Prioritization of phytosanitary capacity-building options in Tajikistan using the P-IMA framework

Stage 1. Compilation of information dossier

Following the stages in the P-IMA framework, in the first stage of the analysis, an information dossier on the phytosanitary challenges facing agrifood exports from Tajikistan was compiled. This also included an investigation of the associated capacity-building needs that aim to inform the priority-setting process.

Stage 2. Identification the phytosanitary capacity-building options

The phytosanitary capacity-building options to be considered in the prioritization process were identified through a process of stakeholder consultation and workshop. One day workshop on 1st March 2018 was organized in Dushanbe by FAO TAJ, which combined the kick-off workshop and stakeholders' workshop. Thirty-six participants attended the workshop from public and private sectors, international organizations, and academia. The second part of the workshop was devoted to the identification of phytosanitary capacity-building needs on the basis of the views and experiences of workshop participants. The participants discussed issues regarding trade problems with other countries, analyzed the situation with different crops, considered what kind of specific activities should be done in order to overcome these market access problems. Considering diverse professional backgrounds of the workshop participants, the participants were bringing into attention rather generic phytosanitary issues and needs that are common for different plant products and markets.

Participants were requested to fill a questionnaire regarding phytosanitary problems (cards for eliciting phytosanitary capacity-building options). Majority of collected phytosanitary capacity-building needs were either generic, not phytosanitary issue or not related to market access. The deep analysis of the capacity-building needs sifted out all irrelevant needs and kept only eight eligible capacity-building investment options that are trade and phytosanitary-related.

***Table 1*. Phytosanitary capacity-building options**

#	Option	Brief description
1	Plant health controls for melon exports to Russia	Export of melons might face the problem caused by new pests becoming widely spread in Tajikistan. Melons should be free from certain pests to meet phytosanitary requirements for importing countries. This option would achieve compliance with these requirements.
2	Plant health controls for tomato exports to Russia	Export of tomatoes is increasingly facing requirements with respect of phytosanitary requirements, including demonstration of a place of origin. This option would achieve compliance with these requirements.

3	Plant health controls for onion exports to Russia	Export of onion in 2015 amounted 8.1 mln USD. However, in 2017 the amount of export value decreased to 2.4 mln USD as well as production amount. Partly decrease of production related with noncompliance notification regarding phytosanitary requirements of importing country. This option would achieve compliance with these requirements.
4	Plant health controls for cherry exports to China	Export of Prunus spp fruits might face the problem caused by new pests becoming widely spread in Tajikistan. Fruits should be free from certain pests to meet phytosanitary requirements for importing countries. There is a need for systems-based controls to be out in a place in order to address this problem. This option would achieve compliance with these requirements.
5	Plant health controls for apricot exports to Russia	Export of Prunus spp fruits might face the problem caused by new pests becoming widely spread in Tajikistan. Fruits should be free from certain pests to meet phytosanitary requirements for importing countries. There is a need for systems-based controls to be out in a place in order to address this problem. This option would achieve compliance with these requirements.
6	Treatment facilities for dried apricot exports to Russia	Pests often infest dried fruits and it is the main reason to receive noncompliance notifications from importing countries. Currently, treatment is not performed in the way to have sufficient results. This option would achieve compliance with these requirements.
7	Treatment facilities for walnut exports to China	Pests often infest nuts and it is the main reason to receive noncompliance notifications from importing countries. Currently, treatment is not performed in the way to have sufficient results. This option would achieve compliance with these requirements.
8	Plant health controls for lemon exports to Kazakhstan and Russia	Export of lemons might face the problem caused by pests spread in Tajikistan. Lemons should be free from certain pests to meet phytosanitary requirements for importing countries. This option would achieve compliance with these requirements.

Stage 3. Definition of the decision criteria and weights

During the inception workshop of the project, the stakeholders were presented by several examples of decision criteria to be considered in the multi-criteria decision analysis (the analysis is shortly described

in Stage 6) and asked to define an appropriate set of criteria with respective weights to drive the priority-setting process. The workshop participants had a choice to agree on some of the already presented exemplary criteria and propose any additional criterion that should be considered in the list. The participants were then asked to assign weights to these criteria through distribution of 100 points amongst the overall listed criteria in a scorecard. If a criterion is important then it received a positive value, if not then zero.

The scores for decision criteria were collated and an average weighting per criterion calculated. The list of criteria and average weightings are listed in Table 2. A criterion with average weighing less than 5 points fail to be considered in the analysis. As it is shown in Table 2, the criterion for impact on vulnerable groups has a mean value of 2.9, therefore it was not considered in the analysis.

Table 2. **Decision criteria and weights for prioritization of phytosanitary capacity-building options**

Decision Criteria	Min	Mean	Max
Costs			
Up-front Investment	0	20.3	60
On-going Costs	0	5.3	20
Trade impact			
Absolute change in value of exports	0	13.9	50
Trade diversification by products	0	9.7	30
Trade diversification by destination	0	8.5	25
Domestic spillovers			
Impact on agricultural productivity	5	21.1	52
Impact on domestic public health	0	5.9	20
Impact on local environmental protection	0	6.0	15
Social impacts			
Impact on poverty	0	6.4	20
Impact on vulnerable groups	0	2.9	15

Stage 4. Compilation of information cards for the phytosanitary capacity-building options

After identifying the list of the phytosanitary capacity-building investment options and the decision criteria and weights to be considered in the multi-criteria decision analysis, an information card for each phytosanitary capacity-building investment option was prepared with respect to the identified decision criteria. These cards are to ensure consistency in the measurement of each decision criterion across the capacity-building options and to make the priority-setting exercise more transparent and open to scrutiny.

Due to the limited data availability and its quality to measure the impact under each criterion and considering the different plausible ways of representing the criteria, the metrics for criteria were defined. The defined metrics are represented in Table 3. It was defined that up-front investments, on-going costs and absolute change in value of exports will be measured in absolute values, and due to limited data availability, the rest of the criteria will be measured using an ordinal scaling to show how the phytosanitary capacity-building options are ordered relative to one another and not how large the differences between

them. In case of better data availability and of a higher quality the choice of the metrics can be altered that would better describe the impact of certain criteria.

***Table 3*. Decision criteria measurement**

Decision Criteria	Measurement
Costs	
Up-front Investment	Absolute value (USD)
On-going Costs	Absolute value (USD)
Trade impact	
Absolute change in value of exports	Absolute value (USD)
Trade diversification by products	Large negative (-2) Negative (-1) No impact (0) Positive (+1) Large positive (+2)
Trade diversification by destination	
Domestic spillovers	
Impact on agricultural productivity	Large negative (-2) Negative (-1) No impact (0) Positive (+1) Large positive (+2)
Impact on domestic public health	
Impact on local environmental protection	
Social impacts	
Impact on poverty	Large negative (-2) Negative (-1) No impact (0) Positive (+1) Large positive (+2)

With the help of defined metrics for criteria the information cards for each of the eight phytosanitary capacity options were compiled. Each card includes data for ten decision criteria that were measured based on scales provided in Table 3. The information cards also include indicators of the level of confidence of measures calculated for each of the decision criteria. This indicator helps us to assess the quality of each measure based on the used data and derivation method. For example, the measure receives an indicator as '*low'* or '*medium'* if the underlying data is of dubious quality. Ideally, the measures that indicated as '*low'* or '*medium'* should be revised on an on-going basis and updated unless the level of confidence reaches '*high'* in order to improve the quality of the prioritization analysis.

Stage 5. Comparison of the options according to each of the decision criteria

After the compilation of the information cards, it is followed by representing the collected information from the information cards in a way that would be easy to compare eight capacity-building options by each criterion. Hence, the spider diagrams were prepared that plotted the eight phytosanitary capacity-building options against each of the ten decision criteria. These diagrams help to analysis which of the phytosanitary option perform relatively better or worse against each of the decision criteria in comparison to other phytosanitary options.

Stage 6. Calculation of the priorities using MCDA and diagnostics of the results

For the prioritization of the phytosanitary capacity-building options, the priorities are calculated using multi-criteria decision analysis (MCDA) based on all the defined decision criteria simultaneously. To perform this MCDA a software package named D-Sight was used. The up-front investment, on-going costs and trade impact criteria were measured continuously and modelled using linear functions, and other decision criteria were modelled as using level functions since these were measured using ordinal scales. Another important parameter was set for the criteria, which defines whether the objective is to minimize or maximize the value of the decision criteria. In this analysis, the objective is to minimize the up-front investment and on-going costs, and values of all other decision criteria are desirable to maximize.

The following models were estimated using the D-Sight software package:

- *Baseline model* using decision weights derived in Stage 3.
- *Equal weights model* in which all of the decision criteria are weighted equally.
- *Costs and trade impact model* which only the cost and trade impact decision criteria are included in the analysis with the respective weights form the baseline model applied.

The baseline model uses the full set information derived so far and takes into account all the preferences of the stakeholders. After getting the results of the baseline model, it is important to perform the robustness check of these results. For that purpose, the sensitivities of the results to changes in the decision weights were checked. If the results of the tree models remain broadly the same, then it can be concluded that the prioritization rankings are robust.

Stage 7. Validation

At the final stage of the prioritization analysis, it is important to validate the findings of the analysis in several steps. This should involve discussion, reviewing and validating the priorities with stakeholders. During the stakeholder workshop that was held in Dushanbe on 2nd of August, 2018, in which 32 participants attended from public and private sectors, donors, academia and international organizations. The draft analysis was presented to the participants in order to ensure that all stakeholders understand the prioritization and how the measures for the analysis have been derived. During the workshop, some measures were questioned by the participants. Views and comments received to take into consideration to refine the analysis. The next step includes circulation of the results amongst stakeholder to receive further comments on updated results. Stakeholders that can provide better quality measures for decision criteria to be taken into account in the analysis are welcome to contribute to refining the results. It is important to note that the prioritization and the report should be seen as a “living document”, which will be revised as soon as new or better quality information becomes available, new phytosanitary capacity-building option arises, etc.

Results

The results of the stakeholder workshop suggested that all eight options provided in Table 1 are credible investment options for phytosanitary capacity-building. However, before undertaking MCDA to prioritize the capacity-building options, considering that associated costs and resulting benefits differ substantially, the options were sequentially compared on the basis of each decision criterion. For this reason, a series of spider diagrams were plotted to present relative strengths and weaknesses of the eight capacity building options.

Figures 1 and 2 present the up-front investment and on-going costs profiles of the eight capacity-building options. Plant health controls for cherries (option 4) and apricots (option 5) stand out as requiring the largest up-front investments by far, at USD 5.4 million and USD 4.9 million, respectively. Plant health controls for lemons (option 8) and treatment facilities for dried apricots (option 6) and walnuts (option 7) require the lowest up-front investments at USD 0.77 million, USD 0.87 million and USD 0.97 million, respectively. On-going costs are also the highest for plant health controls for apricots (option 5) and cherries (option 4) that require USD 4.7 million per annum and USD 2.5 million per annum, respectively. From these two diagrams, it can be concluded that costs of plant health controls for apricots (option 5) are very high and require almost the same amount of up-front investment and on-going costs per annum. On-going costs for plant health controls for onions (option 3; USD 21 thousand) and lemons (option 8; USD 30 thousand) and treatment facility for walnuts (option 7; USD 55 thousand) and dried apricots (option 6; USD 98 thousand) are at the low levels.

Figure 1. Decision criteria measures scores for phytosanitary-building options – up-front investment (USD)

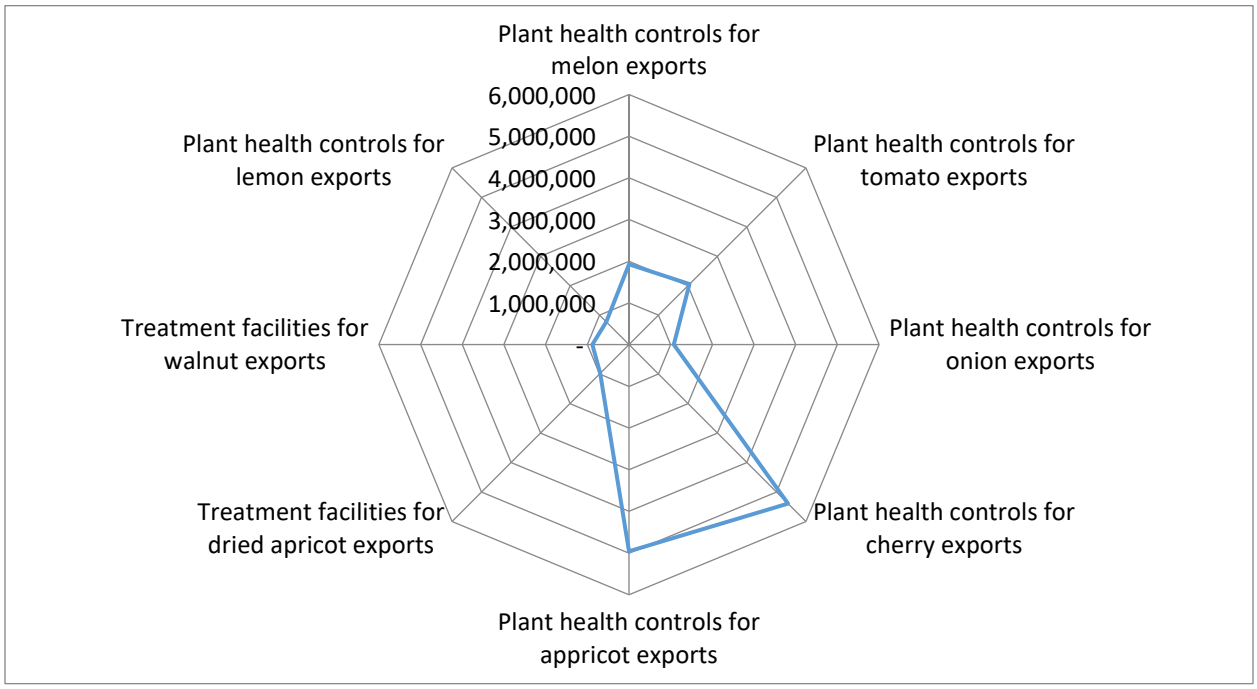


Figure 2. Decision criteria measures scores for phytosanitary-building options – on-going costs (USD)

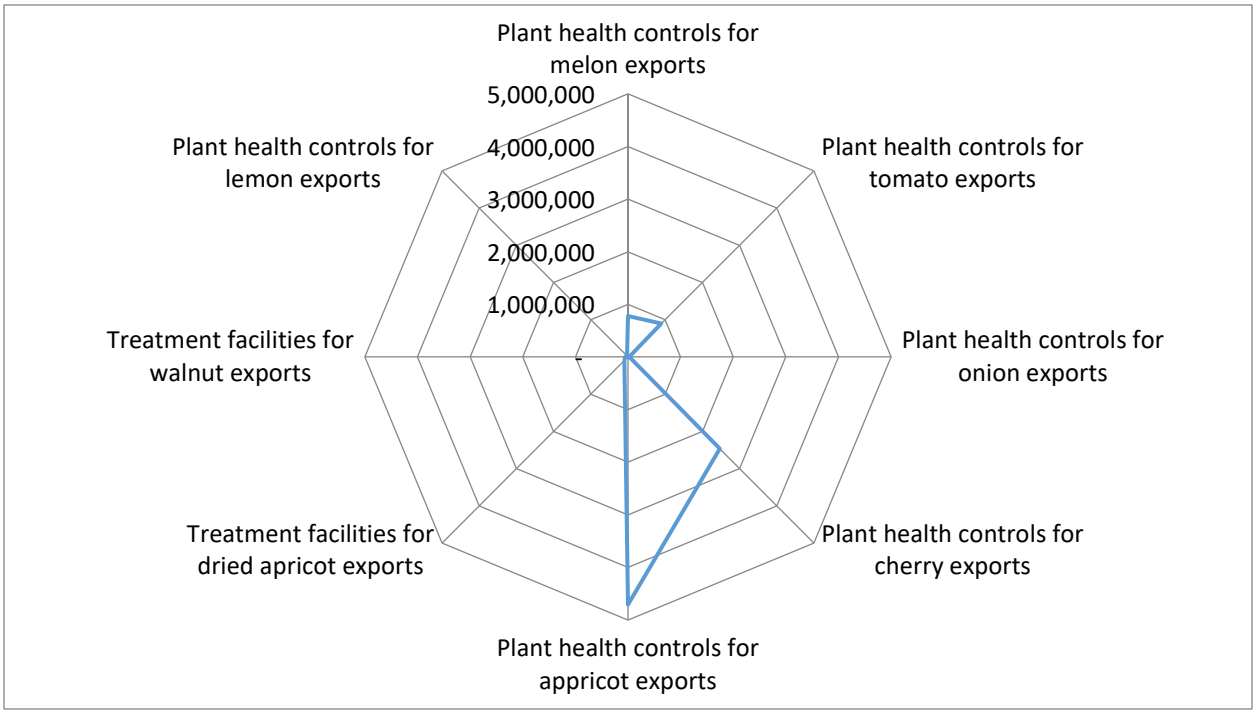


Figure 3 presents the estimated impact of each of the eight capacity-building options on the absolute change in exports value. Plant health controls for onions (option 3) is estimated to have the largest impact on the aggregate value of exports by far, preventing export losses of USD 15 million. This option is followed by plant health controls for cherries (option 4) that also has a very high impact on the aggregate value of exports that is estimated at USD 8 million. Plant health controls for melons (option 1), lemons (option 8) and tomatoes (option 2) are expected to have minimal impact on the value of exports at USD 1,25 million, USD 1,3 million and USD 1,5 million, respectively. It is interesting to note that the option 5 (plant health controls for apricots) with the highest costs is not estimated to have the highest impact on the aggregate value of exports. However, the option 4 (plant health controls for cherries) which also requires high costs is expected to have a high impact on the increase of the exports.

Figure 3. Decision criteria measures scores for phytosanitary-building options – absolute change in trade value (USD)

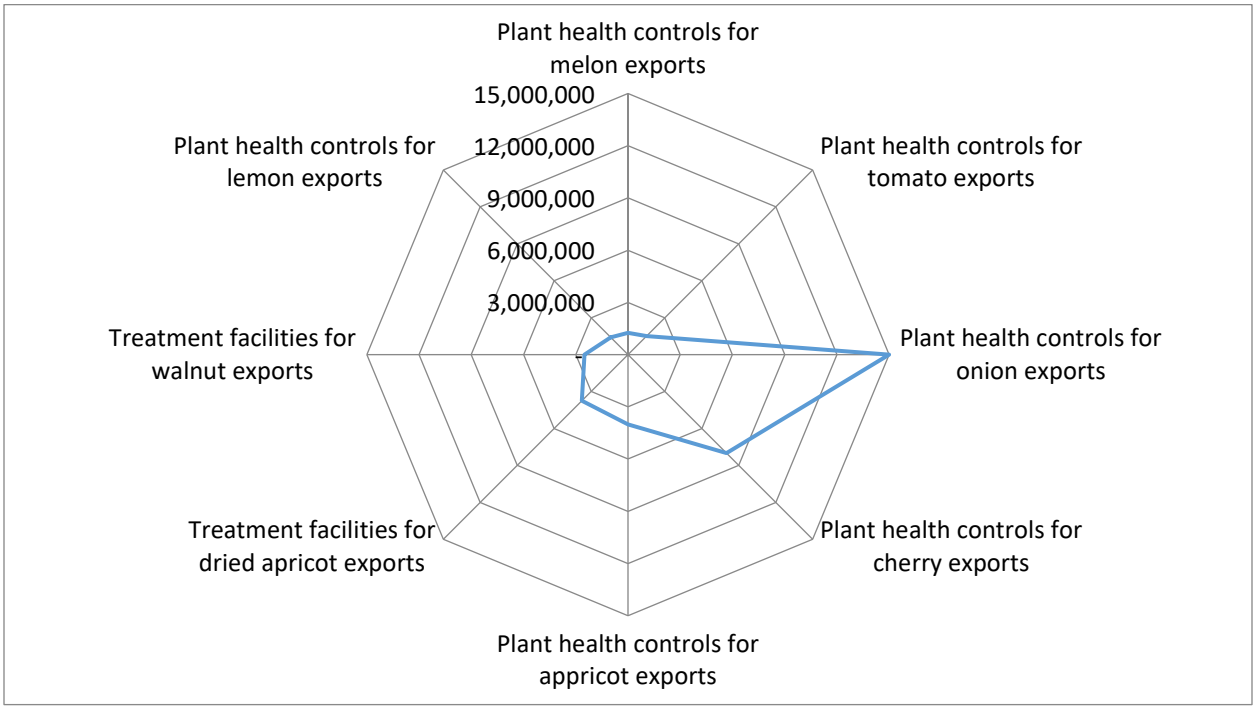


Figure 4 depicts the measured impact in terms of trade diversification by products (blue line) and by markets (orange line). Plant health controls for lemons (option 8) is expected to have the highest positive impact on the diversification by products, and plant health controls for melons (option 1) and cherries (option 4) are expected to have a positive impact on the diversification by products. All other options have no impact on the diversification by products. Plant health controls for melons (option 1), cherries (option 4) and lemons (option 8) are estimated to have a large positive impact in terms of trade diversification by destination. The treatment facility for walnuts (option 7) has a positive impact, and all the other options have no any impact.

Figure 4. Decision criteria measures scores for phytosanitary-building options – trade diversification by product and by destination

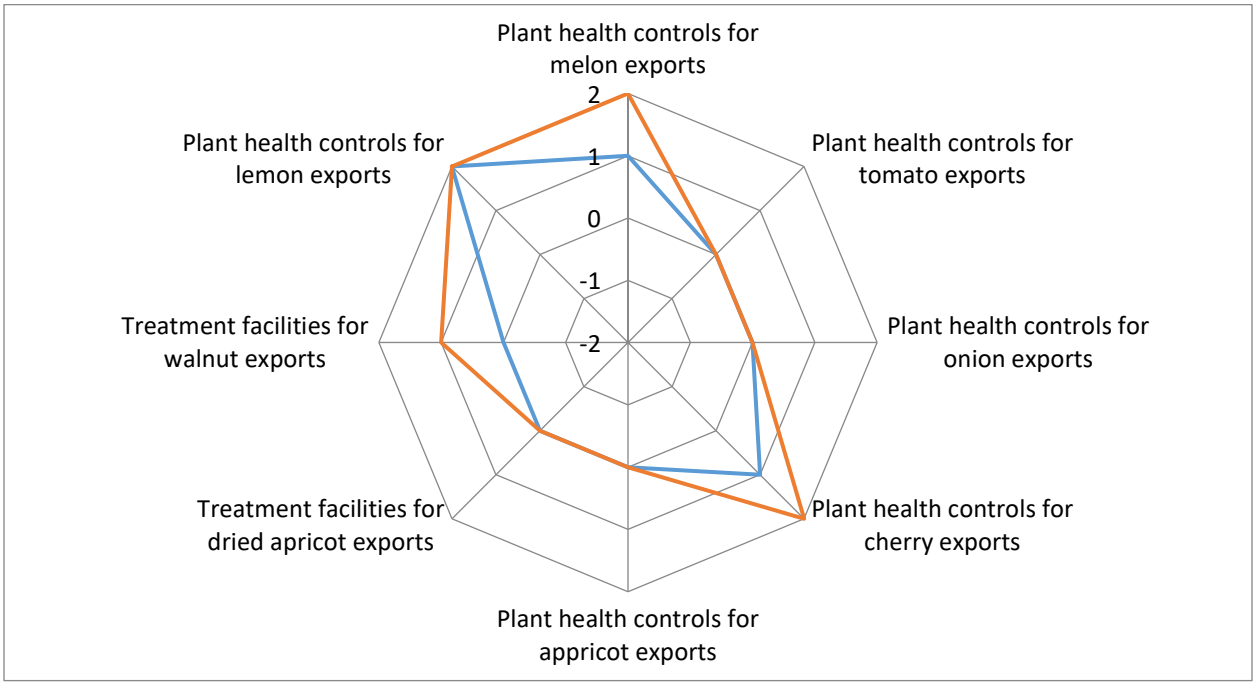


Figure 5. Decision criteria measures scores for phytosanitary-building options – domestic spillovers (impact on agricultural productivity, domestic public health and local environmental protection)

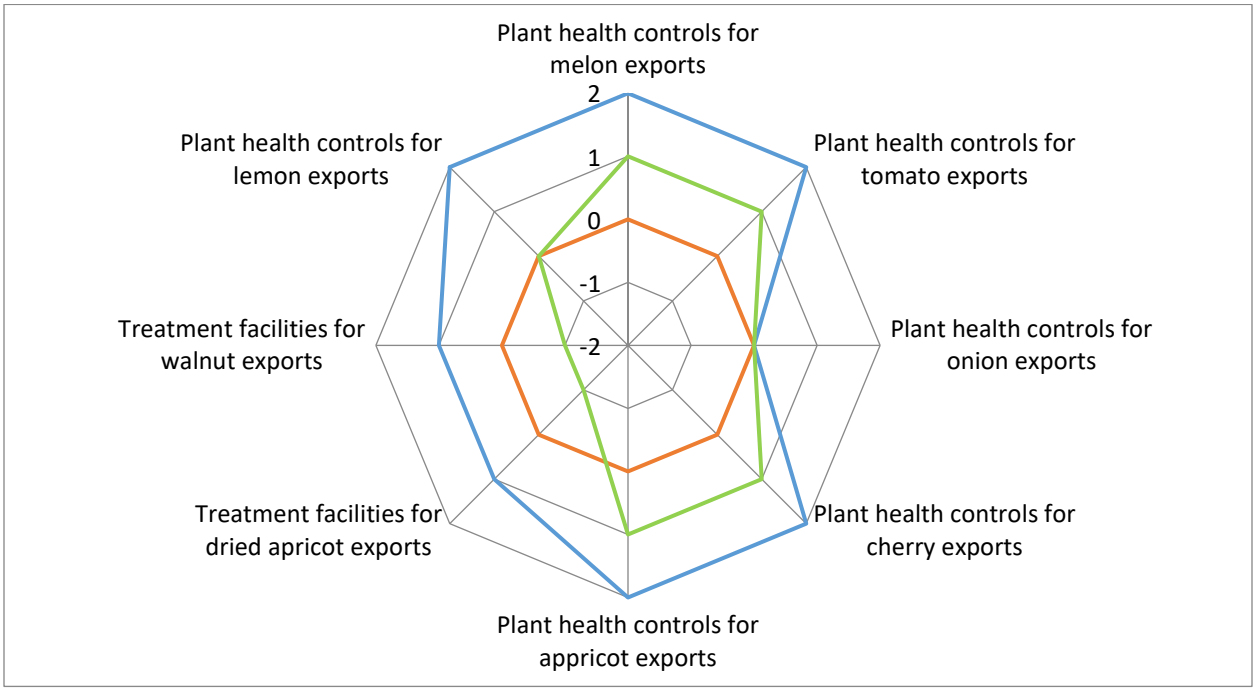
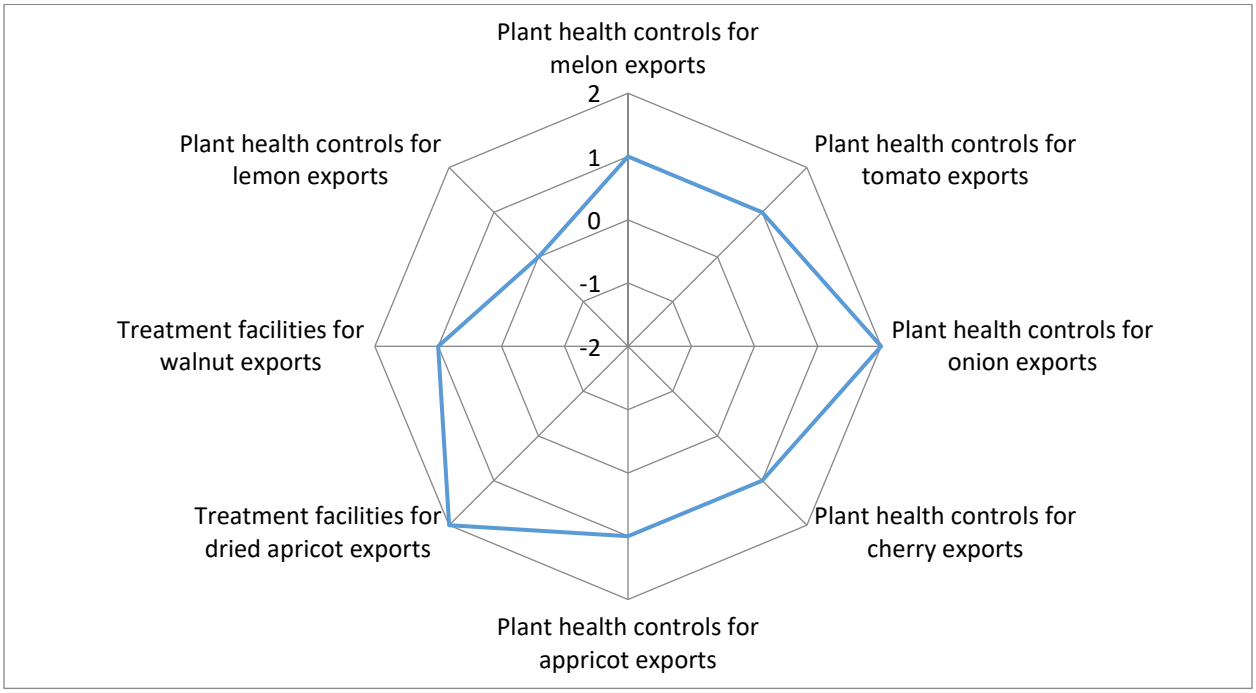


Figure 6 combines and presents the domestic impacts such as an impact on agricultural productivity (blue line), domestic public health (orange line) and local environmental protection (green line). Plant health controls for melons (option 1), tomatoes (option 2), cherries (option 4), apricots (option 5) and lemons

(option 8) are judged to have highly positive impact on agricultural productivity, while treatment facilities for dried apricots (option 6) and walnuts (option 7) are judged to have "moderate" positive impact. Only plant health controls for onions (option 3) does not have any impact on agricultural productivity. All of the eight capacity-building options are foreseen to have neither positive nor negative impact on domestic public health. Therefore, this decision criterion has no influence on ranking results in the current state of the analysis. However, this decision criterion should be preserved in MCDA due to possible changes in estimates for the criterion in the future. Plant health controls for melons (option 1), tomatoes (option 2), cherries (option 3) and apricots (option 5) are judged to have a positive impact on local environmental protection, while treatment facilities for dried apricots (option 6) and walnuts (option 7) are judged to have a negative impact. Plant health controls for onions (option 3) and lemons (option 8) are expected to have no any impact.

Figure 6. Decision criteria measures scores for phytosanitary-building options – impact on poverty



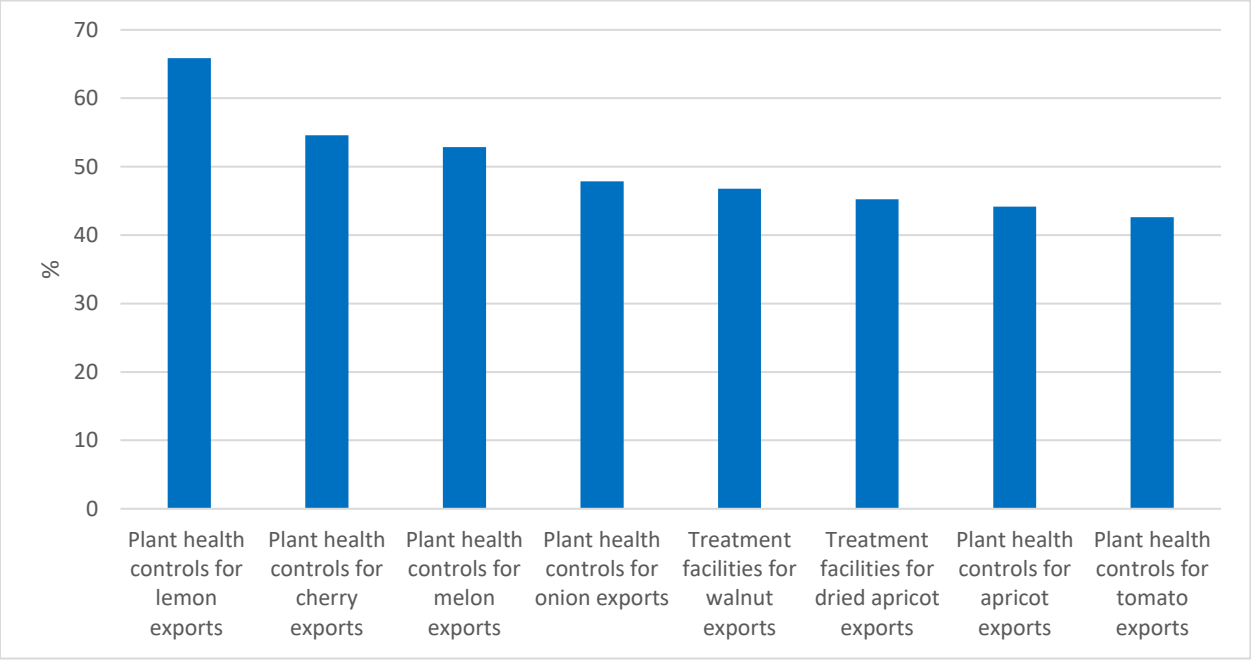
The largest positive impacts on poverty are judged to have option 3 (plant health controls for onions) and option 6 (treatment facilities for dried apricots). All other options have a "moderate" positive impact on poverty, except for option 8 (plant health controls for lemons) that has no any impact.

Figure 7 reports the net flows for the eight phytosanitary capacity-building options for the baseline prioritization model, which uses the decision weights defined in the stakeholders' workshop. The options are ordered according to decreasing score to present the ranking order. The scores are calculated based on the current choice set (the eight options) and indicate only relative priority. It is important to note that low scores do not suggest that a particular capacity-building option is not worth investing in; all of the options bring about benefits of one kind or another. Rather, a high/low ranking only suggests that a particular option should be invested in before/after other options that are ranked lower/higher.

The top priority phytosanitary capacity-building option on the basis of the ten decision criteria is judged to be is plant health controls for lemon exports (option 8). Other highly-ranked options are plant health

controls for cherry exports (option 4) and plant health controls for melon exports (option 1). Plant health controls for onion exports (option 3) and treatment facilities for walnut exports (option 6) are also ranked in the top five. Treatment facilities for dried apricot exports (option 6), plant health controls for apricot exports (option 5) and plant health controls for tomato exports (option 2) scored less than other options and ranked bottom of the eight capacity-building options covered by the analysis.

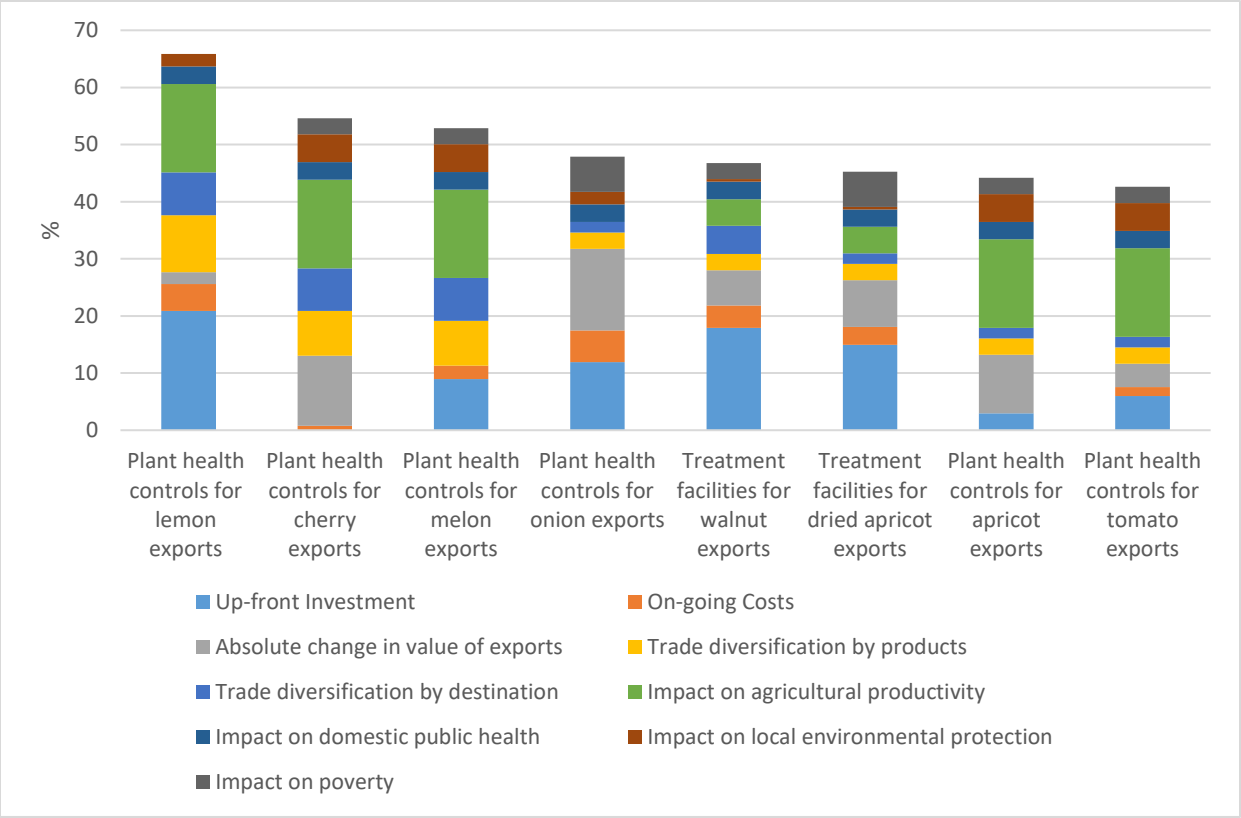
Figure 7. Baseline prioritization model



The ranking of each of the capacity-building options reflects the scores it achieves for each of the ten decision criteria – how well it performs relative to each of the other options in the analysis – weighted according to the decision weights.

Figure 8 presents the contribution that each of the ten decision criteria makes to the overall score achieved by the eight options. For example, the up-front investments and impact on agricultural productivity criteria alone account for slightly more than half (55 percent) of the overall score achieved by plant health controls for lemons exports (option 9). The decision criterion of impact on agricultural productivity contributed to the highest share of overall scores achieved by other two capacity-building options in the top three: plant health controls for cherry exports (option 2) which is ranked as second, and plant health controls for melon exports (option 1) which is ranked as third. The top three options also scored better with respect to the decision criteria of trade diversification by product and trade diversification by destination. Overall, as it can be seen from Figure 8 the decision criteria such as up-front investment, absolute change in value of exports and impact on agricultural productivity are the main influencing decision criteria in the analysis.

Figure 8. Baseline prioritization model – criteria contribution to option scores



The foregoing results are considered to be the most valid prioritization that were obtained using all the decision criteria and weights determined during the stakeholder workshop. However, it is also important to consider that the preference of the decision criteria and their weights to consider in the analysis to drive the prioritization of the phytosanitary capacity-building options most likely significantly different amongst stakeholder groups. The differences in preferences of the stakeholder groups can lead to disagreements in decision-making processes. Therefore, it is important to check the sensitivity of the results to changes in the key elements of the analysis. In cases where the prioritization is insensitive to changes in the key elements, it is expected to be relatively easy to reach the agreement amongst stakeholder groups in regard options to be prioritized. Potential different preferences between the stakeholder groups might be in the weights assigned to each of the decision criterion. For example, representatives of the Ministry of Economic Development and Trade might allocate significantly more weights to the decision criteria of up the-front investment, on-going costs and absolute change in value of exports. For this reason, two more models were run: equal weights prioritization model; and cost and trade impact prioritization model.

Figures 9 and 10 present the results for equal weights model and cost and trade impact model, respectively. In the first of these models, the ten decision criteria are set equally. As in the baseline model, plant health controls for lemons exports (option 8) is ranked first, and plant health controls for cherry exports (option 4), plant health controls for melon exports (option 1) and plant health controls for onion exports (option 3) are ranked second, third and fourth, respectively. However, in the equal weights model treatment facilities for walnut exports (option 7) and treatment facilities for dried apricots (option 6)

swapped in their rankings compared to the baseline model, thus being ranked fifth and sixth, respectively. The bottom two options (options 5 and 2) remained in the same ranking as in the baseline model. Overall, the rankings remained the same for almost all the options.

The results for the cost and trade impact model presented in Figure 10 are based on only tree decision criteria such as the up-front investment, on-going costs and absolute change in export value. Their respective weights from the baseline model are retained. In this model, the prioritization results for the eight phytosanitary capacity-building options change significantly compared to the baseline model. Only plant health controls for lemon exports (option 8) remained in the top three but shifted from the first to the third in the ranking compared to the baseline and the equal weights models. Other two options (options 4 and 1), that were in the top three in the baseline and equal weights models, shifted to the bottom. In this model, the plant health controls for onions (option 3) and treatment facilities for walnut exports (option 7) ranked as first and second, respectively, which were ranked in the middle position in the previous two models. As in the baseline and the equal weights models, the option 2 (plant health controls for tomato exports) remained in the bottom and the option 6 (plant health controls for apricot exports) remained in the middle position.

Figure 9. Equal weights prioritization model

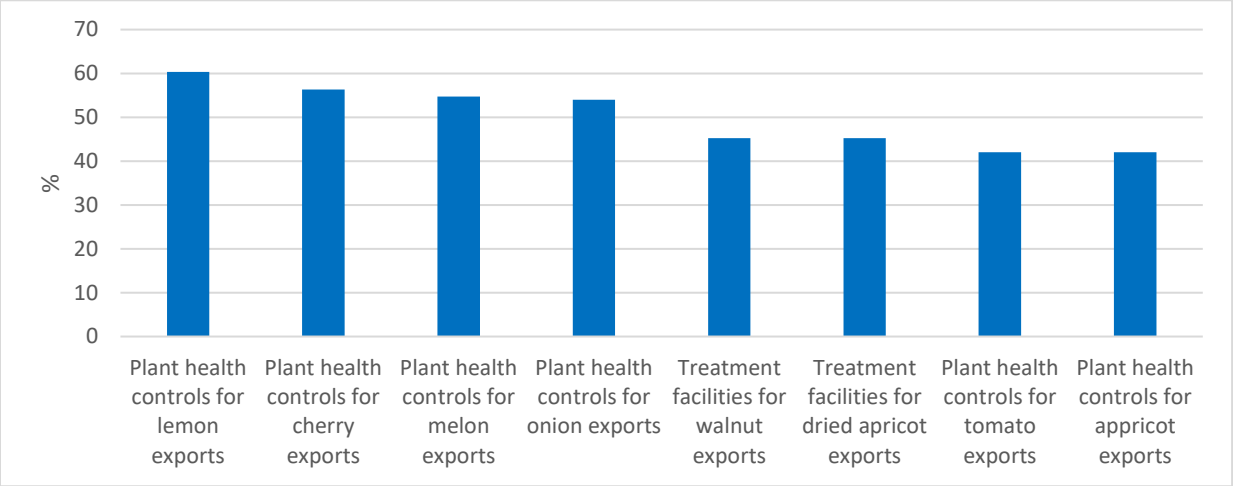
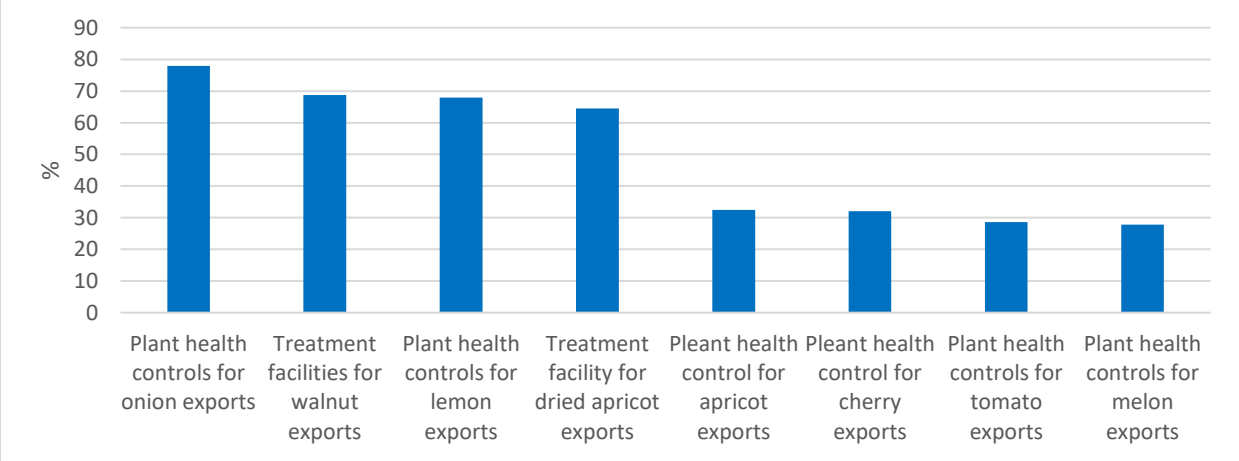


Figure 10. Cost and trade impact prioritization model



Conclusion

This report presents the initial results of a priority-setting exercise for phytosanitary capacity-building in Tajikistan. The priority-setting exercise was carried out using the prioritization framework P-IMA, which prioritizes the investment options based on an approach of multi-criteria decision analysis (MCDA). With this approach, the phytosanitary capacity-building options were ranked considering the stakeholders' preferred decision criteria. The phytosanitary capacity-building options to be considered in the prioritization process were identified through a process of stakeholder consultation. Majority of collected phytosanitary capacity-building needs were either generic, not phytosanitary issue or not related to market access. The deep analysis of the capacity-building needs sifted out all irrelevant needs and kept only eight eligible capacity-building investment options that are trade and phytosanitary-related. Identified phytosanitary capacity-building options were then prioritized on the basis of defied ten decision criteria with their weights during the stakeholders' workshop. These decision criteria consider up-front investment and on-going costs that require each of the options, the payoff from these investment options in terms of trade impact (including change in value of exports, trade diversity by product and destination), domestic spillovers on agricultural productivity, public health and the local environment, and impact on poverty.

The application of the P-IMA framework provides a coherent ranking of the eight phytosanitary capacity-building options. The baseline prioritization model results are as follows:

1. Plant health controls for lemon exports (option 8)
2. Plant health controls for cherry exports (option 4)
3. Plant health controls for melon exports (option 1)
4. Plant health controls for onion exports (option 3)
5. Treatment facilities for walnut exports (option 7)
6. Treatment facilities for dried apricot exports (option 6)
7. Plant health controls for apricot exports (option 5)
8. Plant health controls for tomato exports (option 2)

The results of the baseline model are estimated to be the most valid since it takes into account all the preferences of the stakeholders. However, it is important to recognize that only one of these options remained in the top three priorities across the three models that aim to check the sensitivity of the results to changes in the key elements of the analysis (decision criteria and/or their weights). This option is:

- Plant health controls for lemon exports (option 8)

Moreover, plant health controls for tomato exports (option 2) remain ranked very low in all three scenarios. It is important to highlight that the majority of the capacity-building options show their sensitivities only in the cost and trade impact model that prioritizes the options based only on the three decision criteria. However, the results of the baseline model are not sensitive to the equal weights model that assigns weights equally amongst the full set of decision criteria. Hence, this implies that the type of criteria included in the decision making analysis has a significant impact on defining the priorities.

The third model's results showing high sensitivity beyond the ranking plant health controls for lemon exports (option 8) suggest the need for on-going dialogue and reflection amongst stakeholders across and within the public and private sectors. Whilst the stakeholders have not yet provided their feedback on the

results presented above, some stakeholders might feel that a particular option was treated inadequately, or that pertinent set of decision criteria are not considered. It is more likely that some of the stakeholders might show their disagreement with estimates in the information sheets. In this case, stakeholders they are welcome to provide new data that can be used to reconsider estimates in the information sheets, so the model can be re-run using the updates and get new results. The ranking process of the capacity-building options can be improved also by covering the perspectives of a larger number and wider range of stakeholders. It is also important to recognize that a key function of the P-IMA framework is to facilitate debate over the prioritization of the capacity-building options. The results of the prioritization should not be accepted the as “final”, but rather should be seen only as the starting point for the use of the P-IMA framework to prioritize phytosanitary capacity-building options in Tajikistan. Therefore, the initial prioritization should be revisited and revised on an on-going basis and updated with new and/or higher quality data.

Annex. Information cards

Option 1. Plant health controls for melon exports to Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	1 927 550	Pest surveillance program, diagnostic capability and eradication measures are estimated at approximately at 1.9 mln USD.	Medium
On-going cost	778 310	Annual on-going costs for the abovementioned activities are calculated based on production area for melons.	Medium
Trade impacts			
Change in absolute value of exports	1 250 000	In 2017, exports volume reached 273 tons. In the last decade the exports of melons has significantly declined (1600 tons in 2009), also exports to Russia. In 2017, Russia imported around 23 thousand tons of melons from around the world, most of which came from Uzbekistan and Kazakhstan. Tajikistan has a high potential in Russian market and could increase its exports in the short-term minimum by 500 tons, which would increment exports value by 1.25 million USD over 5 years. This approximation also considers the increasing trend in production and productivity per hectare.	Medium
Trade diversification by products	1	The exports of melons are at very low levels and its share in total exports is negligible. Boost in exports volume would diversify the list of mainly exported products.	High
Trade diversification by markets	2	Current exports to Russian market is negligible. Increasing exports to the market would expand the list of markets for melons, with high potential in gaining access to new markets with similar phytosanitary requirements.	High
Domestic Spillovers			
Impact on domestic agricultural productivity	2	Expected to have high positive impact on the productivity.	Low
Impact on domestic public health	0	None	High
Impact on local environmental protection	1	Expected to have a positive impact	High
Social impacts			
Impact on poverty	1	78 percent of melons come from dehkan farms and 22 percent from households.	Low

Option 2. Plant health controls for tomato exports to Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	2 054 271	Pest surveillance program, diagnostic capability and eradication are estimated at approximately at 2.05 mln USD.	Medium
On-going cost	894 647	Annual on-going costs for the abovementioned activities are calculated based on production area for tomatoes	Medium
Trade impacts			
Change in absolute value of exports	1 500 000	Current levels of tomato exports are very low, 268 tons in 2017. The exports have declined significantly since 2007, when exports were 1308 tons (main destination was Russia). Russia has stopped importing tomatoes from Tajikistan, which is one of the largest importers of tomatoes in the world (0.5 mln tons in 2017). In 2017 Tajikistan produced 409400 tons of tomatoes. Tajikistan could increase in the short-term its exports to Russia minimum by 500 tons, thus increasing the exports value by 1500000 USD over 5 years.	Medium
Trade diversification by products	0	None	High
Trade diversification by markets	0	None	High
Domestic Spillovers			
Impact on domestic agricultural productivity	2	Expected to have a high positive impact	Medium
Impact on domestic public health	0	None	High
Impact on local environmental protection	1	Expected to have a positive impact	High
Social impacts			
Impact on poverty	1	Expected to have a positive impact	Low

Option 3. Plant health controls for onion exports to Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	1 075 000	Pest surveillance program and diagnostic capability are estimated at approximately at 1.07 mln USD.	Medium
On-going cost	21 400	Annual on-going costs for the abovementioned activities are calculated based on production area for onions.	Medium
Trade impacts			
Change in absolute value of exports	26 000 000	The export amount onions has significantly shortened since 2015, when Tajikistan exported 114 600 tons of onions. The export amount to Russian has also declined significantly and Russia did not import onions from Tajikistan in 2017. Tajikistan produces around 550000 tons of onions annually and forecasts increase in production. Currently main importer of Tajik onions is Kazakhstan. Tajikistan could start exporting onions to Russia (20 000 tons per annum), thus increasing its exports value by 15 000 000 USD over 5 years.	Medium
Trade diversification by products	0	None	High
Trade diversification by markets	0	None	High
Domestic Spillovers			
Impact on domestic agricultural productivity	0	None	High
Impact on domestic public health	0	None	High
Impact on local environmental protection	0	None	High
Social impacts			
Impact on poverty	2	Expected to have high positive impact	Medium

Option 4. Plant health control for cherry exports to China

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	5 395 102	Pest surveillance program, treatment facility, diagnostic capability, export certification system and eradication measures are estimated at approximately at 5.4 mln USD	Medium
On-going cost	2 467 802	Annual on-going costs for the abovementioned activities are calculated based on production area and potential exports volume for cherries	Medium
Trade impacts			
Change in absolute value of exports	8 000 000	Exports of cherries have significantly declined since 2013, when it reached 414 tons. Current exports are very small. China has been increasing its imports of cherries in the last years and has expressed its interest in Tajik cherries too. Tajikistan could start exporting 400 tons per annum in the short-term, thus increasing its export by 8 mln USD over 5 years. The production of cherries in Tajikistan has been increasing.	Medium
Trade diversification by products	1	Current exports volume is low and its share in total exports is small. The boost in exports volume of this product would have a positive impact on trade diversification by products.	High
Trade diversification by markets	2	Current exports are destined to few countries. Investing into respective capacity-building would increase its exports to new markets.	High
Domestic Spillovers			
Impact on domestic agricultural productivity	2	Expected to have a high positive impact	High
Impact on domestic public health	0	None	High
Impact on local environmental protection	1	Expected to have a positive impact	High
Social impacts			
Impact on poverty	1	Expected to have a positive impact	Low

Option 5. Plant health control for apricot exports to Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	4 957 525	Pest surveillance program, treatment facility, diagnostic capability, export certification system and eradication measures are estimated at approximately at 4.9 mln USD.	Medium
On-going cost	4 706 279	Annual on-going costs for the abovementioned activities are calculated based on production area and potential exports volume for apricots.	Medium
Trade impacts			
Change in absolute value of exports	4 000 000	Exports of apricots in 2016 amounted almost 3 000 tons. Exports mainly destined to Kyrgyzstan and Kazakhstan. Exports to Russia are negligible. Tajikistan could increase its exports of apricots to Russia by 1000 tons, thus increasing exports value by 4 mln USD over 5 years. The production of apricots has been increasing too.	Medium
Trade diversification by products	0	None	High
Trade diversification by markets	0	None	High
Domestic Spillovers			
Impact on domestic agricultural productivity	2	Expected to have a high positive impact	High
Impact on domestic public health	0	None	High
Impact on local environmental protection	1	Expected to have a positive impact	High
Social impacts			
Impact on poverty	1	Expected to have a positive impact	Low

Option 6. Treatment facility for dried apricot exports to Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	977 000	Export certification system and treatment facility are estimated approximately at 0.98 mln USD.	Medium
On-going cost	97 750	Annual on-going costs for the abovementioned activities are calculated based on production and potential exports volume of dried apricots.	Medium
Trade impacts			
Change in absolute value of exports	3 750 000	The exports of dried apricots has declined for the last years. Top destination for dried apricots is Kazakhstan followed by Russia but with small amount. Exports to Russia could be increased by 1500 tons in the short-term, thus increasing exports value by 3,75 mln over 5 years.	Medium
Trade diversification by products	0	None	High
Trade diversification by markets	0	None	High
Domestic Spillovers			
Impact on domestic agricultural productivity	1	Expected to have a positive impact	Low
Impact on domestic public health	0	None	High
Impact on local environmental protection	-1	A negative impact caused by treatment facility	Medium
Social impacts			
Impact on poverty	2	Expected to have a high positive impact	Low

Option 7. Treatment facilities for walnut exports to China

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	878 800	Export certification system and treatment facility are estimated approximately at 0.88 mln USD	Medium
On-going cost	55 200	Annual on-going costs for the abovementioned activities are calculated based on production and potential exports volume of walnuts	Medium
Trade impacts			
Change in absolute value of exports	2 500 000	Exports of walnuts have decreased since 2014. The main export destination for walnuts is Kazakhstan. In some years. China imported small amount of walnuts from Tajikistan. Tajikistan could start exporting walnuts to China, around 500 tons per year in the short-term, thus increasing exports value by 2,5 mln USD over 5 years.	Medium
Trade diversification by products	0	None	High
Trade diversification by markets	1	Expected to have a positive impact	High
Domestic Spillovers			
Impact on domestic agricultural productivity	1	Expected to have a positive impact	Low
Impact on domestic public health	0	None	High
Impact on local environmental protection	-1	A negative impact caused by treatment facility	Medium
Social impacts			
Impact on poverty	1	Expected to have a positive impact	Low

Option 8. Plant health control for lemon exports to Kazakhstan and Russia

Decision criteria	Estimated value	Source of data and method of estimation	Level of confidence
Cost			
Up-front investment	773 200	Pest surveillance program, eradication measures, diagnostic capability and treatment facility are estimated at approximately at 0.77 mln USD.	Medium
On-going cost	30 080	Annual on-going costs for the abovementioned activities are calculated based on production area and potential exports volume of lemons.	Medium
Trade impacts			
Change in absolute value of exports	1 400 000	Lemons are mainly exported to Kyrgyzstan. Also exports significantly decreased to Kazakhstan and Russia. Overall exports have declined too since 2016, when it was 361 tons. Tajikistan could expand its exports to Kazakhstan and Russia by 200 in the short-term, respectively, thus increasing exports value by 1,4 mln USD over 5 years.	Medium
Trade diversification by products	2	Current exports volume is very low and its share in total exports is negligible. The boost in exports volume of this product would have a high positive impact on trade diversification by products.	High
Trade diversification by markets	2	Current exports are destined to few countries. Investing into respective capacity-building would increase its exports to new and lost markets.	High
Domestic Spillovers			
Impact on domestic agricultural productivity	2	Expected to have high positive impact	Medium
Impact on domestic public health	0	None	High
Impact on local environmental protection	0	None	High
Social impacts			
Impact on poverty	0	None	Medium