reWINE

Reutilització d'ampolles de vidre al sector vitivinícola del sud d'Europa

METHODOLOGICAL GUIDE TO IMPLEMENT THE PROJECT REWINE IN OTHER REGIONS

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reWINE

Glass bottles reuse in southern Europe wine sector

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Abstract

Waste management is one of the biggest environmental challenges of modernity and is affecting worldwide communities. Industries and policy makers are concerned about the environmental impact and consequences of domestic product packaging. This concern shows the importance of reducing packaging waste in order to avoid environmental pollution and to follow the sustainability standards of national and international legislation. Even though Spain meets the recycling rate established by Directive 94/62, the reuse of glass bottles is almost negligible, only the sector of Hotels, Restaurants and Catering (HoReCa) reuse glass bottles (non-alcoholic beverages or beer bottles) but in small scale projects developed by private companies.

Deliverable 5.1 of reWINE project has provided the information to ensure that the wine bottles returning system proposed in reWINE is feasible from a technical, economic and environmental perspective.

Therefore, it is important that the results and the lessons learnt from the reWINE are collected and used to create a methodological guide to be used by other regions beyond Catalunya that aim at developing a wine bottle return system.

The main objective of this deliverable is to provide a methodological guide regarding the potential and future implementation of equivalent reWINE projects in other regions.

1. Introduction

Waste management is one of the biggest environmental challenges of modernity and is affecting worldwide communities. In Spain, packaging waste represents approximately 30% of municipal solid waste by weight and from that percentage the 68% is recycled (Eurostat, 2015). In the region of Catalonia glass packaging represents 5% of municipal solid waste by weight (Agencia de Residuos de Catalunya, 2019). As a result of these statistics, industries and policy makers are concerned about the environmental impact and consequences of domestic product packaging, therefore best practices related to the protection of resources and minimizing the ecological impact arising from production and consumption as well as from the disposal of products are becoming important to implement improvements that promote sustainability.

The 94/62/EC (European Parliament and Council Directive, 2005) directive on packaging and packaging waste puts as priority preventing the production of packaging waste and, as additional fundamental principles, reusing packaging, recycling and other forms of recovering packaging waste before the final disposal. In Spain, the glass recycling rate is 68%, which meets the target of recycling established by Directive 94/62 / EC, before December 31, 2008. The European Strategy for Plastics in a Circular Economy is a recent initiative whose proposal is to initiate work on harmonized rules to ensure that by 2030 all plastics packaging placed on the EU market can be reused or recycled in a cost-effective manner (European Commission, 2018); this new initiative will affect specially the private sector because packaging must be reinvented and new opportunities for investment and generation of jobs will be created. Also, this strategy on plastics can also broader the use of glass packing and at the same time increase the reuse of glass packaging by making it cost-effective lying on the new frame of circular economy. Moreover, the European Union has been promoting many laws related with waste prevention, management and treatment, reaching more than 56% of average recycle rate in Europe (Fazio and Pennington, 2007).

1.1 Objectives

Deliverable 5.1 of reWINE project has provided the information to ensure that the wine bottles returning system proposed in reWINE is feasible from a technical, economic and environmental perspective. Therefore, it is important that the results and the lessons learnt from the reWINE are collected and used to create a methodological guide to be used by other regions beyond Catalonia that aim at developing a wine bottle return system. The main objective of this deliverable is to provide a methodological guide regarding the potential and future implementation of equivalent reWINE projects in other regions.

For this purpose, the following scheme (Figure 1) summarizes the replication strategy proposed in this report that includes, firstly, the communication section that includes the actions that have been carried out by the reWINE partners to promote the project in different regions with the aim of establishing collaborations channels for future project developments.

Secondly, the actions related to the analysis outcomes from the reWINE project (Information). Thirdly, actions that aim at evaluating potential regions that may host the project (Selection of the regions). Lastly, actions related to the implementation of the project in terms of analysing the availability of washing plants, logistics and channels for bottles collection.

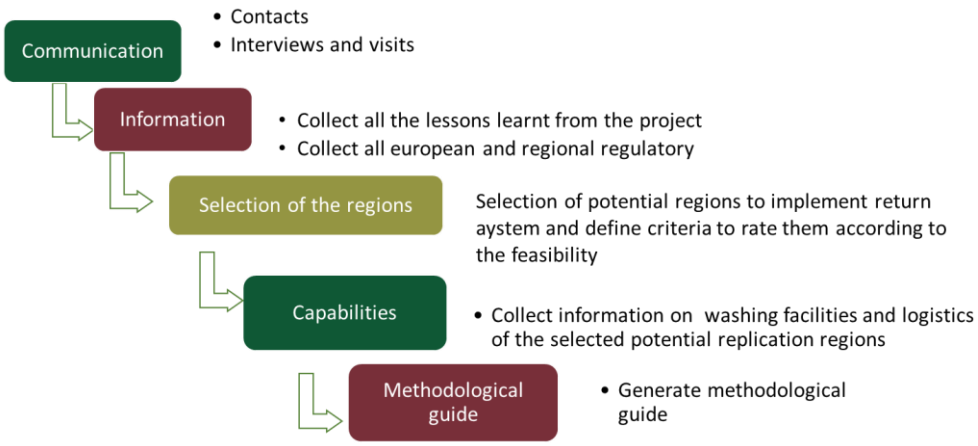

Figure 1. Replication strategy scheme

2. Communication: contacts established from reWINE

The Catalan Waste Agency (ARC) is in charge of the networking activities with the collaboration of INEDIT and FPRC. The activities summarized below gather workshops, conferences, public presentations to involve the different agents in the reuse of wine bottles or to spread the knowledge acquired during the reWINE pilot test and share with them the barriers and opportunities found during the different steps in the project.

During the project (2016-2020) there has been a total of 30 events assisted in the Catalan territory with different clusters, retailers, Municipalities or wineries among others. There have

been organised two reWINE workshops (the first on 2017 and the second on 2020) with other regional or country inspiring initiatives. There was the presentation of the project (2017) and the one with the results achieved with the pilot test (2020). All this detailed information can be found in the Final Dissemination Report.

The more significant exchanges of experiences are showed below. The more relevant have been done with Spanish regions because of the territorial proximity or other exchanges due to the similar reuse objectives:

- **Valencia government**: the ARC was invited in a Valencia ecofair in October 2019 and to assist in a seminar and taking part in a working group of glass bottle reuse for drinks with government members of Valencia, Balearic Islands, and the Basque Country where the experiences in this field were shared.

- **Navarra government**: they were interested in learning and knowing about the logistics and washing process of bottles as they ordered a consulting firm to do a technical study to boost a public washing system in Navarra. There were two meeting with them and moreover, they were in the draft process of the new waste Law of Navarra and its taxation (14/2018), with the incorporation of specific aims of package and drinks reuse.

- **Balearic Islands government**: They were interested in the reWINE project since its beginning so at the end of 2017 it was agreed to establish a dynamic of permanent knowledge exchange during the project. The FPRC reWINE partner established the continued communication with them and advised them with the elaboration of the new Balearic waste law 8/2019. There were 8 meetings and moreover, the European Conference of Plastic Strategy and the 'Prevention and Reuse' session in Palma on the 19th of October 2018 where the reWINE project was presented in both.

- **Basque Country government**: Since February 2019 it has been a fluent exchange of information between the Catalan Waste Agency and the Ihobe (Public Society of Environmental Management of Basque Government). On the 1st April 2019 there was a meeting in the ARC where they presented the draft of the internal document about the situation and context of managing alternatives of drink packaging in Horeca channel.
  There was a fluent contact with the **Usurbil Municipality** (Basque Country, near San Sebastian), as they belong in the cider production area in the Basque Country. They did a diagnosis of the cider producers of the region and the different washing logistics for reusing bottles. The ARC had 3 meetings with them, and they presented its experience in the second reWINE workshop.

- **Styria government (Austria):** Unless the physical distance they have a reuse wine bottle system in its 500ha region. They were invited to present its experience in the first reWINE workshop and then they invited the ARC to go to Styria and know better the project. The project is about to promote the regional wine produced in Styria and they designed a specific bottle to differentiate from the other wines outside the region. Then the meetings and mails were fluent since they were invited to the second reWINE workshop to explain their advances.

Apart from other exchange experiences not so relevant, there has been an exchange with European financed projects: the European Week for Waste Reduction, the CircE project (European regions toward Circular Ecomony), the LIFE+ Greece Cyclamen and the LIFE+Grack task Force, the LIFE Sarmiento, the LIFE Priorat + Montsant, the Interreg SUBTRACT and the Interreg Poctefa TRAILS project.

3. Information: preliminary evaluation

3.1 Analysis of the regulatory schemes

The environmental problem targeted by the present proposal is waste prevention, decoupling resources from the economies, climate change mitigation, with reference to the reduction of greenhouse gas emissions, increasing the number of uses of glass wine bottles and minimizing waste generation and valorization.
Priority in EU waste strategies and in waste management is to prevent waste generation, to increase resource efficiency and to decouple waste generation and use of resources from economic growth. This is also reflected in the mandatory Waste Prevention Programs in the Waste Framework Directive. However, the concept of and the urgent need for waste prevention has not arrived in the awareness of the different stakeholders. This is also confirmed by the continuously increasing generation of packaging waste in the EU-27 Member States. The objective to reduce generation of municipal solid waste in the EU, which correspond to about 10% of the total waste generated, has not yet been achieved. Despite of various EU waste policies and strategies promoting waste prevention, resource efficiency and increased recycling the Joint Research Centre (JRC) predicts a 42,5% increase in EU waste generation until 2020 compared to 1995.
Recently the European Commission adopted the Communication "Towards a circular economy: a zero waste programme for Europe" to establish a common and coherent EU framework to promote the circular economy. To move towards a clean circular economy means:

- Boosting recycling and preventing the loss of valuable materials;
- Creating jobs and economic growth;
- Showing how new business models, eco-design and industrial symbiosis can move us towards zero waste;
- Reducing greenhouse emissions and environmental impacts.

About waste packaging generation
Packaging has been the subject of intense public debate, as today most food, cleaning, healthcare and other products are offered to consumers in a wide range of packaging alternatives made from different materials and in different sizes. This has resulted in a growing percentage of packaging in municipal solid waste streams. In fact, packaging is the second largest fraction of municipal waste after the organic fraction (Gomez et al., 2008; Gómez et al., 2009) and the proportion increases year by year.
For example, in 1995 every inhabitant in Catalonia was responsible for 120.5 kg of packaging per year, a figure which rose to 150.3 kg per inhabitant per year in 2005 – an increase of 24.7% (FPRCR, 2010).

It is not in line with the objective of the Directive 94/62/EC on Packaging and Packaging Waste, which aims at reducing the production of packaging waste and far away from the objectives formulated in the EU 2020-Strategy; i.e. to increase resource productivity and to decouple economic growth from resource use and its environmental impact.

Need to increase reuse and resource efficiency and reduce environmental impacts
The five-step waste hierarchy (prevention, reuse, recycling and end treatment or disposal) in the Directive 2008/98/EC on Waste gives priority to prevention and reuse for EU waste legislation and policy in order to reduce adverse impacts for the environment and human health through of the generation and management of waste.
The improvement of reuse of beverage packaging is an important contribution to the fulfillment of the EU strategies for prevention and recycling of waste ("Thematic Strategy on the Prevention and Recycling of Waste") and resource efficiency ("A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy"). In this regard wine bottle reuse can contribute to significantly waste prevention and increase resource efficiency in beverage packaging waste management. The reuse of wine glass bottles will impact on the EU directive 2008/98/CE of European Council Parliament and in its transposed Spanish Law 22/2011 of waste and polluted soils through the proper management and the prevention of damage to the environment by promoting the change of the extend current practice (material recycling) to reuse.
http://mst.dk/service/publikationer/publikationsarkiv/2015/apr/emballagestatistik-2012/

3.2 Review of the lessons learnt from reWINE project

During the evolution of the reWINE project, and especially during the development of the pilot phase, several issues have been met and that have been overcome. Therefore, a list of the main outputs (as lessons learnt) collected from the project activity is here provided:

- **Lessons learnt from the collection logistics**:
  - It is preferable to simplify the collection logistics. For instance, it is recommended to use inverse logistics and to involve the minimum number of agents as possible in order to avoid unnecessary bottles trips that will affect the cost of the reused bottles
  - Concentrate efforts on the HORECA channel as the return ratio is higher and both consumers and restaurants managers feel comfortable to deal with reused bottles.
  - Refunding schemes on returned bottles are the preferred ones by the consumers.

- **Lessons learnt from the washing procedure:**
  - Reduce the storage time for the empty bottles as it may imply the necessity of washing more than 1 time the bottles and thus reduce the number of reuses. Therefore, the environmental benefits comparing reused and new bottle would be less significant.
  - Though bottles can be reused more than 10 times, it is suggested to verify with the wine maker the maximum number of reuses of the bottles in order to maintain the optimal appearance of the bottle. In the reWINE project, reused has been limited up to 7 washes to avoid scratches in the glass to be visible.

- L**essons learnt from the washing facility location:**
    - In the reWINE pilot phase, environmental benefits are always found for the reused bottles if the distance between the wineries and the washing facility is below 1100 km. However, for economic reasons, it is preferable to place the washing plants in radius between 30-60 km from the winery to decrease the cost of the shipment of the bottles and thus, provide economic feasibility to the reusability.

4. Selection of the regions

During the reWINE project, several requests for information coming from worldwide have been received, that demonstrates the interest of different regions to implement similar projects.

In fact, all these regions are candidates to host in the future bottles-return system. However, not all of them have the same conditions to implement this kind of project in the short term. For this reason, the following criteria has been chosen to determine which regions have been considered to be more mature to host post-reWINE projects in a short-medium term:

- Wineries location
- Glass bottles washing plants
- Volume of consumption
- Sensitivity of the consumers
- Channels of distribution
- Legislation on reusability of packaging and return systems

At this point, the following regions have been pre-selected considering the contacts that the project consortium has established so far. The following Table 1 shows the qualitative evaluation carried out to select the candidate regions.

Table 1. Evaluation criteria for selected regions

	Glass bottles washing plants availability	Volume of consumption	Channels of distribution	Legislation	Consumers' sensitivity
La Rioja					
Ribeira Duero					
Valencia					
Basque Country					
Balearic Islands					
Tuscany (Italy)					
Piedmont (Italy)					
Veneto (Italy)					
Riestling (Germany)					
Chile					
Argentina					

Green: Very good/Mature
Yellow: Fair/in development
Red: insufficient/to be developed

Regarding the criteria "Availability of washing plants", it should be stated that at this moment none of these regions have exclusive wine bottles washing plants. However, the reusable glass bottle is available for other beverages, such as beer, mineral water, soft drinks or cider. These packaging are washed mostly in the same bottling plants and belong to the brand that produces the beverage. The first step would be to check the possibility of transforming the already available washing plants to be capable to wash wine bottles and to offer them in order they can wash bottles from a beverage different from what they produce.

Regarding the criteria "Volume of consumption" and "Channels of distribution" it should be noted that they refer to the amount of wine that is produced and commercialized (consumed) in the same region of production and where it is consume (privately/ HoReCa). At the beginning, it is recommended to implement the return systems in regions where the ratio between the wine consumed and the wine produced is high, in order to ensure that the glass bottles do not have to be shipped for a long distance. Moreover, the reuse of bottles for high consumption wines ensures that the storage time is short enough and bottles can be washed just after their use, allowing an efficient cleaning process. For instance, for La Rioja, more than 63% of the wines commercialized are consumed at a Spanish national level (https://www.riojawine.com/wp-content/uploads/2020/05/ESTADISTICAS_RIOJA2019.pdf); in Piedmont, more than 85 % of the

wines produced are consumed in the same region (http://www.inumeridelvino.it/category/area-geografica/52-italia/521-piemonte).

Nevertheless, it should be noted that for Chile and Argentina regions, the wines produced there are mainly exported (https://www.vinetur.com/2020060360601/argentina-exporto-en-2019-su-mayor-volumen-de-vino-en-6-anos-pero-redujo-sus-ingresos-por-tercer-ano-seguido.html) and therefore, the return of empty bottles can be an issue.

As far as the "Consumers sensitivity" is concerned, it should be noted that this refers to the degree of commitment of the society regarding the waste prevention actions. In green are shown those regions where the return system from the private consumer is already a reality, for glass or plastic packaging. In yellow, those regions where these initiatives are not fully implemented and where education and communication campaigns have to be intensified.

5. Capabilities

5.1 Market study for wineries & wine retailers

This step serves to list the contact data of the wine producers in the selected region in order to identify barriers, desirability and potential solutions for wine bottle reuse.
The scope of the market study is to envisage whether the wines that are produced in the selected region, as the potential reuse of bottles is efficient from different perspectives (logistics, economics and environment) at a local and regional level.

At the end of this task, a full map of the potential interest of the wine reusability, volumes and commercialization channels, as well as consideration of potential risks shall be provided.

Methods:

- Creation of a database of wineries which produce for the local and regional market and the regulatory councils of the DOs. Support from each region's wine makers associations is crucial to enable the proper penetration of the initiative
- Interview the wineries to find out, firstly, information on their production, volumes, types of bottles, commercialization markets and secondly, their interest in the use of reusable bottles
- Define the type of bottles and the volumes of distribution to select the most representative type.
- Workshops to inform the wineries about the initiatives and collect their requirements can be a good exercise to reinforce the idea of collaboration and also to find contention plan to potential risks.

5.2 Market study for municipal household waste recycling centers (HWRC)

This step serves to identify household waste recycling centers in each region, that can be interested in implementing wine bottle reuse in the future and serve as collection points.

This activity shall consist in listing the contact data of the municipal household waste recycling centers (HWRC) to identify of barriers, desirability, and potential solutions for wine bottle reuse.

Methods:

- Creation of a database of HWRC in each region.
- Interview the HWRC to find out, firstly, information on their capacity to facilitate the storage of collected empty bottles and potential incentives for those users that bring the empty bottle to the waste collection point.

5.3 Market study for restaurants & food stores and wine retailers

This step serves to identify restaurants, as well as food and wine retailers in each selected region that can be interested in implementing wine bottle reuse.

Figures of the pilot phase in the reWINE project, shown in D B4.1, have shown that the restaurant channel is the scenario that is capable to collect a major ratio of bottles. Therefore, the implication of this sector shall be included in order to ensure the success of the return system.

Methods:

- Creation of a database of restaurants, hotels, retails in each region. The database can be collected mainly through the regional chamber of commerce or enterprises organization.
- Interview/surveys on these activities to find out the volume of bottles that are consumed, the wineries that commercialize their wines there, the possibility of storing empty bottles and if the return of other bottles from beer/soft drinks, etc.

5.4 Washing facilities evaluation

This action aims at identifying the regional washing facilities, and in case there are not any, designing new ones. In addition, in this action it is necessary to include testing operations to validate the cleaning procedures for glass wine bottles.
It should be notices that for some regions, washing plants are available through their activity is focused on other beverage bottles, such as cider, beer or mineral water. For this reason, it is suggested to check with them the possibility of introducing the wine bottles in their washing circuits and learn from their experience in washing other types of bottles.

The criteria to select the most appropriate washing facilities and the aspects to be considered for the washing are the following

Criteria for washing selection

- Location and proximity to wineries: the closer, the better
- Washing capability: check the washing capacity volume with the amount of bottles wines discarded in that specific region
- Washing technology: check the possibility of doing a mechanical washing in alternative to chemical ones.

- Versatility to wash different types of wine bottles types and remove hydrosoluble and non hydrosoluble labels. Check if they can perform bottles classification.

5.5 Design of the logistics

The methodology to implement a pilot test in the regions can be structured in the following phases (Figure 2).

Phase I evaluate and search different logistics models employed to recover used products as empty glass bottles of beverage, mostly based on reverse logistic for the return of these containers. As the collecting and recovering products can lead to numerous complications for logistic processes, logistics may have differences.

Phase II In this phase, all requirements from the washing plant are studied, and some previous test for all the bottles that will participate are made in order to complete all information for the logistic.

Phase III, wineries are studied. All logistics for the collection of bottles are evaluated and a logistics for the pilot test is discussed with each winery.

Phase IV, all different logistics are proposed and studied with wineries and also wholesalers and supermarket chain participating in the pilot test.

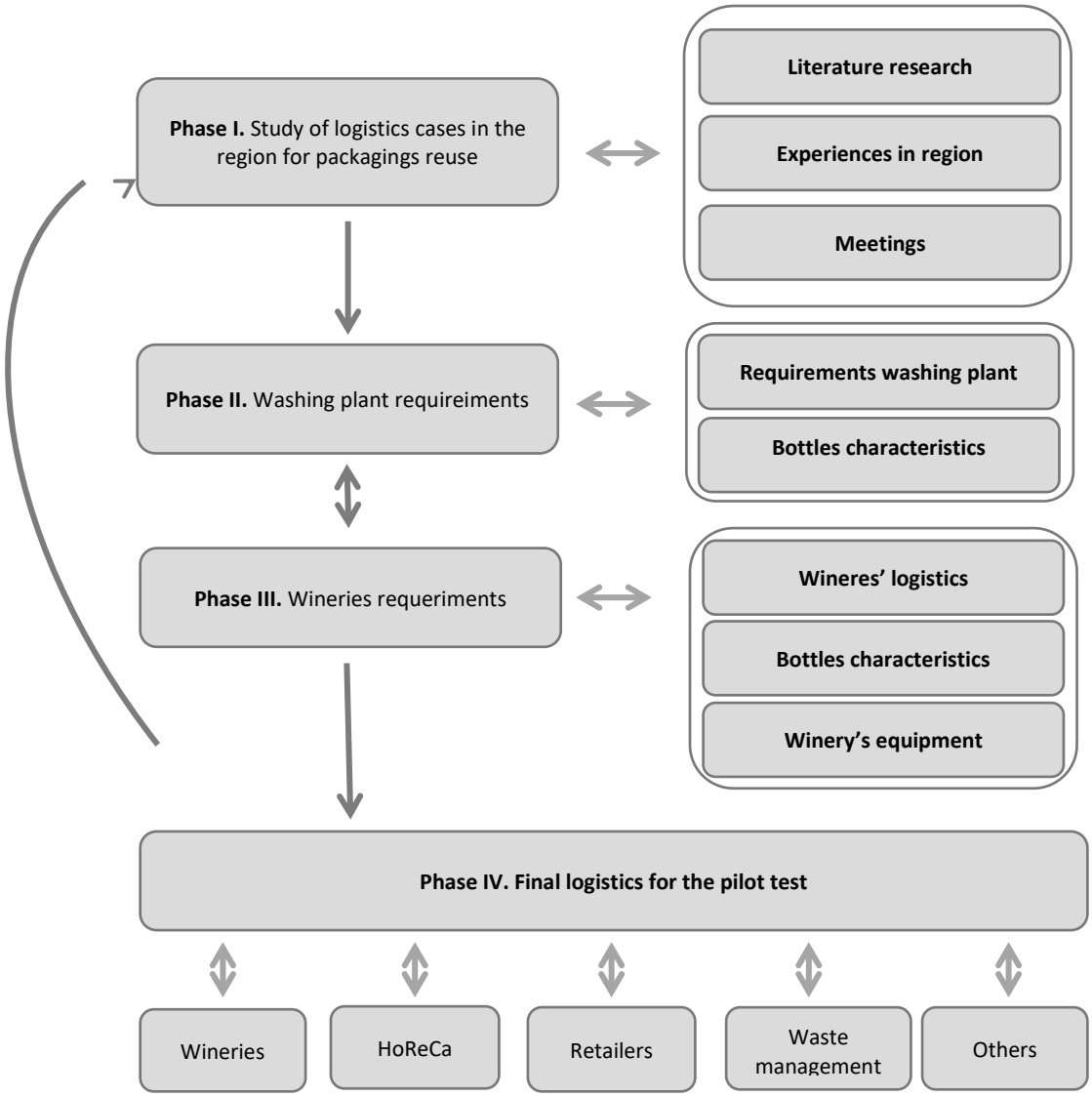

Figure 2. Logistics schemes

5.6 Design of a communication campaign

From the reWINE experience, a good communication campaign should be carried out in order to involve all the stakeholders and collect the maximum number of bottles as possible. Target audience for this campaign has to focus on:

- Final consumers
- HoReCa staff
- Wineries
- Waste management centres
- Local administration
- Retailers

This campaign should take special care to the image and messages, being positive, modern and emotional.

It should be launched taking advantage of both physical (posters, banners, flags) and digital platforms (social network, websites) so the costumer identifies the bottles that can be returned and where they have to be stored.
It is recommended to involve public administrators to support the bottles return, and use public events where catering is served, or even TV/internet spots to inform the final consumers about this initiative.

6. Conclusions and next steps

This document has presented the replication strategy that has been adopted by the reWINE partners, based, mainly, in collecting all lessons learnt from the pilot phase during the project, and establish contact with potential implementers of future project.

The pilot phase in the reWINE has served to prove the technical, economic and environmental feasibility of the wine bottles return system in Catalunya. Though there are points that still need to be improved, it has been possible to identify them and provide potential solutions to solve them.

In parallel, worldwide regions have contacted the reWINE partners to find out more on the project as they will to replicate the project and want to learn from the reWINE experience. The same way, reWINE partners have carried out an extensive work to promote, disseminate and explain the project through workshops, congresses, wine taste and meetings.

All this activity has led to create a shortlist of potential regions that may host replication projects as they comply with most of the criteria that make a region eligible to implement similar initiatives.

It is also planned to continue making networking with other LIFE projects related to the theme of the reWINE project: waste prevention communication, environmental management of wine industry, etc. The international scale dissemination will continue with the European Week of Waste Reduction, and the Association of Cities and regions for Recycling and Sustainable Resource Management (ACR +).

The contacts done with agents from other countries in the previous phases of the project will continue in order to know their next steps and to find similarities among all of them to get inspired.

This activity, that will continue beyond the end of reWINE, will aim to create a critical mass to implement the wine glass bottles return and make it real.