

## BETTER Water-management for Advancing Resilient-communities in Europe

**Action D4** – Assessment of socio-economic impact accounting for the hydrologic effectiveness of the interventions

### Report about ex-ante data collection – data update and ex-ante flood-related damage evaluation

Covering the project activities from 31/05/2019 to 31/10/2019

#### Project Data

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#### Beneficiary Data

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## 1 Glossary, Abbreviations, Acronyms

BEWARE	BEtter Water-management for Advancing Resilient-communities in Europe
COMSAN	Municipality of Santorso
COMMAR	Municipality of Marano Vicentino
NWRMs	Natural Water Retention Measures as classified by the Office International de l'Eau ( <a href="http://www.nwrm.eu">www.nwrm.eu</a> )
SUDS	Sustainable Urban Drainage Systems
TESAF	Dipartimento Territorio e Sistemi Agro-Forestali, Università degli Studi di Padova
Floods	All events in which water inundates lands not normally covered by water (directive 2007/60/EC, 2007) (Salvati et al., 2014)



## 2 Executive summary

In order to extend the database necessary to carry out the analysis of socio-economic implications for the local communities and of the economic impacts of the interventions, some public events organized within the action C1.1 during the months of September and October 2019 was exploited to administrate supplementary questionnaires (survey description in Project deliverable: Action D3 - Baseline Report). This additional administration was realized having the foresight to interview citizens that were not aware of the project activities. This allowed us to include the last collected data within the previous database. In this report we have also included within the administrative databases two heavy rainfall events that occurred in July and August 2019, in Santorso. Both events were so severe that a public state of emergency (*richiesta di stato di emergenza*, according to the Italian regulation) was issued. As a consequence, the administrative databases, in the timespan 2010-2019, report 18 and 6 flood-related events occurred in the municipalities of Santorso and Marano Vicentino (Italy), respectively. Finally, this report includes the data analysis in order to evaluate the ex-ante flood-related damage. To assess the overall damage caused by those events to both private and public assets, the following damage components were estimated:

- Defensive actions, i.e. measures undertaken by public authorities, fire brigades, volunteer organizations or private agents as an immediate response to each event, aiming at minimizing damage (e.g., remedial, clean-up, and mitigation). Defensive costs occur in the aftermath of the adverse event;
- Restoration actions, aiming at re-establishing the ex-ante conditions of the assets (including both premises restoration and furniture/equipment repair or replacement). Restoration costs generally follow in time the defensive actions;
- Prevention actions undertaken by either public or private agents, in order to reduce future risks (hence, to minimize damage from future events). Prevention costs imply investments that may cover longer timespan.

Overall, the damage amounts to €1.3 million, although this estimate could have been underestimated, given some limitations in the available datasets. Indeed, some key figures about damage components are unavailable (in particular, we exclude from this amount the prevention costs incurred by private households). In the context of the BEWARE Project, this amount could be considered as a conservative ex-ante estimate of the damage caused by floods in the two municipalities.

The average unit damage to private assets is equal to € 4,274, when considering households and firms affected by the adverse events in the observed period. Moreover, the public costs (defensive, restoration, and prevention costs) equals € 141 per each resident family in the two municipalities. In addition, it could be noticed that defensive and restoration costs show an upward trend over the ten-year timespan under consideration in this analysis. Figures are increasing, although several costly defensive interventions have been implemented.





### 3 Project overview

#### 3.1 Background and justification

The consequences of climate change are exacerbated by land-use changes which affect the control of rainfall-runoff relations, and the impact on flood risk. Effectively, urbanisation is steadily contributing to the increase of impervious areas and reducing the time-to-peak. This actual scenario is fostering the debate on sustainable climate-adaptation strategies in line with the requirements of the EU Strategy on adaptation to climate change, adopted by the European Commission in 04/2013. The pressure that European countries are facing is demonstrated by scientists' modelling disaster scenarios, which evidenced that, in absence of adaptation measures in place, river flooding could affect about 300,000 people per year in the EU by 2050 and 100,000 more by 2080 (doubling the affected people in the period 1961–1990) (Rojas R. et al., 2012). Scientists showed a consistent increase of flood risk in the British Isles, western Europe and northern Italy, mainly due to the population increase.

The Italian Institute for Environmental Protection and Research (ISPRA), in a study published in June 2018, highlighted that 91% of the Italian municipalities is currently under risk of flooding, compared to the 88% in 2015. Nevertheless, in Northern Italy, the consumption of soil is higher than other Italian regions, worsening the already fragile hydrogeological conditions of the country. The effects of soil sealing and climate changes on the flood dynamics, in the Veneto Region (North-Eastern Italy), has been demonstrated in a recent paper published by TESAF (one of the project partners). The paper provides a regional screening of land-use, rainfall regime and flood dynamics in Veneto Region, covering the timeframe 1900–2010. This analysis suggests that both climate and land-use changes contributed (in synergy and individually) to a significant increase in the flood occurrence. Moreover, Sofia et al. (2017) demonstrated that floods are usually of short duration while the number of flooded areas is higher than in the past. In accordance, several flood events occurred in the region during the last decades and the most severe ones had been recorded in 1966, 1982 and in 2010, between October 30<sup>th</sup> and November 2<sup>nd</sup> (called the *All Saints* flood). During this last event, heavy rainfalls occurred in the lower mountain belt, between the provinces of Verona and Vicenza simultaneously, favoured by multiple negative atmospheric conditions (e.g. an increase of the temperatures melting the snow and southern winds contrasting the regular water down flow). 140 km<sup>2</sup> of roads were inundated, 130 municipalities and about 500,000 citizens were affected, 3 persons and more than 150,000 animals died. The economic burden reached up to 429 M€. Other moderate events occurred in the same area in 2011, 2012, 2013 and 2014 (the term “water bombs” was used by mass media to describe flood events triggered by intense rainfall events). However, effective disaster management needs an integrated approach to land planning, which promotes sustainable measures to restore the water storage capacity of the soil.

A previous research (Roder G., 2019) covering the overall Veneto Region shown that people has a medium-low perception of flood risk, neglecting the future probability of occurrence and undertaking few individual mitigation actions. The lack of knowledge of the inhabitants is the main cause of their lack of preparedness: in fact they usually delegate the responsibility of their safety to public authorities in charge.

Results justify the need of increasing citizen's awareness and good practices adoption for collective welfare. The study area of the present study is the upper Vicenza province, included in the Bacchiglione–Brenta river system. In this area, and in the rest of Veneto region, green solutions (like the ones promoted by the project) could play a key role in flood mitigation. However, at present time, NWRMs are poorly adopted in the region (and at the National level) and, until now, NWRMs have not been considered/included in the flood risk management plans, drafted by the the *Distretto Idrografico Delle Alpi Orientali* ([www.alpiorientali.it](http://www.alpiorientali.it)). Currently, all the public investments are placed for structural measures without considering neither green solutions nor non-structural measures for people's empowerment. Moreover, Veneto region, with the law n. 3637 of 13/12/2002, asked for a compulsory 'evaluation of hydraulic compatibility' for all the new building regulations. This technical guidance provides methods for hydrologic evaluations but does not suggest NWRMs adoption to preserve the hydraulic invariance.

The individual's adoption of NWRMs is expected to provide positive benefits at the society level: i) under a bottom-down approach (the setting of new water regulations) and ii) under a bottom-up approach (the implementation of transferable measures in a participative context). In this regard, it is remarkable that the Flood Directive recommends a wide involvement of the civil society when defining the management plans: «The Member States shall encourage active involvement of interested parties in the production, review and updating of the flood risk management plans (...)» (Art. 10 p. 2).

### 3.2 Project objectives

The main project objective is the achievement of a global strategy for climate adaptation to flooding risk, increasing water infiltration and storage in urban and rural areas and involving the local communities actively. BEWARE project aims to increase knowledge, benefits and real implementation of NWRMs (Natural Water Retention Measures) both in the territory of COMSAN and COMMAR (Vicenza, Veneto Region, IT) and also in other EU municipalities, thanks to demonstrative interventions fully coordinated with information, communication and education activities. Specific objectives are:

1. To perform six urban NWRMs to reduce flood risk by increasing water infiltration and storage in COMSAN and COMMAR. Such measures are: i) undertrained bioretention, ii) infiltration trenches, iii) detention basin with an internal bioretention pond, iv) rainwater harvesting plus dry wells, v) rain gardens plus grass swales and vi) SUDS treatment train;
2. To perform one agricultural NWRM, in COMMAR, to reduce the flood risk and to partially solve the drought problems of some agricultural firms during the dry periods;
3. To promote a participative approach to implement local initiatives and measures on water-retention actions, facing climate change challenges;
4. To establish a local administrative, financial, and technical context, supporting the diffuse employment of NWRMs;
5. To enhance the link between European policies and local contexts, actively involving citizens and key-stakeholders, on the EU goals on climate change;

6. To demonstrate that small diffused works and the implementation of best practices can guarantee hydraulic safety, facing climate-change consequences effectively;
7. To favour the replication of the proposed actions in other geographic areas of Italy and Europe.

The project is innovative for the Communities because it aims to tackle the flood issue on a new participatory perspective. It promotes a set of low-cost measures that municipalities, farms or citizens can manage efficiently. In fact, although in several European Countries a sustainable water-retention approach is still developing, in Italy and in Veneto Region a substantial delay exists. Similar defective situations have been found in Europe (see collected letters of support), highlighting the need for modern water-retention techniques (Flood Directive, art.7) to be rapidly translated into practice, inside the EU territory.

The participation is the key to develop a favourable background for effective climate adaptations initiatives. Through active involvement, BEWARE aims to promote a public responsibility for facing hydraulic risks and proposes a set of best practices to be implemented in a wider context. Indeed, the strategy can also be a shortcut to ensure social acceptance of a more sustainable land-use planning. Although the NWRMs are technically mature, they are poorly spread in Veneto Region and other European countries. Therefore the action panel of BEWARE is a virtuous example, voted to trigger a positive trend in NWRMs employment.

In addition to the strong demonstrative character of the project, the involvement of all public and administrative authorities at local level that are considered by the Covenant of Mayor's framework (Mayors Adapt) is a real innovation, if considering such a wide area (the project will involve, in the definition of a common water strategy, all 33 municipalities - *Intesa Programmatica d'Area IPA Altovicentino*).

The project will provide insights for the building code's revision in the two involved municipalities; it will include mandatory norms for climate change adaptation that will improve the resilience of new buildings. New measures will be also taken to consider the buildings' renovation. Through the network provided by different stakeholders, the code will be proposed as a model; in particular, BEWARE will involve other Italian and European municipalities and local governments. A Permanent Centre for Resilient Communities will be launched by the Consortium and hosted by COMSAN; it will provide:

- training activities for local administrators, civil servants, farmers, technicians;
- educational activities for pupils.

Furthermore, in this Centre, seminars and workshops planned by BEWARE will be organized. The knowledge spread with these activities will help the dissemination and replication of such measures. In addition, the transformative impacts of the other actions will strongly contribute to the community awareness to cope with climate problems, taking individual practical actions both in private and public territory (e.g. contrasting the soil sealing).

BEWARE is supported by the Italian Ministry of the Environment and the Protection of the Territory and the Sea (see support letters). A specific agreement will be proposed to involve the Ministry as permanent observant; the agreement will foresee the national dissemination of the project's results.

## 4 Survey strategy

This chapter shows the data collection strategy of the damage due to heavy rainfall events in the public and private assets of Santorso and Marano Vicentino Municipalities. The period under investigation is a time span that covers ten years, from 2010 to 2019. To obtain a whole picture of the situation in this period, we adopted two different data collection approaches:

1. The first approach consists in the consultation of the two municipalities databases, in which administrative data on heavy rainfall events damage had been archived. This type of documentation includes:
  - the date of the event,
  - the place where the damage occurred,
  - a short description of the event,
  - the quantification of the direct damage to public assets,
  - the number of workers, civil protection volunteers, or firefighters involved in the defensive intervention and the time spent for these operations,
  - a description of the defensive intervention and the mitigation action,
  - the quantification of the damage to private assets only when citizens asked for public support.

The sample survey covered not only Santorso and Marano Vicentino Municipalities, but also citizens living in the overall Altovicentino area.

2. The second approach consists of a “direct” data collection that was included in the ex-ante citizens awareness questionnaire-based sample survey (Project deliverable: Action D3 - Baseline Report). The administration method was mixed: online (the EU survey portal has been used for this purpose, <https://ec.europa.eu/eusurvey>) and face to face interviews.

The question about the suffered damage is the number two of the questionnaire administered to citizens (Annex 1): “In the last 10 years, have you ever had a flooding direct experience which caused damage to your property?”. In case of positive answer the interviewed person was asked to provide details about the damaged assets and the mitigation and restoration costs incurred.

The sample survey aimed at: *i)* covering the information gap of the administrative data sources in the target Municipalities and *ii)* providing a wide range of data to assess each type of damaged assets (garage, cellar, basement, ground floor, car, office, shop, or other) by considering the overall Altovicentino area.

Having used two different data sources, the double-counting risk exists. Consequently, the two datasets were carefully checked to identify overlapping cases.



## 5 Data collected – updated version

The first approach considers damage to public assets in the analyzed time span and the damage to the private assets that were recorded for public defensive interventions and/or public compensation. In order to evaluate damage caused by flood occurrences, we carried out a preliminary analysis on the floods that occurred in the municipalities of Santorso and Marano Vicentino from 2010 to 2019<sup>1</sup>. We have also included the two events that occurred in July and August 2019, in Santorso. Both events were so severe that a public state of emergency (*richiesta di stato di emergenza*, according to the Italian regulation) was issued. Table 5.1 reports the updated annual distribution of the events that was recorded in the administrative databases of the two Municipalities.

*Table 5.1. Number of events related to heavy rainfall recorded in the administrative databases of the two Municipalities of Santorso and Marano Vicentino that caused damage to public and private assets.*

Municipality	Santorso				Marano Vicentino			
	Total	Only public	Only private	Public & private	Total	Only public	Only private	Public & private
<b>2010</b>	2			2	4	3		1
<b>2011</b>								
<b>2012</b>	2			2	1			1
<b>2013</b>	1			1				
<b>2014</b>	2			2				
<b>2015</b>	1		1					
<b>2016</b>								
<b>2017</b>					1			1
<b>2018</b>								
<b>2019</b>	3	1	1	1				
<b>frequent events</b>	7		5	2				
<b>Total number of events</b>	18	1	7	10	6	3	0	3

The damaging events occurred over the decade we considered, even if some defensive hydraulic works were implemented by the two local governments and citizens.

With regard to the sample survey, 265 questionnaires have been collected. Among the respondents, 42 citizens (15.8 %) were affected by a flood event in the last ten years and reported damage to their assets. Citizen affected by floods were also asked to provide a short damage description and an estimate of monetary losses (direct expenses). These losses refer to defensive interventions and restoration of the damaged assets.

During the double counting check of the collected events only three overlapping cases were identified and will be threatened accordingly during the analysis.

<sup>1</sup> According to ISTAT, on Jan. 1<sup>st</sup>, 2019, the overall population of Marano Vicentino was 9,513 inhabitants (748 inhabit. per sq.km) and the overall population of Santorso was 5,734 (434 inhabit. per sq.km).





## 6 Ex-ante flood-related damage evaluation

### 6.1 Material and methods

To assess economic damage, we considered floods affecting both private buildings (houses and industrial facilities) and public structures (e.g., public buildings, parking lots, roads). We referred to the municipal-level administrative records, reporting affected assets and any public or private measures undertaken in response to each event aiming at minimizing damage (i.e., defensive actions). As a consequence, the amount of overall damage to private buildings could have been underestimated, if a household did not report the occurrence of an adverse event to the local administration.

To assess damage and its cost components, we considered three different types of action and their related costs:

- *Defensive actions*, i.e. measures undertaken by public authorities, fire brigades, volunteer organisations or private agents as an immediate response to each event, aiming at minimising damage (e.g., remedial, clean-up, and mitigation). Defensive costs occur in the aftermath of the adverse event;
- *Restoration actions*, aiming at re-establishing the ex-ante conditions of the assets (including both premises restoration and furniture/equipment repair or replacement). Restoration costs generally follow in time the defensive actions;
- *Prevention actions* undertaken by either public or private agents, in order to reduce future risks (hence, to minimise damage from future events). Prevention costs imply investments that may cover longer timespan.

While detailed information is available for damage to public and productive assets, official datasets not necessarily return detailed data on damage to residential buildings. Thus, damage assessment to residential buildings follows a twofold procedure, which distinguishes the events occurred until May 2019 and the two events occurred in 2019 Summer.

For the severe events in 2019 Summer in Santorso, damage assessment can rely on the official damage claim, collected and provided by the local public administration. Official reports return detailed information on the damage claims, according to the citizens' applications for public grants.

Conversely, for those events until May 2019, we have information on the occurrence of each event (e.g., the event damaging a basement), but we often lack a detailed monetary quantification of damage. When official information on the incurred costs was unavailable, these costs have been estimated, through a direct survey. In order to increase the accuracy of the analysis, we carried out a questionnaire-based sample survey and we have involved households living not only in the municipalities of Marano Vicentino and Santorso, but also in the surroundings. In more detail, we considered the area of Altovicentino (Figure 6.1). Collected information allows us providing more robust average estimates for the following types of assets, which were usually damaged after heavy rainfalls:

- underground basements with cellars, i.e., a room of the house – located under the level of the ground – which is used only for storing goods and other household's belongings;

- garages, for parking cars, motorbikes or other vehicles and/or for storing other belongings;
- living rooms, located either underground (underground basement) or at the ground floor: in the Veneto Region, it is easy to observe underground floors fully furnished with sofas, tables and chairs, TV sets...;
- other parts of the dwellings (e.g., courtyards and gardens), located at the ground floor.

In order to properly assess damage in this case study, we have also considered a fifth type of assets that are often damaged after the occurrence of a flood: motor vehicles. Unlike the previous types of assets, they do not represent the premises of a building. In fact, they are movable properties. We decided to include them into the analysis, due to their large unit value.

The survey was administered in two different ways:

- during public presentations of the BEWARE project. To avoid any possible biased answers from respondents, the survey was administered at the beginning of any meetings;
- online, by means of a Computer Assisted Web Interviewing (CAWI). To avoid double-counting errors, the CAWI survey included an explicit question about the participation of the respondent to any of the public presentations of the BEWARE project. If so, the questionnaire was not administered.

In particular, citizens were asked if they had had direct experience of floods in the last 10 years, causing damage to their own property. If so, they were asked to indicate: i) the number of times the damage occurred; ii) the monetary cost they incurred (encompassing defensive, restoration, and prevention actions undertaken, if any); iii) the hours spent either by the family or by public authorities for defensive actions. The labour cost (even the family one) was valued at its opportunity cost: indeed, the standard unit cost of a worker was taken as reference (*Prezzario Regionale per i lavori pubblici*, Veneto Region, 2019). The cost related to the equipment used for remedial actions (e.g. pumps) was also considered. This cost was estimated according to the same source (Veneto Region, 2019).

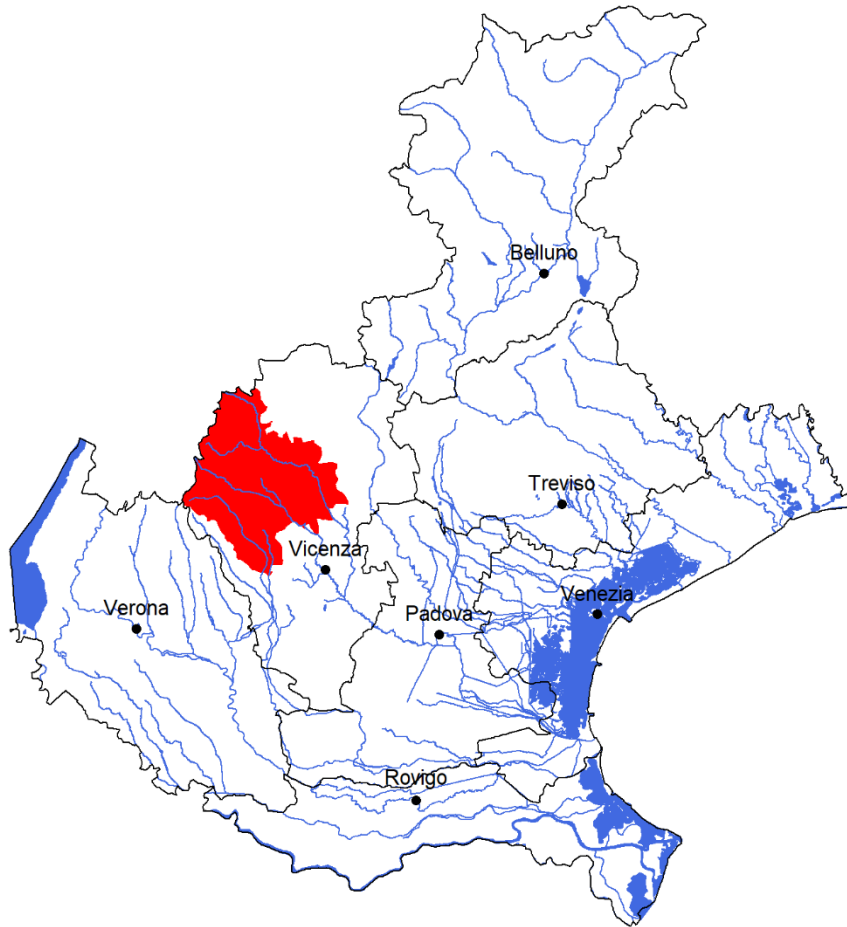


Figure 6.1. The Altovicentino area (in red colour), in the Veneto Region

Overall, 265 persons answered the survey. Despite the focus of the BEWARE project on the municipalities of Santorso and Marano Vicentino, participants from the two municipalities just represent 60.7% of the total respondents (45.2% and 15.5%, respectively). Remaining 40% of the respondents come from other municipalities in the Veneto Region (Figure 6.2). Around 16% of the respondents have experienced direct damage to their own properties.

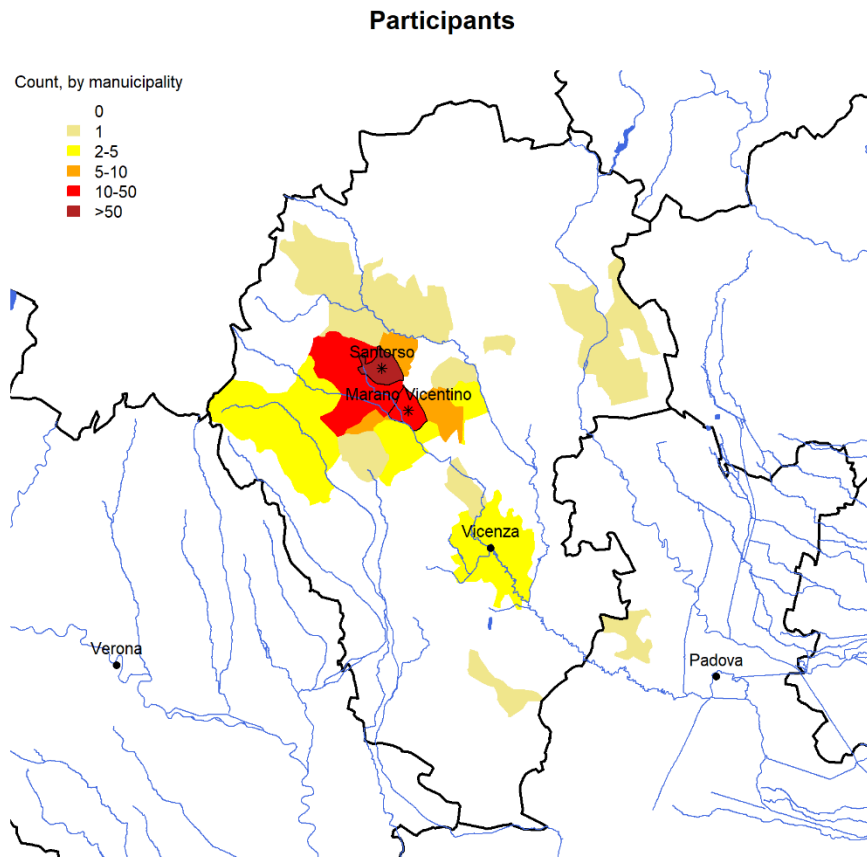


Figure 6.2. Respondents to the survey, by municipality (a blow-up of the Altovicentino area)

According to the BEWARE Project's goals, ten farmers in the area were also interviewed, about the damage they incurred due to both heavy rainfalls and droughts.

Regardless the year of the adverse event occurrence, all the damage cost components were expressed at 2019 prices, using the index numbers of the cost of construction of buildings in Italy, as provided by ISTAT (2019).

## 6.2 Overall flood-related damage assessment (2010-2019)

Table 6.1 returns the assessment of the overall damage caused by flood occurrences in Marano Vicentino and Santorso in the timespan 2010-2019. The damage amounts to €1.3 million. This includes defensive and restoration costs for both private and public assets, as well as the only prevention costs incurred by the public. Indeed, the amount of private prevention costs is difficult to estimate, since the administrative

datasets are rather incomplete on this subject. However, to have an estimation of these private costs, families that undertook defensive investments spent on average € 301 per household.

It has to be noticed that our estimate of the overall damage in the two municipalities could have been underestimated, given the aforementioned limitations in the available datasets, which may miss some key figures about damage components. Consequently, in the context of the BEWARE Project, €1.3 million could be considered as a conservative ex-ante estimate of the damage caused by floods in the two municipalities.

A breakdown of those damage components is shown in Figure 6.3. If we exclude the overall prevention costs, the defensive and restoration costs account for more than € 0.8 million, namely 61% of the total damage. The average unit damage to private assets is equal to € 4,274, when considering households and firms affected by the adverse events in the observed period. Moreover, the public costs (defensive, restoration, and prevention costs) equals €141 per each resident family in the two municipalities (according to ISTAT 2011 Census data).

Table 6.1. Assessed damage components to private and public assets, by municipality and year.

Municipality	Year	No. events	Households	Firms	Defensive and restoration costs (2019 prices)		Prevention costs (2019 prices)
					Private assets	Public assets	Public expenditures
Marano Vicentino	2010	4	3	0	7,104.67	2,103.82	0.00
	2012	1	13	0	17,992.08	90,948.70 *	0.00
	2017	1	61	3	212,009.07	6,660.10	111,124.54
	<b>Total</b>	<b>6</b>	<b>77</b>	<b>3</b>	<b>237,105.83</b>	<b>99,712.61</b>	<b>111,124.54</b>
Santorso	2010	2	1	0	6,419.88	0.00	0.00
	2012	2	0	2	25,296.48	739.79	3,098.74
	2013	1	0	0	0.00	4,294.73	17,587.37
	2014	2	5	2	45,259.55	8,629.54	92,962.11
	2015	1	0	0	0.00	0.00	0.00
	2019	3	5	2	124,070.91	240,374.00	294,000.00
	frequent events	7	6	1	6,303.41	0.00	0.00
	not specified	2	0	0	0.00	1,867.41	0.00
<b>Total</b>	<b>20</b>	<b>17</b>	<b>7</b>	<b>207,350.22</b>	<b>255,905.47</b>	<b>407,648.22</b>	
<b>TOTAL</b>		<b>26</b>	<b>94</b>	<b>10</b>	<b>444,456.05</b>	<b>355,618.09</b>	<b>518,772.77</b>

\* this figure also includes restoration actions for events occurred in 2010.

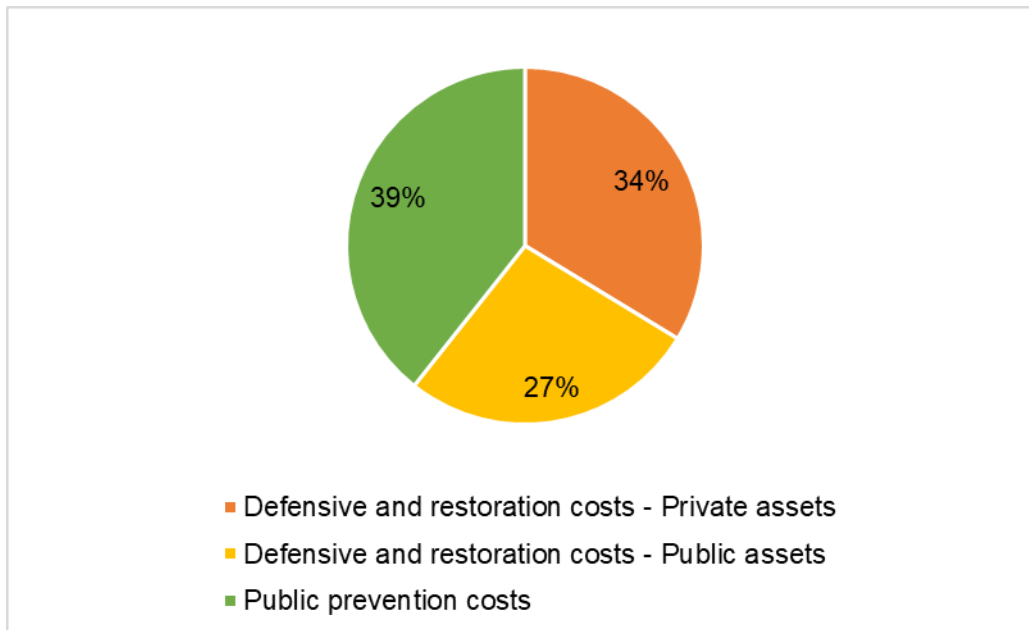


Figure 6.3. Overall damage, by component

Moreover, it could be noticed that defensive and restoration costs show an upward trend over the ten-year timespan under consideration in this analysis. Firstly, in the latest years both Santorso and Marano Vicentino experienced a growing number of affected households. Secondly, when considering both public and private defensive and restoration costs, these damage components have been increasing since 2017 (Figure 6.4). This has occurred, although several costly defensive interventions had been implemented.

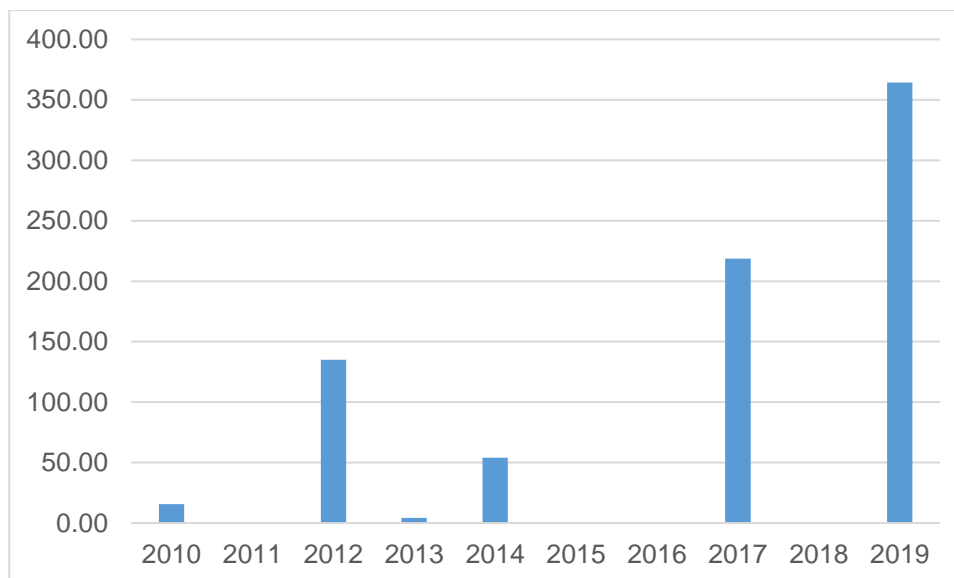


Figure 6.4. Trend of the defensive and restoration costs in the two municipalities (000 €)

The above-mentioned figures do not consider the defensive and restoration costs, due to flood occurrence, incurred by farmers. According to the survey, most of the interviewed farmers reported damage due to flood occurrence, whose costs amount to €59,184 (defensive and restoration costs,

only). However, these figures only refer to the sample of farmers, while no information is available about the occurrence of flood-related adverse events to the overall farms located in the two municipalities.





## 8 References

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## **9 Annexes**

- Annex 1. Questionnaire administered to citizens

## **Annex 1**

### **Questionnaire administered to citizens**



**TESAF**

Dipartimento Territorio  
e Sistemi Agro-Forestali  
Università di Padova



European Association for Local Democracy  
Promoting good governance and citizen participation at the local level in Europe and its Neighbourhood

## Allagamenti e misure di mitigazione sostenibile

Questo questionario è stato redatto esclusivamente per finalità di ricerca scientifica e per la verifica dell'efficacia delle attività intraprese dal progetto. Tale questionario non ha alcuna finalità collegata alla valutazione, di qualsiasi tipo, delle persone per la commercializzazione di prodotti finanziari. I risultati saranno elaborati in forma anonima e nel rispetto del nuovo "Codice in materia di protezione dei dati personali" D. Lgs. 196/03 e all'art. 13 GDPR 679/16. Tutte le informazioni individuali saranno trattate in maniera aggregata in modo che i dati elaborati nell'ambito del sondaggio non possano essere associati ad interessati identificati o identificabili

Dichiaro di aver letto l'informativa privacy "Codice in materia di protezione dei dati personali" D. Lgs. 196/03 e all'art. 13 GDPR 679/16 e acconsento al trattamento dei miei dati personali per le finalità di ricerca scientifica e di valutazione del progetto LIFE BEWARE con la possibilità di revocare tale consenso in qualsiasi momento rivolgendosi al Prof. Vincenzo D'Agostino (Università degli Studi di Padova) tramite email: [beware.tesaf@unipd.it](mailto:beware.tesaf@unipd.it).

Acconsento  Non acconsento

### 1. Riguardo ad allagamenti dovuti ad eventi meteorici:

#### (a) In che misura pensa che tali eventi costituiscano un problema per la sua casa?

Per nulla	Poco	Abbastanza	Molto	Moltissimo	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### (b) In che misura pensa che tali eventi costituiscano un problema per il suo Comune (vicini, parenti, amici, edifici pubblici, zone industriali, zone agricole)?

Per nulla	Poco	Abbastanza	Molto	Moltissimo	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 2. Negli ultimi 10 anni, ha avuto esperienza diretta di un allagamento che ha provocato danni alla sua proprietà?

- Sì (se ha spuntato questa casella, per favore compili la tabella)
- No
- Non so



Piccoli fossati	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tetti verdi (verde pensile)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sistemi di bioritenzione (giardini pluviali, strisce filtranti: aiuole con piante, zone anche allagabili per brevi periodi)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pozzetti a perdere (pozzi drenanti)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bacini/zone di infiltrazione: superfici a quote più basse nel giardino che raccolgono l'acqua piovana e favoriscono l'infiltrazione	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piccole aree verdi di vaso (es. laghetti/vasche che raccolgono l'acqua piovana)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strisce drenanti	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**7. Ha mai acquistato/investito (o lo ha fatto il condominio in cui abita) in opere per la prevenzione o riduzione di danni da allagamenti a protezione della sua proprietà?**

Sì (Se ha spuntato questa casella, per favore compili la seguente tabella)

No

<b>Tipo di intervento di propria iniziativa</b>	<b>Quanti interventi (numero)</b>	<b>Anno di progettazione (es.2010; es.2010,2018)</b>	<b>Costo medio unitario per intervento (€)*</b>	<b>Dimensione media dell'intervento **</b>
<input type="checkbox"/> Pompe				.....l/h .....W
<input type="checkbox"/> Chiusure temporanee (paratie) o permanenti (muretti)				.....m
<input type="checkbox"/> Cisterne di raccolta acqua piovana fuori terra o interrata (con acqua anche riutilizzabile)				.....l
<input type="checkbox"/> Ampie cisterne/grandi serbatoi interrati (vasche volano)				.....m <sup>3</sup>
<input type="checkbox"/> Pavimentazione permeabile o semi-permeabile (es. zone parcheggio), cortili/strade non pavimentati ricoperti con ghiaio				.....m <sup>2</sup>
<input type="checkbox"/> Piccoli fossati				.....m lineari
<input type="checkbox"/> Tetti verdi (verde pensile)				.....m <sup>2</sup>
<input type="checkbox"/> Sistemi di bioritenzione (giardini pluviali, strisce filtranti: aiuole con piante, zone anche allagabili per brevi periodi)				.....m <sup>2</sup>
<input type="checkbox"/> Pozzetti a perdere (pozzi drenanti)				.....Ø esterno m
<input type="checkbox"/> Bacini/zone di infiltrazione: superfici a quote più basse nel giardino che raccolgono l'acqua piovana e favoriscono l'infiltrazione				.....m <sup>2</sup>

<input type="checkbox"/> Piccole aree verdi di vaso (es. laghetti/vasche che raccolgono l'acqua piovana)				.....m <sup>2</sup>
<input type="checkbox"/> Strisce drenanti				.....m lineari
<input type="checkbox"/> Altro .....				
<input type="checkbox"/> Altro .....				

\* es. se acquistate n.2 pompe indicarne costo totale diviso 2

\*\* l/h=litri/ora; W=Watt; m=metri; m<sup>2</sup>=metri quadrati; m<sup>3</sup>=metri cubi; Ø=diametro

**8. Sarebbe disposto ad adottare nella sua proprietà\*, oppure ha già in programma, delle opere per limitare i danni da allagamenti nei prossimi 5 anni?**

*\*Se in affitto ma con la prospettiva di comprare casa prossimamente*

- Sì (se ha spuntato questa casella, per favore compili la tabella)
- No
- Non so (se ha spuntato questa casella, per favore compili la tabella)

<i>Specificare il tipo di intervento che intende adottare nel prossimo futuro:</i>
<input type="checkbox"/> Pompe
<input type="checkbox"/> Chiusure temporanee (paratie) o permanenti (muretti)
<input type="checkbox"/> Cisterne di raccolta acqua piovana fuori terra o interrata (con acqua anche riutilizzabile)
<input type="checkbox"/> Ampie cisterne/grandi serbatoi interrati (vasche volano)
<input type="checkbox"/> Pavimentazione permeabile o semi-permeabile (es. zone parcheggio), cortili/strade non pavimentati ricoperti con ghiaino
<input type="checkbox"/> Piccoli fossati
<input type="checkbox"/> Tetti verdi (verde pensile)
<input type="checkbox"/> Sistemi di bioritenzione (giardini pluviali, strisce filtranti: aiuole con piante, zone anche allagabili per brevi periodi)
<input type="checkbox"/> Pozzetti a perdere (pozzi drenanti)
<input type="checkbox"/> Bacini di infiltrazione: superfici a quote più basse nel giardino che raccolgono l'acqua piovana e favoriscono l'infiltrazione
<input type="checkbox"/> Piccole aree verdi di vaso (es. laghetti/vasche che raccolgono l'acqua piovana)
<input type="checkbox"/> Strisce drenanti
<input type="checkbox"/> Altro.....
<input type="checkbox"/> Altro.....

**9. In caso negativo, potrebbe giustificare la sua risposta?**

*\*Può fornire massimo 3 risposte\**

- Non conosco tali interventi e non ne comprendo il beneficio
- Lo ritengo inutile, poiché ritengo nessuna azione del singolo possa ridurre l'esposizione al rischio
- Ritengo di non essere esposto personalmente al rischio da allagamenti
- Non ritengo di essere io in prima persona a dover gestire tale problematica
- Non sono io che posso prendere queste decisioni (es. sono in affitto)
- Sono interessato ma non ne conosco i costi
- Sono interessato ma i costi sono troppo elevati
- Altro .....
- Altro .....



**10. Se interessato, in che misura ritiene che tali opere possano risolvere il problema degli allagamenti nella sua proprietà?**

Per nulla	Poco	Abbastanza	Molto	Moltissimo	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**11. In che misura ritiene che opere adottate individualmente nella sua proprietà per la riduzione dal rischio di allagamenti possano essere un beneficio per l'intera collettività?**

Per nulla	Poco	Abbastanza	Molto	Moltissimo	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## DATI GENERALI

**12. Indichi il suo genere**       Femmina     Maschio

**13. Indichi il suo anno di nascita**.....

**14. Quale è il Suo titolo di studio?**

Licenza elementare o nessun titolo     Licenza media inferiore     Diploma di scuola superiore

Laurea o altro titolo universitario/specializzazione

**15. Per favore, indichi il suo Comune di residenza**

<input type="checkbox"/> Arsiero	<input type="checkbox"/> Malo	<input type="checkbox"/> Schio
<input type="checkbox"/> Breganze	<input type="checkbox"/> Marano Vicentino	<input type="checkbox"/> Thiene
<input type="checkbox"/> Caltrano	<input type="checkbox"/> Montecchio Precalcino	<input type="checkbox"/> Tonezza del Cimone
<input type="checkbox"/> Calvene	<input type="checkbox"/> Monte di Malo	<input type="checkbox"/> Torrebelvicino
<input type="checkbox"/> Carrè	<input type="checkbox"/> Pedemonte	<input type="checkbox"/> Valdagno
<input type="checkbox"/> Chiuppano	<input type="checkbox"/> Piovene Rocchette	<input type="checkbox"/> Valdastico
<input type="checkbox"/> Cogollo del Cengio	<input type="checkbox"/> Posina	<input type="checkbox"/> Valli del Pasubio
<input type="checkbox"/> Fara Vicentino	<input type="checkbox"/> Recoaro Terme	<input type="checkbox"/> Velo d'Astico
<input type="checkbox"/> Isola Vicentina	<input type="checkbox"/> Salcedo	<input type="checkbox"/> Zanè
<input type="checkbox"/> Laghi	<input type="checkbox"/> San Vito di Leguzzano	<input type="checkbox"/> Altro.....
<input type="checkbox"/> Lastebasse	<input type="checkbox"/> Sarcedo	
<input type="checkbox"/> Lugo di Vicenza	<input type="checkbox"/> Santorso	

**16. Qual è la sua posizione lavorativa?**

Occupato     In cerca di occupazione     Studente     Casalinga     Pensionato     Altra condizione  
(specificare.....)

**17. Svolge qualcuna di queste attività come professione?**

Tecnico/Professionista/Ingegnere/Architetto comprese altre figure professionali che si occupano di problemi del territorio (es. edilizia, ambiente)     Protezione Civile     Vigili del Fuoco     Nessuna delle precedenti

**18. Svolge qualcuna di queste attività come volontario?**

Protezione Civile  Vigili del Fuoco  Nessuna delle precedenti

**19. Quante persone lavorano nel suo nucleo familiare? .....**

**20. Quanti bambini o ragazzi fino a 18 anni di età ci sono nel suo nucleo familiare? .....**

**21. Quante sono le persone con più di 65 anni di età? .....**

**22. È iscritto a qualche associazione per la protezione dell'ambiente?**

Sì  No

**23. A che titolo occupa l'abitazione in cui vive?**

Proprietà  Affitto  Titolo gratuito

**24. La casa/appartamento in cui vive comprende:**

(a) Un piano terra  Sì  No

(b) Un piano sotto terra  Sì  No

**25. Come descriverebbe la situazione finanziaria della sua famiglia?**

<u>Difficile</u>	<u>Modesta</u>	<u>Stiamo abbastanza bene</u>	<u>Stiamo molto bene</u>	<u>Non so</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CONTATTI

Siamo interessati a ricontattarla alla conclusione del progetto (nel 2022) allo scopo di valutare il cambiamento della percezione individuale del rischio da allagamento a seguito delle attività di sensibilizzazione e informazione condotte durante il progetto. Le chiediamo quindi la cortesia di indicarci il suo numero telefonico o la sua email al fine di ricontattarla per proporle nuovamente tale questionario. **Le ricordiamo che i risultati delle rilevazioni potranno essere diffusi soltanto in forma anonima.**

**Contatto** (numero di telefono o e-mail) .....

**Se vuole lasciare un commento riguardo il tema trattato o raccontarci la sua esperienza, prego scriva qui:**

.....  
.....  
.....

**GRAZIE per aver partecipato al sondaggio!**