Damage and Loss Assessment Software for Post Flood in Jakarta (JAKSAFE)

Functional Specification Document

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WORLD BANK GROUP

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PENANGGULANGAN BENCANA INDONESIA

BPBD DKI JAKARTA

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Document Information

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Change History

Version	Date	Authors	Summary of Changes
1.0	26 February 2015	Kezia Roberta	Initial release

1.1	23 March 2015	Kezia Roberta	- Update URL Request to DIMS - Add road Impact Analysis - Add logic to calculate estimate aggregate impact - Update structure file of assumptions - Update DaLA calculation process - Update structure file of result - Update DaLA calculation Draft Report - Remove DaLA as QGIS Plug in
1.2	06 April 2015	Kezia Roberta	Translated document to English
1.3	21 April 2015	Kezia Roberta	- Change template - Add description for new settings interface - Finalization document

1 Introduction

1.1 Purpose

The purpose of this document is as a reference for developer or system analyst when developing or propose a solution for program to be developed.

1.2 Reference

- Lap DALA PDNA Jkt 2013_lores.pdf.

1.3 Definitions, Acronyms and Abbreviations

- BPBD – *Badan Penanggulangan Bencana Daerah* (Regional Disaster Management Agency).
- DaLA – Damage and Loss Assesment .
- DIMS – Disaster Information System of BPBD DKI Jakarta.
- OSM – Open Street Map.
- JSON – JavaScript Object Notation.
- CSV – Comma-Separated Values.
- RW – *Rukun Warga*, a division of the region of Indonesia under the Village(*Kelurahan*).
- RT – *Rukun Tetangga,* a division of the region of Indonesia under RW.

2 JakSAFE services

2.1 Description

JakSAFE service is a system to estimate the damage and loss(DaLA) due to flood event in DKI Jakarta. JakSAFE is running as services that will collect the flood report from DIMS every 6 hours. These report data are stored in JakSAFE database. During flood period, JakSAFE will query the report data and compile them into flood hazard shapefile (hazard.shp) that classified the DKI Jakarta area according to the height and duration of flood.

Hazard shapefile then will be analyzed with building shapefile and road shapefile to find both of affected and inundated asset. The result then will be classified by the asset type, subsector, and location (village/*kelurahan*) to obtain the csv file of the summary of affected and inundated asset in each village.

For asset that can be analyzed using spatial data, it will be analyzed using hazard file and aggregate data at predefined administartion level, such as RT, RW, village(*kelurahan*), district(*kecamatan*), city(*kota*), or province(*provinsi*). Hazard file is used to define the location, and the aggregate file is used to defined the number of asset. The result of this process is csv file that consists of affected and inundated asset in each affected area.

After the number of affected and inundated asset is obtained, the next process is calculate the DaLA. DaLA calculation is done by multiplying the number of affected asset with the assumption value of damage and loss. The result of calculation is presented in pdf report and published on JakSAFE user interface and the website of BPBD DKI Jakarta.

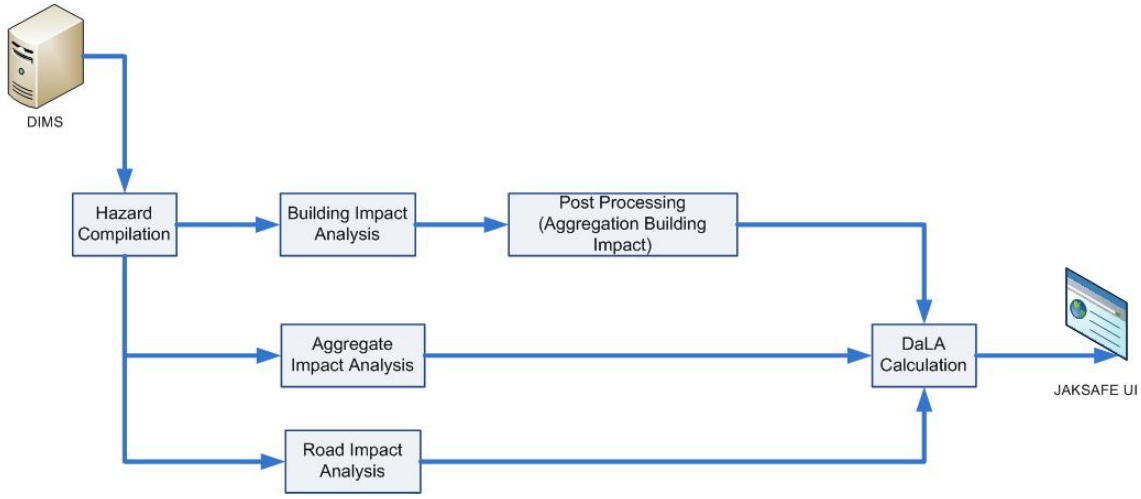


Figure 1. JakSAFE Service Process

2.2 Prerequisite

JakSAFE is made based on DaLA report of DKI Jakarta in 2013 by the World Bank. Based on that DaLA report, buildings or assets are categorized into 4 sectors and 15 sub-sectors with the list of assets as follows:

Sector	Subsector	Asset
Produktif (Productive)	*Pertanian* (Agriculture)	*Tambak* (Fish Pond)
	Perdagangan (Trade)	*Pasar Tradisional* (Traditional Market)
		Mal (Mal)
		Restoran (Restaurant)
		Minimarket
		Ruko (Shop house)
		UKM + mikro (Small and micro enterprise)
		Bongkar muat pelabuhan (unloading port)
	Industri (Industry)	*Pabrik* (factory)
		Perkantoran (office)
		Pabrik kecil (small office)
		Usaha mikro (micro enterprise)
	Pariwisata (Tourism)	Hotel
		Obyek Wisata, layanan turis (tourism object and services)
Sosial dan Perumahan (Social and Residential)	*Perumahan* (Residential)	*Rumah Teratur* (regular house)
		Rumah Tidak Teratur (irregular house)
	Kesehatan (Health)	*Apotek* (pharmacy)
		Rumah Sakit (hospital)
		Puskesmas (health center)
	Pendidikan (Education)	*Sekolah* (school)
		Universitas (university)

		Fasilitas Olahraga (sport facility)
Infrastuktur (Infrastucture)	*Transportasi* (Transportation)	*Jalan* (road)
		Terminal
		Kendaraan (vehicle)
		Kereta api (train)
	Telekomunikasi (Telecommunication)	Provider
		BTS
	Energi (Energy)	SPBU (gas station)
		Gardu PLN (PLN substation)
	Air bersih dan sanitasi (Water and Sanitation)	*Instalasi* PDAM (PDAM installation)
		MCK
		Pompa Air (water pump)
		Tanggul Air (levee)
Lintas sektor (Cross Sector)	*Pemerintahan* (Government)	*Fasilitas Kepolisian* (police facility)
		Fasilitas Pemerintahan (government facility)
		Fasilitas Militer (military facility)
		Rumah Dinas (official residence)
	Lingkungan (Environment)	*Taman* (park)
		Kebersihan (hygiene)
	Finansial (Finance)	*Perbankan* (banking)
		Asuransi (insurance)
	Agama (Faith)	*Masjid* (mosque)
		Gereja (church)
		Vihara

The impact of flood is classified by the duration and height of inundation as follows:

Kelas Dampak **Impact class**	***Tinggi (cm)*** **Height (cm)**	***Lama (hari)*** **Duration (days)**
a1	10-70	<1
a2	71-150	<1
a3	>150	<1
a4	*Terdampak* (Affected)	<1
b1	10-70	1-4
b2	71-150	1-4
b3	>150	1-4
b4	*Terdampak* (Affected)	1-4
c1	10-70	5-8
c2	71-150	5-8
c3	>150	5-8
c4	*Terdampak* (Affected)	5-8
d1	10-70	>8
d2	71-150	>8
d3	>150	>8
d4	*Terdampak* (Affected)	>8

Calculation of damage and loss is done by multiplying the assumption value of damage and loss with the number of affected assets. Therefore, the assumption data is required in the form of the value of damage and loss of each asset in the respetive impact class.

3 Detail Process

3.1 Hazard Compilation

3.1.1 Description

Hazard compilation is a module to compile the report of flood event in Jakarta into shapefile to be used as input for DaLA calculation.

3.1.2 Flow

When the jakSAFE service is started and the first request is running, the request time minus 6 hours is set as t0 (start period of flooding event). Every 6 hours, system will request flood event data in latest 6 hours from DIMS. The response is JSON file that will be parsed and saved into database. If within two consecutive days, the response is null, then the latest time when DIMS give the response is set as *t1* (end period of flooding event).

Before the system start to compile flood report, the system will query the fl_event table to check the availability of data from previous two days. If there is no record, then the system will set the request time minus 6 hours as *t0* and request time as *t1*. Otherwise, if there is any data, system will set the request time as *t1*. *t0* and *t1* of each process will be recorded in auto_calc table.

The process is started by querying flood event data between *t0* and *t1*, then classified them according the existence of id RT. The query result is saved into csv file, so there will be two csv file, they are report RT and report RW. These report will be compiled with boundary shapefile and *kelas_dampak*.csv. The compilation result of each reports then will be joined as a hazard shapefile (hazard.shp).

In case there is more than one record with same location but has different height, the height in that location is determined by taking the average value of height. For example, at RT 01/RW 01, in the first 6 hours (first report) is affeceted by 50 cm flood. The next 6 hours (second report), there is no report, then the next 6 hours (third report), that loaction is affected by 70 cm flood. When the data is compiled on the third report, the flood height at RT01/RW01 is (50+70)/2 = 60 cm.

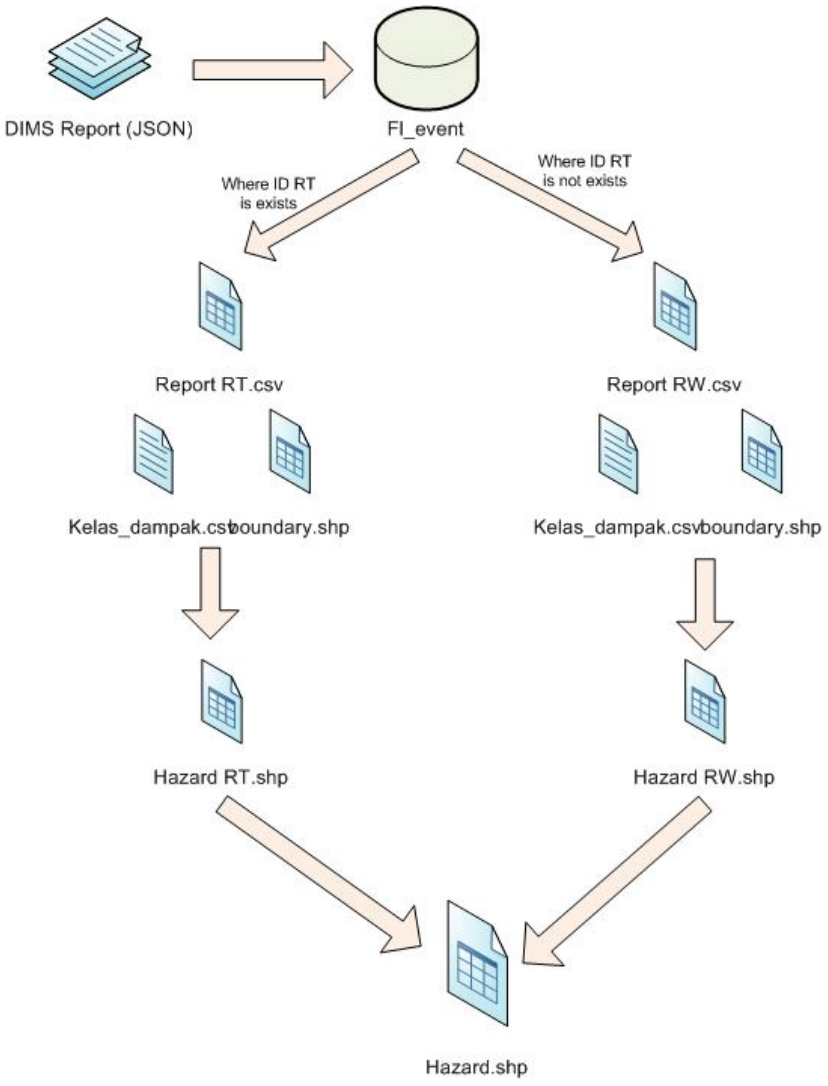


Figure 2. Complie hazard shapefile

3.1.3 Format Request Data

The report of flood event is obtained by sending GET request to DIMS via predefined URL. Request parameter is start time and end time.

Request sample : http://dims.url?starttime=1503181200&endtime=15031759

The response of that request is the flood event that reported between 18-03-2015 12:00 to 18-03-2015 17:59.

3.1.4 Format Laporan Kejadian Banjir (DIMS Response)

The response of DIMS which is the report of flood event is sent in JSON format. This response contains informations as follows :

- Id_RW : RW identifier, the last three digits represent the RT id. The '000' means the RT id is undefined.
- *Waktu kejadian* : the time when Village(*Kelurahan*) reports the event to BPBD.

- *Kelurahan* : the name of affected Village(*Kelurahan*).
- *Kecamatan* : the name of affected District (*Kecamatan*).
- RW: Affected RW.
- RT : Affected RT.
- *Ketinggian* : The height of indundation in those location in centimeters.

The sample of DIMS response:

```
{
        {
                "id_RW" : "3171000000000007000",
                "waktu_kejadian" : "2015-02-24 07:00:00",
                "kelurahan" : "nama kelurahan",
                "kecamatan" : "nama kecamatan",
                "RT": "07",
                "RW": "",
                "ketinggian" : "80"
        },
        {
                "id_RW" : "3171000000000008000",
                "waktu_kejadian" : "2015-02-24 08:00:00",
                "kelurahan" : "nama kelurahan",
                "kecamatan" : "nama kecamatan",
                "RW": "08",
                "RT": "",
                "ketinggian" : "40"
                },
        ...
}
```

3.1.5 Database

3.1.5.1 Table fl_event and fl_event_raw

Fl_event table in JakSAFE database that used to store the report data which sent by DIMS. The structure of fl_event table are as follows:

Field	Type	Description
Id	int	Sequential unique record id
ID_RW	Big int	Id RW
Village	Varchar	Village name
District	Varchar	District name
RT	Varchar	RT
RW	Varchar	RW
Height	Numeric	Height of inundation in cm
Evt_time	Datetime	Reporting time of flood event
Sync_time	Datetime	Request time to DIMS

The report of flood event from DIMS could contain data which in a location there was two report with different reporting time, such as:

```
{
        {
                "id_RW" : "3171000000000007000",
                "waktu_kejadian" : "2015-02-24 07:00:00",
                "kelurahan" : "kampung melayu",
                "kecamatan" : "jatinegara",
                "RT": "07",
                "RW": "01",
```

```
                "ketinggian" : "80"
        },
        {
                "id_RW" : "3171000000000007000",
                "waktu_kejadian" : "2015-02-24 08:00:00",
                "kelurahan" : "kampung melayu",
                "kecamatan" : "jatinegara",
                "RW": "07",
                "RT": "01",
                "ketinggian" : "40"
                },
        ...
}
```


If there is a kind of these data, then the report data will be saved on fl_event_raw and the worstcase data will be stored in fl_event.

Fl_event_raw is table which have same structure as fl_event, that used to store the raw data of DIMS response.

3.1.5.2 Table auto_calc

Table auto_calc is a table to stored the record of automatic calculation which runs every 6 hours.

Field	Type	Description
Id	int	Sequential unique record id
T0	Datetime	Starting date of flood event
T1	Datetime	Final date of flood event, request/process time
Damage	Numeric	Estimation of total damage between t0 to t1
Loss	Numeric	Estimation of total loss between t0 and t1

3.1.6 Input

The input for each stage of hazard compliation module are descibed in these following subsections.

3.1.6.1 Report RT dan Report RW

Report RT and Report RW are the result of querying fl_event table between t0 and t1, where:

1. Report RT is record which the last three digit of id_rw != '000', and
2. Report RW is record which the last three digit of id_rw == '000'

The result of query process is saved as csv file and stored in these directory:

- Report RT : **/root/auto/output/fl_report/requesttime[YYYYMMDDHHMMSSS]/requesttime_report_RT.csv**
- Report RW : **/root/auto/output/fl_report/requesttime[YYYYMMDDHHMMSSS]/requesttime_report_RW.csv**

3.1.6.2 Boundary Shapefile

Boundary shapefile of RT and RW DKI Jakarta. These shapefile are stored in directory:

/root /auto/input/boundary/boundary.shp

3.1.6.3 Impact Class

Configuration file in csv format to define the limit of height and duration of inundation for each flood impact classification. The column of *kelas_dampak*.csv are as follows:

1. ***Kelas_dampak*** (impact_class): unique code for impact class, for example a1, a2, b1, b2, etc.
2. ***Tinggi_min*** (min_heigh) : minimum height of impact class(cm).
3. ***Tinggi_max*** (max_heigh): maximum height of impact class(cm).
4. ***Durasi_min*** (min_duration): minimum duration of impact class(days).
5. ***Durasi_max*** (max_duration): maximum duration of impact class(days).

Here is the example of *kelas_dampak*.csv:

Kelas_dampak	***Tinggi_min***	***Tinggi_max***	***Durasi_min***	***Durasi_max***
A1	0	4	10	50
A2	0	4	50	150

kelas_dampak.csv file will be stored in directory :
/root/auto/config/kelas_dampak/kelas_dampak.csv

3.1.7 Output

The output of each stages in hazard compilation module are described in these following subsections.

3.1.7.1 Hazard RT dan RW

Hazard RT is a compilation result of report_RT.csv, boundary.shp, and *kelas_dampak*.csv. Hazard RW is a compilation result of report_RW.csv, boundary.shp, and kelas_dampak.csv. The attributes of hazard RT and RW are as follows:

- ID RT
- ID RW
- *Kelurahan* (Village)
- *Kecamatan* (District)
- *Kota* (City)
- *Rata-rata ketinggian* : The average of inundation height
- *Lama rendaman* : duration of inundation
- Kelas dampak : impact class

Hazard RT and hazard RW shapefile will be stored in directory:

- Hazard RT:
  /root /Auto/output/hazard /[request time(YYYYMMDDHHMM)]/hazard_RT.shp
- Hazard RW:
  /root /Auto/output/hazard/[request time (YYYYMMDDHHMM)]/hazard_RW.shp

3.1.7.2 Hazard Shapefile

This is the final result of hazard compilation module which is the result of joining shapefile of hazard RT and shapefile of hazard RW. The administrative level of hazard shapefile is RT.

The shapefile is stored in directory:

/root /auto/output/hazard/[start time_endtime (YYYYMMDDHHMMSS)]/starttime_endtime (YYYYMMDDHHMMSS)_hazard.shp

3.2 Shapefile Impact Analysis

3.2.1 Description

Shapefile impact anlysis is a process to define both the inundated asset and affected asset. Shapefile impact analysis is done by running impact function with hazard shapefile and building shapefile as input file.

In this process, the building shapefile will be overlayed with hazard shapefile, so that the inundated and affected asset can be obtained. The output of this process is building shapefile with additional information of the flooding location, the height of flood, the duration of flood, impact class, and the area of affeted asset. The output file will be stored in directory:

/root/auto/output/impact/[startime_endtime(YYYYMMDDHHMMSS)]/shapefile/ [startime_endtime(YYYYMMDDHHMMSS)]_impact_building.shp.

The location of building shapefile:

/root/auto/input/exposure/shapefile/building_exposure.shp

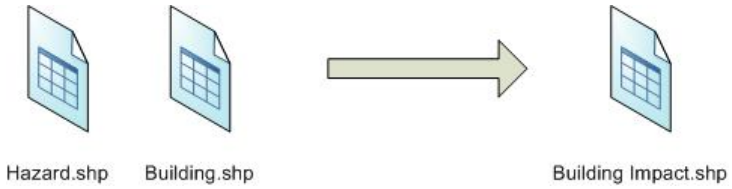


Figure 3. Impact analysis process

3.3 Post Processing (Aggregation Shapefile Impact Analysis)

3.3.1 Decription

This is the stage after impact analysis to classified the affected asset based on its type, subsector, village and impact class.

3.3.2 Process

- Read *subsektor.config* file to determine the subsector that to be found and the type of its asset.
- For each affected asset, classified it according to its type, so that the general type of asset is defined.
- Group the asset based on its village, subsector, impact class and asset type, so that the impact summary is obtained.

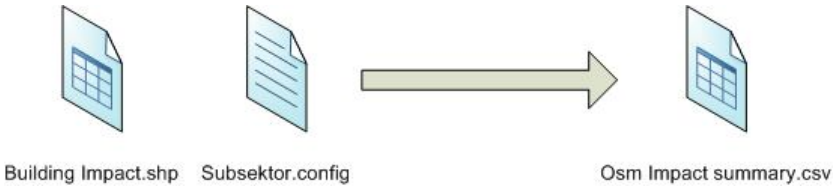


Figure 4. Post Processing Building Impact Analysis

3.3.3 File Description

3.3.3.1 Impact shapefile

Impact shapefile is the impact analysis result of building shapefile.

3.3.3.2 Subsector config

This is a python configuration file that define the source of exposure data of each asset. Here is the draft of subsector config:

```
ASET = {}
```

Array of assets

```
ASET['PASAR TRADISIONAL'] = {
       'SEKTOR': 'PRODUKTIF',
       'SUBSEKTOR' : 'PERDAGANGAN',
       'ASET' : 'PASAR TRADISIONAL',
       'HAZARD' : FALSE,
       'IMPACT' : 'osm_impact.csv'
       'DALA' : 1
}
```

Configuration for assets, example *Pasar Traditional* Traditional Market)
SEKTOR = sector name,
SUBSEKTOR = subsector name,
ASET = asset name,
HAZARD = hazard file, default **false,**
IMPACT = impact summary csv filename,
DALA = method ID to estimated DALA

This subsector config file is stored in directory : **/root/auto/config/subsektor/subsektor.py**

3.3.3.3 Impact summary

Impact summary is csv file contains aggregate data on village level of impact building shapefile. The structure of csv file are as follows:

Provinsi (Province)	*Kota* (City)	*Kecamatan* (District)	*Kelurahan* (Village)	*Subsektor* (Subsector)	*Aset* (Asset)	*Kelas_dampak* (Impact_class)	*Jumlah_asset* (Total_asset)

The location of output file:
/root/jakSAFE/Auto/output/impact/[starttime_endtime (YYYYMMDDHHMM)]/summary/osm_impact.csv

3.4 Aggregate Impact Analysis

3.4.1 Description

Not all subsector asset can be obtained from building impact analysis, therefore it takes aggregate impact analysis process to obtain total asset in affected location. Aggregate impact analysis module is used to determine how many assets are affeceted in flooded area.

3.4.2 Process

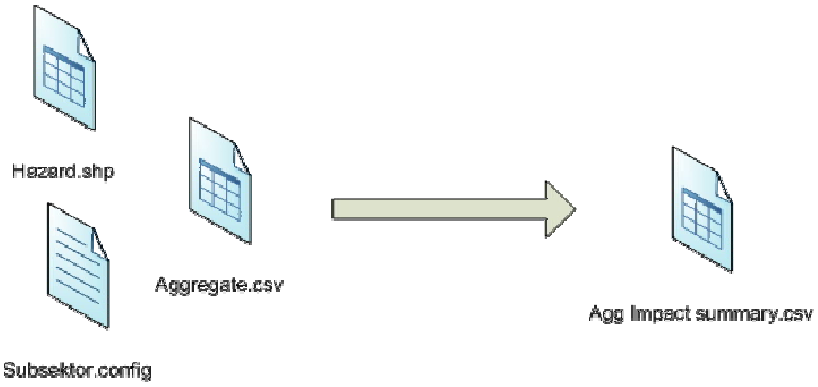


Figure 5. Aggregate Impact Analysis IO files

- Read config file to find the asset to be calculate using aggregate data.
- For each asset to be calculated using aggregate data:
  - Find the asset in aggregate file.
  - Find the location, the location lookup level is start from province to RT. If there is no location information on lower lookup level then the aggregate level is the current lookup level
  - Example:
    - Asset = BTS
    - Hazard :
      Jakarta Timur; Jatinegara; Kampung Melayu; RW 01; 001; C2
    - Aggregate:
      DKI Jakarta; Jakarta Timur; Jatinegara; Kampung melayu; NULL; NULL; Telekomunikasi; BTS; 7
    - Based on those data above, the hazard level is RT and the aggregate level is Kelurahan
- Define the affected and inundated assets in each RT/RW
  - Case 1:
    - Hazard level : RT
    - Aggregate level : RT
    - Total Affected Asset = Total asset in RT
  - Case 2:
    - Hazard level : RT
    - Aggregate level : RW / *Kelurahan* / *Kecamatan* / *Kota* / *Provinsi*
    - Total Affected Asset = percentage of RT in aggregate level * total asset in aggregate level
    - Example: RT01/RW 01, Kampung Melayu, Jatinegara, Jakarta Timur is flooded 50 cm for 5 days (C2). Data aggregate is in RW level, that RW 01 Kampung Melayu have 50 school. Area of RT is 1 m2 and area of RW is 5 m2. (The area is known from the hazard shapefile).
      Based on that information, so
      - percentage RT =1/5*100% = 20%
      - Total school in RT 01 =20%*50 = 10 unit.

- Case 3:
  - Hazard level : RW
  - Aggregate level : RT
  - Total Affected Asset = Total asset in each RT in that RW
- Case 4
  - Hazard Level : RW
  - Aggeragate level : RW
  - Total Affected Asset = Total asset in RW
- Case 5 :
  - Hazard level : RW
  - Aggergate level : *Kelurahan / Kecamatan /Kota /Provinsi*
  - Total Affected Asset =Percentage RW in aggregate level * total asset in aggregate level

- Affected asset on level RT and RW then will be aggregated into Village level.

3.4.3 File Description

3.4.3.1 Hazard shapefile

Hazard shapefile is the output of hazard compilation module. This file is used to specify the affected location and the percentage of affected area.

3.4.3.2 Subsector config

Subsector config is the same config file that used in post processing aggregate building impact analysis. This file is used to determined the assets that should be calculated using aggregate file.

3.4.3.3 Aggregate csv

Aggregate csv is the input file in csv format which contains data of total assets in an administration area. The structure of this file is as follows:

***Provinsi* (Province)**	***Kota* (City)**	***Kecamatan* (District)**	***Kelurahan* (Village)**	**RW**	**RT**	***Subsektor* (subsector)**	***Aset* (asset)**	***Jumlah aset* (total asset)**
DKI Jakarta	Jakarta Timur	Jatinegara	Kampung Melayu	01	01	Air bersih dan sanitasi	MCK	6
DKI Jakarta	Jakarta Timur	Jatinegara	Kampung Melayu	02	*NULL*	Air bersih dan sanitasi	MCK	18
DKI Jakarta	Jakarta Timur	Jatinegara	Kampung Melayu	*NULL*	*NULL*	Telekomunikasi	BTS	20
DKI Jakarta	Jakarta Timur	Jatinegara	*NULL*	*NULL*	*NULL*	Lingkungan	Taman	5
DKI Jakarta	Jakarta Timur	*NULL*	*NULL*	*NULL*	*NULL*	Energi	Gardu PLN	38
DKI Jakarta	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	Transportasi	Terminal	60

The location of aggregate file : **/root/auto/input/aggregat/aggregat.csv**

3.4.3.4 Aggregate Impact Summary

Aggregate impact summary is the result of aggregate impact analysis. This is a csv file which have structure as follows:

***Provinsi* (Province)**	***Kota* (City)**	***Kecamatan* (District)**	***Kelurahan* (Village)**	***Kelas Dampak* (Impact Class)**	***Subsektor* (subsector)**	***Aset* (Asset)**	***Jumlah aset* (Total asset)**
DKI Jakarta	Jakarta Timur	Jatinegara	Kampung Melayu	C2	Air bersih dan sanitasi	MCK	6
DKI Jakarta	Jakarta Timur	Jatinegara	Kampung Melayu	C2	Air bersih dan sanitasi	Pompa Air	3

The location of output file:
/root/auto/output/impact/[starttime_endtime (YYYYMMDDHHMM)]/summary/agg_impact.csv

3.5 Road Impact Analysis

3.5.1 Description

Module to analyze the affected Jakarta Road. The result is the length of affected or inundated road in meters.

3.5.2 Process

- Intersect hazard and road shapefile
- For each road shapefile that intersected with hazard area, find the length of affected road segment.
- The result of road impact analysis is the information of the length, location, and impact class of affected road segment.

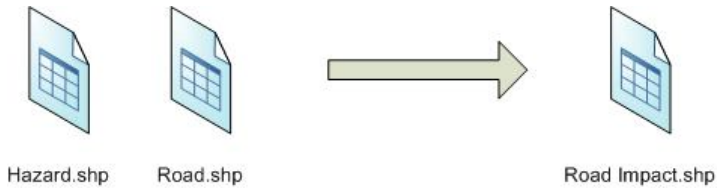


Figure 6. Road Impact Analysis

3.5.3 File Structure

3.5.3.1 Road Shapefile (road.shp)

Road shapefile is OSM road shapefile with additional information of the length of the road and the number and coefficient of vehicles that across the road.

***Nama Jalan* (Road name)**	***Panjang*(m) (Length (m))**	***Angkot***	***Bus Sedang* (minibus)**	***Bus Besar* (big bus)**	***Mobil* (private car)**	***Motor* (motorcycle)**	**Truck**	***Lainnya* (others)**	***K_angkot***	***K_...***
Jend. Sudirman	4125	10	50	20	1000	2000	500	1000	0.1	..

The location of road shapefile :**/root/auto/input/exposure/shapefile/road_exposure.shp**

3.5.3.2 Summary of road impact analysis

The structure of summary result of road impact analysis are as follows:

Nama Jalan **(Road name)**	***Panjang*****(m)** **(length (m))**	***KelasDampak*** **(Impact Class)**	***Provinsi*** **(Province)**	***Kota*** **(City)**	***Kecamatan*** **(District)**	***Kelurahan*** **(Village)**	**RW**	**RT**
Jend. Sudirman	500	D1	DKI Jakarta	Jakarta Selatan	Kebayoran Baru	Senayan	01	001

The location of output file :
/root/auto/output/impact/[starttime_endtime (YYYYMMDDHHMMSS)]/summary/road_impact.csv

3.6 DaLA Calculation

3.6.1 Description

This is a module to calculate the damage and loss based on the summary of impact building post processing, aggregate impact analysis, and road impact analysis.

3.6.2 Process

The input of DaLA calculation are building impact summary, aggregate impact, road impact and assumptions file. The output are DaLA report and raw file of calculation process.

DaLA Report consists of two reports, DaLA report of all assets and DaLa report for insurance. The insurance DaLA report is created separately to avoid double counting for losses, because the insurance loss is the value of the claim to be paid to the insured assets affected by flooding events.

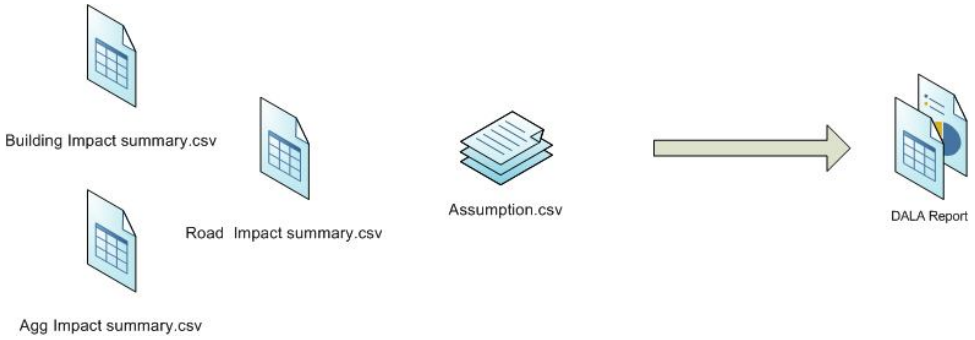


Figure 7. File Flow of DaLA calculation

There are 5 ways to estimated DaLA of each asset:

1. DaLA calculation per unit asset
2. DaLA calculation based on the area of asset
3. DaLA calculation based on the length of asset
4. DaLA calculation based on the information of aggregate loss/damage
5. DaLA calculation for insurance

Total Damage and total loss exclude insurance DaLA result are stored in auto_calc table.

Terminal
Kereta api (Stasiun)(Train Station)

Apotek
Rumah Sakit

Bandara (Airport)
BTS
Taman (Park)
Perbankan (kerusakan)(Damage of banking asset)
Asuransi (kerusakan)(Damage of insurance asset)
Pasar Tradisional (Traditional Market)
Mal
Minimarket
Ruko (Shop house)
UKM+Mikro(Small and micro enterprise)
Pabrik (Factory)
Perkantoran (Office)
Pabrik Kecil (Small factory)
Usaha Mikro (Micro enterprise)
Hotel
Objek Wisata(Tourism object)
Rumah teratur (Regular house)
Rumah tidak teratur (Irregular house)
Puskesmas
Sekolah
Universitas
Fasilitas Olahraga
Gardu PLN
SPBU
Instalasi PDAM
MCK
Pompa Air (Water pump)
Tanggul Air (Levee)
Fasilitas Kepolisian(Police facility)
Fasilitas Pemerintahan (Governmnet Facility)
Fasilitas Militer (Military Facility)
Rumah Dinas(Official residential)
Masjid (Mosque)
Gereja (Church)
Vihara

This calculation method is also used to calculated DaLA for vehicle asset. Before calculate the DaLA, number of affected vehicle asset should be determined. Number of affected vehicle is calculated according to the inundated or affected roads.

Input for this calculation are:

- Road impact analysis to find the affected road
- Road shapefile to find the number and coefficient of each vehicle
- Assumptions of damage and loss matrix as the damage/loss value

The logic for this calculation are as follows:

- Find the name of affected road from road impact file
- For each distinct road name that have the worst impact class, find the number of affected vehicle. The data of number and coefficient of each vehicle are provided in road shapefile.
- After knowing the number of affected vehicle, damage and loss can be estimated by multipying the number of affected vehicle with coefficient of asset and the value of appropriate damage/loss matrix.
- Example:

Road impact analysis

Road Name	Length	Impact class
Panglima polim	100	C1
Panglima polim	50	A2
Fatmawati	5	A4

Road shapefile

Road name	length	Angkot	Bus sedang	...	Koefisien angkot	Koefisien bus sedang	...
Panglima Polim	900	100	50	...	0.7	0.8	..

Damage matrix

Asset	Subsector	A1	A2	...	C1	...	D4
KENDARAAN	TRANSPORTASI	1000000	1000000		2000000		2000000

Loss Matrix

Asset	Subsector	A1	A2	...	C1	...	D4
KENDARAAN	TRANSPORTASI	1000000	1000000		2000000		2000000

Based on the road impact analysis, it is found that the affected road is *panglima polim*, and this road has vary impact class, that is C1 and A2. Since C1 is worse than A2 then the impact class of *Panglima Polim* is C1.

From road shapefile, it is known that *Panglima Polim* is accrosed by 100 *angkot,* 50 *bus sedang*. So, the **Damage of vehicle** is

(Total *Angkot* * Coefficient * Damage Unit) + (Total *Bus Sedang* * Coefficient * Damage Unit) + ..

The **Loss of vehicle** is

(Total *Angkot* * Coefficient * Loss Unit) + (Total *Bus Sedang* * Coefficient * Loss Unit) + ..

3.6.2.1 DaLA calculation based on the area of asset

This function is to calculate the damage and loss according to the area of inundated or affected asset. The calculation method is same as the calculation for unit asset, however it count area of asset instead of number of unit. The area of asset then multiplied by the value of damage and loss from damage/loss matrix.

This function is used to calculate asset of *pertanian* (agriculture) and *lingkungan* (environment), that is *tambak* (fish pond) and *kebersihan* (hygiene).

3.6.2.2 DaLA calculation based on the length of asset

This function is to calculate the damage and loss according to the length of the inundated or affected asset. This calculation is used for the inundated and affected asset which have the length attribute, such as road(*Jalan)*.

The calculation method is same as the calculation for unit asset. The length of asset will multiply by the value of damage and loss from damage/loss matrix.

3.6.2.3 DaLA calculaton based on information of aggregate valye of damage/loss

If the known value of loss or damage is aggregate assumptions, then the loss for each area is determined by the percentage of the area. The input is hazard file, aggeragte assumption. The logic of calculation is:

- Look at the aggerate level of aggregate assumption file. If the Province name is known then the assumpton level is province, else if the lower level is known then the assumption level is that lower level.

- Calculate the percentage of affected area on the area of aggregate assumptions. The area of affected can be found in hazard shapefile.
  Percentage of affected area = affected area/total affected area on agregate level
- **Loss = percentage of affected area * value of aggregate loss**
- **Damage =percentage of affected area * value of aggregate damage**

Asset to be calculate by this function :

- Provider
- Banking (Loss)

3.6.2.4 DaLA insurance calculation

The losses of insurance asset is total claim that should be paid by insurance company to their customer. Claim that should be paid is categorized into four types, namely property, motor, engineering, and general accident.

Input for calculation of DaLA insurance as follows:

- DaLA Calculation result
- Assumptions of insurance penetration
- Insurance assumptions

To estimate the losses of property, motor and engineering, the DaLA result of each asset is multiplied by the assumption value of insurance penetration.

Loss value of general accident is **population of Jakarta * percentage of insurace penetration * probability of accident * claim value**. These assumptions can be found on insurance assumptions file.

Example:

DaLA calculation result

***Provinsi* (Province)**	***Kota* (City)**	***Kecamatan* (District)**	***Kelurahan* (Village)**	***Subsektor* (Subsector)**	***Aset* (Asset)**	***Kerusakan* (Damage)**	***Kerugian* (Loss)**
DKI JAKARTA	JAKARTA SELATAN	KEBAYORAN BARU	PETOGOGAN	PERUMAHAN	RUMAH TERATUR	100000000	1000000000
DKI JAKARTA	JAKARTA SELATAN	KEABYORAN BARU	PULO	PERUMAHAN	RUMAH TERATUR	200000000	1000000000

Assumptions of insurance peentration

SUBSEKTOR (Subsector)	**ASSET**	**INSURANCE TYPE**	**PROVINSI (Province)**	**KOTA (City)**	**KECAMATAN (District)**	**KELURAHAN (Village)**	**PENETRASI ASURANSI (insurance penetration)**
PERUMAHAN	RUMAH TERATUR	PROPERTY	DKI JAKARTA				0.9

Insurance loss for REGULAR HOUSE = (100000000 + 200000000)*0.9 = xxxx

3.6.3 Assumptions

There are two types of assumption file, namely damage/loss assumption file for each asset and impact class and aggregate damage/loss assumption in an area.

3.6.3.1 Assumptions Matrix

3.6.3.1.1 Damage

***Subsektor* (Subsector)**	***Aset* (Asset)**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
Pendidikan	*Sekolah*																
Kesehatan	*Puskesmas*																

3.6.3.1.2 Loss

***Subsektor* (Subsector)**	***Aset* (Asset)**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
Pendidikan	*Sekolah*																
Kesehatan	*Puskesmas*																

3.6.3.2 Matrix of Aggregate assumption

***Provinsi* (Province)**	***Kota* (City)**	***Kecamatan* (District)**	***Kelurahan* (village)**	**RW**	**RT**	***Subsektor* (subsector)**	***Aset* (asset)**	***Kerugian* (loss)**	***Kerusakan* (damage)**
DKI Jakarta	*Null*	*Null*	*Null*	*Null*	*Null*	Finansial	Perbankan	*Null*	58000000000
DKI Jakarta	*Null*	*Null*	*Null*	*Null*	*Null*	Finansial	Asuransi	*Null*	30000000000

3.6.4 File Description

3.6.4.1 Impact summary

Impact summary is the result of impact summary that stored in directory :
/root/auto/output/impact/[starttime_endtime (YYYYMMDDHHMMSS)]/summary/

3.6.4.2 Assumptions

Assumptions which used by the system is consits of file assumption and aggegate assumption that has been descibed in previous section, insurance assumptions, and assumptions of insurance penetration.

The structure of insurance assumption is

Asumsi (Assumptions)	**Nilai (value)**
Populasi DKI Jakarta (Population in DKI Jakarta)	10000000
Kemungkinan Kecelakaan (Probability of accident)	0.000001%
Nilai klaim general accident (General accident claim value)	1000000000

The structure of assumptions of insurance penetration file is:

Subsektor (subsector)	Aset (asset)	Insurance Type (insurance type)	Provinsi (province)	Kota (city)	Kecamatan (district)	Kelurahan (village)	Penetrasi Asuransi (insurance penetration)
Perumahan	Rumah Teratur	Properti	DKI JAKARTA				0.8

These assumption file is save in directory:

- **/root /Auto/input/assumptions/asumsi_kerugian.csv**
- **/root /Auto/input/assumptions/asumsi_kerusakan.csv**
- **/root /Auto/input/assumptions/asumsi_aggregat.csv**
- **/root /Auto/input/assumptions/asumsi_asuransi.csv**
- **/root /Auto/input/assumptions/asumsi_penetrasiasuransi.csv**

When the calculation process is running, these file willl be copied to this directory:

- **/root/jakSAFE/Auto/output/ assumptions /[starttime_endtime(YYYYMMDDHHMMSS)] /**

3.6.4.3 Metadata of Assumptions

This is a file that contains the source of assumption that used by each asset.

Aset (Asset)	Sumber (source)
Sekolah	DaLA DKI Jakarta 2013, World Bank
Universitas	DaLA DKI Jakarta 2013, World Bank

This file is saved in the same directory as assumption file.

3.6.4.4 DaLA Report

The result of DaLA calculation is in form of csv file contains detail calculation result and pdf file contains the summary of DaLA with chart.

1. Result of DaLA for each subsector
   The structure of csv file is

Provinsi	Kota	Kecamatan	Kelurahan	Subsektor	Aset	Kerusakan	Kerugian

   Filename : **DaLAsubsector_starttime_endtime(YYMMDDHHMMSS).csv**
2. Summary of calculation on City Level
   The structure of csv file is

Sektor	Subsektor	Asset	Kota	Kerusakan	Kerugian

   Filename : **DaLAsummary_starttime_endtime(YYMMDDHHMMSS).csv**

The pdf filename is **DaLA_starttime_endtime(YYMMDDHHMMSS).pdf**

File location: **/root/jakSAFE /output/report/[starttime_endtime(YYYYMMDDHHMM)]/**

4 User Interface and Function

4.1 Description

JakSAFE service is running on background. The user interface is needed to view the report of calculation and process log, configure data input and output, and to calculate DaLA for specific period of time. The interface is build as a web based application.

4.2 Menu

- Automatic Report
- AdHoc DaLA
- Flood Reports
- Settings
- Information
- Login/Logout

4.3 Automatic Report

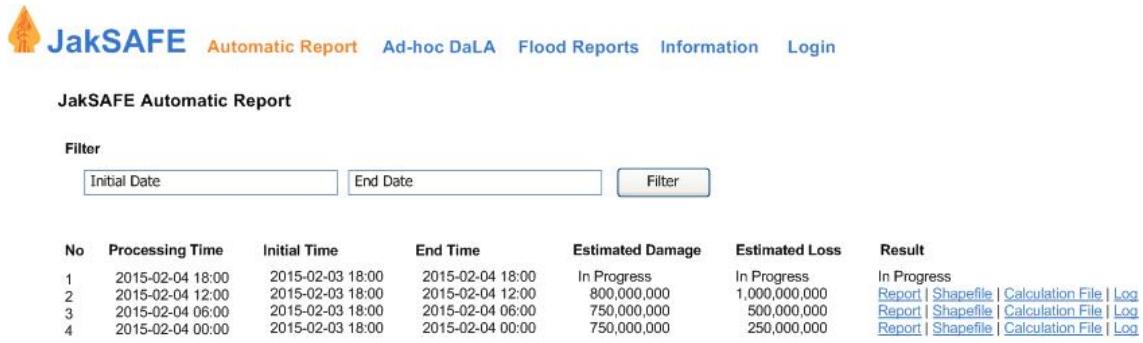


Figure 8. JakSAFE Interface - Automatic Report

This is the page to see the estimation value of DaLA every 6 hours and download the detail report. The component of automatic report page are as follows:

Page Element	Type	Description
initialDate_filter	Textbox, datepicker	Field to input the initial date to filter the automatic calculation record
endDate_filter	Textbox, datepicker	Field to input the end date to fileter the automatic calculation record
Filter	Button	Button to filter the record of automatic calculation during the initial date to end date
Report_table	Table	Table which consists of record from auto_calc table. The records are sorted descending by processing time. - Processing time = auto_calc.t1 - Initial time = auto_calc.t0 - End time = auto_calc.t1 - Estimated damage = auto_calc.damage. If null then the value in row is 'In Progress' - Estimated loss = auto_calc.loss, if null then the value in row is 'In Progress' - Result = link to download the detail result of calculation

4.3.1 Functionality

4.3.1.1 Filter

- To filter the record by the initial date and end date
- When the user click 'Filter' button, the report table will show the record calculation that has been done between initial date and end date. The initial date and end date is used as range of field t1 when querying adhoc_calc table.
- Both startdate and enddate is required. Date format is 'YYYY-MM-DD'

4.3.1.2 Download Result

- Fuction to download the DaLA calculation result, it consists of :
    - **Report**
      When this link is clicked, then the pdf report file will be downloaded.
    - **Shapefile**
      When the shapefile link is clicked then the zip file which consists of hazard shapefile and impact analysis shapefile will be downloaded.
    - **Calculation File**
      When the calculation file is clicked then the zip file which consists of aggregate impact summary, building impact summary, road impact summary and DaLA calculation table will be downloaded.
    - **Log**
      When the log is clicked then the log process file will be downloaded.

4.4 AdHoc DaLA

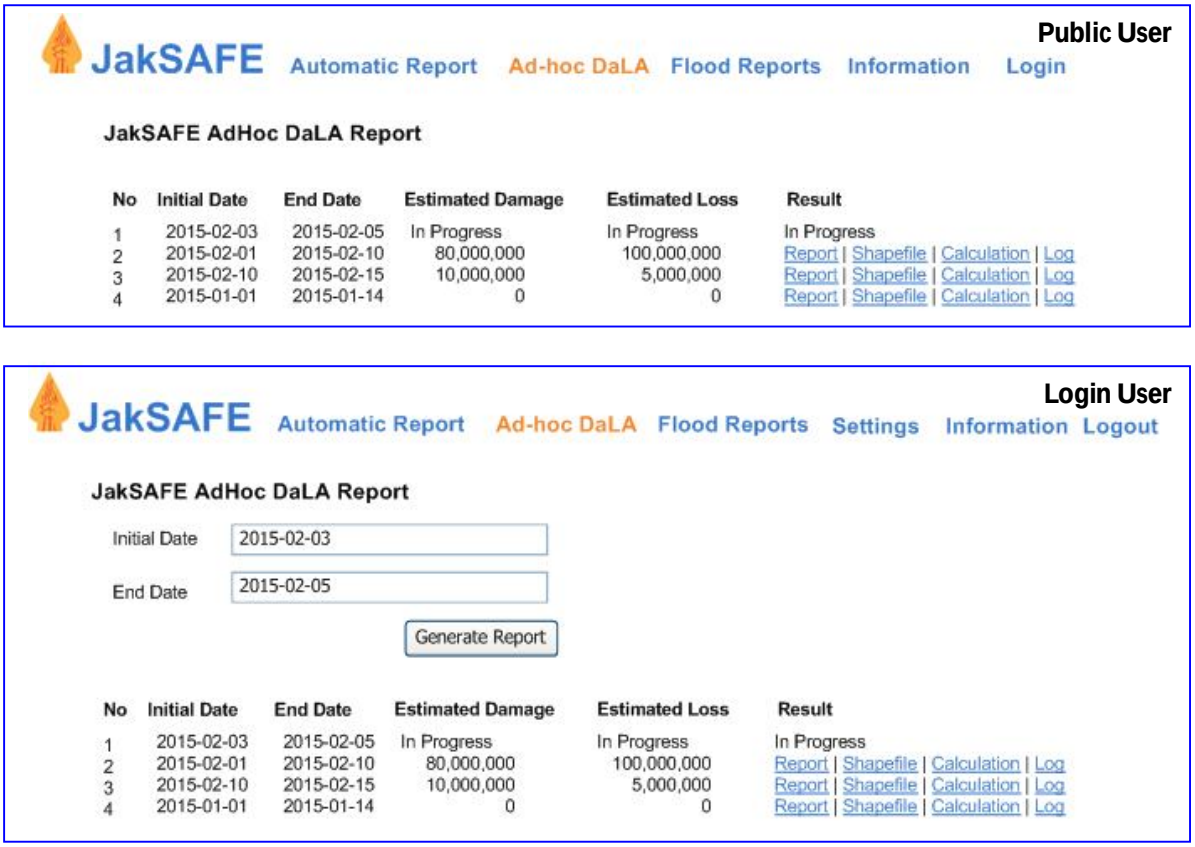


Figure 9. User Interface AdHoc DaLA report

This is the page to view DaLA report for specific period that defined by user. There are two interface for adhoc DaLA. The interface for public user and interface for login user. At user login interface, there are functionality to generate DaLA reports.

The component in JakSAFE adhoc DaLAreport is as follows:

Form element	Type	Description
Initial_date	Textbox, datepicker	Initial date of DaLA calculation.
End_date	Textbox, datepicker	End date of DaLA Calculation.
Create_report	Button	Button to start DaLA calculation.
AdHoc Report	Tabel	Table which consits the summary of adhoc calculation result. Data is taken from adhoc_calac table, sort descending Initial date = adhoc_calc.t0 End date = adhoc_calc.t1 Estimated damage = adhoc_calc.damage, if there is no value yet then the value is 'In Progress' Estimated loss = adhoc_calc.loss, if there is no value yet then the value is 'In Progress' Result = link to download the details of calculation result. If the calculation is running, show the progress bar.

4.4.1 Functionality

To calculate DaLA in specific period of time. This function only available for login user.

On click '**Generate Report**' button:

- System will read the input data (initial date and end date)
- End date should be greater than input date.
- If input validation is succeed then system will start the adhoc DaLA process, starting from Hazard compilation to DaLA calculation. The detail is explained below.

4.4.1.1 Hazard Compilation

- To query flood event data between t0 (initial time) and t1(end time). This data then will be classified by the existence of ID RT.
- If there is no record found, then the process is finished with 'No Flood Event' on result column.
- The next step is compile the query result with RT and RW boundary shapefile and *kelas_dampak*.csv. The '*kelas_dampak*.csv' file is the same file which used in automatic process
- The compilation hazard RT dan RW then merge into a hazard shapefile
- The output is stored in directory :
    - **/root/ AdHoc/output/hazard/[starttime_endtime(YYYYMMDDHHMMSS)]/**

4.4.1.2 Impact Analysis

- The hazard shapefile will be overlayed with building shapefile. This proces will be resulting the impact shapefile.
- Building data is the building shapefile that used in automatic process
- The output directory is
  /root/Adhoc/output/impact/[starttime_endtime(YYYYMMDDHHMMSS)]/shapefile/

4.4.1.3 Post Processing Aggregation Impact Analysis Result

- Aggregating the impact analysis result by its building type, location and impact class
- The process and config file are just like in the automatic process.
- The output directory is:
  root/adhoc/output/impact/[starttime_endtime(YYYYMMDDHHMMSS)]/summary/

4.4.1.4 Aggregat Impact Analysis

- To find the affected assets that can not be defined by OSM shapefile.
- The impact analysis process, aggregate file and configuration file that used in this process are the same file as in automatic process.
- The output is stored in this directory:
  root/adhoc/output/impact/[starttime_endtime(YYYYMMDDHHMMSS)]/summary/

4.4.1.5 Road Impact Analysis

- The hazard shapefile will be overlayed with road shapefile. This proces will be resulting the impact shapefile.
- Road data is the road shapefile that used in automatic process
- The output directory is

/root/jakSAFE/Auto/output/impact/[starttime_endtime(YYYYMMDDHHMMSS)]/shapefile/

4.4.1.6 DaLA Calculation

- To calculate the damage and loss for the affected assets
- The process flow and assumptions file are same as in the automatic process.
- The output will be stored in this directory: **/root/jakSAFE/adhoc/output/report/[starttime_endtime(YYYYMMDDHHMMSS)]/**
- Total damage and loss will be saved into adhoc_calc table

4.4.2 Download Calculation Result

- The feature to download calculation result is same as the feature in automatic report page.

4.4.3 Database structure

Adhoc_calc table is a table to store the record of adhoc calculation. The structure of adhoc_calc table are as follows:

Tabel 1. adhoc_calc

Field	Type	Description
Id	int	Sequential unique record id
Create_date	Datetime	Create date of adhoc report
T0	Datetime	Start date to query flood event from fl_event table
T1	Datetime	End time to query flood event from fl_event table
Damage	Numeric	Estimated value of total damages during t0 to t1
Loss	Numeric	Estimated value of total losses during t0 to t1

4.5 Settings

This menu only can be accessed by login user.

4.5.1 Global Config

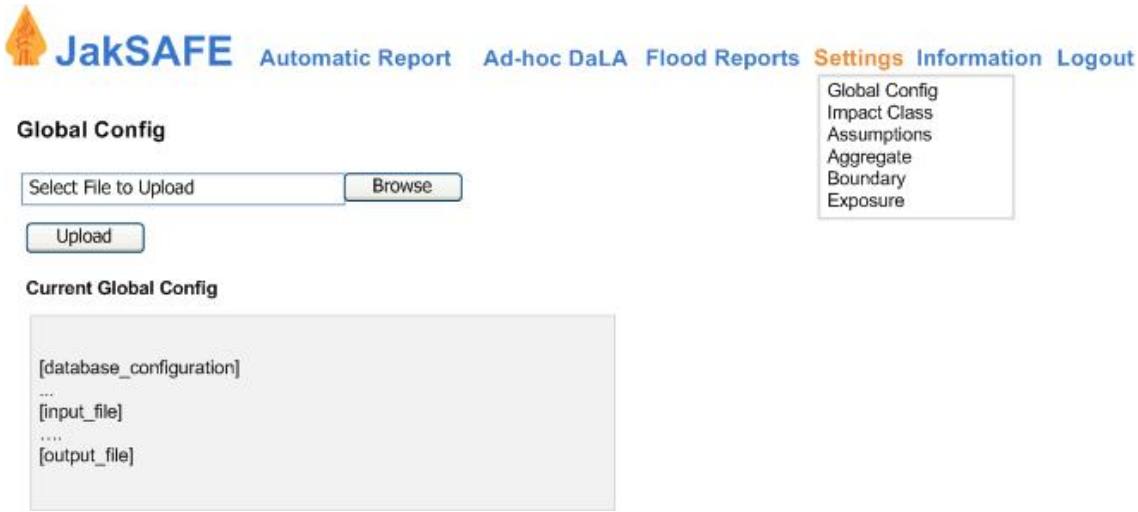


Figure 10. Global config settings

This is page to view the current configuration that used in calculation process. Component of global config page are as follow:

Form element	Type	Description
File select	Textbox	Texbox which show the location and name of selected file.
Browse	Button	Button to search '*.cfg' file to be uploaded
Upload	Button	Button to upload cfg file Onclick : 1. System will validate the format of file. The extention of file must be .cfg 2. System will replace the curreny cofiguration file with new file
Global config	Textarea, disabled	Diabled text area which display the content of global_config.cfg file.

4.5.2 Impact Class

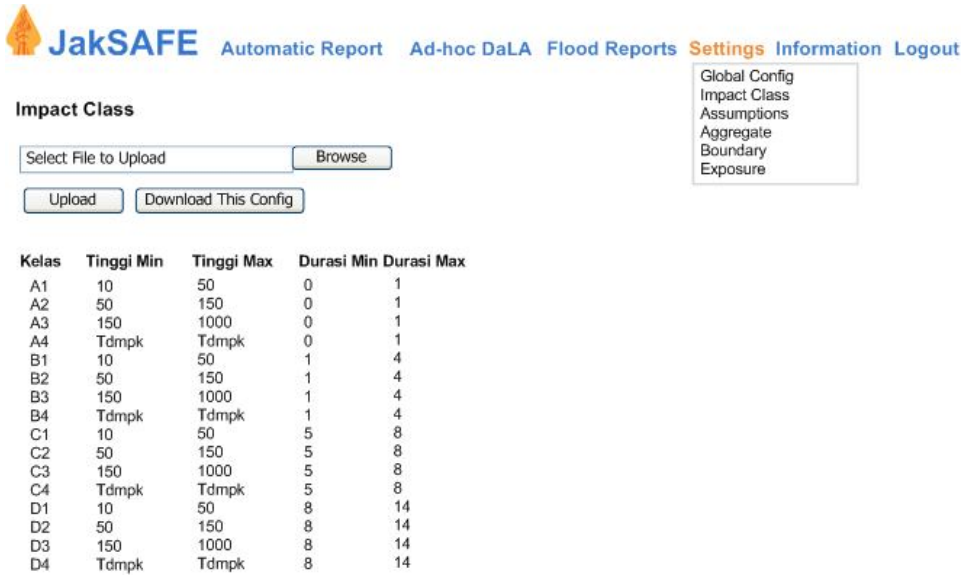


Figure 11. Impact class configuration

This is the page to view the classifcation of impact class which is used in the system. In this page, user can download the csv file that used and change the configuration of impact class by uploading the new classification file

The component of this upload from are as follows

Form element	Type	Description
Download this config	Button	Button to download existing *'kelas_dampak.csv'*
File select	Textbox	Texbox which show the location and name of selected file.
Browse	Button	Button to search '*kelas_dampak.csv*' file to be uploaded
Upload	Button	Button to upload file '*kelas_dampak*.csv' Onclick : 1. System will validate the format of file. The extention of file must be .csv

		2. System will check the structure and data type 3. If validation is success, the old '*kelas_dampak*' file will be moved to 'backup' directory and will be renamed as '*kelas_dampak*_uploaddate(YYMMDD_HHMM).csv 4. File the name of uploaded file is not '*kelas_dampak*.csv', then rename it and saveinto config folder

4.5.3 Assumption

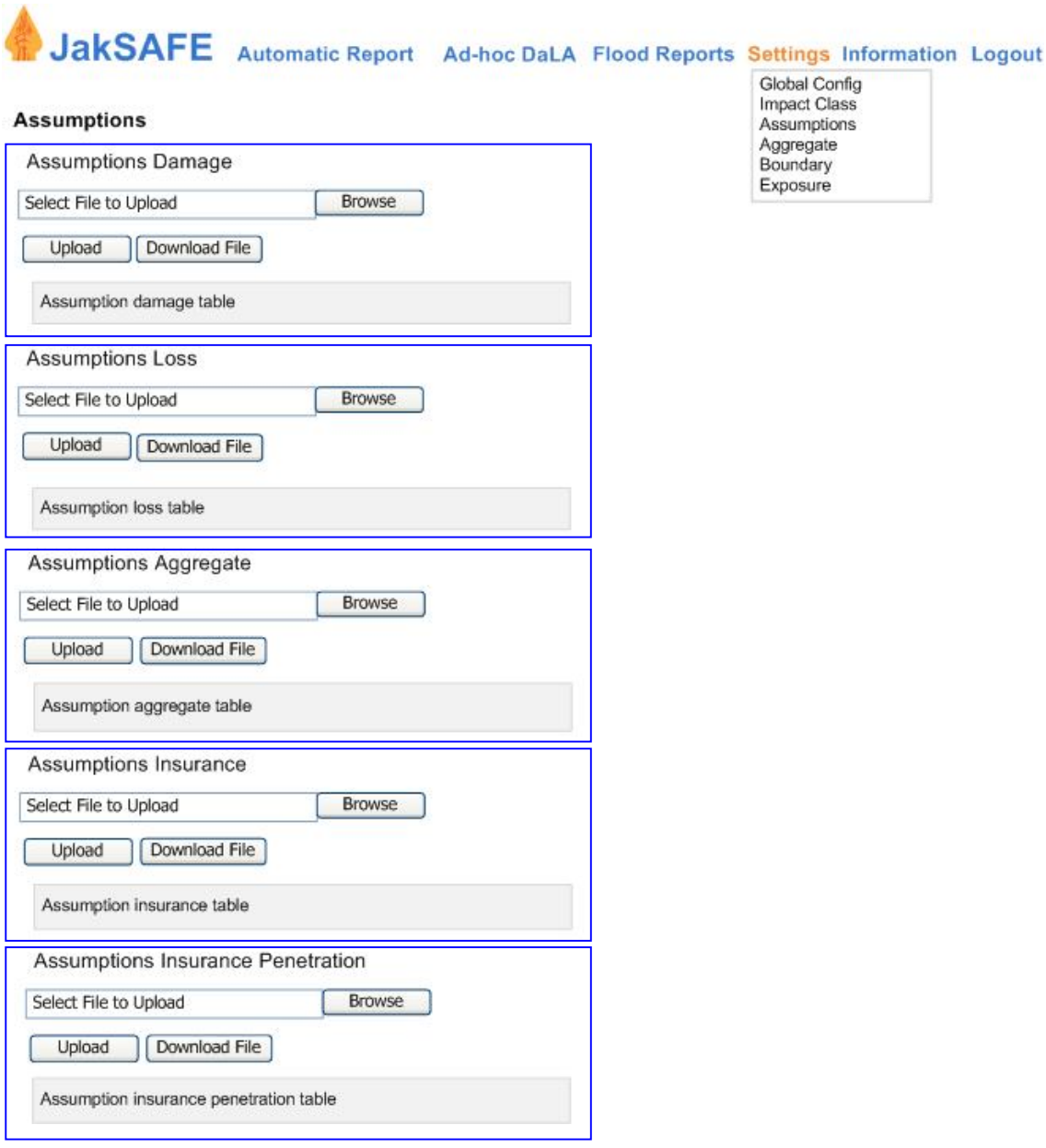


Figure 12. Assumptions Settings

Page to download and upload assumption file.This page consists of five section of assumption file, namely :

1. Assumptions damage
2. Assumptions loss

3. Assumptions aggregate
4. Assumptions insurance
5. Assumptions insurance penetration

Each section contais these following component.

Form element	Type	Description
File select	Textbox	Texbox which show the location and name of selected file.
Browse	Button	Button to search assumption csv file to be uploaded
Upload	Button	Button to upload assumption file Onclick : 1. System will validate the format of file. The extention of file must be .csv 2. System will replace the existing assumption file with new file
Download File	Button	Button to download the assumptions file.
Assumption table	Table	Table which display the content of assumption csv file

4.5.4 Aggregate

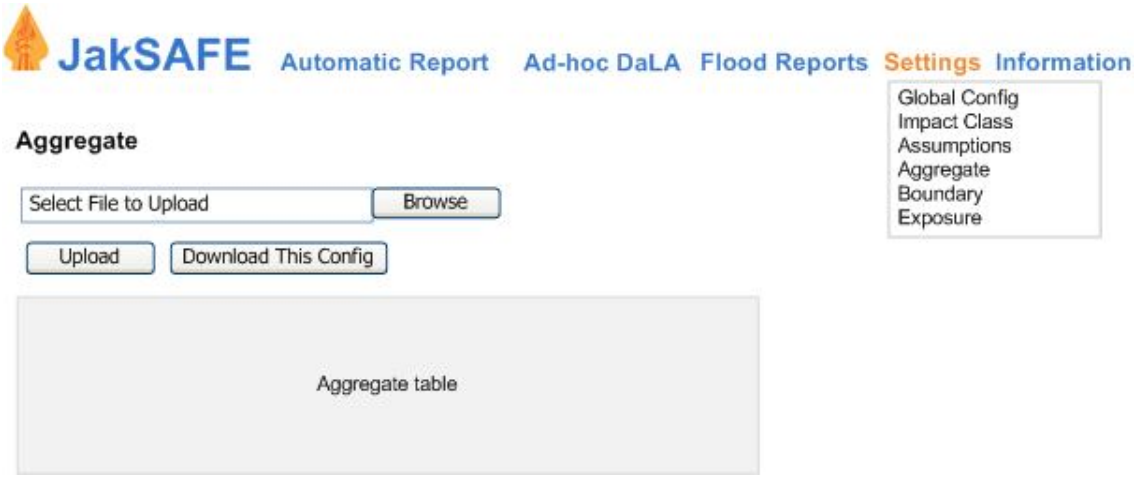


Figure 13. Aggegate settings

Page to view, download, ad upload the exposure aggregate data. Component of this page are as follow:

Form element	Type	Description
File select	Textbox	Texbox which show the location and name of selected file.
Browse	Button	Button to search aggregate csv file to be uploaded
Upload	Button	Button to upload assumption file Onclick : 1. System will validate the format of file. The extention of file must be .csv 2. System will replace the existing aggregate file with new file
Download File	Button	Button to download the aggregate file.
Aggregate table	Table	Table which display the content of aggregate csv file

4.5.5 Boundary

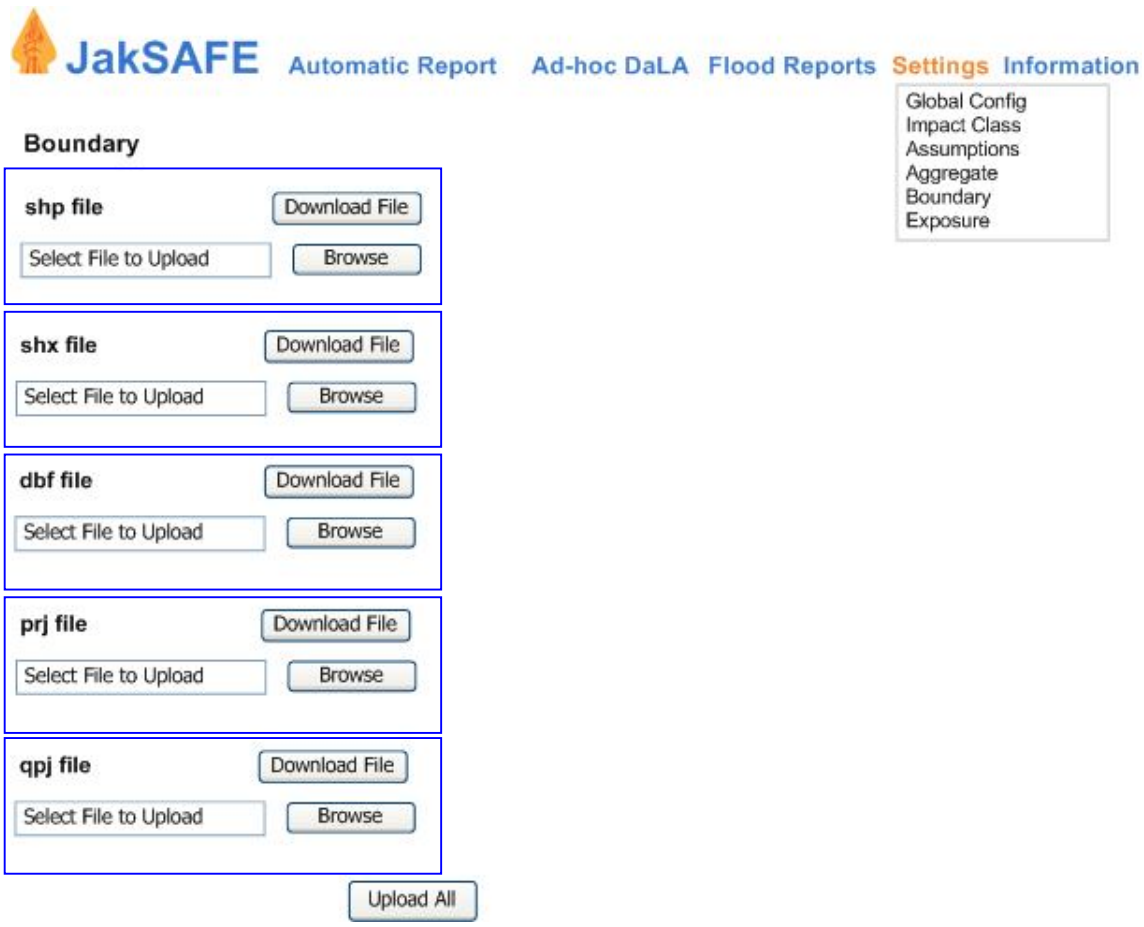


Figure 14. Boundary Configuration

Page to download and upload boundary shapefile. Boundary shapefile is the file that used in hazard compilation process.Shapefile is consists of five files, shp, shx, dbf, prj, and qpj. The component of this page are as follow:

Form element	Type	Description
File select	Textbox	Texbox which show the location and name of selected file. Each shapefile component has its own file select.
Browse	Button	Button to search aggregate csv file to be uploaded. Each shapefile component has its own file select.
Download File	Button	Button to download the shapefile component. Each shapefile component has its own file select.
Upload All	Button	Button to upload all shape file Onclick : 1. System will validate the format of file. The extention of file must be .shp, shx, dbf, prj, and qpj. 2. System will replace the existing boundary files with new file

4.5.6 Exposure

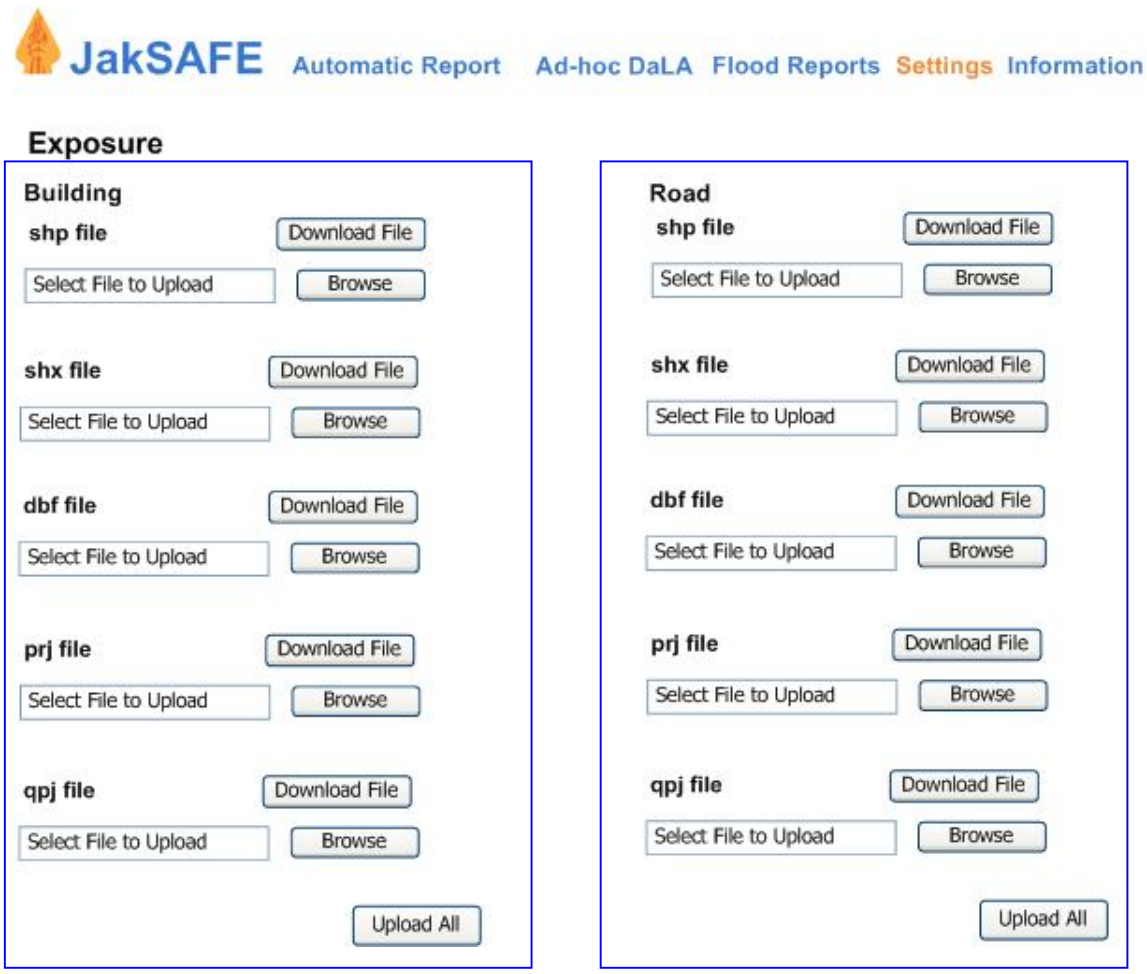


Figure 15. Exposure Settings

Page to download and uplaod exposure shapefile. This page consists of two section, building section and road section. Each section conatins these following component.

Form element	Type	Description
File select	Textbox	Texbox which show the location and name of selected file. Each shapefile component has its own file select.
Browse	Button	Button to search aggregate csv file to be uploaded. Each shapefile component has its own file select.
Download File	Button	Button to download the shapefile component. Each shapefile component has its own file select.
Upload All	Button	Button to upload all shape file Onclick : 1. System will validate the format of file. The extention of file must be .shp, shx, dbf, prj, and qpj. 2. System will replace the existing exposure files with new file

4.6 Login

Figure 16. Login page

Page to login to JakSAFE. When user is login, they can view the settings menu a dn generate adhoc report.

5 DaLA Report

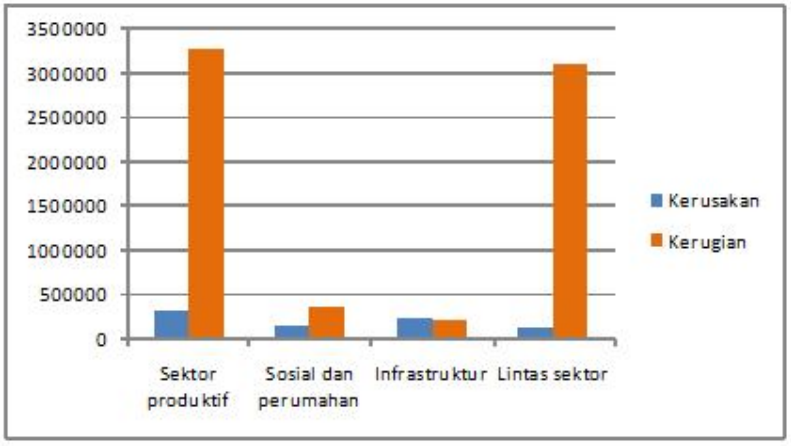
JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

Tanggal Kejadian : 5 Februari 2015 – 10 Februari 2015

Penilaian Kerusakan dan Kerugian per Sektor (dalam Juta Rupiah)

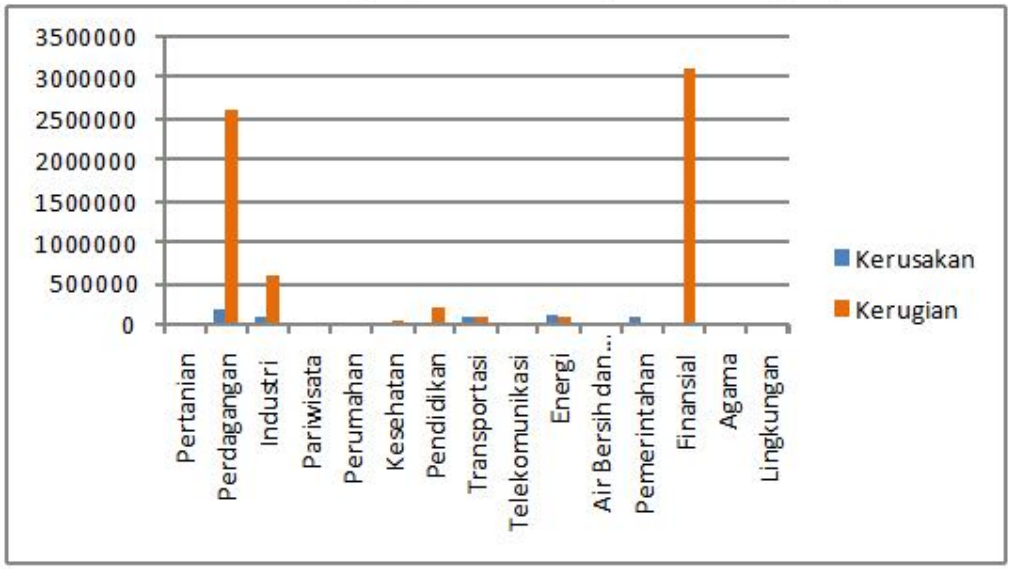
Sektor	Kerusakan	Kerugian	Total
Produktif	310,559	3,279,146	3,589,705
Pertanian	35	100	135
Perdagangan	200,061	2,627,894	2,827,955
Industri	92,327	613,598	705,925
Pariwisata	18,135	37,555	55,690
Sosial dan Perumahan	151,013	357,656	508,669
Perumahan	62,387	40,942	103,311
Kesehatan	39,585	84,880	124,465
Pendidikan	49,041	231,851	280,892
Infrastruktur	224,673	205,840	430,512
Transportasi	101,958	101,213	203,170
Telekomunikasi	230	1,500	1,730
Energi	116,000	100,500	216,500
Air Bersih dan Sanitasi	6,485	2,627	9,112
Lintas Sektor	138,538	3,112,078	3,250,616
Pemerintahan	92,161	92	92,252
Finansial	0	3,110,259	3,110,259
Agama	44,378	46	44,424
Lingkungan	2,000	1,681	3,681
Total	824,783	6,954,719	7,779,502

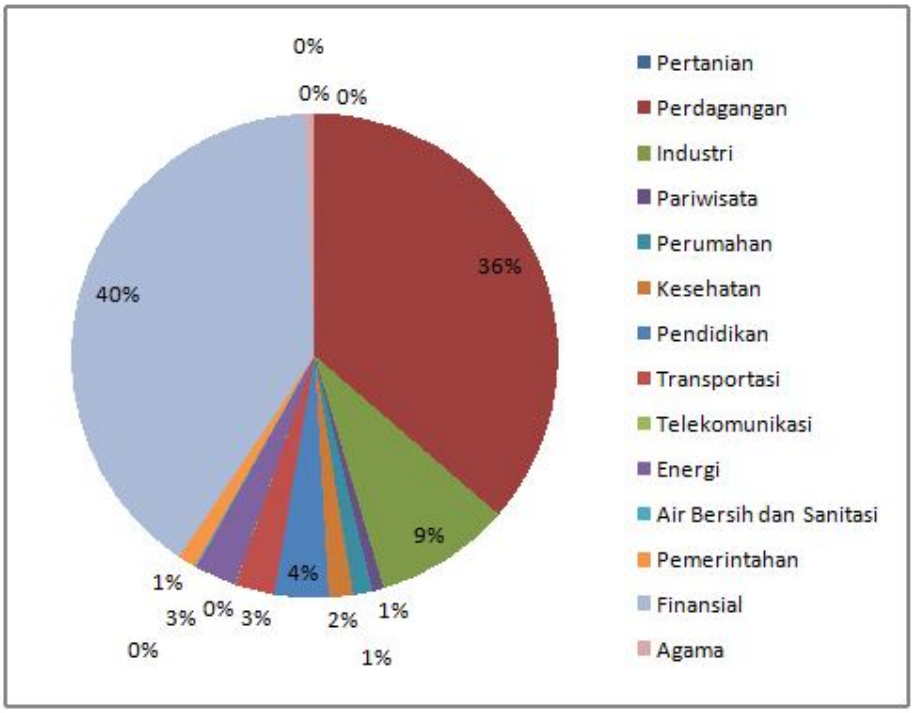


JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

Penilaian Kerusakan dan Kerugian per Sub Sektor (dalam Juta Rupiah)





JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

Kerusakan per Sub Sektor (dalam Juta Rupiah)

SUBSEKTOR	ASET	Kerusakan					Total Kerusakan
		Jakut	Jaksel	Jakpus	Jakbar	Jaktim	
Pertanian	Tambak		15		20		35
Perdagangan	Pasar Tradisional	30,360	13,800	10,800	61,800	-	116,760
	Mal	8,250	6,750	-	5,100	2,250	22,350
	Restoran	330	-	-	258	30	618
	Minimarket	198	81	360	707	-	1,346
	Ruko	11,463	588	765	6,777	-	19,593
	UKM + mikro	9,367	7,088	1,013	5,869	16,059	39,395
	Bongkar muat pelabuhan						
Industri	Pabrik	22,440	4,080	-	-	1,700	28,220
	Perkantoran	1,240	880	80	2,520	320	5,040
	Pabrik kecil	7,416	6,636	788	5,692	15,422	35,954
	Usaha mikro	4,768	4,266	506	3,659	9,914	23,113
Pariwisata	Hotel	2,605	15	3,650	6,365	-	12,635
	Obyek Wisata, layanan turis	4,000	-	1,000	500	-	5,500
Perumahan	Rumah Teratur	32,799	16	-	11,559	4,609	48,983
	Rumah Tidak Teratur	4,926	1,930	333	1,891	4,325	13,404
Kesehatan	Apotik	585	100	-	3,310	-	3,995
	Rumah Sakit	2,100	45	375	655	45	3,220
	Puskesmas	8,800	680	560	18,530	3,800	32,370
Pendidikan	Sekolah	918	249	105	1,249	284	2,806
	Universitas	34	21	25	80	38	197
	Fasilitas Olahraga	12,511	9,555	2,625	13,771	7,576	46,038
Transportasi	Jalan	17,471	2,912	17,471	17,471	2,912	58,238
	Terminal	-	-	-	600	400	1,000
	Kendaraan	17,000	2,125	6,375	12,750	4,250	42,500
	Kereta api	66	-	154	-	-	220
Telekomunikasi	Provider						
	BTS	175	-	50	5		230
Energi	SPBU	-	-	-	-	-	-
	Gardu PLN	24,167	24,167	24,167	38,667	4,833	116,000
Air Bersih dan Sanitasi	Instalasi PDAM	410	60	60	80	180	790
	MCK	78	12	22	22	36	170
	Pompa Air	1,025	150	600	450	800	3,025
	Tanggul Air	-	-	2,000	-	500	2,500
Pemerintahan	Fasilitas Kepolisian	618	51	51	294	-	1,013
	Facilitas Pemerintahan	28,139	6,621	4,138	36,416	7,449	82,763
	Fasilitas Militer	1,441	720	216	4,322	504	7,203
	Rumah Dinas	543	71	-	473	95	1,181
Lingkungan	Taman	300	-	700	600	400	2,000
	Kebersihan						
Finansial	Perbankan	100	-	100	-	50	-
Agama	Masjid	9,207	4,136	3,336	14,811	5,471	36,960
	Gereja	2,424	-		2,644	110	5,178
	Vihara	770	-	350	1,120	-	2,240
Total dalam juta Rupiah		268,944	97,819	82,674	281,035	94,311	824,783

JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

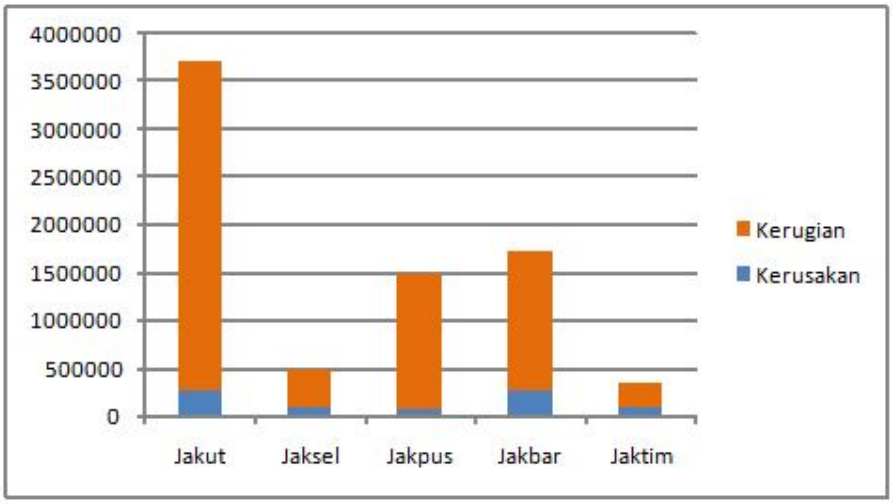
Kerugian per Sub Sektor (dalam Juta Rupiah)

SUBSEKTOR	ASET	Kerugian					Total Kerugian
		Jakut	Jaksel	Jakpus	Jakbar	Jaktim	
Pertanian	Tambak		50		50		100
Perdagangan	Pasar Tradisional	154,880	21,120	49,280	177,760	7,040	410,080
	Mal	799,500	246,000	82,000	348,500	82,000	1,558,000
	Restoran	136	1,056	594	2,112	6,204	10,102
	Minimarket	6,204	-	183,408	9,408	21,600	220,620
	Ruko	288,024	-	19,116	22,474	1,970	331,583
	UKM + mikro	1,970	21,240	56,299	-	-	79,508
	Bongkar muat pelabuhan	18,000					18,000
Industri	Pabrik	386,560	18,120	-	-	36,240	440,920
	Perkantoran	8,816	3,480	2,320	10,150	1,392	26,158
	Pabrik kecil	28,108	19,178	2,733	26,340	40,857	117,216
	Usaha mikro	7,027	4,794	683	6,585	10,214	29,304
Pariwisata	Hotel	3,531	17	7,320	16,381	-	27,250
	Obyek Wisata, layanan turis	8,420	-	1,883	1	-	10,305
Perumahan	Rumah Teratur	17,116	6	-	7,687	2,545	27,353
	Rumah Tidak Teratur	3,633	2,175	376	2,567	4,821	13,571
Kesehatan	Apotik	500	600	-	2,700	-	3,800
	Rumah Sakit	8,800	600	1,500	3,500	600	15,000
	Puskesmas	18,640	1,600	1,440	36,960	7,440	66,080
Pendidikan	Sekolah	53,353	14,036	6,002	78,585	16,572	168,548
	Universitas	1,898	783	1,252	2,616	1,878	8,426
	Fasilitas Olahraga	14,912	11,391	3,130	16,415	9,029	54,877
Transportasi	Jalan	3,374	562	3,374	3,374	562	11,248
	Terminal	-	-	-	300	200	500
	Kendaraan	25,320	3,165	9,495	18,990	10,080	67,050
	Kereta api	6,725	-	15,691	-	-	22,415
Telekomunikasi	Provider	300	300	300	300	300	1,500
	BTS						
Energi	SPBU	9,400	-	1,800	6,000	800	18,000
	Gardu PLN	17,188	17,188	17,188	27,500	3,438	82,500
Air Bersih dan Sanitasi	Instalasi PDAM	305	65	45	60	135	610
	MCK	770	90	315	190	360	1,725
	Pompa Air	82	12	48	36	64	242
	Tanggul Air	-	-	40	-	10	50
Pemerintahan	Fasilitas Kepolisian	1	0	0	0	-	1
	Facilitas Pemerintahan	28	7	4	36	7	82
	Fasilitas Militer	1	1	0	4	1	7
	Rumah Dinas	1	0	-	0	0	1
Lingkungan	Taman						
	Kebersihan	1,009	84	84	420	84	1,681
Finansial	Perbankan	1,149,446		689,667	459,778		2,298,891
Agama	Masjid	9	4	3	15	5	37
	Gereja	2	-	2	3	0	7
	Vihara	1	-	0	1	-	2
Total dalam juta Rupiah		3,449,673	387,724	1,400,808	1,450,073	266,448	6,954,719

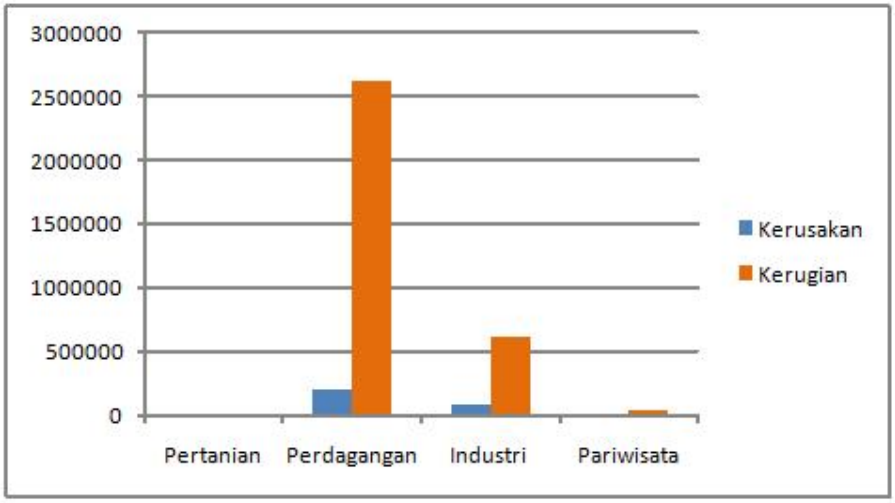
JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

Kerusakan dan Kerugian per Wilayah (dalam Juta Rupiah)



Kerusakan dan Kerugian Sektor Produktif (dalam Juta Rupiah)



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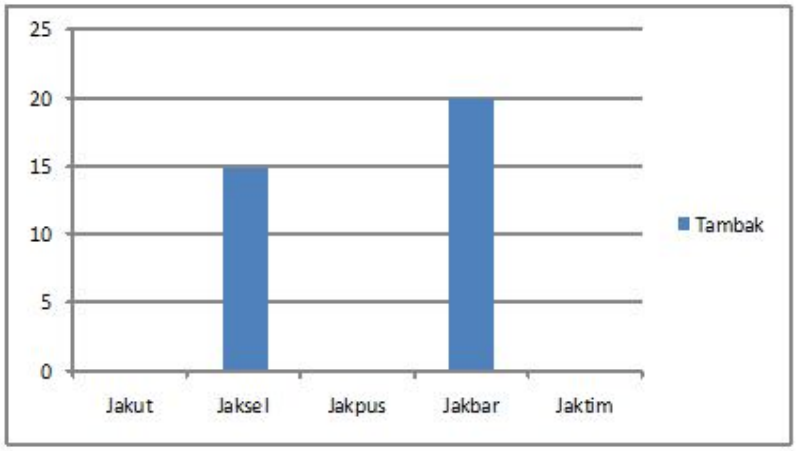
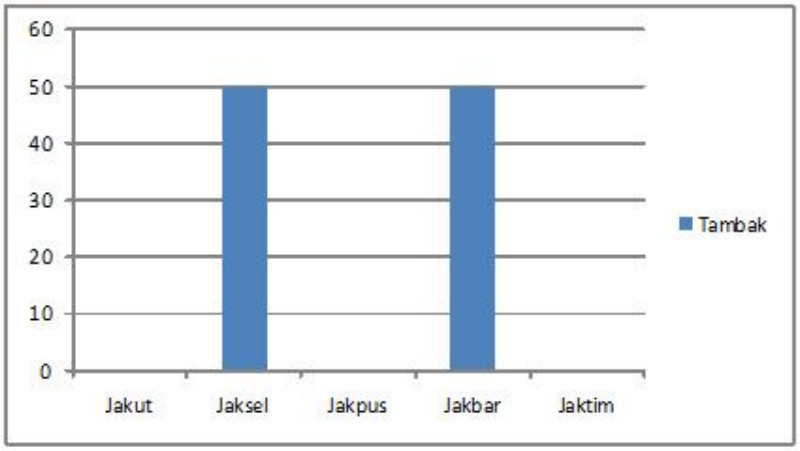
Penilaian Kerusakan dan Kerugian Banjir Jakarta

Penilaian Kerusakan Sub Sektor Pertanian (dalam Juta Rupiah)



Penilaian Kerugian Sub Sektor Pertanian (dalam Juta Rupiah)



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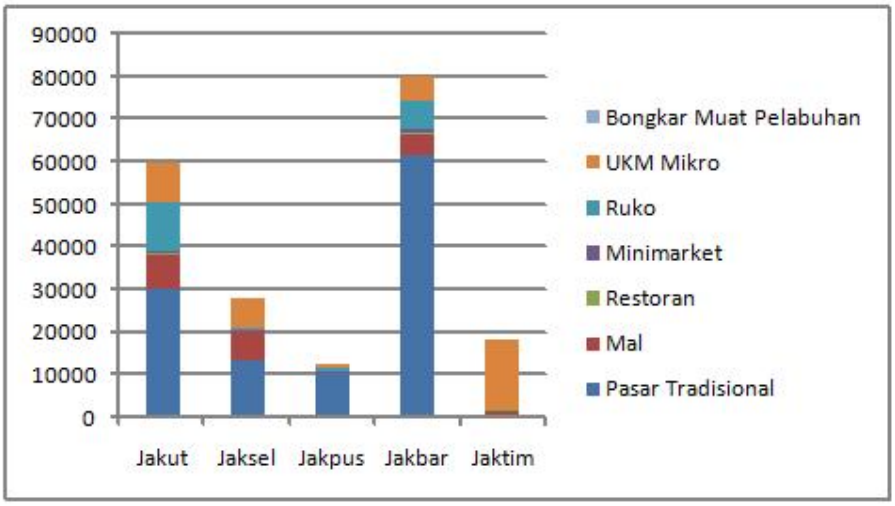
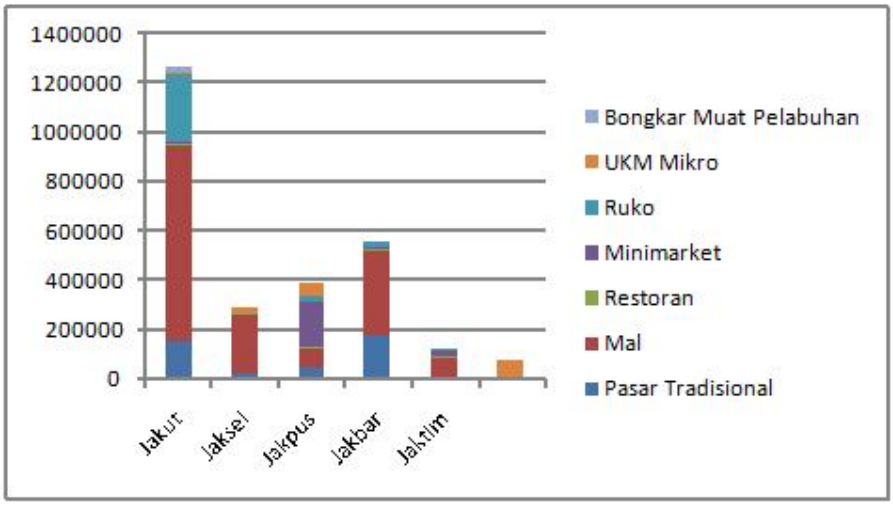
Penilaian Kerusakan dan Kerugian Banjir Jakarta

Kerusakan Sub Sektor Perdagangan (dalam Juta Rupiah)



Kerugian Sub Sektor Perdagangan (dalam Juta Rupiah)



Report ini adalah estimasi nilai kerusakan dan kerugian hasil perhitungan cepat dari bencana banjir pada tanggal 5 February 2015 – 10 February 2015. Untuk nilai real kerusakan dan kerugian akibat banjir ini perlu diadakan perhitungan lebih rinci berdasarkan laporan kerusakan dan kerugian langsung di lokasi kejadian.

Each subsector have its own loss and damage chart. This document only provide the example for subsector agricultulture and trade.

5.1 DaLA Report of Insurance Assets

JakSAFE

Penilaian Kerusakan dan Kerugian Banjir Jakarta

Tanggal Kejadian : 5 Februari 2015 – 10 Februari 2015

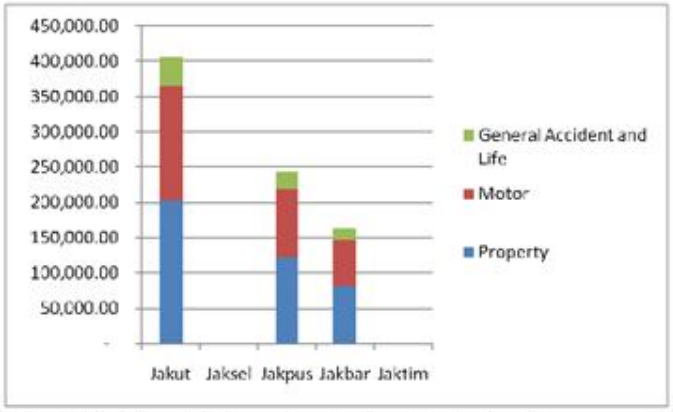
Kerusakan dan Kerugian Asuransi

		Kerusakan					Total Kerusakan
SUBSEKTOR	ASET	Jakut	Jaksel	Jakpus	Jakbar	Jaktim	
Finansial	Asuransi						-
Total dalam juta Rupiah		-	-	-	-	-	-

		Kerugian					Total Kerugian
SUBSEKTOR	ASET	Jakut	Jaksel	Jakpus	Jakbar	Jaktim	
Finansial	Asuransi	405,684		243,410	162,273		811,367
Total dalam juta Rupiah		405,684	-	243,410	162,273	-	811,367

Detail Kerugian Asuransi

			Kerugian					Total Kerugian
SUBSEKTOR	ASET	Jenis Asuransi	Jakut	Jaksel	Jakpus	Jakbar	Jaktim	
Finansial	Asuransi	Property	202,841.85	-	121,705.11	81,136.74	-	
		Motor	162,273	-	97,364	64,909	-	
		General Accident and Life	40,568	-	24,341	16,227	-	
Total dalam juta Rupiah			405,684	-	243,410	162,273	-	811,367



Report ini adalah estimasi nilai kerusakan dan kerugian hasil perhitungan cepat dari bencana banjir pada tanggal 5 February 2015 – 10 February 2015. Untuk nilai real kerusakan dan kerugian akibat banjir ini perlu diadakan perhitungan lebih rinci berdasarkan laporan kerusakan dan kerugian langsung di lokasi kejadian.