Value Chain Analyses: Prespa Region (Municipality of Resen)

Food and Agricultural Production

EU for Economic Growth Project

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AREA SCIENCE PARK

1. Introduction

The Prespa region (Municipality of Resen) belongs to Pelagonija planning region which covers 4,717 km^2 or 18.34% of the total territory of the country. The Municipality of Resen covers an area of 551 km^2 where 16,825 inhabitants (7.1% of the population of Pelagonija region) live. There are 44 settlements in the Municipality of Resen and the density of the population is 29.3 inhabitants/km^2. From those, 43 are villages and the other is the City of Resen, which is the municipal and administrative center.

1.1. Economic indicators

There is limited data on municipal level, so the data for the Pelagonija region is taken as first approximation. Therefore, the data should be used and interpreted with caution. Pelagonija region is the fourth most developed region in the country with development index of 0.91. The Demographic index is 0.8, while the socio-economic index is 1.09. The GDP of the Pelagonija region has increased from 60,293 Million MKD in 2015 to 78,146 Million MKD[1] in 2019. At the same time its share in the total GDP of the country increased from 10.8% in 2015 to 11.3% in 2019.

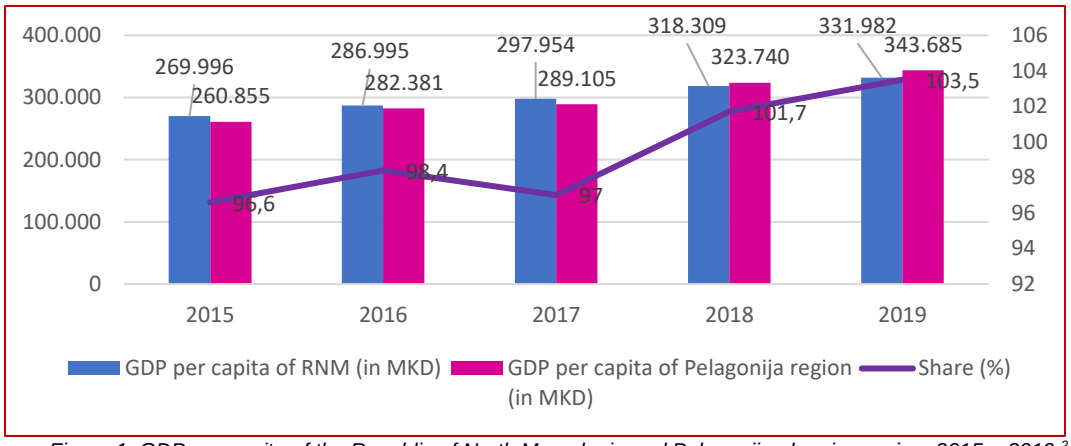

Figure 1: GDP per capita of the Republic of North Macedonia and Pelagonija planning region, 2015 – 2019 [2]

The GDP per capita of the Pelagonija region has increased in absolute value from 260,855 MKD in 2015 to 343,685 MKD in 2019. When compared with the GDP per capita of the country it increased from 96.6% in 2015 to 103.5% in 2019, and it is the fourth in the country after Skopje, Vardar and South-East region.

In the development of the overall economy of the Pelagonija planning region, the sectors of Mining, manufacturing, electricity, gas and water supply, sewerage, waste management, and remediation activities are the most dominant. Other sectors in the regional GDP are: Agriculture, forestry and fishing, Wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage; accommodation and food service activities; Real Estate Activities and Public administration and defence; compulsory social security; education; human health and social work activities. In the period 2015 – 2019, the biggest increase of 85.12% was in the sector Information and communication.

[1] 1 EUR = 61,5 MKD

[2] State Statistical Office, makstat database

Investments in fixed assets in the Pelagonija planning region decreased from 10,215 Million MKD in 2015 to 10,101 Million MKD in 2019. The decrease in the investments in fixed assets can be attributed to the sectors of Agriculture, and forestry and fishing with significant decrease from 31.20% in 2015 to only 11.31% in 2019, and the Construction sector from 7.13% in 2015 to 5.02% in 2019. In the period 2015 – 2019, the biggest increase of the investments in fixed assets of 33.6 times was in the sector Professional, scientific and technical activities.

According to the data of the State Statistical Office, the number of active business entities in 2019 in the Municipality of Resen is 468 and represents 5.62% of the total number of active business entities in Pelagonija region which is 8,327. The number of active business entities per 1000 inhabitants in the Municipality of Resen is almost 29, and this is much lower than the number for Pelagonija region (36.71). The MSMEs make up 99.8% of the total number of companies with 65.6% micro companies and 33.5% small companies. There are only 3 medium and 1 big company. The ratio of number of companies' deaths and the number of newly established businesses is not available at municipal level.

Number of employees						
Year	2017		2018		2019	
Location	**Resen**	**Pelagonija**	**Resen**	**Pelagonija**	**Resen**	**Pelagonija**
Total	459	8,064	460	8,118	468	8,327
Share (%)	5.69%	100%	5.67%	100%	5.62%	100%
Total per 1000 inhabitants	28.20	35.22	28.40	35.62	28.96	36.71
0[3]	n/a	613	n/a	679	n/a	624
1-9	300	6,779	298	6,761	307	7,029
10-49	156	515	158	515	157	513
50-249	2	131	3	140	3	141
250 +	1	26	1	23	1	20

Figure 2: Number of active companies in Pelagonija planning region and in the Municipality of Resen (Prespa area) based on the number of employees, 2017 – 2019 [4]

The total number of companies in the Municipality of Resen has decreased from 459 in 2015 to 440 in 2020 (decrease of 4.14%). The biggest number of companies are in the sector Wholesale and retail trade; repair of motor vehicles and motorcycles with 176 in 2020, followed by the sector Accommodation and food service activities with 43 as well as Transportation and storage and Professional, scientific and technical activities both with 39. There are 22 companies in the sector Agriculture, forestry and fishing and 31 company in the Manufacturing sector. In both sectors the number of companies in 2020 is bigger than in 2015.

[3] Included in the number of companies with 1-9 employees.

[4] State Statistical Office, makstat database

The value of exports from Pelagonija region have increased from 306.57 Million EUR in 2015 to 624.03 Million EUR in 2019. At the same time the share of exports has increased from 7.5% in 2015 to 9.7% in 2019. In the same period, imports in Pelagonija region have increased from 272.65 Million EUR in 2015 to 438.93 Million EUR in 2019 (increase of 1.6 times). The share of imports in Pelagonija region has also increased from 4.7% in 2015 to 5.2% in 2019. The trade surplus was 185.1 Million EUR in 2019.

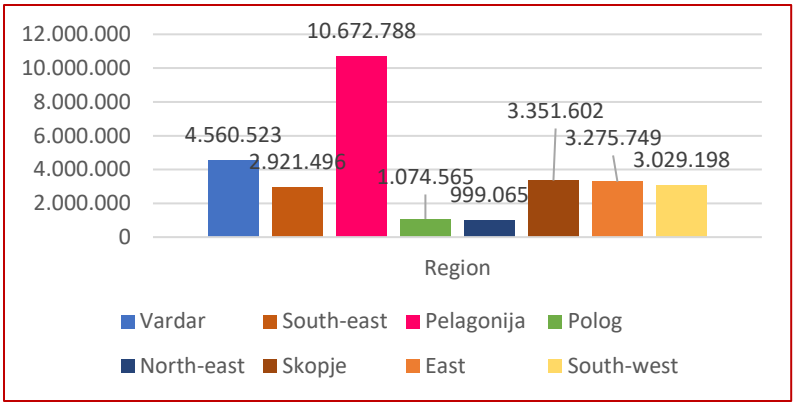

Figure 3: Volume of IPARD support per region, in EUR, 2019 [5]

The biggest contribution in the exports from the Pelagonija region comes from the following sectors: Products of agriculture, hunting and related services with share of 20.15% of total exports from the sector at national level in 2017; Textiles with share of 7.4% (2016); Wearing apparel with share of 13% (2016); Electrical equipment with share of 10.9% in 2016.Pelagonija region has received by far the biggest support through IPARD of all regions in amount 10,672,788 EUR.

1.2. Environmental indicators

There are not many relevant environmental indicators on regional level. The following Table (figure 4) provides information of water supply, use and protection against pollution in industry and mining in Pelagonija region.

It is obvious that different indicators in Pelagonija region in 2019 account for very low percentages. The municipality of Resen does not have a strategy for climate change prepared and no environmental indicators for the municipality could be obtained.

	2015	2016	2017	2018	2019
Water supply	25,452	7,235	970	39,100	25,254
(%)	0.59	0.20	0.05	1.16	1.08
Water used for technological purposes	24,573	6,711	796	24,316	25,344
(%)	0.57	0.18	0.06	1.09	1.57
Discharge of un-purified water	25,430	7,201	597	23,695	24,698
(%)	0.59	0.20	0.06	1.29	1.85
Discharge of purified water	6,551	6,469	151	237	154
(%)	40.47	51.26	0.05	0.07	0.06
Discharge of wastewater	1,604	810	748	23,932	24,852
(%)	0.57	0.37	0.06	1.09	1.57

Figure 4: Water supply, use and protection against pollution in industry and mining in Pelagonija region, in 000 m3, 2015 – 2019[6]

[5] Strategy for regional development 2021 - 2031

[6] State Statistical Office, Regions in the Republic of North Macedonia, various editions

1.3. Social indicators

The total population in the Municipality of Resen has slightly decreased from 16,313 in 2015 to 16,158 in 2019 (-1%). Women represent 49.3% of the population in 2019. The share of population older than 40 years is 55.8%. The number of young people aged 15–40 years has decreased from 5,556 in 2015 to 5,223 in 2019 (decrease of 6%).

	2016					2017				
	Total	**0-14**	**15-40**	**40-64**	**65+**	**Total**	**0-14**	**15-40**	**40-64**	**65+**
Total	**16.313**	1.918	5.556	5.933	2.906	**16.274**	1.932	5.439	5.911	2.992
Men	**8.265**	994	2.954	3.041	1.276	**8.249**	997	2.896	3.023	1.333
Women	**8.048**	924	2.602	2.892	1.630	**8.025**	935	2.543	2.888	1.659
	2018					**2019**				
	Total	**0-14**	**15-40**	**40-64**	**65+**	**Total**	**0-14**	**15-40**	**40-64**	**65+**
Total	**16.198**	1.914	5.305	5.894	3.085	**16.158**	1.917	5.223	5.847	3.171
Men	**8.209**	979	2.819	3.011	1.400	**8.197**	981	2.776	2.987	1.453
Women	**7.989**	935	2.486	2.883	1.685	**7.961**	936	2.447	2.860	1.718

Figure 5: Population of the Municipality of Resen, by gender, 2016 – 2019[7]

Pelagonija region has the second highest employment rate of all regions in the country of 56% in 2019. It has been above the national average for the whole period 2015-2019. The unemployment rate in Pelagonija region has significantly decreased from 21.1% in 2015 to 13.1% in 2019. That rate is the fourth of all regions in the country.

The Total number of unemployed persons in Resen is 1,543 which is 9.5% of the total population from which 694 were women (almost 45%). The Total number of unemployed at age 15–40 years in Resen is 719 (46.6% of total number of unemployed), while the number of unemployed women at age 15–40 years is 352 which represents 50.7% of total number of unemployed women.

	Total	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60+**
Total	**1.543**	23	137	180	223	156	150	134	144	201	195
Women	**694**	9	68	90	112	73	74	62	66	81	59

Figure 6: Number of unemployed persons in the Municipality of Resen, by age and gender, 30.05.2021[8]

[7] State Statistical Office, makstat database

[8] Employment Service Agency – Branch office Resen

The Employment Service Agency is conducting a Labour market skills survey which aims to provide short-term indicators of employers' expectations regarding new employment and the needed skills in order to be competitive in the labour market. It is based on 293 surveyed employers in the Pelagonija region (9,7% of total in the country). Based on the survey conducted in November 2019 the priority in new employments will be given to persons with the following skills in the Pelagonija region: system administrator, computer programmer, economist, medical doctor, economist for insurance, process engineer, graphic designer, economist for marketing, mechanical engineer, civil engineer, technical operator, pharmaceutical technician, mechanical technician, salesman, welder, chemical technician – operator, seamstress, waiter, locksmith, cook, barmen, baker, construction worker, bus driver, worker for simple tasks for processing of tobacco, worker for simple tasks for freight uploading/ downloading of general worker, etc.

There is only one secondary school in the municipality of Resen with 311 students in the school year 2019/2020. The number of male and female students is almost balanced as well as of the teachers. The number of enrolled students in secondary education in the Municipality of Resen has decreased from 397 in 2015/2016 to 311 in 2019/2020, which is significant decrease of 21.7%.

	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020
Total	**397**	**340**	**308**	**317**	**311**
Female	202	173	145	156	157
Male	195	167	163	161	154

Figure 7: Students in secondary school, by gender, in the Municipality of Resen and year of study

The number of graduates in the Municipality of Resen shows variation in the analysed period with a general negative trend and significant drop in 2017/2018. The Municipality of Resen had in total 57 graduate students and 3.53 graduated students per 1000 inhabitants in the school year 2018/2019.

Indicator	2014/15	2015/16	2016/17	2017/18	2018/19
Number of graduated students	n/a	67	78	51	57
Number of graduated students per 000 inhabitants	n/a	4,11	4,79	3,15	3,53

Figure 8: Analysis of the indicators related to higher education in the Municipality of Resen, 2015/16 – 2018/2019[9]

[9] State Statistical Office, makstat database

2. Value Chain Selection

Although the economic analysis shows that the Agricultural sector, or specifically the production of fruit, is experiencing a decrease in investments and is economically speaking not one of the most important sectors in the Pelagonija region, it is the main job-creator and production sector of the municipality of Resen. Of the municipalities' 16,825 inhabitants, more than 12,000 receive their income from apple farming[10]. The number of agricultural holdings on the territory of the Municipality of Resen is 3,200 (with an average of four family members).

Although most of the labour force is already engaged in this sector a significant potential was seen in this value chain. The main focuses being the decrease of production costs and the increase of investments in value-added products to generate higher income for the farmers and new skilled jobs in processing the products. Furthermore, various green opportunities to reduce pollution and to increase production were identified and can be integrated in the value chain.

2.1. Selection Matrix

The following matrix describes and rates the selection criteria for Value Chain and provides an overview. In the next section the key criteria of the selected value chains within the relevant dimensions (Economic, Environmental, Social) are presented in more detail.

2.1.1. Activity Type

	 Innovative nature	 Expected Market Disruption	 Expected Additional Income	 Local Job Creation (esp. Target Groups)	 Contribution to Circular Economy	 Overall Assessment
Fresh & Processed fruits	**	***	***	**	***	***

- **Innovative nature:** To connect agricultural farming with the ICT industry by implementing smart agriculture as well as by linking agriculture with non-farm activities, such as rural tourism. The processing industry starts the production of new products such as organic fruits, apple chips, dried fruits, jams, pies, juices, etc.
- **Expected Market Disruption**: New initiatives in the selected value chain will have a positive market impact, decrease imports, and increase export potentials with organic fruits and high value-added products.
- **Expected Additional Income:** From decreased production costs, organic fruits and high value-added products and possibly higher number of sales.
- **Local Job Creation (esp. Target Groups):** Investments in value-added products will contribute to new employment (including a demand for a more skilled and higher wage labour force).

[10] Resen municipality figures

- **Contribution to Circular Economy:** The most significant impact is expected to be in this segment, by decreasing pollution (soil, air, water) to transform waste into value-added products and to create a circular economy.
- **Overall Assessment:** The selected value chain is very important for the Resen municipality; the proposed initiatives will increase the value chain's competitiveness and contribute to the additional income for the farmers and processing companies, which make up the highest percentage of employees in the municipality.

2.1.2. Sector

	Circular and Green Economy	Innovation and IT	Highly Competitive Economic Sector	Rural development Business Development Services	Export Potential/Import Substitution	Overall Assessment
Fresh & Processed fruits	***	**	***	***	***	***

- **Circular and Green Economy:** To increase the use of organic fertilizers (compost) that can be locally produced (by organic waste from the apple production).
- **Innovation and IT:** The food processing industry is a very dynamic sector from the aspect of technology and invention with a critical mass of innovative SMEs that can accelerate this subarea's future development, including the ICT sector in innovative agritech activities.
- **Highly Competitive Economic Sector:** The current value added in the agricultural sector in Resen is low. There is opportunity to increase this through the introduction and expansion of processing and product diversification. The reputation, quality, and yields are considered to be good but have not been valorised to their potential.
- **Rural development Business Development Services:** The proposed activities will impact the farmers businesses in the municipality's rural areas and create new opportunities for production and tourism businesses in the municipality.
- **Export Potential/Import Substitution:** The export potential is expected to be more significant with high value-added products.
- **Overall Assessment:** The selected value chain is the main economic activity in the Resen municipality. The proposed activities will be successful only if the target community is open to changes.

3. Value Chain Sector Grids

Dimensions	Key Criteria	Fresh & Processed fruits (focus on apples) value chain for the Resen Municipality Key Criteria findings
ECONOMIC	Market demand prospects (local and/or export)	According to the 2019 state statistical data, the total apple production in North Macedonia was 88,701t, from which the Pelagonia region produced 57,195t (66.3%), with 95% produced in the Resen municipality. In the same year, the total export of fresh apples was 103'274t (plus 1'278 t processed apple products) and the country's import of fresh apples was 731.9t and the apple concentrate 166.2t. The country has a positive export balance of fresh and processed apple and the apple harvest is usually around the same quantity, however it can vary due to the changing weather conditions. • The national demand of this type of apples is being met and lots of apple products are exported to EU or other countries. Other apple/fruit based (high value added) products need to be created and produced. • There is no national demand for a higher production of fresh apple, but a demand for processed apple products could be created. According to the numbers from Makstat, there seems to be a production surplus which could be used for other products in order to generate profits. Furthermore, additional apples could be exported to the EU or neighbouring countries. • It is assumed that although the apple production in Resen creates a lot of biowaste (up to 20%), imported apples are of a kind which are not being produced in the municipality. • Other products like cider, alcohol, vinegar, dried fruit products, apple chips, marmalade could be produced and sold locally or exported.
	Opportunities for employment creation	The municipality of Resen has 16,825 inhabitants, from which more than 12,000 receive income from apple farming. The number of agricultural holdings on the territory of the Municipality of Resen is 3,200 (with an average of four family members). As already most of the labour force is engaged in this sector, the main focus of the value chain is to decrease production costs and increase investments in value-added products to generate higher income and new skilled jobs. Additionally, the work of the seasonal harvest helpers should be legalised and formalised in order for them to enjoy better working conditions, social protection, and payment as well as to integrate this labour into the official statistics. • Apple producers lack work force. Unskilled labour as well as skilled technicians.

		• There are enough unemployed people in the municipality (more than 1'500) and in the region which can be integrated in this field of work, however they might need help with being allocated to the businesses in need or informed about opportunities. • Expert knowledge for maintenance, construction etc. is needed, however could be found locally or regionally • Another potential might be in "legalising" people working in the grey economy such as seasonal workers with the help of the municipality. It is believed that the municipalities might be willing to engage in a program to formalise this kind of work in order for them to increase the number of employed people and tax revenue and to decrease the number of unemployed people.
	Comparative advantage of production Level of competitiveness (in comparison to competing producers)	• The ideal natural conditions made this region the best for apple production in North Macedonia and beyond. The annual output makes the Prespa region a serious competitor for fresh fruit traders and an interesting possibility for processors to invest. • The comparative advantage however needs to be strengthened by increasing the value of the main products. Either through (labour and resource) efficient processes and/or through higher quality products, which are also recognised internationally as such. For example, through applying for internationally recognized certificates in sustainable and organic production. • With a lot of apples being thrown away in production, harvest or similar processes there is a large potential of increasing the competitiveness in the production in this sector.
ENVIRONMENTAL	Impact of the value chain functions on the environment	There are several negative environmental impacts from the value chain: • **Biowaste** – the share of biowaste varies from 7% to 12% of the total annual production as does the percentage of waste apples. In some years it can be up to 25%, or approximately 20,000t to 40,000t including bio waste from the processing facilities. • **Wood residues** from tree pruning - based on the information from the local farmers and the regional unit of the State Agency for Promotion and Development of Agriculture, the average unit volume of wood residues from pruning is 5 to 6 m^3 per hectare or 27,500 m^3 or 16,500t of wood residues. Most of this wood waste is left on the ground and turned into organic mulch or used to heat the homes of agricultural families. Burning the wood brings pollution – pellet production could however decrease this and at the same time solve the problem with the left-over wood. Another potential is to compost it and using it as fertilizer. • **Unsold apples** – information from the conducted interviews state that significant amounts of around 20% or about 20,000t to 30,000t per year of unsold apples are dumped on illegal landfills near the rivers. The ph-value is changing due to the decomposing of the apples which is then being transported to the lakes and therefore interrupting the ecosystem. • **Pesticides** - on average, farmers protect orchards 15 to 20 times with 1,000l (dissolved pesticides) per ha or 100 million litres per year. Pesticides are going into the soil and then pollutes the groundwater / drinking water / lake etc.

		• **Fertilizers** - on average, the farmers use 700 kg of fertilizers per hectare or annually 3,500t. for all region. The adverse effects from fertilizers are air pollution due to nitrogen emissions, water, and soil degradation because of nitrogen leaching, eutrophication. All this waste is washed away with the rain in the Prespa lake, which degrades the water quality. • **Water usage** - there is no data on the amount of water that farmers use for irrigation, but the positive fact is that 90% of farmers use drip irrigation, decreasing the amount of water over flood irrigation. Improvements about the water consumption can be done and are directly related to the production of fruits in the region.
	Impact of the environment on value chain functions vulnerability of the value chain to (degraded) environment and climate change.	Weather and the natural environment play a fundamental role on the functions of this value chain. By introducing more resilient/adaptable crops, better technology, and more targeted and responsive methods such as selective irrigation, pest control, heat/cold protection, etc. the changing environmental effects can be reduced. The value chain is already experiencing **negative impacts from Climate Change**, with early and erratic crop flowering, reduced quality of fruits, the emergence of new diseases, and water supply issues all presenting new challenges. In addition, significant threats such as floods, storms and droughts will likely increase in severity in the coming decades[11].
	Green opportunities	• **Decrease of water use / Smart irrigation** - the amounts of irrigation water used is a relevant issue. The unit cost of water is low, which may lead to the opportunistic behaviour of irrigating much more than necessary. Monitoring technologies (sensors) are relatively cheap, and the information they make available could help reduce water usage. • **Decrease fertilizers using** compost from available resources such as biowaste, biowaste from processors, wood residues, unsold apples, and chicken manure available from local company and sludge from municipal wastewater treatment system (Resen). Precision agriculture can mitigate those adverse effects through site-specific mapping and variable fertilizer application rates within plots. • **Smart agriculture** – Soil sensors for moisture levels, pH value and soil nutrient levels, soil compaction or mechanical resistance, etc. Integrated fruit production (IFP), economical production of market quality crops, prioritizes the safest possible human health and the environment, and integrated pest management (IPM) to control pests and diseases • **Decrease use of pesticide** the most significant impact is expected to be in this segment, by decreasing land, air and water pollution. • **Energy efficiency and renewable energy** projects for fruit processors by installing PV panels on roofs, replacing oil steam boilers with agriculture pellet boilers, etc. • **Decrease the high** percentage of thrown-away products and therefore decrease the **biowaste**, by more efficient supply chains and processes and more export to avoid left over stocks. • **Collaborate with a "green" labels** (Certificate) to increase the value of the products

[11] As an example, in July 2021, the Prespa area was hit by hail that will decrease this year's yield drastically.

SOCIAL	(Prospects for) Inclusion of disadvantaged groups (poor, women, youth, refugees, minorities, handicapped, …)	According to Employment Service Agency, Resen office, there are 1,543 unemployed people, from which 694 are females, 563 people younger than 40, and 11 unemployed people with disabilities. Those people could be employed in the value chain during the harvest period and in the post-harvest technology for fresh fruits, and processing facilities. However, that income is not registered, and their work is needed for a short period only. The opportunities for employment creation, as identified above, can be applied to these groups creating more and better jobs. Synergies with ESA, to employ people with disabilities could be used, because the agency provides incentives for companies who employ people with disabilities (e.g., 20 average salaries for one employment or 40 average salaries for people with wheelchairs or completely blind people, 1,620 € non-refundable funds for workplace adaptation, and trainings etc.)
	Impact of the value chain on surrounding communities	• By improving the quality and diversity of the products, as well as the (over)use of pesticides and other harmful treatments, the health of both the consumers and the local residents should be improved. • The sector employs and has the ability to employ more females in the workforce increasing household incomes • The move to smart agriculture, and the modernisation of processes, as well as the integration of technology can increase the local human capacity. • The improvement of farming and processing methods, and the reduction of pollutants would have an impact on all local residents, not just those directly related to the value chain. • The increased wealth within the communities should also directly affect the improvement of social capital. • Improved farming methods should encourage and increase local biodiversity • Improving the quality of the crop and diversifying the products should lead to reduced food waste
INSTITUTIONAL	Evidence of private sector, government and/ or donors having plans for investment in the value chain	• World Bank- **Agriculture Modernization Project** for North Macedonia[12] is to improve competitiveness (Resen & Strumica) in targeted agricultural sub-sectors and strengthen agricultural public sector readiness for EU accession, project value 46 million €. • **The Smart Specialization Strategy**, started in March 2018, when the letter of commitment from the country's government on starting the development of the National Research and Innovation Strategy for Smart Specialisation (RIS3) reached the Joint Research Centre (JRC). • Agency for Financial Support in Agriculture and Rural Development[13] • Instrument for pre-accession assistance for rural development[14] (IPARD), 2014-2020 budget 60 m €

[12] https://projects.worldbank.org/en/projects-operations/project-detail/P168014

[13] http://www.ipardpa.gov.mk/Root/default_eng.asp

[14] https://ipard.gov.mk/en/home/

		• The Increasing Market Employability Programme (IME) **is aimed at strengthening the business sector in the Republic of North Macedonia. IME mission is to create an enabling environment for identified high-growth target sectors, to support agricultural producers and processors[15] to supply high-quality products to new markets, while creating decent jobs in rural areas.** • There are two potential private investments. The Turkish company **Zorlu** is interested in building a fruit production and processing center for 10,000 tons of apples. **Reis Group** intention is to invest in cold storage for 5,000 tons of fresh fruits and production of apple chips, and apple and pumpkin concentrate.
	Sector (promotion) policies and regulations are in place and effective	There are several laws define primary agriculture production: • Law on agriculture and rural development • Law on Phyto pharmacy • Law on organic agricultural production In addition, the processing industry is regulated by the Food Safety law, the law on Environment, and the Waste Management Law. However, as there is pollution through the extensive use of fertilizers, and illegal waste dumping of rotten apples and trimmings, the laws on i) organic agricultural production, ii) the law on environment and iii) the waste management law, are most likely not effective or not being implemented in a way to address the real problems.
	Chain actors / government / donors / support organizations' readiness to change, to collaborate and to align interventions	The following relevant actors are listed. Interviews and exchanges were held with many of the organisations to gain their support for the alignment of interventions and to cooperate/collaborate in the value chain development: **Government institutions** The Ministry of Agriculture, Forestry and Water Economy[16] The Agency for Financial Support in Agriculture and Rural Development The Agency for Promotion of Agricultural Development[17] (National Extension Agency)

[15] https://ime.org.mk/sustainable-agriculture/

[16] http://www.mzsv.gov.mk/%D0%9F%D0%BE%D1%87%D0%B5%D1%82%D0%BD%D0%B0.aspx#

[17] https://agencija.gov.mk/

		Business Associations Economic Chamber of North Macedonia[18], Macedonian Chambers of Commerce[19], The Macedonian Association of Processors[20], Small Business Chamber[21], The Macedonian association of agricultural cooperatives – MAAC[22] **Donors** Delegation of the European Union to the Republic of North Macedonia, GIZ, USAID, SECO, JICA, World Bank According to the statements given by the actors met during the phase of the mapping of the eco system, they voiced their consent to contribute in this regard and to undertake the necessary changes and alignments to their programs.
	Feasibility of the intervention	The following interventions were deemed to be feasible and suited to integrate in the value chain: • To support Smart Agriculture initiatives incorporating ICT technologies, equipment, and sensors used in agriculture production systems. Smart farming tools can help reduce these negative impacts, minimize environmental constraints and reduce production costs in farming activities. To support projects like smart facilities for storage and logistic regarding agricultural products. • To support processing industry moving toward a production of high added-value products, as well as healthy and organic food products and local food brands. • Support the implementation of the EU standards. • To support environmental initiatives such as compost production, compost spreaders, energy-efficient processing technologies, renewable energy projects etc.

[18] https://www.mchamber.mk/default.aspx?mid=1&lng=2

[19] https://chamber.mk/

[20] http://www.map.org.mk/index.php/en/

[21] http://www.sbch.org.mk/

[22] https://mazz.mk/en/homepage/