A procedure for field-survey of flood damage data

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Online resource 1: Form for data collection to be implemented in the procedure

Notes:

Three different colours are used in the form:

- Black: for pre-compiled fields
- Blue: for fields to be filled in during survey
- Red: for fields to be filled in after the survey, also on the basis of other sources. In the final version of the form (that will be filled in by collectors during survey) such fields will be deleted but still be present in the database.

	Province I	.D.	L L L
Mu	nicipality I.I	D.	L L L
Municipality		_ _ _	<u> </u>
	Form I.D.	_ _	. L L L I
Date	<u> </u>		

SECTION 1 – SURVE	Y DATA	Data	Notes	Guidelines
Conditions for survey		Team I.D. _ _ Collector I.D. _ _ Support by private citizen Name: Surname: Tel./e-mail: Function: Owner Tenant Other		Supply information on collector and their team. Indicate whether support by private citizen was supplied during the survey. If so, indicate personal details of the citizen, a telephone number/e-mail address and their function, being the owner, the tenant or other (e.g. neighbour, volunteer, etc.)
SECTION 2- BUILDIN	IG LOCATION	Data	Notes	Guidelines
Geographic coordinates (Datum WGS84, Format DMS)	_ _ ° _ ' _ " N _ _ ° _ ' _ " E	_ _ ° _ _ ' _ _ " N _ _ ° _ _ ' _ _ " E		Validate geographic coordinates. Use the WGS84 datum, DMS (Degree Minutes Seconds) format. If other datum/format is used, please specify in "Notes".
Cadastral coordinate	Sheet I.D. _ _ _ Particle I.D. _ _ _			

Address	□ street □ avenue □ square Other Number □ □ □ □ □ □ □ □ □ □	□ Confirmed □ Not Confirmed □ street □ avenue □ square Other Number □ L L L		When data are not confirmed, update the information.
SECTION 3 – BUILDII	NG FEATURES	Data	Notes	Guidelines
Building typology	 □ Detached house □ Apartment house/semi-detached house Number of housing units _ _ □ presence of attached buildings □ public building Specify 	□ Confirmed □ Not Confirmed □ Detached house □ Apartment house/semidetached house Number of housing units _ _ □ presence of attached buildings □ public building Specify		When data are not confirmed, update the information. Specify building typology and whether attached buildings are present. In the case of apartment house/semi-detached house, indicate the number of housing units.
Surface		Width _ _ _ m Length _ _ m		
Number of storeys (excluding basement)	_ _ N°	☐ Confirmed ☐ Not Confirmed ☐ L		When data are not confirmed, update the information. Indicate the number of storeys, excluding basement.

Presence of basement	□ No □ Yes _ _ N°	 □ Confirmed □ Not Confirmed □ No □ Yes □ _ N° □ Basement windows 	When data are not confirmed, update the information. Indicate the number of storeys below the ground level and whether basement windows are present.
Open space		☐ Yes ☐ No ☐ Court ☐ Garden ☐ Other	
Period of construction	 □ before 1945 □ 1945-1991 □ 1991-2007 □ after 2007 	 □ Confirmed □ Not Confirmed □ before 1945 □ 1945-1991 □ 1991-2007 □ after 2007 □ restoration within last 20 years 	When data are not confirmed, update the information. Besides age, indicate whether evidence of restoration (within the last 20 years) is present.
Building structure			When the building is made up of parts with different structure, please specify in "Notes".

Level of maintenance		□ Good □ Regular □ Bad			The level of maintenance is to be considered"bad" if, before the flood: • pavements were lacking or severely damaged (more than 20% of the total surface); • cover/plaster was lacking or severely damaged (more than 10% of the total surface); • walls were severely damaged; • more than one external openings was lacking or in bad condition; • the electric and plumbing systems were not designed/built according to the law. When openings, pavements, cover/plaster and roof were new/preciousness and systems were functioning, the level of maintenance is to be considered "good". Otherwise, the level of maintenance is to be considered "regular".
SECTION 4 – DESCRI	PTION OF FLOOD EVENT		Data	Notes	Guidelines
Duration		Beginning: Hour Date End: Hour Date Peak of water Hour	_ _ _ _ _ _ _ _ _ _ _ _ depth:		Event begging and end refer to the period of time in which water was inside the building. Please use the following format: • "hh mm" for hour • "dd mm yy" for date

Water depth outside the building	SURVEY POINT: Description: Water depth _ _ _ cm Altitude _ _ _ m REFERENCE PLANE: Description:	Attach photos in order to univocally identify the survey point and the reference plan
	Altitude _ _ _ m	
	SURVEY POINT: Description:	Attach photos in order to univocally identify the survey point and the reference plane
Water depth outside attached buildings	Water depth _ _ _ cm Altitude _ _ _ m REFERENCE PLANE:	
	Description:	
	Altitude _ _ _ m	

Presence of sediments		 ☐ Yes ☐ No Type of sediment: ☐ fine sediments ☐ garbage ☐ coarse sediments ☐ vegetation/wood ☐ Other									
Presence of contaminants		☐ Yes ☐ No Type(s) of contaminant(s): ————									
SECTION 5 – DAMAGE TO HOUSING UNIT (TO REPEAT FOR EVERY HOUSING UNIT)											
Section 5A- unit feat	tures	Data	Guidelines								
		□ Confirmed		When data are not confirmed, update							
Owner	Name: Surname: Place of birth: Date of birth: _ _ _ _ _ Address:	□ Not Confirmed Name: Surname: Place of birth: Date of birth:		the information. In the case of more than one owner, please specify it in "notes" along with data of further owners.							
Owner Cadastral coordinates	Surname: Place of birth: Date of birth: _ _ _ _	Name: Surname: Place of birth: Date of birth:		In the case of more than one owner, please specify it in "notes" along with							

Number of storeys (excluding basement)	_ _ N°		Indicate the number of storeys, excluding basement.
Presence of basement	 □ No □ Yes □ No □ Basement windows Surface □ □ □ □ □ □ □ □ m² 		Indicate the number of storeys below the ground level and whether basement windows are present. Indicate the surface of every storey, pertaining to the housing unit. In the case of more than one storey, supply single floor information in "Notes".
Elevation of ground floor	_ _ _ cm		Elevation of the ground floor with respect to the ground level, in front of the building. If the ground level is irregular, please specify it in "Notes".
Section 5B- Direct damage	Data	Notes	Guidelines
Flooded storeys	Basement Use: box cellar housing storage not in use under construction/restoration Other Technological systems pertaining to unit: plumbing system electrical system heating system Ground floor		Indicate which storeys were flooded and their use. Indicate whether technological systems are present, for every storey.

	Use:	
	□ commercial □ housing	
	□ not in use	
	☐ under construction/restoration	
	☐ Other	
	Technological systems pertaining to unit:	
	☐ plumbing system	
	☐ electrical system	
	☐ heating system	
	□ upper floors	
	Use:	
	☐ commercial ☐housing	
	□ mansard	
	□ not in use	
	☐ under construction/restoration	
	☐ Other	
	Technological systems pertaining to unit:	
	☐ plumbing system	
	☐ electrical system	
	☐ heating system	
Maximum water depth inside buildings	Basement _ _ _ cm Ground floor _ _ _ cm Upper floors _ _ _ cm	Data refer to maximum water depth inside the building, during the whole flood event.

DAMAGE TO STRUCT	ΓURE – Concrete	/Steel	buildi	ngs							
	□ Yes □ No										Specify, for each degree of dam severity, the portion of the affe elements with respect to the to
		Lig	ht Dan	nage	Med	Medium Damage Severe Damage				mage	elements in the unit.
		<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	Damage is to be considered "lig when the strength of the eleme not compromised, there is no d for occupants because of collap /fallen objects
Structural damage	Pillars										Damage is to be considered"me
	Cladding										when the strength of the eleme could be compromised, leading
	Floor										collapse. Falling objects are pos
	Stairs										Damage is to be considered "se
	Roof										when the strength of the eleme
	Partitions										compromised and collapse occurred/is likely.
	Foundations										
Causes of collapse						claddin tructu sever elemen vithou	ose of e og without ral elen re dama its (pilla t buildi re dama g struct	out dar nents age to s ars and ng colla age/col	structur girders apse	ral s) o/of	

					[without building collapse severe damage to foundations and building collapse building displacement				
							ing rota		Tene	
DAMAGE TO STRUC	TURE – Masonry	/Wood	d build	dings						
	□ Yes □ No									
		<1/3	tht Dar 1/3-5/3	mage 8/7<	<1/3	1/3-2/3 multiple of multiple o	amage 8/7×	<1/3	vere Da 8/2-5/1	emage 8/2<
Structural damage	Vertical structures Floors Stairs									
	Roof Partitions Foundations									
		1			1	1		1		
Causes of collapse					[ground	e dama	cause	of floo	of od wave

	□ severe damage/collapse to/of building structure □ severe damage to foundations without building collapse	
	□ severe damage to foundations and building collapse	
	□ building displacement	
	□ building rotation	
	_ _ _ _ €	Specify the economic value of damage.
	□ Yes □ No	
Damage to	_ _ _ damaged surface [m ²]	
coating/plaster	_ _ _ . €	Specify the economic value of damage.
	□ Yes □ No	Windows/doors are to be considered
	N° of damaged doors _ _	"damaged" if they need to be fixed/replaced. On the contrary, incurred costs must be considered as
Damage to doors	_ _ _ damaged surface [m ²]	"clean-up cost".
and windows	N° of damaged windows _ _	
	_ _ _ damaged surface [m ²]	
	_ _ _ _ €	Specify the economic value of damage.
Damage to pavements	☐ Yes ☐ No _ _ _ _ damaged surface [m²]	Pavements are to be considered "damaged" if they need to be fixed/replaced. On the contrary,

			incurred costs must be considered as "clean-up cost".
			Specify the economic value of damage.
Damage to technological systems		 □ plumbing system □ electrical system □ heating system □ lift □ Other 	
		<u> </u>	Specify the economic value of damage.
Damage to structure - Total			Specify the economic value of damage, as the sum of previous headings.
DAMAGE TO CONTE	NTS		
		Yes No	
Damage to furniture		_ _ _ €	Specify the economic value of damage.
Damage to household appliances		Yes □ No Decify:	Specify the economic value of
Other	S _F	pecify:	damage.

		_ _ €		Specify the economic value of damage.
Damage to contents - Total				Specify the economic value of damage, as the sum of previous headings.
Direct damage - Total				Specify the economic value of damage, as the sum of previous headings.
Section 5C- Indirect damage	2	Data	Notes	Guidelines
Lack of Usability		☐ Yes ☐ No Duration ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
Clean-up costs		□ Yes □ No		Clean-up costs relate, for example, to the following activities: cleaning, debris removal, clearing, etc.
		□ private work□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		Indicate if clean-up was done by private citizens or local authorities. In the first case, please specify incurred costs or required job (in terms of days/person).
Section 5D- Mitigation factor	ors	Data	Notes	Guidelines
Mitigation actions		□ None□ Suction pumps□ Shields□ Moving objects at upper floors		

		□ Power interruption / state □ Evacuation □ Other Time: Hour Date			
SECTION 6 - DAMA	GE TO COMMON AREAS (To fill in o	nly in the case of apartn	nents house/sem	ni-detached house)	
Section 6A- Commo	n areas features	Data		Notes	Guidelines
Presence of basement		□ No □ Yes □ Basement windows Surface _ _	_ _ N°		Indicate the number of storeys below the ground level and whether basement windows are present. Indicate the surface of every storey, common to all housing units. In the case of more than one storey, supply single floor information in "Notes".
Elevation of ground floor		L	_ _ cm		Elevation of the ground floor with respect to the ground level, in front of the building. If ground level is irregular, please specify in "Notes".
Section 6B- Direct damage		Data		Notes	Guidelines
Flooded storeys		□ Basement Use: □ box □ cellar □ not in use	r		Indicate which storeys were flooded and their use. Indicate whether technological systems are present, for every storey.

	☐ under construction/restoration	
	☐ Other	
	Technological systems common to all units:	
	□ plumbing system	
	☐ electrical system	
	☐ heating system	
	☐ Ground floor	
	Use:	
	□ porter's lodge/lobby	
	□ not in use	
	☐ under construction/restoration	
	☐ Other	
	Technological systems common to all units:	
	☐ plumbing system	
	☐ electrical system	
	☐ heating system	
	□ upper floors	
	Use:	
	□ lobby □ mansard	
	□ not in use	
	☐ under construction/restoration	
	□ Other	
	Technological systems common to all units:	

					[elect	bing sys	tem				
Maximum water depth inside buildings					Gr	semen ound fl oper flo	oor			_ cm _ cm _ cm	Data refer to maxing inside the building, flood event.	
DAMAGE TO STRUC	TURE – Concrete	/Steel	buildi	ings	•							
	□ Yes	□ No									Specify, for each do severity, the portion elements with response.	on of affected
		Lig	ght Dar	mage	Med	Medium Damage			Severe Damage		elements in the co	
	Pillars	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	Damage is to be co when the strength not compromised, for occupants beca /fallen objects	of the element is there is no danger
Structural damage	Cladding										Damage is to be	
	Floor										considered"mediu strength of the ele	
	Stairs										compromised, lead Falling objects are	ding to its collapse.
	Roof										Damage is to be co	
	Partitions										when the strength	of the element is
	Foundations										compromised and occurred/is likely.	collapse
Causes of collapse	Evidence of: □ collapse of external without damage to st elements					_						

	T	I	
	Evidence of:		
	☐ severe damage/collapse of ground wall because of flood wave		
	without building collapse		
	☐ severe damage/collapse to/of building structure		
Causes of collapse	☐ severe damage to foundations without building collapse		
	☐ severe damage to foundations and building collapse		
	□ building displacement		
	☐ building rotation		
	_ _ _ €		Specify the economic value of damage.
	□ Yes □ No		
Damage to	_ _ _ damaged surface [m ²]		
coating/plaster			Specify the economic value of damage.
	☐ Yes ☐ No		Windows/doors are "damaged" if they need to be fixed/replaced. On
Damage to doors and windows	N° of damaged doors _ _		the contrary, incurred costs must be considered as "clean-up cost".
	_ _ _ damaged surface [m²]		considered as clean-up cost.
	N° of damaged windows _ _		
	_ _ _ damaged surface [m ²]		

	_ _ _ €	Specify the economic value of damage.
Damage to floors	☐ Yes ☐ No _ _ _ _ damaged surface [m²]	Pavements are "damaged" if they need to be fixed/replaced. On the contrary, incurred costs must be considered as "clean-up cost".
	_ _ €	Specify the economic value of damage.
Damage to technological systems	 plumbing system electrical system heating system lift Other 	
	_ _ _ €	Specify the economic value of damage.
Damage to structure - Total		Specify the economic value of damage, as the sum of previous headings.
DAMAGE TO CONTE	NTS	
Daniel de ferritaire	□ Yes □ No	
Damage to furniture		Specify the economic value of damage.
Other	Specify:	
		Specify the economic value of damage.

Damage to contents - Total	_ _ _		Specify the economic value of damage, as the sum of previous headings.
Direct damage - Total	_ _ _ €		Specify the economic value of damage, as the sum of previous headings.
Section 6C- Indirect damage	Data	Notes	Guidelines
Lack of Usability	☐ Yes ☐ No Duration ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
Clean-up costs	□ Yes □ No		Clean-up costs relate, for example, to the following activities: cleaning, debris removal, clearing, etc.
	 □ private work □ □ □ □ □ □ □ □ □ □ 		Indicate if clean-up was done by private citizens or local authorities. In the first case, please specify incurred costs or required job (in terms of days/person).
Section 6D- Mitigation factors	Data	Notes	Guidelines
Mitigation actions	□ None □ Suction pumps □ Retaining walls □ Moving objects at upper floors □ Power interruption / switching off □ Evacuation		

		□ Other		
		Time:		
		Hour _ _ _		
		Date _ _ _ _		
		Motivation:		
SECTION 7 DANAA		DEDICAT FOR ANY ATTACHED BUILDING		
SECTION 7 - DAIVIAG	JE TO ATTACHED BUILDINGS (TO F	REPEAT FOR ANY ATTACHED BUILDNG)		
Section 7A- features	of attached building	Data	Notes	Guidelines
		□ Confirmed		When data are not confirmed, update
		□ Not Confirmed		the information.
	Name:	Name:		In the case of more than one owner, please specify it in "notes" along with
	Surname:	Surname:		data of further owners.
Owner	Place of birth:	Place of birth:		
	Date of birth: _ _ _ _	Date of birth: _ _ _ _		
	Address:	Address:		
	☐ Common property	☐ Common property		
Cadastral coordinates	Sub-Particle _ _			
Surface		_ _ _ m²		
Number of storeys (excepting basement)		_ _ N°		Indicate the number of storeys, excluding basement.

Presence of basement	□ No □ Yes _ _ N° □ Basement windows Surface _ _ _ m²		Indicate the number of storeys below the ground level and whether basement windows are present. Indicate the surface of every storey, pertaining to the building. In the case of more than one storey, supply single floor information in "Notes".
Elevation of ground floor	_ _ _ cm		Elevation of the ground floor with respect tothe ground level, in front of the building. If ground level is irregular, please specify it in "Notes".
Section 7B- Direct damage	Data	Notes	Guidelines
Flooded storeys	□ Basement Use: □ box □ storage □ poultry house/stable □ not in use □ under construction/restoration □ Other Technological systems pertaining to attached building: □ plumbing system □ electrical system □ heating system □ heating system □ dround floor Use: □ box □ storage □ poultry house/stable		Indicate which storeys were flooded and their use. Indicate whether technological systems are present, for every storey.

		□ not in use		
		☐ under construction/restoration		
		☐ Other		
		Technological systems pertaining to attached building:		
		☐ plumbing system		
		☐ electrical system		
		☐ heating system		
		□ upper floors		
		Use:		
		☐ storage ☐ poultry house/stable		
		□ not in use		
		☐ under construction/restoration		
		☐ Other		
		Technological systems pertaining to attached building:		
		☐ plumbing system		
		☐ electrical system		
		☐ heating system		
Maximum water		Basement _ _ _ cm		Data refer to maximum water depth
depth inside		Ground floor _ _ _ cm		inside the building, during the whole flood event.
buildings		Upper floors _ _ _ cm		nood crent.
DAMAGE TO STRUC	TURE – Concrete/Steel buildings	<u>, </u>	•	

	□ Yes	□ Yes □ No											
Structural damage		Light Damage			Medium Damage			Severe Damage					
	D.II.	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3			
	Pillars Cladding												
	Floor												
	Stairs												
	Roof												
	Partitions												
	Foundatiosn				<u> </u>								
					Sign	nifican	t prese	nce of:					
						☐ collapse of external cladding without damage to structural							
		е	elements										
			☐ severe damage to structural elements (pillars and beams)										
Causes of collapse			without building collapse										
			severe damage/collapse to/of										
								building structure					
						☐ severe damage to foundations without building collapse							
						sever	e dama	ige to f	ounda	tions			

	I										
	and building collapse										
						buildi	ing disp	lacem	ent		
						∃ buildi	ing rota	ition			
DAMAGE TO STRUCT	TURE – Masonry,	/Wood	d build	dings							
	□ Yes	□ No			T				Specify, for each degree of damage severity, the portion of affected elements with respect to total		
		Light Damage				Medium Damage			ere Da	mage	elements in the building. Damage is to be considered "light"
Structural damage		<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	<1/3	1/3-2/3	>2/3	when the strength of the element is not compromised, there is no danger for occupants because of collapse /fallen objects
	Vertical structures Floors										Damage is to be considered "medium" when the strength of the element could be compromised,
	Stairs										leading to its collapse. Falling objects are possible.
	Roof										Damage is to be considered "severe"
	Partitions										when the strength of the element is
	Foundations										compromised and collapse occurred/is likely.
Causes of collapse			[8	sever sround without	t prese e dama wall be t building e dama	ige/col ecause ng colla	lapse of floo apse	d wave			
				g struct		•	•				

	□ severe damage to foundations without building collapse	
	□ severe damage to foundation and building collapse	
	□ building displacement	
	□ building rotation	
	_ _ _ .	Specify the economic value of damage.
	□ Yes □ No	
Damage to	_ _ _ damaged surface [m²]	
coating/plaster	_ _ _ €	Specify the economic value of damage.
Damage to doors and windows	□ Yes □ No	Windows/doors are "damaged" if
	N° of damaged doors _ _	they need to be fixed/replaced. On the contrary, incurred costs must be considered as "clean-up cost".
	_ _ _ damaged surface [m ²]	considered as clean-up cost.
	N° of damaged windows _ _	
	_ _ _ damaged surface [m ²]	
	_ _ _ _ €	Specify the economic value of damage.
Damage to floors	☐ Yes ☐ No _ _ _ _ damaged surface [m²]	Pavements are "damaged" if they need to be fixed/replaced. On the contrary, incurred costs must be considered as "clean-up cost".

	_ _ _ _ €	Specify the economic value of damage.							
Damage to technological systems	□ plumbing system □ electrical system □ heating system □ Other								
	_ _ _ _ €	Specify the economic value of damage.							
Damage to structure - Total	_ _ _ _ €	Specify the economic value of damage, as the sum of previous headings.							
DAMAGE TO CONTENTS									
Damage to furniture	□ Yes □ No								
	_ _ _ _ €	Specify the economic value of damage.							
Damage to household appliances	☐ Yes ☐ No Specify:								
	_ _ _ _ €	Specify the economic value of damage.							
Other	Specify:								
	_ _ _ _ €	Specify the economic value of damage.							

Damage to contents - Total	_ _ _ _ €		Specify the economic value of damage, as the sum of previous headings.
Direct damage - Total	_ _ _ _ €		Specify the economic value of damage, as the sum of previous headings.
Section 7C- Indirect damage	Data	Notes	Guidelines
Lack of usability	☐ Yes ☐ No Duration ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
Clean-up costs	□ Yes □ No		Clean-up costs relate, for example, to the following activities: cleaning, debris removal, clearing, etc.
	 □ private work □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		Indicate if clean-up was done by private citizens or local authorities. In the first case, please specify incurred costs or required job (in terms of days/person).
Section 7D- Mitigation factors	Data	Notes	Guidelines
Mitigation actions	 □ None □ Suction pumps □ Retaining walls □ Moving objects at upper floors □ Power interruption / switching off □ Evacuation 		

	☐ Other							
	Time:							
	Hour _ _ _							
	Date _ _ _ _							
	Motivation:							
SECTION 8 – ATTACHMENTS								
☐ Building Plan (1:100)								
☐ Photos to identify buildings								
☐ Photos to identify reference point for water depth record								
□ Photos of damaged items								