is the most common species of fruit trees in Serbia, and has the greatest economic importance. Serbia is the second biggest producer of plum in the world. Serbia mainly exports fresh, frozen and dry plums. Several other products such as brandy, jam, marmalade, plum preserves, compote and plum puree are also produce among which plum brandy “Šljivovica“ is economically the most important.

Raspberries are grown on small family owned farms on plots of land that average is 0.5 hectares. They are harvested by hand. Raspberries are grown on 16 thousand hectares throughout Serbia. With an average yield per hectare of 6 tons, Serbia in 2004 produced more than 92 thousand tons of raspberries. During the recent years in Serbia average annual production of raspberry was about 80.000 t which is 5.5% of total production of fruit.

Almost 90% of raspberry is frozen in large warehouses, and only 10% are still used for processing or sale in retail stores. The majority of Serbian raspberries are exported frozen (93%), and only a small number of exported fresh. About 25% of world raspberry production is from Serbia.

The Republic of Serbia occupies a high position in value of produced quantities of raspberries, in comparison with the other countries producers of raspberries. In 2012, Serbia was fourth, in 2011 second and in 2010 took the fourth place. In the export of agricultural and food products, 10.84% is the share of raspberries in the period 2004 to 2011. Raspberry exports in the mentioned period reached a maximum in 2011 and amounted 210 million dollars. The biggest competitive battle between manufacturers, Serbian and Polish, are heading to the markets of Germany, France, Austria and Belgium.

The main problems in production of raspberry was high sensitivity to climate changes, inadequate implementation of production processes and unplanned increase of production areas, even in the absence of minimum for high-quality and cost-effective production of raspberries. Also, lack of money at the time of purchase and late payment to producers make a problem in production process.

Plum is the most common species of fruit trees in Serbia, and has the greatest economic importance. In addition to large and versatile use value, good quality and high rankers, the distribution has contributed and easy propagation of shoots and selfing.

Of all areas harvested with fruit, 67% goes on stone fruit, two third of which are areas under plum. In overall annual production of fruit in Serbia stone fruit participates with 57%. Orchards in Serbia occupy 4.8% of area under agricultural land. More than 50% of that is plum orchards.

According to the number of plum trees (40,822,000) and the production of 581,874 tons in 2011 (which represents a decrease compared to 662,631 tonnes in 2009), Serbia was second in the world, followed by United States, Romania, Turkey, Spain, etc [Source: RZS].

Serbia holds second place, after China, with 158.000 ha under plum trees, which is 6.24% of total world area under plum. Serbia has double of more area under plum than countries in region, and holds first place in Europe, with Bosnia and Romania, far behind with 79.000 and 67.478 ha. All the other countries in the region have less than 20.000 ha under plum.

In renewed Serbian export, fruit participate with 17%, plum participate with 10% in fresh fruit export, and less than 1% in agricultural export in total. The majority of Serbian plum are exported fresh (63.39%), than frozen (21.10%) and dried (13.83%). Among other products (brandy, jam, marmalade, plum preserves, compote and plum puree), the most important is „Šljivovica“ – plum brandy (1.18%). About 75% of all produced plum in Serbia is processed to plum brandy.

Cultivation of plums faces many problems in Serbia today, planting material, plum varieties, cultivation methods, mechanization, production stagnation, decline in yields, age of trees. One of the main problems in cultivation of plum in Serbia is plum pox virus (PPV) for which effective measures does not exist. Majority of plum trees are infected with this virus, more than 70%, representing a threat to the future cultivation of plum.

At the beginning of the project, the needs of traditional fruits SMEs in Serbia have been investigated and collected (Inventory of Needs, IoN). With this purpose, four questionnaires, one for each traditional food category, were developed including issues from the entire food production chain, but also questions related to food safety and quality, and entrepreneurship & legal aspects. After collecting of data from SMEs involved in production and processing of sweet fruits, SWOT analysis was performed with the following findings:

#### Strengths:

- Big potential of human resource and its well trained professionals
- Experience and tradition in innovation in Sweet fruit sector
- Big and diverse potential of domestic raw materials
- High quality of specific varieties recognized on international market (raspberry from Arilje)

#### Weaknesses:

- Low level of research and development in the companies
- Lack of long-term strategy for development in the companies
- Obsolete equipment
- Lack of continuous education in the companies
- Weak connection of companies with the generators of technologies and knowledge
- Low level of IPR culture
- Lack of marketing skills
- Lack of ICT skills (skill to complete questionnaires)
- Problem with labelling (mostly because of IPR issues)
- Packaging

#### Opportunities:

- Sweet fruit sector as national priority
- Possibility for IPR protection
- Financial opportunities in IPA (instrument for precessions associations) funds
- Building clusters and networking (Ethno cluster)
- Branding of traditional products
- Trends in health food and organic production

#### Threats:

- Absence of standardization and harmonization of legal regulations
- Insufficient presence of knowledge and technology transfer institutions
- Distributer, bad cold chain transport
- Retailer, bad storage conditions and payments

TRAF00N partners, relevant SME associations and external specialist has analyzed during the multi-stakeholder workshops (MSWs) the results of IoN for the traditional fruits in Serbia with the main objectives: 1) prioritizing the needs collected in the IoN, 2) matching the needs identified in the IoN with the available transferable innovations identified by partners, 3) identifying those needs which do not require in depth research and may be solved without the development of new research projects, finding the solutions within the consortium experts, external scientists, or in collaboration with ongoing projects and 4) identifying those needs requiring new scientific approaches to be included as recommended research lines/initiatives in the Strategic Research and Innovation Agenda (SRIA).

During 2015 and 2016, based on the results of MSWs, four Training Workshops (TWs) for SMEs have been held in Serbia on topic "Innovation in production and processing of raspberry and plume", attended by number of participants, including representatives of SMEs, individual producers, faculties, institutes, Innovation center, Science and Technology Park, Intellectual Property Office, clusters, Laboratory of Food Control, media and press. Exchange of opinions, discussions and presentations has served as crucial input for generation of ideas and proposals for improvement of innovation and knowledge transfer in traditional sweet fruits sector in Serbia. In addition, questionnaire based survey is conducted for assessment of state of the art in traditional sweet fruits production, processing and distribution in the view to deliver relevant information for innovation in food supply chain and provide basis for proposal of the most important steps which should be undertaken to improve production of traditional sweet fruits in Serbia. Several important topics were recognized as very important for improvement of fruit sector: continual educations of all actors in food chain, better communication with local and national authorities, more involvement of academic community in creation and transfer of novel knowledge, straightening of associations and development of Innovation Strategy. During the TWs, the technological, legal, or business-related solutions for these previously identified needs/demands have been transferred to SMEs.

Based on the detected innovation gaps and the identified needs that require further research, and complemented by SWOT analysis of the demands of SMEs during the MSWs, TRAF00N has developed national SRIA for the traditional fruits in Serbia in order to inform national policy makers about future research needs of traditional fruits SMEs. Additionally, a general SRIA (no product-specific) for traditional foods at European level has been developed in collaboration with the FP7 TRADEIT project. This joint TRAF00N-TRADEIT SRIA will inform the European Commission and European policy makers about future research answering the identified needs of SMEs in Europe.

Major topics for national SRIA for traditional fruits in Serbia, are presented by the rank of the evaluated importance, are:

#### Primary production:

1. Breeding issue trade-off between productivity and quality
2. Establishment and development of certified planting material
3. Cost-efficient implementation of water management system
4. Implementation of technical solutions for controlling pest and diseases management in organic and conventional production
5. Development of multi resistant varieties for organic production
6. Faster and better implementation of food safety management systems



Processing (technology, energy, etc.):

1. Implementation of modern packaging to enhance shelf life, to reduce waste and to improve the post-harvest technology (storage)
2. Modernization of storage technology of raw materials and products
3. Development and implementation of modern processing technology
4. Adaptation of the processing technology in order to lower the energy consumption
5. Better implementation of waste management and development of value-added by-products

Product (labelling, health/food safety, etc.):

1. Faster and better implementation of food safety management systems
2. Producer targeted dissemination of knowledge on health, nutritional properties of their products
3. Reducing the diversity in forms, materials and numbers of packaging by raising consumers awareness (communicate on local environment, tradition and regional trademark)

Business (marketing, organization, consumers, regulations, etc.):

1. Constant improvement of policy conditions for labour management and organization of support.
2. Branding of traditional products
3. Increase the awareness on traditional food through continuous education and communication
4. Building associations, clusters and food technology platform
5. New business model (supply chain actor's balance)
6. Simplification of the procedure leading to obtain certification
7. Implementation, harmonization and creation of laws and regulation policy.

In addition to the development of the national Strategic Research and Innovation Agenda (SRIA) for traditional fruits in Serbia, all participants (stakeholders, decision makers, chamber of commerce, producers – SMEs, researchers, etc.) have discussed idea of establishment of the national technology platform in the agro food sector in Serbia. Representatives from SMEs, higher education and research institutions, included in workshops, surveys and other research and evaluations within this project are asked whether they are willing to join initiative to create technology platform in the agro food sector in Serbia: National technology platform “Food for life”. Big majority – 93.85% has expressed their willingness to join this initiative.

# 1 PREFACE

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## 1.1 TRAF00N project

Name: TRAF00N

“Traditional Food Network to improve the transfer of knowledge for innovation”

Period: 01.11.2013 – 31.10.2016

Project duration: 36 months

TRAF00N defines Traditional Food as:

“Food which is produced according the gastronomic heritage by at least three generations, which shows specific feature(s) that distinguish it clearly from other similar products of the same category in terms of the use of ‘traditional ingredients’ (raw materials of primary products) or ‘traditional composition’ or ‘traditional type of production and/or processing method’. Furthermore it is associated with a certain local area, region or country.”

Main Objectives of the project are:

- 1) Improvements in technology transfer to SMEs producing and processing traditional foods:
  - For improved food quality, safety and environmental performance
  - Stabilized production protocols
  - Correct use of IPR, European food law, use of labels, marketing, product development strategies
- 2) Development of strategic research and innovation agenda for traditional foods responding to the needs of all stakeholders.
- 3) Stimulation of entrepreneurship among food researchers, commercial take-up of food R&D results, and entrepreneurial networking.

In the European Union, Small and Medium Enterprises (SMEs) of the food sector are increasingly under pressure due to developing open markets, increasing demand of standardized and price competitive food products by the consumers, rising importance of large retailers, and challenges in obeying governmental regulations. This raises the risk of losing many traditional foods as well as traditional techniques of production, processing, preservation, and packaging that are applied by SMEs using regional raw materials and often have a role in the cultural identity of regions. SMEs of traditional foods must extend their skills in modern as well as competitive marketing and production techniques to comply with existing European regulations and to promote the aspects of their products related to nutrition and health.

To support traditional SMEs, FP7 TRAF00N project ([www.trafoon.eu](http://www.trafoon.eu)) has established a knowledge transfer network of 30 European research institutions, technology transfer agencies, and SME associations from 14 European countries by covering the value chain of four groups of traditional food products based on (1) grains, (2) fish, (3) vegetables and mushrooms, and (4) sweet fruits and olives. These food sectors are traditional, healthy foodstuffs which are essential for a balanced nutrition. Since November 2013 and until October 2016, TRAF00N is supporting European’s traditional SMEs in these food sectors to foster sustainable innovation and

entrepreneurship in the sector of traditional foods for the benefit of the regions of Europe and the European consumer.

TRAF00N increases the communication and interaction between traditional food SMEs, SME associations, and research institutions to improve and increase the knowledge transfer towards traditional SMEs on different areas of influence/activities (e.g. food production, food processing, packaging, marketing, labelling, certification, stabilization of production protocols to assure food quality and food safety, legal issues), and to enable research topics that are needed by European food SMEs.

## 1.2 TRAF00N work plan

At the beginning of the project, the needs of traditional food SMEs all over Europe have been investigated and collected (Inventory of Needs, IoN). With this purpose, four questionnaires, one for each traditional food category, were developed including issues from the entire food production chain, but also questions related to food safety and quality, and entrepreneurship & legal aspects. All TRAF00N partners contacted the identified SMEs and SME associations via email/phone/visit, extracting the relevant information for the IoN through the corresponding questionnaire. After extract the needs, SWOT analyses of the results for each TRAF00N traditional food category were carried out by country and sector.

Five multi-stakeholder workshops (MSWs) took place between September and October 2014 in Poland, Spain, Switzerland, the Netherlands and Czech Republic. In each MSW, TRAF00N partners, relevant SME associations and external specialist analyzed the results of IoN for the core regions of the food category. The main objectives of the MSWs were: 1) prioritizing the needs collected in the IoN, 2) matching the needs identified in the IoN with the available transferable innovations identified by partners, 3) identifying those needs which do not require in depth research and may be solved without the development of new research projects, finding the solutions within the consortium experts, external scientists, or in collaboration with ongoing projects and 4) identifying those needs requiring new scientific approaches to be included as recommended research lines/initiatives in the Strategic Research and Innovation Agenda (SRIA).

During 2015 and 2016, based on the results of MSWs, more than 55 Training Workshops (TWs, <http://www.trafoon.eu/training-workshops/>) for SMEs have been held in Europe. During the TWs, the technological, legal, or business-related solutions for these previously identified needs/demands have been transferred, where specifically trained mediators have been used to communicate these solutions in the language of the respective countries.

As additional knowledge transfer tool, a multi-lingual online Information Shop ([www.trafoon.org](http://www.trafoon.org)) containing the information gathered and implemented within the TRAF00N network has been created. This free access online tool includes information (PDF files, ebooks, audio and video files etc.) about innovations in primary production, processing and marketing of traditional food using regional raw materials in different languages. The Information Shop also contains databases of experts and organizations to enable potential future collaborations and SME-oriented research projects, and includes all technology/innovation knowledge transferred during the TWs and guidelines for product innovations in diverse European languages.

### 1.3 *Strategic Research and Innovation Agenda (SRIA) for Traditional Foods*

Based on the detected innovation gaps and the identified needs that require further research, and complemented by SWOT analysis of the demands of SMEs during the MSWs, TRAF00N has developed four SRIAs for the core regions of the TRAF00N traditional foods categories:

- (1) grains,
- (2) fish,
- (3) vegetables and mushrooms, and
- (4) sweet fruits and olives.

TRAF00N SRIAs will inform national policy makers about future research need of traditional food SMEs, especially fostering rural development.

As previously stated, it has been created additional knowledge transfer tool, a multi-lingual online Information Shop ([www.trafoon.org](http://www.trafoon.org)) containing the information gathered and implemented within the TRAF00N network.

Based on the detected innovation gaps and the identified needs that require further research, and complemented by SWOT analysis of the demands of SMEs during the MSWs, TRAF00N has developed **national SRIA for the traditional fruits in Serbia** in order to inform national policy makers about future research need of traditional fruits SMEs. Additionally, a general SRIA (no product-specific) for traditional foods at European level has been developed in collaboration with the FP7 TRADEIT project. This joint TRAF00N-TRADEIT SRIA will inform the European Commission and European policy makers about future research answering the identified needs of SMEs in Europe.

## 2 The Development Process of the SRIA

### 2.1 Implementation plans for the SRIA

Implementation plans for the SRIA contain steps that will bring to creating Strategic Research and Innovation Agenda for Traditional Food. It includes two main phases:

1. Stakeholders Consultation Session 1 (SCS1): Creation of the vision and prioritization and relevance of the subject areas / topics;
2. Stakeholders Consultation Session 2 (SCS2): Creation of the vision.

The first phase lasted from April to December 2015 and it resulted in a collective Strategic Research & Innovation Agenda. It was created on the basis of strategic research and innovation agendas (gaps) from traditional food categories sub-networks (WP2-5) and cross-sectional work packages (WP6&7). The most important inputs in this phase were inventories of needs per product groups, evaluations of the workshops, former projects, TRAF00N network, SWOT and SOR analyses, dialogue on the 2nd Annual meeting. Detailed list of inputs, activities and outputs in this phase is presented in the table below. Main outcome of this phase will be draft version of SRIA for all product groups.

The second phase lasted from January to October 2016 and it delivered Final Strategic Research and Innovation Agenda for Traditional Food. In this phase were engaged all relevant stakeholders in traditional food sector in order to collect information and disseminate project results. Final SRIA design includes strategic themes and information about future challenges, impact, R&I activities, etc. Activities of all project partners in this phase are presented in the table below.

SRIA of ETP “Food for life” was used as a representative model in creating these Implementation plans.

Year	2015									2016				
Month	April	May	June	July	August	September	October	November	December	January	February	March	April	May
Phase	M18/ M19	M19	M20	M21	M22	M23	M24	M25 2 <sup>nd</sup> Annual Meeting	M26	M27	M28	M29	M30	M31
<b>Stakeholders Consultation Session 1 (SCS1): Creation of the vision and prioritization and relevance of the subject areas / topics</b>	<p>A collective Strategic Research &amp; Innovation Agenda will be compiled based on strategic research and innovation agendas (gaps) from traditional food categories sub-networks (WP2-5) and cross-sectional work packages (WP6&amp;7).</p> <p><b>Inputs</b></p> <ul style="list-style-type: none"> <li>- <b>inventories of needs</b> of the respective traditional food WPs/SMEs (WP2-5)</li> <li>- <b>feedback/evaluation</b> of the workshops (WP 2-7)</li> <li>- Literature/<b>former project research</b>: collective list of innovation needs of SMEs (WP2-5) and a FP6/7 project validation (WP2-5)</li> <li>- Contact to extend TRAF00N <b>networks</b></li> <li>- <b>SWOT Analysis</b> and <b>SOR</b> (Strategic Orientation)</li> </ul>									<p><b>Outcomes of the SCS1</b></p> <ol style="list-style-type: none"> <li>1. Subject areas of the engagement of the research and innovation community</li> <li>2. Vision of traditional food</li> <li>3. For each stakeholder group, the specific key actors will be identified by TRAF00N’s extensive network in order to have a comprehensive list of the main actors in knowledge transfer on traditional food in</li> </ol>				

		- <b>dialogue between and within the WP</b> on the 2 <sup>nd</sup> Annual Meeting	Europe  4. Ranking list of the subject areas / topics of the engagement of the research and innovation community  Drafts of SRIA for all product groups.
<b>Activity (all project partners)</b>	Consultation, creation, adoption, distribution	<p>1) Elaboration of the first draft of SRIAs for traditional food categories sub-networks (WP2-5) and cross-sectional work packages (WP6&amp;7) (WP leaders in collaboration with the partners from the corresponding WPs)</p> <p>2) Presentation of</p> <ul style="list-style-type: none"> <li>- first draft of SRIAs for WP2-5, including areas/topics from WP6&amp;7 (Strategic themes and subcategories)</li> <li>- results/feedback of the training workshops on the 2<sup>nd</sup> Annual Meeting (12<sup>th</sup>/13<sup>th</sup> November 2015)</li> </ul> <p>3) <u>Identification process of the project partners</u></p> <ul style="list-style-type: none"> <li>→ Discussion on the first draft of SRIAs: <ul style="list-style-type: none"> <li>▪ Strategic themes and subcategories</li> <li>▪ Capacities and potentials</li> <li>▪ Needs and opportunities</li> <li>▪ Obstacles and Barriers</li> <li>▪ Emerging trends and research needs</li> </ul> </li> <li>→ <ul style="list-style-type: none"> <li>▪ innovation needs</li> <li>▪ innovation gaps</li> </ul> </li> </ul> <p>on the 2<sup>nd</sup> Annual Meeting (12<sup>th</sup>/13<sup>th</sup> November 2015)</p>	<p>1) Training Workshops 2016: presentation of the results of SCS1 on the training workshops to get feedback and adjustments from the SMEs</p> <p>2) <u>Identification process of the SMEs</u></p> <ul style="list-style-type: none"> <li>→ Discussion on: <ul style="list-style-type: none"> <li>▪ Capacities and potentials</li> <li>▪ Needs and opportunities</li> <li>▪ Obstacles and Barriers</li> <li>▪ Emerging trends and research needs</li> </ul> </li> <li>→ Identification of: <ul style="list-style-type: none"> <li>▪ innovation needs</li> <li>▪ innovation gaps</li> </ul> </li> </ul> <p>on the training workshops 2016</p>

Year	2016				
Month	June	July	August	September	October
Phase	M32	M33	M34	M35	M36
<b>Stakeholders Consultation Session 2 (SCS2): Creation of the vision</b>	<p><b>Outcomes of the SCS2</b> Final Strategic Research and Innovation Agenda for Traditional Food</p> <p><b>Target Group:</b> All stakeholders with a strong influence in the area (policy makers, unions of associations, universities). This will allow an extra initial momentum in disseminating the project's SRIA.</p> <p><b>Final SRIA Design - Strategic themes for each traditional Food sector based on Inputs and Outcomes of the SCS1:</b></p> <ol style="list-style-type: none"> <li>1. Main Strategic Themes related to the WP with Subcategories</li> <li>2. Precise information <ul style="list-style-type: none"> <li>- Rationale (Specific/future challenge)</li> </ul> </li> </ol>				

	<ul style="list-style-type: none"> <li>- State of the art (Scope)</li> <li>- Vision of traditional food and expected achievements (Impact)</li> <li>- Required research and innovation activities (a, b, c, d,...)</li> </ul> <p><b>Example:</b></p> <p style="text-align: center;">OUTLINE OF TOPICS IN THE STRATEGIC RESEARCH AND INNOVATION</p> <p>AGENDA</p> <ol style="list-style-type: none"> <li>1. Research and innovation to overcome the challenges of the traditional food regulation       <ol style="list-style-type: none"> <li>1.1 Supporting the development of a diverse traditional food sector through better farming policies, better certification and market data           <ul style="list-style-type: none"> <li>➔ Rationale, State of the art, Impact, Required research.....</li> </ul> </li> <li>1.2 Ensuring consumer confidence in traditional food</li> <li>1.3 Alternatives to contentious inputs used in traditional food agriculture</li> <li>1.4 Development of innovative systems for traditional food aquaculture</li> <li>1.5 Traditional food processing concepts and technologies</li> </ol> </li> <li>2. Traditional food farming and food systems support crucial empowerment in rural areas       <ol style="list-style-type: none"> <li>2.1. Business models and labour dynamics of value addition through food and feed processing</li> <li>2.2. Strengthening the resilience and innovation capacities of the traditional food sector</li> <li>2.3. Agro-ecological and traditional food farming as means of improving food security and rural development</li> </ol> </li> <li>3. Eco-functional intensification enhances the productivity, stability and resilience of agro-ecosystems       <ol style="list-style-type: none"> <li>3.1 Improved ecological support functions</li> <li>3.2 Innovative ICT tools for traditional food systems</li> <li>3.3 Solutions for resource-efficient primary production, based on the “Internet-of-Things”</li> </ol> </li> <li>4. ...</li> </ol>
<p><b>Activity</b> <b>(all project partners)</b></p>	<ol style="list-style-type: none"> <li>1) Formulate for each traditional Food sector the Strategic themes based on Inputs and Outcomes of the SCS1</li> <li>2) Priorities: Ranking list of the subject areas / topics of the engagement of the research and innovation community</li> </ol> <p>The web site of TRAF00N will function as a portal and will enable active web based communication:</p> <ol style="list-style-type: none"> <li>a) Via Intranet: enables that all project partners can work on the latest version of the SRIA jointly, follow the progress of its development and exchange ideas/ make comments.</li> <li>b) Via TRAF00N website – uploading final version for public, raising awareness</li> </ol> <p>Send final version of SRIA to EU-Commission.</p>

## 2.2 Implementation plans for the national SRIA - Serbia

Serbia selected two fruits: raspberry and plum. Raspberries are one of Serbia’s best known and most widely exported fruits. Serbia is one of the biggest producers and exporters of raspberries in the world. They are prized worldwide for their colour, unique taste and firmness. Raspberry of Arilje has protected indication of origin in Serbian IPO. Plum is the most common species of fruit trees in Serbia, and has the greatest economic importance. Serbia is the second biggest producers of plum in the world. Serbia mainly exports fresh, frozen and dry plums. Several other products such as

brandy, jam, marmalade, plum preserves, compote and plum puree are also produce among which plum brandy “Šljivovica“ is economically the most important.

National SRIA - Serbia is done in the field of traditional production of raspberries and plums on the basis of data collected by surveying producers and on several workshops held during 2015 and 2016.

This process has required several steps:

- Identification of the needs of companies engaged in the production of traditional fruit on the basis of data obtained through Innovation audit forms created within the project;
- Organization of workshops for producers of raspberries during the 2015 in Belgrade and Ivanjica and collecting data from participants using a questionnaire containing the following elements - Innovation activities of enterprises; environment for scientific research and innovation activity in the production of traditional food based on raspberry; Government, regulatory environment, laws and regulations, EU integrations;
- Organization of workshops for producers of plums during 2016 in Čacak and Kraljevo and collecting data from participants using two questionnaires:
  - 1) survey with the following elements - Innovation activities of enterprises; environment for scientific research and innovation activity in the production of traditional food based on plums; Government, normative environment, laws and regulations, EU integrations.
  - 2) questionnaire with topics to be included in future SRIA at National and European level.

At the beginning of the project, the needs of traditional fruit SMEs in Serbia have been investigated and collected (Inventory of Needs, IoN). With this purpose, four questionnaires, one for each traditional food category, were developed including issues from the entire food production chain, but also questions related to food safety and quality, and entrepreneurship & legal aspects. After extract the needs, SWOT analyses of the results for traditional fruits in Serbia were carried out.

TRAF00N partners, relevant SME associations and external specialist have analyzed during the multi-stakeholder workshops (MSWs) the results of IoN for the traditional fruits in Serbia with the main objectives: 1) prioritizing the needs collected in the IoN, 2) matching the needs identified in the IoN with the available transferable innovations identified by partners, 3) identifying those needs which do not require in depth research and may be solved without the development of new research projects, finding the solutions within the consortium experts, external scientists, or in collaboration with ongoing projects and 4) identifying those needs requiring new scientific approaches to be included as recommended research lines/initiatives in the Strategic Research and Innovation Agenda (SRIA).

During 2015 and 2016, based on the results of MSWs, four Training Workshops (TWs) for SMEs have been held in Serbia on topic “Innovation in production and processing of raspberry and plum”, attended by number of participants, including representatives of SMEs, individual producers, Faculties, Institutes, Innovation center, Science and Technology Park, Intellectual Property Office, Clusters, Laboratory of Food Control, media and press. Exchange of opinions, discussions and presentations has served as crucial input for generation of ideas and proposals for improvement innovation and knowledge transfer in traditional sweet fruits sector in Serbia. In addition, questionnaire based survey is conducted for assessment of state of the art in traditional sweet fruits production, processing and distribution in the view to deliver relevant information for innovation in food supply chain and provide basis for proposal of the most important steps which should be undertaken to improve production of traditional sweet fruits in Serbia. Several important topics were recognized as very important for improvement of fruit sector: continual educations of all actors in food chain, better communication with local and national authorities, more involvement of academic community in creation and transfer of novel knowledge, straightening of associations



and development of Innovation Strategy. During the TWs, the technological, legal, or business-related solutions for these previously identified needs/demands have been transferred to SMEs.

As additional knowledge transfer tool, a multi-lingual online Information Shop ([www.trafoon.org](http://www.trafoon.org)) containing the information gathered and implemented within the TRAF00N network has been created. This free access online tool includes information (PDF files, e-books, audio and video files etc.) about innovations in primary production, processing and marketing of traditional food using regional raw materials in different languages.

Based on the detected innovation gaps and the identified needs that require further research, and complemented by SWOT analysis of the demands of SMEs during the MSWs, TRAF00N has developed **national SRIA for the traditional fruits in Serbia** in order to inform national policy makers about future research need of traditional fruits SMEs. Additionally, a general SRIA (no product-specific) for traditional foods at European level has been developed in collaboration with the FP7 TRADEIT project. This joint TRAF00N-TRADEIT SRIA will inform the European Commission and European policy makers about future research answering the identified needs of SMEs in Europe.

### 3 Vision for Traditional Food

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Within the project CAPINFOOD survey was conducted in order to determine the general objectives of food production and processing in Serbia [CAPINFOOD, 2014].

The Delphi method (questionnaires are sent to dozens of experts, preserving their identity and replies) is used in two rounds in order to identify:

1. Overall objectives of the agro food sector in Serbia;
2. Key priority economic activities within agro food sector in Serbia.

#### 3.1 Overall objectives of the agro food sector in Serbia

List of objectives is presented in the following table without rankings of relative importance among them.

No.	Overall objectives of the agro food sector in Serbia
1	Better utilisation of secondary products from food industry
2	Marketing development
3	Improvement of the organization of agricultural and food manufacturers network with support of government
4	Preparation of law regulations
5	Improvement of food safety and food quality
6	Implementation of innovations in the food production and food processing
7	Improvement of education and science
8	Production of traditional food
9	Production of organic food
10	Improvement of fruit science, viticulture and vegetable crops
11	Improvement of crop science
12	Improvement of zoo techniques
13	Establishment of sustainable development
14	Improvement and increase of food production and export

Production of traditional food, as well as improvement of fruit science, is among first ten objectives of the agro food sector in Serbia.

#### 3.2 Priority economic activities within agro food sector in Serbia

The key priority economic activities within agro food sector in the Republic of Serbia, according to opinions of the pool of experts are listed in the following table:

Rank	NACE Rev. 2	MANUFACTURING
1	103	Processing and preserving of fruit and vegetables
2	101	Processing and preserving of meat and production of meat products

3	110	Manufacture of beverages
4	105	Manufacture of dairy products
5	108	Manufacture of other food products
6	120	Manufacture of tobacco products
7	109	Manufacture of prepared animal feeds
8	107	Manufacture of bakery and farinaceous products
9	106	Manufacture of grain mill products, starches and starch products

Processing and preserving of fruit is the **first key priority economic activity** within agro food sector in the Republic of Serbia.

## 4 Environment for SRIA in the Field of Traditional Food

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### 4.1 National economic context

#### Raspberry

Raspberries are one of Serbia's best known and most widely exported fruits. Serbia is one of the biggest producers and exporters of raspberries in the world. They are prized worldwide for their colour, unique taste and firmness. Between 90-95% of Serbian raspberries is the North American Willamette variety.

Other raspberry varieties cultivated in in Serbia include Meeker, Promise and Gradina. Raspberries are grown on small family owned farms on plots of land that average 0.5 hectares. They are harvested by hand. Raspberries are grown on 16 thousand hectares throughout Serbia.

With an average yield per hectare of 6 tons Serbia in 2004 produced more than 92 thousand tons of raspberries. Serbia's raspberry harvest starts in late June and ends in July, depending on weather conditions and the location of the field. Almost 90% of raspberry is frozen in large warehouses, and only 10% are still used for processing or sale in retail stores. Most fresh raspberries are sold and consumed during the summer season. The majority of Serbian raspberries are exported frozen (93%), and only a small number of exported fresh [SIEPA, "Fruit industry in Serbia"].

During the recent years in Serbia average annual production of raspberry was about 80.000 t which is 5,5% of total production of fruit. Over 90% of raspberry produced is being frozen and exported and the rest is being sold fresh or made into other products. About 25% of world raspberry production is from Serbia. In that way about 100 million of euros is insured in the Balance of Payment. Serbia mostly exports frozen and rarely cooled raspberry [Kljajić, Vuković, Arsić, 2013].

The potential value of Serbian raspberries production on the world market can be seen from the data on the ranking of the Republic of Serbia in raspberry production in 2010, 2011 and 2012. Serbia occupies a high position in value of produced quantities of raspberries, in comparison with other countries producers of raspberries. In 2012, Serbia was fourth, in 2011 second and in 2010 took the fourth place.

In the export of agricultural and food products, 10.84% is the share of raspberries in the period 2004 to 2011. Raspberry exports in the mentioned period reached a maximum in 2011 and amounted 210 million dollars. The increased value of exports is the result of increased production in 2011. The minimum value of exports in 2005 in the amount of 109 million dollars. The largest consumers of raspberries in Europe are the biggest importers of raspberries from the Republic of Serbia. The biggest competitive battle between manufacturers, Republic of Serbia and Polish, are heading to the markets of Germany, France, Austria and Belgium. Poland's accession to the European Union received a number of advantages to breeding and placement of raspberries. The largest European companies in the food industry build processing facilities in Poland and thus stimulate the development of agriculture and breeding raspberries [Radosavljević, 2014].

The main problems in production of raspberry was high sensitivity to climate changes, inadequate implementation of production processes and unplanned increase of production areas, even in the

absence of minimum for high-quality and cost-effective production of raspberries. Also, lack of money at the time of purchase and late payment to producers make a problem in production process.

## Plum

Plum is the most common species of fruit trees in Serbia, and has the greatest economic importance. In addition to large and versatile use value, good quality and high rankers, the distribution has contributed and easy propagation of shoots and selfing.

According to the number of plum trees (40,822,000) and the production of 581,874 tons in 2011 (which represents a decrease compared to 662,631 tonnes in 2009), Serbia was second in the world, followed by United States, Romania, Turkey, Spain, etc [Source: RZS].

Of all areas harvested with fruit, 67% goes on stone fruit, two third of which are areas under plum. In overall annual production of fruit in Serbia stone fruit participates with 57%. Orchards in Serbia occupy 4.8% of area under agricultural land. More than 50% of that is plum orchards. Number of fruit crops for consumption in fresh state is low. Cultivation of plums faces many problems in Serbia today, seedlings, plum variety, cultivation methods, mechanization, production stagnation, decline in yields, age of trees, inadequate orchards.

Main problem in cultivation of plum in Serbia is extensive production, which characterize low level of agricultural techniques and low yield. More than 50% of plum crops are grown extensively.

Serbia holds second place, after China, with 158.000 ha under plum trees, which is 6.24% of total world area under plum. Serbia has double of more area under plum than countries in region, and holds first place in Europe, whit Bosnia and Romania, far behind with 79.000 and 67.478 ha. All the other countries in the region have less than 20.000 ha under plum.

In renewed Serbian export, fruit participate with 17%, plum participate with 10% in fresh fruit export, and less than 1% in agricultural export in total. Serbia has determined cost for fresh and dried plum, boat uncompetitive. In the last fifteen years world average for one ton of fresh plum were 650\$, while Serbian was 188\$ per ton, and for dried plum Serbian price was 1062\$ per ton, and world average was 1798\$. Even so the export was revived, it never achieved former figures. Fresh plum export has fallen from annual 10.000 t to 650, dried plum from 30.000 t to 817, export of frozen plum fell from former 6.000 t to 3.500, but never the less is most profitable plum export product. Between 1996 and 2006, export of plum began to revitalize slowly, but it is still far from being profitable part of Serbian export [Matković, 2015].

Cultivation of plums in Serbia faces with many internal problems, such as planting material, plum varieties, cultivation methods, mechanization, production stagnation, decline in yields, age of trees. One of the main problems in cultivation of plum in Serbia is plum pox virus (PPV) for which effective measures do not exist. Majority of plum trees are infected with this virus, more than 70%, representing a threat to the future cultivation of plum.

Companies - respondents offered the following answers to the question about the type of product produced by their company:

<b>Q: What kind of raspberry products is your company producing?</b>
Fresh raspberry

Frozen raspberry
Dried raspberry
Seedlings raspberries and other berries
Oatmeal with raspberries
Dehydrated porridge cereal with raspberries
Chocolate-coated dried raspberry
<b>Q: What kind of plum products is your company producing?</b>
Fresh plum
Dried plum
brandy (Rakija)
Chocolate-coated plum
Plum products

#### 4.2 Cooperation of producers of the traditional fruit with SR sector

The following table presents the reasons for companies engaged in the production of traditional fruit (raspberry and plum) have not cooperated with the scientific research (SR) sector.

<b>Q: Have you ever cooperated with the scientific and research sector in Serbia?</b>
Answer No – the reasons why there is no cooperation with the SR sector in Serbia - RASPBERRIES:
Bad promotion of the SR sector
I had no opportunity.
It is not available to me.
There was no interest from both sides
New producer
I am a beginner
We were not shown the way to cooperate
Answer No – the reasons why there is no cooperation with the SR sector in Serbia – PLUMS:
The most important things I have learned during the years
New business
There was no opportunity
Small production volume
Difficult to come, procedure
Answer No – the reasons why there is no cooperation with the SR sector in Serbia – traditional fruits:
There was no interest from both sides
The most important things I have learned during the years
New business
I had no opportunity.
Small production volume
It is not available to me.
Difficult to come, procedure

Areas of cooperation between producers of traditional fruits and scientific research sector in Serbia are presented in the table below.

<b>Q: Areas in which raspberry producers have cooperated with the scientific and research sector in Serbia?</b>
The technology of growing raspberries
Technology of raspberry processing
Certification of raspberry planting material
Technology of organic raspberry production
Creation and introduction of new raspberry varieties
Hygienic aspects
Introduction of HACCP standard
<b>Q: Areas in which plum producers have cooperated with the scientific and research sector in Serbia?</b>
The technology of growing plums
Technology of plums processing
Technology of organic plum production
introduction of HACCP standard
Hygienic aspects
Technology of packaging plums
<b>Q: Areas in which traditional fruits producers have cooperated with the scientific and research sector in Serbia?</b>
Technology of growing
Technology of processing
Certification of planting material
Technology of organic production
Introduction of HACCP standard
Creation and introduction of new varieties
Hygienic aspects
Technology of packaging

Among the producers of fruits is prevalent the belief that it is difficult to cooperate with the scientific research sector, primarily because it is not visible enough, ie. services that are in the domain of knowledge and information, which scientific institutions could provide to producers are not recognized in the market.

The areas in which they have been cooperating are mainly related to the fulfillment of the legal regulations, which is the case with the majority of small and medium enterprises in Serbia, when it comes to training and/or cooperation with scientific research sector.

### 4.3 Innovation activities of producers of traditional fruits

The types of innovation activities of the traditional producers of fruit are presented in the table below.

<b>Q: Which of the following innovative activities is your company involved in while dealing with raspberries?</b>
New raspberry products
New raspberry products (higher levels of processing)
New services (extracts, distillates)
Organized approach to solving the problem of waste in the primary and secondary production
Efficient energy use
Organic production
New dehydrated raspberries products
The application of appropriate technologies to raise yields
Food safety
New raspberry packaging
<b>Q: Which of the following innovative activities is your company involved in while dealing with plums?</b>
New plum products
New services
New packaging
Efficient energy use
Organized approach to solving the problem of waste
Organic production
<b>Q: Which of the following innovative activities is your company involved in while dealing with traditional fruits?</b>
New products
New products (higher levels of processing)
New services (extracts, distillates)
Efficient energy use
application of appropriate technologies to raise yields
Food safety
New packaging
Organized approach to solving the problem of waste
Organic production

Producers who participated in the survey in fact did not answer about innovation activities implemented in their companies/farms, but on which innovations they work on. However, their responses, showed a high awareness of the necessity of sustainable innovation, in a market that requires high and continuous product quality from producers of traditional food. Innovations in the field of traditional food are feasible in the field of increasing yields, food safety, organic production, storage methods and packaging of food, as well as waste disposal and processing.



#### 4.4 Government support to the producers of traditional fruits

Comments related to the evaluation of the government support to the traditional fruits producers in Serbia are given in the table below.

<b>Q: How do you, on a scale 1 to 5 (1 – very bad, 5 – excellent) evaluate the support of government bodies (Serbia's Agricultural Extension Service, local governments with raspberry grower associations, etc.) to raspberry producers in Serbia?</b>
Comment
Lack of interest in important things, engaging only for the purpose of daily benefits.
Insufficient engagement of professional staff
Formal, non-functional cooperation. Apply rule PDCA (plan, do, check, act).
There is no coherent and consistent policy that would be acceptable to all the producers and processors.
The great lack of specific knowledge applicable in practice
There is not enough investment, nor an organized lectures and conferences. Price never stable.
Greater presence of the state through subsidies, control of pesticides that are imported
Declarative support with no visible effects and long-term planning.
Lack of awareness and interest
I have good cooperation with the PCC in Kraljevo
It is necessary to hold more training for producers of raspberries because everything starts from good agricultural practices
It should be greater involvement of PASS on the ground or frequent training and practical application - a tour not just a story
Apart from occasional lectures, there is no cooperation
Extremely poor education of manufacturers to achieve the quality and quantity of raspberries.
Country provides very small help
National authorities should more work on cooperation with producers of raspberries
Directors are not experts, staff with no experience, associations exist only because of politics
No one comes to the field
Insufficient, but lack of interest of raspberry producers
No support to small producers
With such price and demand, raspberry does not require support
Protests of raspberry producers are telling about it
I wish that the state take precedence in raspberry production as a strategic product
Local governments and associations are working for themselves, not for farmers
It should be much more
Disaster
Producers from Central Serbia are handicapped with increased requirements (feel like second-class citizens compared to Vojvodina)
lack of interest in local government for improvement of raspberry production (Pozega!)
<b>Q: How do you, on a scale 1 to 5 (1 – very bad, 5 – excellent) evaluate the support of government bodies (Serbia's Agricultural Extension Service, local governments with plum associations, etc.) to plum producers in Serbia?</b>

Comment
Insufficient, field work
My experience: it is impossible or very difficult to obtain any kind of help for beginners in business
They remember fruit producers after the hail
It could be better
Slow, inadequate, too much documentation, unsettled scales of subsidies
PSSS does not have knowledge to provide any support. Local government does not have the capacity nor the will to support the production of plums
It is on the very beginning
Insufficient and unevenly distributed subsidies, especially small producers
Very bad
It must be better
It should be more present to focus on better quality
There is no system support
Insufficient engagement of state institutions and the lack of cooperation of the state and entrepreneurs
<b>Q: How do you, on a scale 1 to 5 (1 – very bad, 5 – excellent) evaluate the support of government bodies (Serbia's Agricultural Extension Service, local governments with associations, etc.) to traditional fruit producers in Serbia?</b>
Comment
Lack of interest in important things, engaging only for the purpose of daily benefits.
Insufficient engagement of professional staff
formal, non-functional cooperation. Apply rule PDCA (plan, do, check, act).
There is no coherent and consistent policy that would be acceptable to all the producers and processors.
The great lack of specific knowledge applicable in practice
There is not enough investment, nor an organized lectures and conferences. Price never stable.
Greater presence of the state through subsidies, control of pesticides that are imported
Declarative support with no visible effects and long-term planning.
Lack of awareness and interest
It should be greater involvement of PASS on the ground or frequent training and practical application - a tour not just a story
Apart from occasional lectures, there is no cooperation
Extremely poor education of manufacturers to achieve the quality and quantity of raspberries.
Country provides very small help
National authorities should more work on cooperation with producers of raspberries
Directors are not experts, staff with no experience, associations exist only because of politics
Insufficient, but lack of interest of raspberry producers
No support to small producers
There is no system support
Insufficient engagement of state institutions and the lack of cooperation of the state and entrepreneurs
Local governments and associations are working for themselves, not for farmers

It should be much more
Disaster
Producers from Central Serbia are handicapped with increased requirements (feel like second-class citizens compared to Vojvodina)
Insufficient engagement of state institutions and the lack of cooperation of the state and entrepreneurs

Support of government bodies ie. local government and agricultural expert service of Serbia is evaluated with very low marks; raspberry producers gave average grade 2.46, while plum producers 2.2. The comments show lack of interest and insufficient engagement of state institutions in the production and marketing of raspberry and plum products.

Although the plum has been traditionally, since the beginning of the nineteenth century one of the most cost-effective product in Serbia, and it is woven into the cultural tradition of Serbia, that is not sufficient reason to strategically place support to the production of plums, what would ensure the continuity of their own support.

Producers expect from the state a stable environment that will allow not only stable prices, but more support in education, training and awareness. Producers are inclined to think that the government shows interest for them only in political purposes, although there are also self-critical comments - that it is producers themselves are not politically interested or organized in achieving their long-term goals.

## 5 Research and Innovation to Overcome the Challenges of the Traditional Food Production

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### 5.1 The measures necessary to be taken to improve the production of traditional fruit

Producers of traditional fruit proposed a series of measures to improve the activity they are engaged in. Their suggestions are given in the table below.

<b>Q: What is the most important to undertake in order to enhance raspberry production in Serbia?</b>
Strict control of exports - 3-4 exporters (cluster)
Education of producers. Imports of quality planting materials or producing
Defining raspberry as a strategic product
Education of producers and introduction of control and professional support in the field
Defining Rules on the purchase, quality and safety. To form an association of producers and exporters by models from South Tyrol. The quality and safety of health imperative
Adoption of new bylaws and their full implementation in practice
Increasing knowledge about the importance of entry, growing and processing technologies
Supporting the purchase of quality planting material
That the state, manufacturers and processors listen more science
The region, production organization and control of planting material, control and production management
Subsidies. To promote young people. To revive the village. Greater protection of producers.
Incentives for new crops, new varieties of raspberries for processing
It is necessary to pay more attention to organic raspberry production, reduce the use of pesticides especially during flowering raspberry
Higher education, provide a guaranteed market and price
The most important are the advice and guidance of professional staff
To ensure a healthy planting material
The establishment of the office at district level in which the producers receive advice on the application of pesticides and anything else related to production
Planting material, protection, protection of the hail, new varieties of raspberries, raspberry incentives to raise
introduction of standards ... starting from primary producers through the processing industry, to retail
High quality planting material, proper care
Work on the production quality and quantity of yield. It is working enough on the quality of producers
Stable price and safe placement on the EU and the Russian market
In March and April - intense shows on TV stations to educate farmers to better prepare their crops.
Government strategy
The creation of cooperatives from the state guarantee
Subsidies paid before the start of planting, harvesting

long-term contracts (10 years), stable prices
greater participation of professional and advisory services in raspberry production - increase in subsidies for the production of raspberries (irrigation, anti-hail nets, buying seedlings)
<b>Q: What is the most important to undertake in order to enhance plums production in Serbia?</b>
To get rid of old infected trees, but the market is just planting material
To ensure equity, that manufacturers are not left
Associations, market stability, cooperation producer-processor
Introducing producers with varieties of plums intended for specific forms of processing
Support state and these institutions
Support to producers, the cheapest raw materials, stable market
Improve knowledge of producers through organised access (state-Institute-Association). Promotion of plums as a national brand. Due to insufficient knowledge producers generally considered plum as unprofitable
Better subsidies and reallocation of farm-plot
Constant training and following modern trends in production; increase investment in production and processing of plums
Government regulation and subsidies
processing capacities
State subsidies, favourable premiums of insurance companies (hail, drought), the guarantor of the state minimum and maximum price of plums, and a standardization of prices of plums
Purchase plum without VAT, the reward for companies that perform the overall plum in their place
Lectures on new technologies
The selection of varieties, finalization processing, production of new products
To subsidize the cultivation of plums, organized purchase, product standardization
<b>Q: What is the most important to undertake in order to enhance traditional fruits production in Serbia?</b>
Strict control of exports - 3-4 exporters (cluster)
Education of producers.
Defining traditional fruits as a strategic product
Education of producers and introduction of control and professional support in the field
Defining Rules on the purchase, quality and safety
To form an association of producers and exporters by models from South Tyrol.
The quality and safety as imperative
Adoption of new bylaws and their full implementation in practice
Supporting the purchase of quality planting material
That the state, manufacturers and processors listen more science
Subsidies
To promote young people
To revive the village.
Greater protection of producers.
Incentives for new crops,
It is necessary to pay more attention to organic raspberry production
provide a guaranteed market and price

The establishment of the office at district level in which the producers receive advice on the application of pesticides and anything else related to production
Work on the production quality and quantity of yield
The creation of cooperatives from the state guarantee
long-term contracts, stable prices
Government strategy

This question was seeking for answers to solve problems acclaimed by the producers of traditional fruit, and inviting all stakeholders to actively engage in solving these problems. Thus, the scope of the proposed measures is very wide, but mostly the solutions are in undertaking actions by the state, and in making long-term strategic measures. Also, self-organization of producers is proposed as a solution in a few replies - establishment of associations, education.

## 5.2 *The activities to be taken by the state to improve the production of traditional fruit*

According to the opinion of producers of the traditional fruit, the activities of state bodies that would improve their business are:

<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with raspberries:</b>
<b>Government:</b>
Subsidies, support
Acceptance of raspberry as a strategic product
Supporting the development of institutions and organizations
To subsidize new products and technologies
Greater investment in research
Protecting producers
Standards, harmonization of legislation, monitoring by the MPSV (through subsidies)
By controlling the illegal trade of planting material
Incentives
Guaranteed price, the market
infrastructure
Implementation of the law
Better support to small producers
Placement of the state (the product)
The bigger subsidies as far as crop insurance in order to stimulate all manufacturers
More incentives through loans
<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with plums:</b>
<b>Government:</b>
To encourage the development of small and medium enterprises
The organization of markets
Assistance in providing funds
Harmonization of the retail price and the exchange rate of the euro

improving the environment
Subsidies
Help in purchasing machinery, equipment (loans, subsidies), zoning
Incentives for organic production
Increasing subsidies for planting, subsidies for clearing old and sick plantations
A stable and arranged environment for business
Changing regulations
Assistance with the purchase of plums, transparent standards for export
To create fair conditions for business
Recognition of traditional production and support of small producers

**Q: What activities of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with traditional fruits:**

<b>Government:</b>
Subsidies
Acceptance of raspberry as a strategic product
Supporting the development of institutions and organizations
To subsidize new products and technologies
Greater investment in research
Protecting producers
Standards, harmonization of legislation, monitoring by the MPSV (through subsidies)
By controlling the illegal trade of planting material
Incentives
Guaranteed price, the market
infrastructure
Implementation of the law
Better support to small producers
More incentives through loans

Activities that the state should undertake are in the field of strategy, legislation, infrastructure development, ensuring stable market. These activities show long-term commitment of the state to develop agriculture, this commitment will be only declarative until undertaking actions in line with those proposed by the participants of the survey.

### 5.3 *The activities to be taken in the SR sector in order to improve the production of traditional fruits*

In the field of scientific and research sector, it is necessary to take the following actions to improve fruit production:

<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with raspberries:</b>
<b>Scientific-research sector:</b>
Help in the development of technological innovations
Research in the specific conditions of the product, training
Concretization of scientific results

new technologies
Applied Research- specific problems specific solutions
Strengthening research teams to solve specific objectives in this area
A small number of researchers
Applicability of knowledge
Tips for new producers and additional advice to existing ones
Soil testing, control of applications the chemicals
New resources for the protection and feeding, new varieties of raspberries
Research of new Raspberry products
Education of producers
greater practicality in the field, better communication
Continuous information on the changes of technology and product range
More frequent workshop
Protecting prices and safe product placement
Sale of real (good) seedlings
<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with plums:</b>
<b>Scientific-research sector:</b>
planted orchards
Improving production
better cooperation
Transfer of knowledge to producers / processors through an organized system (expert departments, associations, media)
The inclusion of the specific problems caused by drought
Production of new varieties resistant to diseases
greater involvement
Knowledge and technology transfer
Monitoring the use of protective equipment, notifications for new achievements
To get closer to the base, the production, processing
<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with traditional fruits:</b>
<b>Scientific-research sector:</b>
Help in the development of technological innovations
Research in the specific conditions of the producer, training
Concretization of scientific results
new technologies
Applied Research- specific problems specific solutions
Strengthening research teams to solve specific objectives in this area
Tips for new producers and additional advice to existing ones
Soil testing, control of applications the chemicals
New resources for the protection and feeding, new varieties of raspberries
Research of new products
Education of producers
greater practicality in the field, better communication



Continuous information on the changes of technology and product range
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Scientific and research sector can assist in the production of traditional fruit using various measures. Researchers should be interested in developing new technologies that are in the service of production and products of traditional fruit to be more active on the ground in concrete terms, closer to producers.

Scientific and research sector should develop advisory and educational functions that will achieve better communication with producers, and thus the transfer of technologies and new knowledge and information.

#### 5.4 *Activities that should encourage innovation in order to promote the production of traditional fruit*

Activities of innovators that would contribute to improving the operations of the traditional fruit producers are presented in the table below.

<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with raspberries:</b>
<b>Innovators:</b>
New technologies and products
Market realization of Invention
Solutions for extending storage of fresh fruit
Proposals to increase investments both in fresh, and in various forms of derivatives
Certified planting material
permanent innovation
Creating new varieties, innovations in processing, new products
Constant innovation in all areas
In the future it will be necessary to invent a picker of raspberries - we will have the problem with the workforce
The best producers should be consulted
Introducing producers with economically sustainable production in the quality and quantity raising yield
<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with plums:</b>
<b>Innovators:</b>
New technologies
The proposals to innovation
better cooperation
New technical solutions in primary production and processing, database availability
Willingness to implement innovations
Create new processed products
networking
Inform the producers about innovation, technology, packaging on time
The maximum value, they need to invest in

In the field of marketing (packaging)
<b>Q: What <u>activities</u> of the following three stakeholder groups would contribute to the improvement of performances of your company in dealing with traditional fruits:</b>
<b>Innovators:</b>
New technologies and products
Market realization of Invention
Solutions for extending storage of fresh fruit
New technical solutions in primary production and processing, database availability
Willingness to implement innovations
Create new processed products
networking
permanent innovation
Creating new varieties, innovations in processing, new products
Constant innovation in all areas

Small and medium-sized enterprises, ie. entrepreneurs and innovators in the field of traditional sweet fruit would improve its operations by introduction of new products from the traditional fruit on the market, as well as new technologies in primary production, processing and storage of fresh fruit.

## 6 Regulatory Environment in the Field of Traditional Food

### 6.1 The legal framework that is needed to improve the situation of the traditional producers of fruit in Serbia and on the EU market

The legislation that would improve the situation of producers of raspberries on domestic and foreign markets is presented in the table below.

<b>Q: Which legal regulations are necessary to improve the position of raspberry producers in Serbia and on EU market?</b>
We have legal regulations, but they are not implementing properly.
Implementing regulations of the Law on Food Safety. National list of inputs (pesticides and fertilizers). Systematic control of health safety and draconian punishment.
More stable price. To educate insurance companies. Subsidies. Stronger anti-hail protection. More products from raspberries, not only to be sold in its raw state.
Changes of Rules on production plants in line with the EU. Subsidize per kilogram of raspberry production and not on the surface, establish experimental fields with new varieties and using modern equipment, regular training and education, involvement of local government, support investors as drivers of development
Safety of raspberry and products of raspberry
There should be uniform prices at the national level
Increase norms and standards, to introduce them into laws
It is essential that the price of raspberries is unique in the whole of Serbia, or raspberries of the same quality that has the same price
Protection from dealers-safe collection
Strict control of planting material, control of plant protection materials, control of imported fertilizers
The regulations in the purchase and sale of raspberries, which would stimulate new producers
The prohibition on the purchase of raspberries on inadequate places (Rules on the purchase of berries)
Increase the presence of agricultural advisory services in the field and increase subsidies
Position of producers is good
The use of chemicals in the production of raspberries
Protection against natural disasters
Better customer inspections and control refrigerator that have duplicate company abroad under different name (export to themselves) !!!
In order to know how it is produced, price ... for investment and technical assistance
Protecting prices and safe product placement
Implementation of the law - the same for all and not - every lawyer interprets the law in its own way
<b>Q: Which legal regulations are necessary to improve the position of plum producers in Serbia and on EU market?</b>
Legal regulations are ok
Better regulation, greater incentives

Regulation of payments at the optimum time, if not- charging interest
Subsidize seedlings
Regulations on plant protection and environmental protection, standardization
Standards-do not provide the required maximum ...
Subtract uncultivated land
The protection of geographical origin of products from plums
For imported packaging and intended for export should not pre-pay the VAT and customs
Protection of traditional products
Laws are good but they have to be applied, the closer relationship of state institutions with direct producers
Legislation on HACCP and export
<b>Q: Which legal regulations are necessary to improve the position of traditional fruit producers in Serbia and on EU market?</b>
We have legal regulations, but they are not implementing properly.
Implementing regulations of the Law on Food Safety
National list of inputs (pesticides and fertilizers)
Systematic control of health safety and draconian punishment.
Changes of Rules on production plants in line with the EU.
Safety of raspberry and products of raspberry
Increase norms and standards, to introduce them into laws
Protection from dealers-safe collection
Strict control of planting material, control of plant protection materials, control of imported fertilizers
The regulations in the purchase and sale of raspberries, which would stimulate new producers
The prohibition on the purchase of raspberries on inadequate places
Increase the presence of agricultural advisory services in the field and increase subsidies
The use of chemicals in the production of raspberries
Protection against natural disasters
Better control of dealers and refrigerate warehouses
Implementation of the law

As it was already noted producers are very familiar with the legislation; according to their answers legislation exists, but it should be implemented and improved with by-laws, stricter quality control, introducing stricter penalties particularly in use ie. abuse of chemical substances. In the implementation of legislation in the primary production would help the system control and the national list of permitted chemicals. On the other hand, it should be strengthened economic regulation, there is a need for provisions in the purchase and sale of fruit as well as ensuring protection from dealers.

## 7 Traditional Food as the Basis for Wellbeing and Quality of Life

### 7.1 The use of pesticides in working with traditional fruit

The ways in which traditional producers of fruit are informed about the proper use of pesticides are presented in the following table.

<b>Q: How do you get information on proper use of pesticides while dealing with raspberries?</b>
Counseling, training, monitoring of innovation
In brochures and at traders
Through distributors and the Fruit Research Institute, Cacak.
The submitted documents - results analysis
Legal regulations
Certificates from supplier
Official Gazette
Over regulators
Professional literature
Consultations with colleagues
Seminars, internet
From other growers and advice from agricultural pharmacy
Contacts with experts
From workers in agricultural pharmacies and in Agro Stations Kraljevo
Consulting with representatives of the Institute in Cacak and professional services of local government in Ivanjica in their presence on the ground.
Cooperation with the chemical companies, expert advice from prof. Slobodan milenkovic
At the seminars, presentations held by agricultural services within the winter school of agriculture
Professional services, EU and USA regulations, training
With the expert assistance of agronomists
This is my area (graduated on plant protection); newspapers, working groups
Knowledge from the faculty
Personal experience
<b>Q: How do you get information on proper use of pesticides while dealing with plums?</b>
From the producers of pesticides
From chemical houses, Media, Advisory Services
Bureau for Plant Protection
Reading professional journals and consultation with professional services
Through advisory services
Internet
Seminars
In direct communication with experts

In agricultural pharmacies
Education
agricultural technicians
Agricultural advisory services
Tips from technologists
<b>Q: How do you get information on proper use of pesticides while dealing with traditional fruits?</b>
Counseling, training, monitoring of innovation
In brochures and at traders
Through distributors and the Fruit Research Institute, Cacak.
The submitted documents - results analysis
Legal regulations
Certificates from supplier
Official Gazette
Over regulators
Professional literature
Consultations with colleagues
Seminars
Internet
Education
Contacts with experts
At the seminars, presentations held by agricultural services within the winter school of agriculture
In agricultural pharmacies
Cooperation with colleagues in the sector of fruit protection -advisory services
Monitoring sites related to the use of pesticides
Through professional services, EU and USA regulations, training
My knowledge from the faculty
Personal experience

Participants of the survey have knowledge on a very sensitive issue regarding the proper use of pesticides. Their sources of information and knowledge are various, ranging from personal experience, consultation with colleagues and knowledge from the faculty, to agricultural pharmacies, internet, expanded education and contacts with experts. They follow not only domestic but also EU and US regulations and foreign literature. On the basis of majority of answers it can be concluded that in the profile of respondents there are producers with higher education, even in the specific field of production of traditional fruit.

## 7.2 Cost efficiency of traditional fruits production

The largest number of respondents considered that their production is cost effective, and indicators on which they base their claims are listed in the following table.

<b>Q: Do you think that your raspberry production is cost-effective and on the basis of which indicators?</b>
<b>No:</b>
It is not economical due to natural disasters
I do not apply agro technical measures (irrigation system)
<b>YES:</b>
Based on the evaluation of costs and revenues it is cost effective. I do not have enough knowledge on the assessment of capital and amortization.
Production is cost effective according to the indicators from the business plan
good knowledge of technology
Yes, oatmeal are the current trend, these are healthy meals applicable to a way of life (students, old people) ...
It is a trend product on the market. Excellent recipes and good distribution give excellent results.
Using modern technologies that are adapted to our climate, demographic, organizational and market conditions.
Yes, because European price of raspberries and the maximum quantity to be exported.
Yes, based on the records of the production of raspberries
It leads to a healthier lifestyle, less use of pesticides.
Raspberry production is economical, because I started as an agricultural producer with 100 kg per acre and now I have 230 with an increase in production
You can earn for survival
Yes, on the basis of yield and income
Yes, I think it's economical but only on larger areas
I think it is, I would argue on the basis of low cost
It is economical, we have no workers, individual work
The yield from hectare is higher than of any other culture
I think it is economical because the conditions for the production of raspberries on my plot are extremely good (location, soil composition, altitude) so the investments are much lower
<b>Q: Do you think that your plum production is cost-effective and on the basis of which indicators?</b>
<b>NO:</b>
Economy is unstable-depending on the purchase price
No.
<b>YES:</b>
We have a yield of 20,000 kg / ha
To have cost efficiency we must have the production of 70-80kg per tree and we have to work on marketing
I applying all agro-cultural practices, I have 1000 plum trees
Energy efficiency, family involved in production, monitoring the market and the needs

Because of low costs
Using pellets as a fuel in production
On the edge of an economical business
Partly with the constant improvement in order to come to an assessment of the cost efficiency
Yes, cost calculations
Yes, family production
Yes, based on the quantity of processed plums and stability of quality
In all ways save and exploit energy
It can be better
<b>Q: Do you think that your traditional fruits production is cost-effective and on the basis of which indicators?</b>
<b>NO:</b>
It is not economical due to natural disasters
I do not apply agro technical measures (irrigation system)
Economy is unstable-dependending on the purchase price
<b>YES:</b>
Based on the evaluation of costs and revenues it is cost effective. I do not have enough knowledge on the assessment of capital and amortization.
Production is cost effective according to the indicators from the business plan
good knowledge of technology
It is a trend product on the market. Excellent recipes and good distribution give excellent results.
Using modern technologies that are adapted to our climate, demographic, organizational and market conditions.
Yes, because European price of raspberries and the maximum quantity to be exported.
It leads to a healthier lifestyle, less use of pesticides.
You can earn for survival
Yes, on the basis of yield and income
Yes, I think it's economical but only on larger areas
I think it is, I would argue on the basis of low cost
In all ways save and exploit energy
It is economical, we have no workers, individual work
The yield from hectare is higher than of any other culture
I think it is economical because the conditions for the production of raspberries on my plot are extremely good (location, soil composition, altitude) so the investments are much lower

A smaller part of the producers that do not consider production of traditional fruit as cost-effective base its claims on the traditional approach of farmers to weather conditions, unstable market, but also the neglect of agricultural measures, especially irrigation, which again has to do with the strategic attitude of the state towards agricultural production.

However, those who have already applied modern technologies and new knowledge consider production of traditional fruits as cost-effective production. Contribution to the cost effectiveness are market trends as well as favorable prices ie. lower investment than the selling price, and such production is economical only on large areas.



## 8 Innovation Eco-system enhances the productivity, stability and resilience of Traditional Food-ecosystem

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### 8.1 *The measures necessary for the intensification of innovation activities in production of traditional fruit*

To the intensification of innovation activities in enterprises engaged in the production of traditional fruit would contribute:

<b>Q. What is necessary to provide in order to intensify innovative activities in your company while dealing with raspberries?</b>
Staff
Investment in production equipment
Funding
Team work
Professional staff
More knowledge and professional support
Samples of new materials for the development of new products
A simplified procedure for registration of inputs for production
More advice from professionals, good soil and of course more subsidized loans for mechanization and expansion. Or at least some grants
Better legislation (obligations and stimulation of the use of waste). Stimulation of new products through tax exemption.
Better cooperation with the research sector in the field of production and processing of raspberries.
Cooperation with experts, everyone has different advice
Market for innovative products
It takes knowledge, it would be good to organize seminars and training
Better cooperation with state institutions and a large number of grants in this section
Continuous training of employees, cash
Intensify informing producers on any changes in varieties of raspberries and technology of growing and picking raspberries
The awareness of employers about the movement towards new technologies, and how they grow raspberries
Modern equipment for the production of fresh raspberries
More education
Structural help of local municipalities
Technology of chocolate coating of dried fruit
Marketing development, capacity expansion
Cooperation with science
Getting to know the programs and more media announcements
To maintain a good price in the market

<b>Q. What is necessary to provide in order to intensify innovative activities in your company while dealing with plums?</b>
Staff
Investment in production equipment
Government investments through projects
Funding
Team work
Professional staff
Young people, give them jobs
More knowledge and expert support
EU Accession Funds
Market Organisation
Cooperation with the scientific research sector
Creating financial conditions for investment in new technologies and products
Knowledge
System approach at local, regional level
Education and networking
Information (via e-mail, etc., the availability of adequate service contacts)
Completion of laboratories
More advice from professionals, good soil and of course more subsidized loans for mechanization and expansion. Or at least some grants
Better legislation (obligations and stimulation to use waste)
Stimulation of new products through tax exemption.
Current assets
Expansion of assortment in plantations on the farm
improving sales
Expansion of production volume
<b>Q. What is necessary to provide in order to intensify innovative activities in your company while dealing with traditional fruits?</b>
Funding
EU Accession Funds
Help of scientific organizations
Market Organisation
Cooperation with the scientific research sector
improving sales
Creating financial conditions for investment in new technologies and products
Knowledge
System approach at local, regional level
Expansion of assortment in plantations on the farm
Better business conditions, higher sales volume
Education and networking
Continuous training of employees, cash
Intensify informing producers on any changes in varieties of raspberries and technology of growing and picking raspberries
The awareness of employers about the movement towards new technologies

Information (via e-mail, etc., the availability of adequate service contacts)
Structural help of local municipalities
Technology of chocolate coating of dried fruit
Marketing development, capacity expansion
Completion of laboratories
Young people, give them jobs
Expansion of production volume

Producers of traditional fruit have a very clear idea about how to strengthen innovation in their companies. In order to intensify innovation activities crucial are resources, both material/financial and human. Then, investments in infrastructure, education and networking.

## 8.2 SWOT - Innovation supporting system

In the beginning of the project, after consultation process with main stakeholders, initial SWOT analysis has been performed with following findings:

### Strengths:

- Big potential of human resource and its well trained professionals
- Experience and tradition in innovation in Sweet fruit sector
- Big and diverse potential of domestic raw materials
- High quality of specific varieties recognized on international market (raspberry from Arilje)

### Weaknesses:

- Low level of research and development in the companies
- Lack of long-term strategy for development in the companies
- Obsolete equipment
- Lack of continuous education in the companies
- Weak connection of companies with the generators of technologies and knowledge
- Low level of IPR culture
- Lack of marketing skills
- Lack of ICT skills (skill to complete questionnaires)
- Problem with labelling (mostly because of IPR issues)
- Packaging

### Opportunities:

- Sweet fruit sector as national priority
- Possibility for IPR protection
- Financial opportunities in IPA (instrument for precessions associations) funds
- Building clusters and networking (Ethno cluster)
- Branding of traditional products
- Trends in health food and organic production

### Threats:

- Absence of standardization and harmonization of legal regulations
- Insufficient presence of knowledge and technology transfer institutions
- Distributer, bad cold chain transport
- Retailer, bad storage conditions and payments

After collecting of data from SMEs involved in production and processing of **raspberries and plums**, SWOT analysis was performed with the following findings:

S

<b>Strengths:</b>	<b>Raspberries</b>	<b>Plums</b>
Abundant raw material base for innovation	3.64	2.73
Great potential of research sector in Serbia and great participation of research in food area	3.57	3.4
Present and forthcoming investments in research infrastructure	3.20	2.95
Developed international collaboration	2.88	2.95
Patent and technical solutions database	2.73	2.72

W

<b>Weaknesses:</b>	<b>Raspberries</b>	<b>Plums</b>
Absence of organized interconnecting (horizontal and vertical) in large systems and insufficient educated human resource for engagement	3.78	3.4
Lack of applicable innovation on large number of subjects	3.56	3.2
Lack of trust in protection and exploitation of intellectual goods and ignorance of the rules in protection system	3.41	3.2
Weak interaction between industries and academic institutions as well as lack of innovation capacity and researchers' motivation for improving research in agriculture and food production	3.40	2.9
Low networking among and inside research institutions	3.18	2.5

O

<b>Opportunities:</b>	<b>Raspberries</b>	<b>Plums</b>
Strategic development of Serbia in the area of food and agriculture	3.83	3.7
Branding of traditional and new products	3.71	2.9
Financial opportunities in international pre-accession funds	3.63	3.2
Increasing consumers' awareness on food products with additional value	3.58	3.1
Building clusters and networking among subjects of innovation activity	3.47	3.7

T

<b>Threats:</b>	<b>Raspberries</b>	<b>Plums</b>
Absence of strategic planning of innovation activity	3.69	2.6
Absence of standardization and harmonization of legal regulations	3.50	3.6
High regional competition and loss of existing markets	3.27	3.3
Insufficient presence of institutions for technology and innovation transfer	3.21	3
Unstable environment for investment	3.09	3.3

On the basis of the ranking of the listed strengths, weaknesses, opportunities and threats by producers of **traditional fruits**, the following marks for each claim were obtained and final SWOT analysis concluded:

## S

<b>Strengths:</b>	<b>Traditional fruits</b>
Great potential of research sector in Serbia and great participation of research in food area	3.55
Abundant raw material base for innovation	3.28
Present and forthcoming investments in research infrastructure	3.11
Developed international collaboration	2.90
Patent and technical solutions database	2.73

## W

<b>Weaknesses:</b>	<b>Traditional fruits</b>
Absence of organized interconnecting (horizontal and vertical) in large systems and insufficient educated human resource for engagement	3.63
Lack of applicable innovation on large number of subjects	3.33
Weak interaction between industries and academic institutions as well as lack of innovation capacity and researchers' motivation for improving research in agriculture and food production	3.25
Lack of trust in protection and exploitation of intellectual goods and ignorance of the rules in protection system	3.20
Low networking among and inside research institutions	3.19

## O

<b>Opportunities:</b>	<b>Traditional fruits</b>
Strategic development of Serbia in the area of food and agriculture	3.79
Building clusters and networking among subjects of innovation activity	3.69
Financial opportunities in international pre-accession funds	3.43
Branding of traditional and new products	3.38
Increasing consumers' awareness on food products with additional value	3.34

## T

<b>Threats:</b>	<b>Traditional fruits</b>
High regional competition and loss of existing markets	3.54
Absence of standardization and harmonization of legal regulations	3.38
Absence of strategic planning of innovation activity	3.17
Unstable environment for investment	3.17
Insufficient presence of institutions for technology and innovation transfer	3.13

## 9 Priorities for the European Innovation Partnership for Traditional Food Productivity and Sustainability

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In addition to the development of the national Strategic Research and Innovation Agenda (SRIA) for traditional fruits in Serbia, all participants (decision makers, chamber of commerce, producers – SMEs, researchers, etc.) are discussed idea of establishment of the national technology platform in the agro food sector in Serbia.

Technology Platforms are industry-led stakeholder fora that develop short to long-term research and innovation agendas and roadmaps for action at EU and national level to be supported by both private and public funding.

European Technology Platforms (ETPs) are policy instrument of the European Union, whose main goal is raising global competitiveness and building leadership positions of European economies. This will be achieved using new approach in linking science and industry – introducing 'bottom up' concept which brings industry in the position of leader that initiates and controls the process.

ETPs span a wide range of technology areas and have to date played an important role by developing joint visions, setting Strategic Research and Innovation Agendas and contributing to the definition of the research priorities including those under the Research Framework Programmes. Their aim was to contribute to increasing synergies between different research actors, ultimately enhancing European competitiveness.

There are currently 37 ETPs and three ETP initiatives ([http://cordis.europa.eu/technology-platforms/individual\\_en.html](http://cordis.europa.eu/technology-platforms/individual_en.html)) which cover the most important technological areas. They connect thousands of European companies, knowledge institutes and policy makers and have facilitated the development of a common vision and research agenda for technology fields they represent.

### 9.1 Clusters and associations of producers of traditional fruit

A large number of traditional producers of fruit is not a member of any cluster / association. However, some of them have recognized the importance of association and they are members of the associations presented in the table below.

<b>Q: Is your company, raspberry producer, a member of a cluster or association? Please indicate their name(s):</b>
Association of Entrepreneurs Arilje
Association of Companies for Processing of Fruits and Vegetables in Kraljevo
Cluster of export products of RS
<b>Q: Is your company, plum producer, a member of a cluster or association? Please indicate their name(s):</b>
Association of producers of dried plums
Kolubarski plodovi, Lazarevac
cluster - Polux Kikinda
Association of Companies for Processing of Fruits and Vegetables

Association of refrigerated warehouses
Slow Food, association Crvena ranka
<b>Q: Is your company, traditional fruit producer, a member of a cluster or association? Please indicate their name(s):</b>
Association of Entrepreneurs Arilje
Association of Companies for Processing of Fruits and Vegetables
Kolubarski plodovi, Lazarevac
cluster - Polux Kikinda
Association of reefers
Slow Food, Crvena ranka
Cluster of export products of RS

## 9.2 National Technology Platform 'Food for Life' and producers of traditional fruit

Producers of traditional fruit find it is necessary to establish national technology platform "Food for Life" (with 93.85% of positive responses).

Do you think that there is a need to establish a national technological platform „Food for life“?	
Raspberry producers:	Percentage of answers
YES	95.3%
NO	4.7%

Do you think that there is a need to establish a national technological platform „Food for life“?	
Plum producers:	Percentage of answers
YES	90.9%
NO	9.1%

Do you think that there is a need to establish a national technological platform „Food for life“?	
Traditional fruits producers:	Percentage of answers
YES	93.85%
NO	6.15%

Representatives from SMEs, higher education and research institutions, included in workshops, surveys and other research and evaluations within this project are asked whether they are willing to join initiative to create technology platform in the agro food sector in Serbia: National technology platform "Food for life". Big majority – 93.85% has expressed their willingness to join this initiative; no matter how big is their knowledge or ignorance about technology platforms.

## 10 Strategic Research and Innovation Agenda for Traditional Food

### 10.1 Topics to be included in future SRIA at National and European level

On the workshops during 2016 a survey was conducted on topics that should be included in the future *Strategic research and innovation agenda* at the European level in the field of production of traditional fruit. All topics are divided into four categories: primary production, processing, product and business. In each of these categories are given several topics of which the respondents had to choose three most relevant and rank them according to the importance.

In the tables below are given the average ratings for each of these topics in the field of raspberries production, plums production and total (traditional fruits production).

All participants are asked to select the three more relevant topics to be included in future research agendas at National and European level, for each category. Within your three selected topics, they have to prioritize them, given a punctuation from 1 (the most relevant) to 3 (the less relevant) in the column of the right side. Final outcomes are presented in the following tables.

#### RASPBERRY

<b>1. Primary production</b>	<b>Punctuation</b>
1.1 breeding issue trade-off between productivity and quality <i>Example: developing new varieties that offer a reasonable productivity, keeping a good quality (external and internal)</i>	2.44
1.2 development of multi resistant varieties for organic production <i>Example: creating new varieties tolerant or resistant to several important diseases for successful cultivation of fruit species in organic production</i>	1.71
1.3 cost-efficient implementation of water management system <i>Example: reducing the water waste with efficient technical system</i>	2.63
1.4 implementation of technical solutions for controlling pest and diseases management in organic and conventional production <i>Example: measures for practical implementation, registration of biopesticides and biofungicides</i>	2.63
1.5 establishment and development of certified planting material <i>Example: procedures and schemes of control and certification for propagating material in order to improve the quality of propagations materials for conventional and organic production</i>	2.00
1.6 faster and better implementation of food safety management systems <i>Example: better implementation of good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	2.29
<b>2. Processing (technology, energy, etc.)</b>	<b>Punctuation</b>
2.1 implementation of modern packaging to enhance shelf life, to reduce waste and to improve the post-harvest technology (storage) <i>Example: intelligent packaging in modified atmosphere</i>	2.00
2.2 better implementation of waste management and development of value-added by-products <i>Example: increasing the valorization of by-products (damaged fruits, kernels of apricot, etc.) to increase their economic value</i>	2.50
2.3 development and implementation of modern processing technology <i>Example: technology for production of nutraceuticals and pharmaceuticals from by-products and wastes, modern distillery, plant dryer</i>	2.71
2.4 adaptation of the processing technology in order to lower the energy consumption <i>Example: implementation of the measures for energy efficient processing, utilisation of modern/green energy sources for the respect of environment</i>	2.56



2.5 modernization of storage technology of raw materials and products <i>Example: extend the availability of raw materials after harvest season, provide the raw material of comparable quality during extended period</i>	1.25
<b>3. Product (labeling, health/food safety, etc.)</b>	<b>Punctuation</b>
3.1 Reducing the diversity in forms, materials and numbers of packaging by raising consumers awareness (communicate on local environment, tradition and regional trademark) <i>Example: facilitating the packaging step by reducing the number of different packaging and so the technical adaptation, the aim is to approach this problem through the education of consumers which therefore will develop the pressure on retailers</i>	2.27
3.2 faster and better implementation of food safety management systems <i>Example: better implementation of all existing EU hygiene standards as good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	1.64
3.3 producer targeted dissemination of knowledge on health, nutritional properties of their products <i>Example: measures aiming at spreading the knowledge on nutritional properties of traditional product, their beneficial effect on consumer health</i>	2.00
<b>4. Business (marketing, organization, consumers, regulations, etc.)</b>	<b>Punctuation</b>
4.1 increase the awareness on traditional food through continuous education and communication <i>Example: consumers' expectations are evolving, but there is a need to communicate the current innovation or way of consumption (for instance: waiting a few days before eating to fruit to get the best maturity possible)</i>	2.57
4.2 constant improvement of policy conditions for labor management and organization of support <i>Example: improvement of labour advisory services, continual labour education, incentives by local authorities and government, improvement of marketing, negotiation and manager skills</i>	2.11
4.3 implementation, harmonization and creation of laws and regulation policy <i>Example: heterogeneity in laws between European countries, that can hinder innovation adoption in specific settings (for instance phytosanitary treatment prohibition)</i>	3.40
4.4 new business model (supply chain actor's balance) <i>Example: spreading the power between actors in the supply chain by implementing new organization or giving voice to the weakest actors</i>	2.25
4.5 building associations, clusters and food technology platform <i>Example: strengthening the number, capacity and role of the associations/clusters of producers in organized production, introduction of new technologies and expansion of existing investments and new products</i>	2.33
4.6 branding of traditional products <i>Example: development of greater role of the state institutions, public and private research sectors, as well as private investment sector in the field of branding of traditional products</i>	2.20
4.7 simplification of the procedure leading to obtain certification <i>Example: support for system of certification obtaining</i>	2.88

## PLUM

<b>1. Primary production</b>	<b>Punctuation</b>
1.1 breeding issue trade-off between productivity and quality <i>Example: developing new varieties that offer a reasonable productivity, keeping a good quality (external and internal)</i>	2.21
1.2 development of multi resistant varieties for organic production <i>Example: creating new varieties tolerant or resistant to several important diseases for successful cultivation of fruit species in organic production</i>	3.00
1.3 cost-efficient implementation of water management system <i>Example: reducing the water waste with efficient technical system</i>	2.63
1.4 implementation of technical solutions for controlling pest and diseases management in organic and conventional production <i>Example: measures for practical implementation, registration of biopesticides and biofungicides</i>	2.71
1.5 establishment and development of certified planting material	2.79

<i>Example: procedures and schemes of control and certification for propagating material in order to improve the quality of propagations materials for conventional and organic production</i>	
<b>1.6 faster and better implementation of food safety management systems</b> <i>Example: better implementation of good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	3.03
<b>2. Processing (technology, energy, etc.)</b>	<b>Punctuation</b>
<b>2.1 implementation of modern packaging to enhance shelf life, to reduce waste and to improve the post-harvest technology (storage)</b> <i>Example: intelligent packaging in modified atmosphere</i>	2.16
<b>2.2 better implementation of waste management and development of value-added by-products</b> <i>Example: increasing the valorization of by-products (damaged fruits, kernels of apricot, etc.) to increase their economic value</i>	2.73
<b>2.3 development and implementation of modern processing technology</b> <i>Example: technology for production of nutraceuticals and pharmaceuticals from by-products and wastes, modern distillery, plant dryer</i>	2.30
<b>2.4 adaptation of the processing technology in order to lower the energy consumption</b> <i>Example: implementation of the measures for energy efficient processing, utilisation of modern/green energy sources for the respect of environment</i>	2.42
<b>2.5 modernization of storage technology of raw materials and products</b> <i>Example: extend the availability of raw materials after harvest season, provide the raw material of comparable quality during extended period</i>	2.62
<b>3. Product (labeling, health/food safety, etc.)</b>	<b>Punctuation</b>
<b>3.1 Reducing the diversity in forms, materials and numbers of packaging by raising consumers awareness (communicate on local environment, tradition and regional trademark)</b> <i>Example: facilitating the packaging step by reducing the number of different packaging and so the technical adaptation, the aim is to approach this problem through the education of consumers which therefore will develop the pressure on retailers</i>	2.15
<b>3.2 faster and better implementation of food safety management systems</b> <i>Example: better implementation of all existing EU hygiene standards as good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	1.65
<b>3.3 producer targeted dissemination of knowledge on health, nutritional properties of their products</b> <i>Example: measures aiming at spreading the knowledge on nutritional properties of traditional product, their beneficial effect on consumer health</i>	1.97
<b>4. Business (marketing, organization, consumers, regulations, etc.)</b>	<b>Punctuation</b>
<b>4.1 increase the awareness on traditional food through continuous education and communication</b> <i>Example: consumers' expectations are evolving, but there is a need to communicate the current innovation or way of consumption (for instance: waiting a few days before eating to fruit to get the best maturity possible)</i>	2.67
<b>4.2 constant improvement of policy conditions for labor management and organization of support</b> <i>Example: improvement of labour advisory services, continual labour education, incentives by local authorities and government, improvement of marketing, negotiation and manager skills</i>	2.57
<b>4.3 implementation, harmonization and creation of laws and regulation policy</b> <i>Example: heterogeneity in laws between European countries, that can hinder innovation adoption in specific settings (for instance phytosanitary treatment prohibition)</i>	3.48
<b>4.4 new business model (supply chain actor's balance)</b> <i>Example: spreading the power between actors in the supply chain by implementing new organization or giving voice to the weakest actors</i>	3.26
<b>4.5 building associations, clusters and food technology platform</b> <i>Example: strengthening the number, capacity and role of the associations/clusters of producers in organized production, introduction of new technologies and expansion of existing investments and new products</i>	3.16
<b>4.6 branding of traditional products</b> <i>Example: development of greater role of the state institutions, public and private research sectors, as well as private investment sector in the field of branding of traditional products</i>	2.74

4.7 simplification of the procedure leading to obtain certification <i>Example: support for system of certification obtaining</i>	3.26
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## TRADITIONAL FRUIT

<b>1. Primary production</b>	<b>Punctuation</b>
1.1 breeding issue trade-off between productivity and quality <i>Example: developing new varieties that offer a reasonable productivity, keeping a good quality (external and internal)</i>	2.26
1.5 establishment and development of certified planting material <i>Example: procedures and schemes of control and certification for propagating material in order to improve the quality of propagations materials for conventional and organic production</i>	2.61
1.3 cost-efficient implementation of water management system <i>Example: reducing the water waste with efficient technical system</i>	2.63
1.4 implementation of technical solutions for controlling pest and diseases management in organic and conventional production <i>Example: measures for practical implementation, registration of biopesticides and biofungicides</i>	2.69
1.2 development of multi resistant varieties for organic production <i>Example: creating new varieties tolerant or resistant to several important diseases for successful cultivation of fruit species in organic production</i>	2.74
1.6 faster and better implementation of food safety management systems <i>Example: better implementation of good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	2.89
<b>2. Processing (technology, energy, etc.)</b>	<b>Punctuation</b>
2.1 implementation of modern packaging to enhance shelf life, to reduce waste and to improve the post-harvest technology (storage) <i>Example: intelligent packaging in modified atmosphere</i>	2.13
2.5 modernization of storage technology of raw materials and products <i>Example: extend the availability of raw materials after harvest season, provide the raw material of comparable quality during extended period</i>	2.32
2.3 development and implementation of modern processing technology <i>Example: technology for production of nutraceuticals and pharmaceuticals from by-products and wastes, modern distillery, plant dryer</i>	2.38
2.4 adaptation of the processing technology in order to lower the energy consumption <i>Example: implementation of the measures for energy efficient processing, utilisation of modern/green energy sources for the respect of environment</i>	2.46
2.2 better implementation of waste management and development of value-added by-products <i>Example: increasing the valorization of by-products (damaged fruits, kernels of apricot, etc.) to increase their economic value</i>	2.68
<b>3. Product (labeling, health/food safety, etc.)</b>	<b>Punctuation</b>
3.2 faster and better implementation of food safety management systems <i>Example: better implementation of all existing EU hygiene standards as good practice-based (GHP, GAP), hazard-based (HACCP) and risk-based (QMRA) systems</i>	1.64
3.3 producer targeted dissemination of knowledge on health, nutritional properties of their products <i>Example: measures aiming at spreading the knowledge on nutritional properties of traditional product, their beneficial effect on consumer health</i>	1.98
3.1 Reducing the diversity in forms, materials and numbers of packaging by raising consumers awareness (communicate on local environment, tradition and regional trademark) <i>Example: facilitating the packaging step by reducing the number of different packaging and so the technical adaptation, the aim is to approach this problem through the education of consumers which therefore will develop the pressure on retailers</i>	2.18
<b>4. Business (marketing, organization, consumers, regulations, etc.)</b>	<b>Punctuation</b>

4.2 constant improvement of policy conditions for labor management and organization of support <i>Example: improvement of labour advisory services, continual labour education, incentives by local authorities and government, improvement of marketing, negotiation and manager skills</i>	2.46
4.6 branding of traditional products <i>Example: development of greater role of the state institutions, public and private research sectors, as well as private investment sector in the field of branding of traditional products</i>	2.59
4.1 increase the awareness on traditional food through continuous education and communication <i>Example: consumers' expectations are evolving, but there is a need to communicate the current innovation or way of consumption (for instance: waiting a few days before eating to fruit to get the best maturity possible)</i>	2.65
4.5 building associations, clusters and food technology platform <i>Example: strengthening the number, capacity and role of the associations/clusters of producers in organized production, introduction of new technologies and expansion of existing investments and new products</i>	3.00
4.4 new business model (supply chain actor's balance) <i>Example: spreading the power between actors in the supply chain by implementing new organization or giving voice to the weakest actors</i>	3.03
4.7 simplification of the procedure leading to obtain certification <i>Example: support for system of certification obtaining</i>	3.16
4.3 implementation, harmonization and creation of laws and regulation policy <i>Example: heterogeneity in laws between European countries, that can hinder innovation adoption in specific settings (for instance phytosanitary treatment prohibition)</i>	3.47

## 10.2 Topics to be included in future SRIA at European level from Serbia

Additional information is provided for the first three, more important issues, selected for national SRIA in Serbia, which should be integrated into SRIA at European level.

### **Primary production**

#### **a. Breeding issue trade-off between productivity and quality**

##### Specific Challenge:

Raspberries are highly sensitive fruits, which have small sustainability and weak transportability. Raspberries are hand-picked, which increases the possibility of defects. These properties of the fruit can be mitigated by creating better varieties, with firm, transportable and larger fruits that can be easier separated from the plant leading to faster and easier harvest. At the same time productivity needs to be preserved allowing cost-effective production. Plum fruits are more tolerable to transport, but rupture of the epidermis in maturity state happens during harvest and transport, increasing quantity of defect fruits. Selection of new varieties with improved technological properties and good yield would reduce defects and increase profit.

##### Scope:

The strategy of varietal innovation development from the perspective of the breeders should be established. The main criteria of varietal innovation should include: firmness, size, climate adaptation, productivity, easing of harvesting and resistant to transport. Universities, R&D Institutions should conduct the research, widely disseminate the results and successfully transferred to producers in assistance of knowledge transfer agencies and IPO.

##### Expected impacts:

- *Developing new varieties that offer a reasonable productivity, keeping a good quality (external and internal)*
- *Introducing producers with economically sustainable production in the quality and quantity*

- *Cooperation with the scientific research sector*
- *Expansion of assortment in plantations on the orchard*
- *Work on the production quality and yield*

## **b. Establishment and development of certified planting material**

### Specific Challenge:

In Serbia, 70-80% of plum trees are infected by plum pox virus (PPV) for which effective protection measures still does not exist. During the vegetative production of planting material, PPV is transmitted to the offspring from mother plants. Only effective measure is production of certified virus-free planting material. Recently, in some raspberry plants was revealed the presence of a new detected virus, raspberry leaf blotch virus (RLBV), which has detrimental effect on the leaf and yield. In the coming period it is necessary to carry out sophisticated analysis to determine how the virus affects the quality of the fruit, mechanism of transmission and early diagnostic methods.

### Scope:

Set of measures should be taken to prevent the further spreading of viruses such as quarantine measures and post-quarantine control, removing of infected plants and permanent control over plants under the risk, production of free-virus plants and prevention of virus infection through certification of planting material, control of the transmission process, selection of safety location for new plum/raspberry cultivation and development of methods for early detection of viruses. The long-term national strategy by governmental bodies should be established. Universities, R&D Institutes, local and national public bodies, policy makers, different associations, producers, media etc. should be involved to overcome this problem.

### Expected impacts:

- *Creating new varieties tolerant or resistant to several important diseases for successful cultivation of fruit species*
- *Establishing procedures and schemes of control and certification for planting material in order to improve the quality of planting materials for conventional and organic production*
- *Development of diagnostic methods for early detection of the viruses*

## **c. Cost-efficient implementation of water management system**

### Specific Challenge:

Raspberry is a plant that requires a lot of moisture, since her root develops in the surface layers of soil. Raspberry flowering and ripening during the late spring and summer, when temperature of air could be very high which would cause a rapid loss of soil water by evaporation and transpiration through the leaves. Accordingly, the first condition for the growth of the raspberry is the presence of a sufficient amount of moisture in soli and air. Plum trees require good supply of water during entire vegetation period, with air moisture between 75-85%. Irrigation drop by drop combine with fertilizers and implementation of atomizers are the best way to supply orchard with enough quantity of water, especially if sensors are distributed inside it. The investment for this type of irrigation is very high for individual producers and SMEs, so any technical solution which could reduce the investment costs could significantly improve application of modern irrigation techniques.

### Scope:

Majority of raspberry and plum orchards in Serbia are in private property, and most of the orchards are in rural highland areas. Majority of private orchards contains of several smaller parcels, which makes difficult implementation of modern techniques of irrigation.

Development of new irrigation techniques with better energy and water saving, or adaptation of existence for small orchards could increase the number of implemented solutions. Better cooperation between state and fruit producers, more funds for traditional producers and organisational support should be established.

Expected impacts:

- *Development of technical solution to minimise the investment costs*
- *Reducing the water waste with efficient technical systems*
- *Using modern technologies that are adapted to our climate, demographic, organizational and market conditions.*

## **Processing**

### **a. Implementation of modern packaging to enhance shelf life, to reduce waste and to improve the post-harvest technology (storage)**

Specific challenges:

Modern packaging such as packaging in modified atmosphere (MAP), active/intelligent packaging, and packaging in edible films are still in development in Serbia. Many SMEs in Serbia expressed the wish to extend the shelf-life of their products. They considered that adequate packaging and storage conditions could contribute significantly. They were not aware of the concept of MAP, active and intelligent packaging and were unsure of what benefits they will achieved concerning that implementation of modern packaging increase the investment costs. Increasing the knowledge on new technological achievements in the field of packaging and storage would be of primary importance for introduction of modern packaging in fruit post-harvest treatment in Serbia.

Scope:

Packaging innovation is necessary for producers and processors of raspberry and plum if they are to extend the shelf-life of products or to expand beyond the normal regional markets. The training and educational programmes should be established by the research community and should be realized by support of local authorities. Establishment and publication of electronic magazine which would translate science innovation results to easy to follow format can be useful for this issue. Further, purchasing of modern packaging technology could be enabled through specific funds allocated to support of SMEs.

Expected impacts:

- *Increasing knowledge on modern packaging technology*
- *Introduction of modern packaging in fruit food chain*
- *Extended shelf-life of raspberry and plum products*
- *Implementation of modern packaging technology*

### **b. Modernization of storage technology of raw materials and products**

Specific challenges:

Modern cold storage (control atmosphere, ultralow oxygen, ultralow ethylene, storage with dynamic atmosphere) are the best way to preserve fresh fruits. Building of these types of cold storage is still in development in Serbia, largely due to cost. Besides that, existing storage still don't have enough capacity to storage all fruit products during the harvest season. On the other hand, distribution of fresh fruits and their products as well as their storage in distributive centers or markets are sometimes in inadequate conditions which significantly reduce the shelf-life of products. Increasing the knowledge of all stakeholders including in post-harvest treatment of fruits on new technological achievements in this field

would help to introduce the post-harvest technologies in fruit food chain and reduce the unnecessary losses.

Scope:

Production of raspberry and plum are mainly performed by SMEs with ten or less employees or by individual producers. Consequently, there is very little in-house knowledge about innovation in production and processing of fruits. Continual education should be organized through different forms by seminars, training workshops etc. But, many smaller SME's focus attention on business maintenance (lower number of employees, maintaining turnover) and have no capacity to attend trainings/events/workshops. Education through media (TV, radio, journals), short-trainings or through local agricultural bodies (agricultural advisory services) could help to overcome this problem. Better cooperation between local producers through formation of cooperatives in assistance of financial support could facilitate purchasing of modern storage technology with satisfy capacity.

Expected impacts:

- *Education of producers on significance of modern post-harvest technology*
- *Modernisation of storage conditions*
- *Implementation of adequate storage conditions in distributive chain*
- *Extend the availability of raw materials after harvest season*
- *Provide the raw material of comparable quality during extended period*
- *Implementation of modern storage*

### **c. Development and implementation of modern processing technology**

Specific challenges:

Processing of fruits in Serbia is at very low level concerning product portfolio. Only several products of raspberry and plum exist on the market among which lyophilized raspberry, dry plum, plum brandy, plum jam, marmalade, compote and sweet of plum are among the economically most important. Development of new processing technology would increase the portfolio of fruit products leading to better utilization of raw material and production of added value products. Products such as chocolate-coated fruits, juices, fruit wine, fruit spreads or confectionary products based on raspberry and plum are insufficiently produced. Majority of by-products and wastes are not exploited. Also, implementation of modern processing technology in existing processing processes could help producers to obtain added value such as in dry plum production. In Serbia, majority of producers has dryers with opposite air/product flow which gave products with unequal quality. Introduction of same air/product flow dryers in plum processing SMEs would enable productions of high quality prunes for shorter period of time and consuming lower energy compared to the opposite air/product flow dryer.

Scope:

Increase awareness of local equipment producers on innovation of their manufacture processes, significance of production of small scale equipment should be conducted through educational seminars/workshops. Research by Universities and R&D Institutions on development of new technology for processing fruits as well as by-products and wastes should be performed. Transfer of knowledge should be efficient by help of knowledge transfer agencies and IPO. Lecturers by experts on fairs, meetings of producers/processors associations and other proper events would increase knowledge of innovation in processing technologies.

Expected impacts:

- *Development and implementation of technology for processing of fruits, by-products and wastes adopted to SMEs capacity*
- *Increasing knowledge about the importance of processing technologies*
- *Increase investment in processing technologies and increase of processing capacities*

## **Product**

### **a. Faster and better implementation of food safety management systems**

#### Specific challenges:

The prevention of pathogens contamination has to be a preferred strategy in food production. The implementation of GAP, GMP and GHP will ensure production of safe products. Potential risk during production of fruits exists in all phases of production process: on the field, during harvest, handling, processing, distribution and storage. The main risks for plum and raspberry production are worker hands, packaging containers and water for irrigation/fertilisation. Producers of raspberry and plum (especially individual producers) are not enough aware of the importance of personnel hygiene and all hazards that could have impact on safety and quality of their products. Concepts similar to hazard analysis and critical control point programs, if systematically applied in plum and raspberry production and processing, could increase safety and quality of products.

#### Scope:

Lack of skilled workers and technical personnel is one of the problems for introduction of good agricultural and hygiene practise. Continual hygiene audits and training should be frequently preformed to educate producers and processors. Also, short-term training programmes for new employees in issues such as HACCP, hygiene, handling, irrigation, packaging etc. could lead to faster implementation of food safety management systems. Such basic training can be conducted by local agricultural advisory services, regional chamber of commerce or producer organisations. Also thorough management risk assessment via traceability system and recall procedures should also be implemented.

#### Expected impacts:

- *Better implementation of all existing EU and other international hygiene standards as good practice-based (GHP, GAP), hazard-based (HACCP), risk-based (QMRA) systems and EHEDG standards*
- *Increasing knowledge of producers/processors about the food safety management*
- *Increase safety and quality of products*

### **b. Producer targeted dissemination of knowledge on health, nutritional properties of their products**

#### Specific challenges:

Raspberry and plum are fruits rich in bioactive compounds (BAC), mainly phenolic compounds (phenolic acids, tannins and flavonoids, such as anthocyanins and flavonols) and vitamins characterized by relatively high antioxidant activity. These compounds, either individually or combined, are responsible for various health benefits, such as prevention of inflammation disorders, cardiovascular diseases, or protective effects to lower the risk of various cancers. Raspberry and plum, fruits full of BAC, are also very delicious and have low energy, which is essential part of balanced diet. Although plum and raspberry are considered as traditional product in Serbia and their productions are bigger than other fruits, the consumer knowledge about health potential of these fruits are still limited. Producers should make an effort to spread the knowledge on nutritional and functional properties of traditional products to improve business success and reputation.

#### Scope:



To create better awareness of the importance of consumption of plum and raspberry products an effective dialog with consumers should be established. Promotional materials in supermarkets (flyers, posters), on social networks or promotion of traditional food through media could be effective way for distribution of information on health benefits of raspberry and plums. Also, training programmes, networking events, formation of science shops and development of communication strategy can assist in this issue.

Expected impacts:

- *Increase awareness of nutritional and functional properties of traditional fruits and their products among consumers*
- *Increase consumption of traditional fruits and their products*

**c. Reducing the diversity in forms, materials and numbers of packaging by raising consumers' awareness (communicate on local environment, tradition and regional trademark)**

Specific challenges:

Product design dimensions can influence consumers' purchase intentions, word of mouth and willingness to pay. Different package size, transparency, visual-attractiveness also influence the sale of products. The self-opening, self-closing, self-sealing packaging became more popular among consumers. This movement in food packaging increase significantly investment of SMEs which is too much for financial limited SMEs economy. Raising consumers' awareness that quality of products are more important than visual impression and possible detrimental effects of too much packaging aesthetic solutions on production of traditional food would make a pressure to manufactures of packaging materials and equipment to reduce the packaging offers.

Scope:

The innovative packaging needs to enhance the product shelf-life, be attractive and consumer-friendly but also be sustainable. Producers of raspberry and plums together with scientific community, association of producers and consumers should on an easily-understandable way communicate with consumers on local and regional level about unnecessary manufacture of different size, forms and numbers of packaging. The traditional products should have several aesthetic packaging solutions recognized by consumers and protected by industrial design.

Expected impacts:

- *Reduction of different forms, materials and numbers of packaging*
- *Increase awareness of consumers of unnecessary production of different size, forms and numbers of packaging*

## **Business**

**a. Constant improvement of policy conditions for labour management and organization of support**

Specific challenges:

Production and processing of raspberry and plum are mainly family business or small company business in which the management, production, distribution, marketing etc. are activities of one person, mainly owners. Due to lack of time, managers of company are disabled to attend training programmes, explore databases or possibilities to get funds.

There is a need to develop support programmes for very small SMEs. Such a support package need not be limited to financial matters but can cover organisational support, management support, external skills provision, etc.

Scope:

Local/regional training supports and guidance through the innovation process is essential for many companies. Associations of producers/processors together with local authorities (agricultural advisory services) should be more active in organisation of training workshops on all food value chain subjects. More control of individual producers should be done by AAS. Information about possibilities of getting financial support from funds should be better distributed among producers/processors. Academic community should be more involved in creation of novel knowledge and transfer of knowledge. Better communication and linkage between all actors in food value chain should be established. Formation of specific funds for development of traditional fruit sector is needed.

Expected impacts:

- *Development of an organizational model for clustering of producers and exporters of traditional fruit products*
- *Development of management models for SMEs*
- *Better networking between producers and academic community*
- *Long-term policy changes within financial sector*
- *Improved marketing skills of SMEs*

## **b. Branding of traditional products**

Specific challenges:

Protection of intellectual property rights is at very low level in Serbia. Although intellectual property office has a long tradition in Serbia, producers and processors of raspberry and plum has a low level of knowledge about possible protection of their products and respective procedures. For example, the most famous Serbian brand - plum brandy "Šljivovica" is not protected. Only raspberry from Arilje is protected by indication of geographical origin in Serbian IPO. Absence of IPR protection causes difficulties in placement of traditional Serbian sweet fruit products on domestic and international markets.

Scope:

The problems of IPR protection and brand development should be overcome by the greater role of the state institutions, public and private research sectors, as well as private investment sector in the field of branding of traditional products. Increasing awareness on significance of protection of traditional products through different forms of industrial property rights (e.g. patents, indications of origin, trademarks and industrial design), copyrights and related rights could be helpful in marketing and placement of traditional fruits and their products on domestic and international markets. Development of effective training programmes for all stakeholders, researchers, producers and processors will increase level of IPR culture in Serbia.

Expected impacts:

- *Increase knowledge on IPR issues*
- *Increased number of IPR protected traditional products*
- *Better placement of Serbian traditional sweet fruit products on domestic and international markets*

## **c. Increase the awareness on traditional food through continuous education and communication**

Specific challenges:

Nowadays, the consumers become aware that what they eat reflect to their health. Consumers perceive fruits as products with a healthy image, especially when they are fresh. Nevertheless, European fruits intake remains well below the levels recommended by the World Health Organisation. On the other hand, consumers considered dried fruits to be healthy due to the (micro)nutrient content of the dried fruits, but they also regarded them unhealthy because of their high sugar content and a loss of vitamins due to drying. Although traditional drying processes lead to a significant loss of bioactive compounds, dried fruits can still be a valuable source not only of energy, dietary fibre and minerals but also of anti-oxidants. Continual communication and education of consumers will help them to understand the quality and health benefits of fruit products.

Scope:

To increase consumer interest and trust in traditional, natural, healthy foods, several important measures should be applied: research on consumer attitudes to traditional fruit products, personalization of consumer demand, transparency in traditional food production methods, research on all health benefits of plum and raspberry and their products, research on influence of processing methods on bioactive compounds in fruit and fruit products, inform consumers on health benefits of consuming plum and raspberries products through different dissemination activities such as promotion on fairs, through touristic offer of Serbia and media.

Expected impacts:

- *Increase the awareness of health benefits of consuming traditional fruit and fruit products*
- *Increasing demand for traditional fruit and fruit products*

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## Members and Supporters of Traditional Food

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Group 1: Food companies, SME associations, clusters	
1	ECO-Vita Zalpanje
2	Uniprodukt D.O.O.
3	Aleva
4	Polo Doo
5	Racio d.o.o.
6	Farm "Tasic"
7	Sumadija KGM
8	Grkovic produkt
9	SPTR Rakija iz Rakije
10	Mondi Lamex
11	Promo Pen doo Čačak
12	Association of Companies for Processing of Fruits and Vegetables Karaljevo
13	Destilerija Zarić
14	Cluster Pannonian brandy
15	Cluster Polux, Association of producers of food products Polux-Kikinda
16	Malina impex
17	Ranch Rain
18	Agroplod
19	Interfood 6O doo
20	Winery "Krajina-Rajac"
21	Interfood
22	Farm – Shii-take
23	„Natural food“
24	GMP Jarmenovci
25	Venus plus
26	Agricultural cooperative "Zablacanka"
27	Shiitake DOO, Despotovac
28	Šampi centar 09
29	"Poljootkup" DOO, Čačak
30	"FOODEX"
31	"GMP Enterprises" DOO, Topola

32	"Nektar" DOO, Ušće
33	"Wood & Fruits" DOO, Niška Banja
34	"Duga fruit" DOO, Kruševac
35	"Narona" DOO, Čačak
36	"Kopy food" DOO, Brus
37	"Džemko" DOO, Čačak
38	"Trnava MG", Kragujevac
39	Ethno food cluster
40	Stanic d.oo.
41	ZZ PECKA PECKA
42	LAKI DOO ARILJE
43	BORJANA DOO, PIROT
44	ZEMLJORADNIČKA ZADRUGA AGROKOOPERATIVA DOMAĆIN, TOPOLA
45	ZZ ČAČANSKA JABUKA DONJA TREPČA
46	RAUCH SERBIA DOO KOCELJEVA
47	VULIĆ & VULIĆ DOO NIŠ
48	AGROPARTNER DOO LUČANI
49	FRIGO -PAUN DOO POŽEGA
50	EURO FRIGO DOO POŽEGA
51	FRIGO-JUNIOR DOO ARILJE
52	NOMIL PROMET DOO ARILJE
53	SICOBERRY DOO RATINA
54	PREDUZEĆE DRENOVAC DOO
55	MS NOVAKOVIĆ DOO ARILJE
56	Agroprodukt doo
57	Forum privrednika Čačak
58	Labagro doo Žitorađa
59	ZR Voćne rakije "Plazinić"
60	Minićeva kuća rakije
61	Dejan Marković PR AGROMAG-DM
62	Toplicaagrar doo Prokuplje
63	Jelički dukat
64	Swiss nature
65	Drenovac
66	Delta agrar
67	Ulixes
68	BMN malinas
69	Hosana
Group 2: Innovation consultants, innovation transfer agents, TTOs, incubators and technology parks, ETPs, NTPs	
1	Center for technology transfer, University of Belgrade
2	Institute of Agricultural Economics
3	Institute of Field and Vegetable Crops

4	Fruit Reseach Institute
5	Science and technology park Čačak
6	Innovation Center of Technology-Metalurgy Faculty of Belgrade
7	Science technological Park Cacak
Group 3: Consumer organisations	
1	Center for Consumer Protection Senta
2	Municipal consumer organization Vlasotince
3	Consumers' Association "Hram"
4	Consumer organization Kragujevac
5	National organisation of Consumers Serbia
6	Consumer organisation of Serbia
7	Center for Consumer Protection "Forum"
8	Center for Consumers of Serbia
9	Assosiation of Consumer Protection Vojvodina
10	Municipal consumer organization Leskovac
11	Consumer organization Kruševac
12	Consumer association of Serbia
Group 4: Research and technology donors	
1	Institute of Agricultural Economics
2	Institute Mihajlo Pupin
3	Faculty of Agriculture, University of Belgrade
4	Fruit research Institute-Čačak
5	Institute of Food Technology (FINS)
6	Faculty of Agronomy, Čačak
7	Maize Research Institute, Zemun Polje
8	Institute for Vegetable Crops, Smederevska Palanka
9	Soil Science Institute, Belgrade
10	Faculty of Agriculture, University of Novi Sad
11	Faculty of Technology and Matellurgy, University of Belgrade
12	Institute of Meat Hygiene and Technology
13	Faculty of Biofarming, Bačka Topola, Megatrend University
14	Institute for Biological Research
15	Institute for Forage Crops Krusevac,
16	Institute of Applied Science in Agriculture
17	Institute of Forestry
18	Institute PKB Agroekonomik
Group 5: Policy decision makers	
1	Belgrade Chamber of Commerce
2	Chamber of Commerce and Industry of Serbia
3	Regional Chamber of Commerce Sombor

4	Regional Chamber of Commerce Subotica
5	Regional Chamber of Commerce Novi Sad
6	Regional Chamber of Commerce Zrenjanin
7	Regional Chamber of Commerce Kikinda
8	Regional Chamber of Commerce Sremska Mitrovica
9	Regional Chamber of Commerce Valjevo
10	Vojvodina Chamber of Commerce
11	Regional Chamber of Commerce Kraljevo
12	Ministry of Agriculture and environment protection
13	Provincial Secretariat for Agriculture, Water Management and Forestry
14	Chamber of commerce of Uzice region
15	Regional chamber of commerce, Krusevac
16	Regional chamber of commerce and industry Leskovac
17	Regional chamber of commerce Niš
18	Regional chamber of commerce Pancevo
19	Regional chamber of commerce Pozarevac
20	Regional chamber of commerce Zajecar
Group 6: Other organisations (professional food organisations, food and beverage federations, mass media organisations, other companies in food production and delivery chain, etc.)	
1	Cluster house
2	Association of Agricultural Journalists
3	Agrivi
4	Agrilink
5	Association of Agro Journalists
6	Agricultural Advisory and Support Service Kraljevo
7	Poljoprivreda Info



## List of Abbreviations

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TW	Training workshop
MSW	Multi-stakeholder workshop
SRIA	Strategic Research and Innovation Agenda
AF	Agro food
R&D	Research and Development
RS	Republic of Serbia
SME	Small and medium-sized enterprise