

A. Introduction of Resilience City

Ungaran Raya is a region located in Semarang Regency in which cities, regencies, or area surrounds the region are highly affected by the development of Ungaran Raya. There is Mt. Ungaran in Ungaran Raya used as water resource which also give both positive and negative impact to lowland regions. Ungaran Raya is located in highland region, thus it has water resource flow so much that it could be used for its citizen's daily activities. However what if the water could go to lower ground quick and uncontrolled? This is the problem that could happen in the near future. If the trend for changing the function of conservation and green belt area occurred continuously, there will be more challenges emerge. If physical transformation could take place dynamically, so does with other transformation challenges such as population. The fast growth of industrial activities attract people to immigrate which contribute to other challenges such as increasing demand for land and congestion.

The dynamic happened in this region must not be ignored, this Semarang Regency spesifically Ungaran Raya must adapt in resolving the problem which occurred directly (Shock) and continually (Stress) so that the region could overcome both current and future challenges. In short, Ungaran Raya must have grand plan to be a resilience region (or city) to cope with emerging problems.

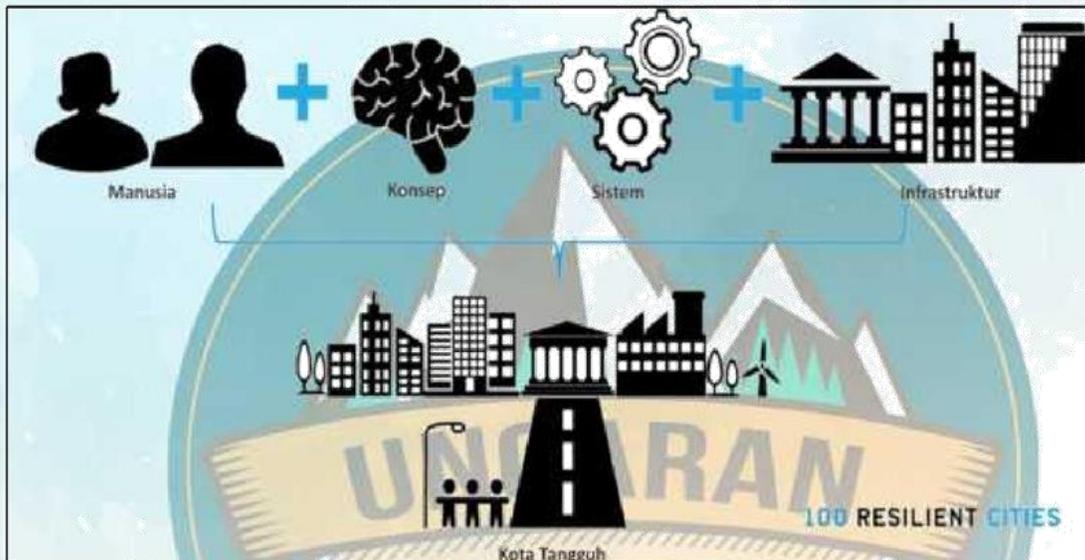
What is Resilience

Resilience City is a city which runs normally while overcoming various challenges and then could recover, grow, and develop better after the event. Resilience (daya lenting) is a system to return to normal/beginning condition after encountering disruption by either stand or adapt with the transformation. In resilience city, people who live and work – especially the poor–have the capability to survive, adapt, and grow despite facing numerous Shock and Stress. There are 2 (two) components of resilience:

- (a) The ability to absorb or restrain the impact of stress (Resistance)
- (b) The ability to recover (Recovery)

Resilience Frame Work

- Asynergic strategy to create a resilience city is needed to resolve problems and challenges in the future. In principle, Resilience City is established whereas human resources, idea, system, and infrastructure availability consistently run so that people within could live peaceful and pleasant for their activity and also the region and city might run better in the future.



Sumber: 100RCSemarang.org

Gambar 2

How to Achieve Resilience (Ubah ke Inggris)

B. Ungaran Raya Profiles

Ungaran Raya is a 246.18 km² region which accounted for 25.9% from the total size of Semarang Regency. Based on 2011-2013 Semarang Regency's hamlet and neighbourhood, Ungaran Raya is SWP-1 region which is a region assigned to be part of regency's capital includes Ungaran Barat Sub-district, Ungaran Timur Sub-district, Bergas, and Pringapus with the centre of development in Ungaran City. Moreover, Ungaran functioned as Semarang Metropolitan's supporting city. In conclusion, Ungaran Raya is centre of Semarang Regency's capital city.

The total population of Ungaran Raya as of 2014 is 325.982 people consisted of 157.273 men and 168.709 women. Women are slightly more than men, dominated by women around 20-24 years old. The amount of 20-24 years old's women occurred because industrial worker are dominated by women. Population of Ungaran Raya encountering a significant population's growth annually. In 2015, population of Ungaran Raya reached 328.736. The most densely populated sub-district is Ungaran Barat sub -district, which is 2.140 people/km², due to its function as centre of activity in Ungaran Raya as well as Semarang Regency. Meanwhile, the least densely populated sub -district is Pringapus sub-district with 627 people/km². In 2014, with the size of 246.2km² and 325.982 people, average density population in Ungaran Raya was 1.471 people/km².

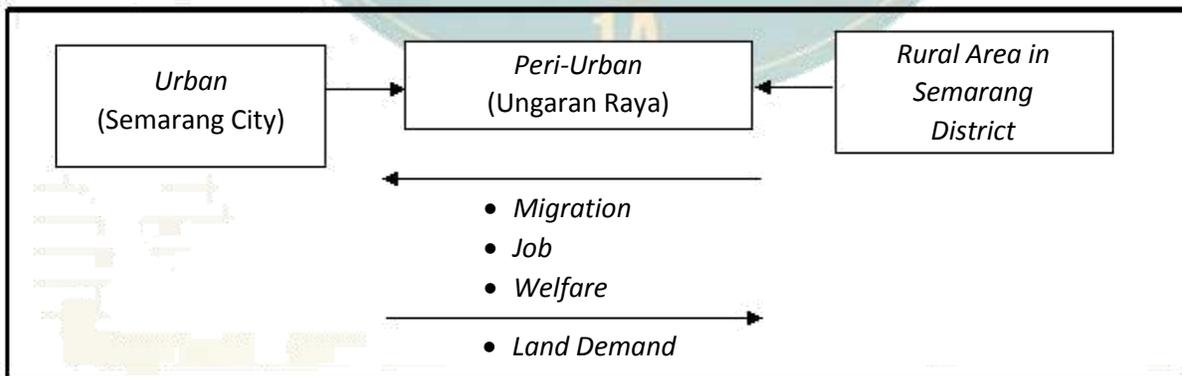
The landscape characteristic of Ungaran Raya is located in 300-1000 masl altitude. Due to its landscape altitude, Ungaran Raya has various slopes. Ungaran Timur Sub-district has a steepest slopes, around 25 -40%. Precipitation level in Ungaran Raya is around 2000-3000 mm/day, dominated by moderate rainfall intensity which is 2500 mm/day. Ungaran Timur and Ungaran Barat have 3000 mm/day, which is the highest rainfall intensity than three other sub-districts. Brown earth type of soil dominated in Ungaran Timur, Pringapus, and Bergas with the total size of 9948 Ha. High precipitation level, steep slopes, and friable soil could led into various disaster such as flood and avalanche if used for residential areas. Thus, it needs land sutability analysis to determine the land use for habitat and non-habitable area.

Ungaran Raya is dominated with cultivation area in which based on theoretical study is an area with 125 score index functioned to be cultivated for buildings. Cultivation area is the biggest, in percentage made up around 69.4% from the total land size, with 18.932 Ha. The distribution of cultivation area is spread evenly in whole 5 sub-districts of Ungaran Raya. Most of cultivation area located around arterial roal. Buffer zone is the second in percentage with 26.4% from the total land size with 7.193 Ha. The distribution of this zone is equally spread in 5 sub-districts of ungaran Raya and tend to be located in suburban area of Ungaran Raya. Meanwhile, the smallest percentage is the preserved area with only about 4.3% of the total size with 1.165 Ha. The distribution of this area only found in Ungaran Barat, Ungaran Timur, Bergas, and Bawen. Mostly located in Mt. Ungaran valley in Ungaran Barat and Bergas also forest area in Ungaran Timur.

Due to its factor to be a centre of Semarang Regency, Ungaran Raya enjoyed a high economic growth with 26.80%, which almost equal to the development of the entire growth of Semarang Regency which is 27.1% in 2013. Based on contribution in economic sector, the most contribute sector in determine the value of GDP in Semarang Regency was Industrial sector which accounted for 46.20% from the total GDP Rp. 13.632.576,4 in 2013. Spatially, industrial sector in Semarang Regency centralised in Ungaran Raya spesifically Bawen, Bergas, and Pringapus. This affected in the increase of GDP in Ungaran Raya which reached Rp. 4.823.723,80 in 2013 with industrial sector made up around 61.53% from the total GDP. Thus, it could be concluded that Ungaran Raya plays significant role notably in industrial sector contribution for Semarang Regency.

c. Resilience issues in Ungaran Raya

Ungaran Raya is consist of West Ungaran, East ungaran, bergas, bawen and pringapus districts. All of ht edistricts geographically located in the northern part of Semarang District directly adjacent to the city of Semarang. Based on the geographical location, Ungaran Raya is known as the Peri-Urban of Semarang City. Because of thesemarang's peri-urban status of Ungaran raya causing a strong interaction between Semarang City and Ungaran Raya. It can be proven by the the demand of land settlement in Semarang sidtrict, dominated in the northern part which is Ungaran Raya. Here is the interaction scheme between Semarang city and Ungaran Raya based on demand for land:



Source: Analysis Result from Group A1 2016's Planning

Figure 2

Scheme Interaction Between Semarang Region & Ungaran Raya

Based on the scheme above, it can be seen that land demand will be growing in the peri-urban area. It can be proven spatially. It clearly visible that land up in the area of Semarang district centered on the northern part of the District of Semarang.

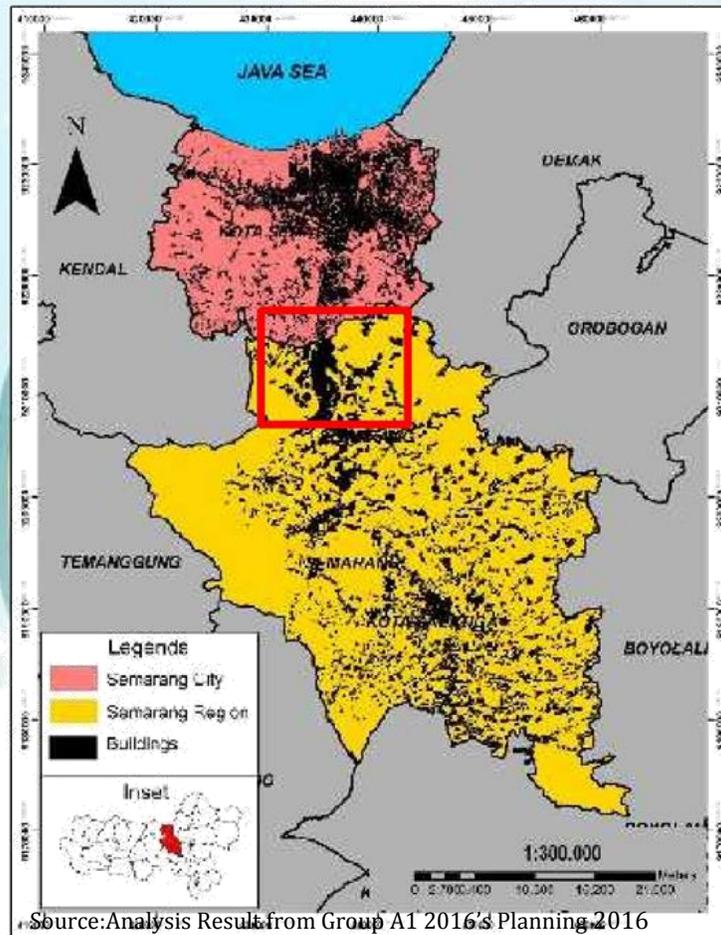


Figure 3

Population Spread of Ungaran Raya

Ungaran
Sub Region

Ungaran Barat • Ungaran Timur • Bergas • Bawen • Pringapus

Centralization Land Building in Peri-Urban

Seeing the peri-urban areas invaded by the demand for land, especially land up causing conversion of land into smaller plots in the northern area of Semarang District. This land conversion caused some problems when performed in water catchment areas. Obviously this will contribute to upstream flood water runoff that will be moving from upstream to downstream in Semarang. For more details can be seen on the map below.



Watershed in Semarang Region & Semarang Regency

RESILIENCE IN PERI - URBAN AREA

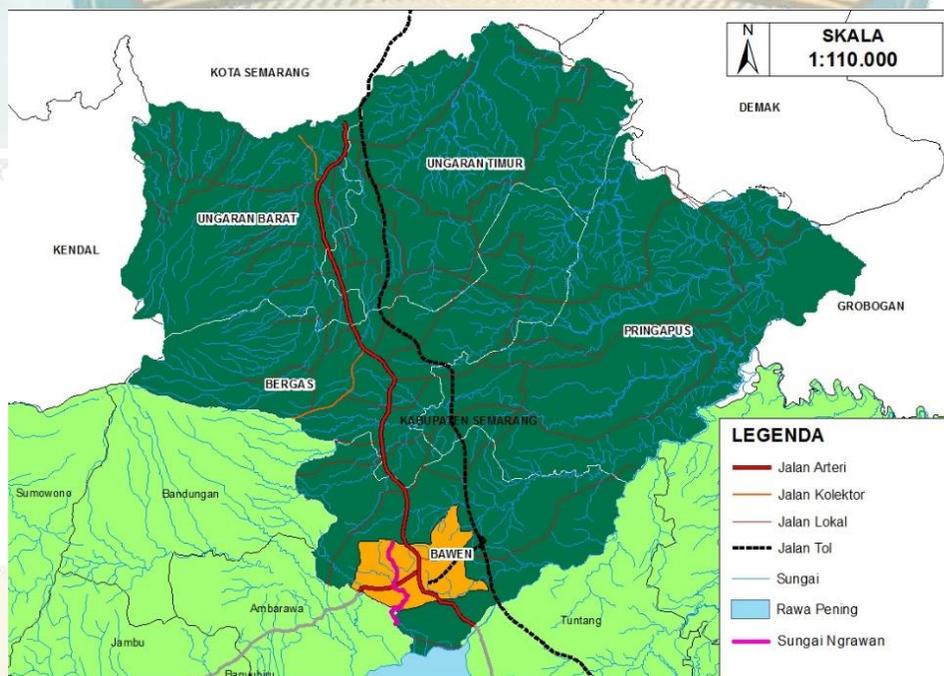
Ungaran Sub Region

Based on the map it can be seen that there is connection between the river flow in headwaters of Ungaran Raya because the elevation is higher than Semarang city. Therefore, if the flood occurs in the West Flood Canal of Semarang City, it is an effect from the water runoff due to the conversion of water catchment areas that invaded by land up where Ungaran Raya as the peri-urban of Semarang City.

Besides the presence of resilience issues that associated with other areas, Semarang city, Ungaran Raya also have the issue of resilience in their region itself, the following are the issues of resilience in Ungaran Raya:

a) Flash Floods

Unlike the floods that occurred in Semarang city because of runoff water and land subsidence, in Ungaran Raya Flash Flood occurred. The difference is, this flood caused by sedimentation of the Ngrawan river flow which is downstream area of Mount Ungaran. The last flash flood occurred in July 2016. Based on the information obtained, flash floods have an impact in losses amounting to 20 Million Rupiahs, even more there's a house that swept away by flash floods.



Flash Flood Map Location

Ungaran
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Ungaran Barat • Ungaran Timur • Bergas • Bawen • Pringapus



Sumber:berita.suaramerdeka.com

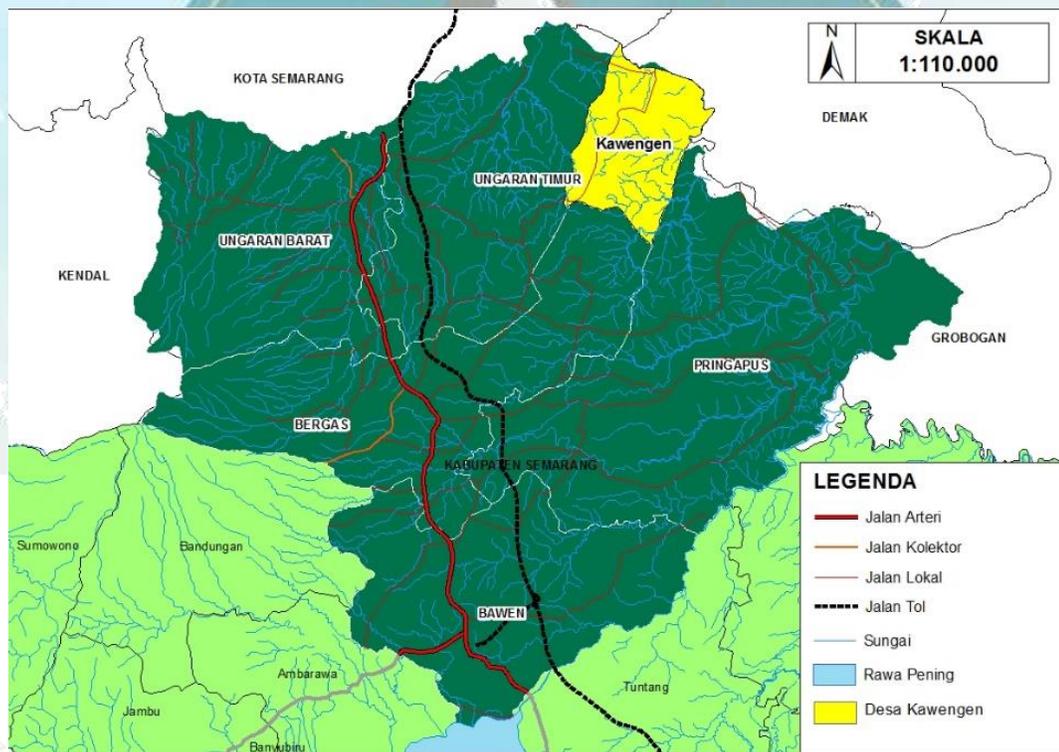
Figure 5

Flash Floods in Bawen Sub-district

If seeing occurrences of the movement of water flowing with quickly toward semarang city , river ngrawan needs to be fixed .Sedimentation being imminent and of land use around the river border make capacity of an upper river to be a slight , so that had an impact on their flood to the city of semarang .Phenomenon that occurs had managed to tampering with especially the construction of infrastructure , tergenangnya roads and the house had become an obstacle make an economy that takes place and to spend the funds infrastructure restoration damaged by flood itself , therefore the flow of a river or canal flood the east and the west to be cleaned up sedimentasinya and enlarged as an effort to preparation face this phenomenon if happened again.

b) Drought On Agricultural Land

Drought struck the Semarang regency that generally occurred in 2015. The heavy drought that occurred hit 55 hectares including two sub - districts in Ungaran Raya. The two sub -districts are Pringapus and East Ungaran. The most severe drought occurred in East Ungaran sub-district precisely in the Kawengen village. The impact of this drought is crop failure that threatening farmers. In addition, other things that threatened is food security in Semarang regency, as can be seen if the farmers suffered crop failure, it will impact to the less intensity rice production which ultimately threatens the food security.



Drought on Agriculture Land Map Location



Figure 6

Drought Agricultural Land

The harvest fails arising from the impact of drought and error management this is a challenge for the government .The government and the community around can make embung to overcome droughts and hit so the loss is not so much .Then greening better get on do in the upstream regions accompanied by the reduction of the conversion of land in upstream areas .Conversion land could reduce the ability land in absorbing water .Program can later reducing the sedimentation so that it will not happened the silting-up of the reservoir .Plants planted in land empty able to maintain granules the ground when rainy .Plant meetings also serves to improve the ability of land in absorbing water , reduce the flow of the surface and evaporation and eventually ground water will be available longer .

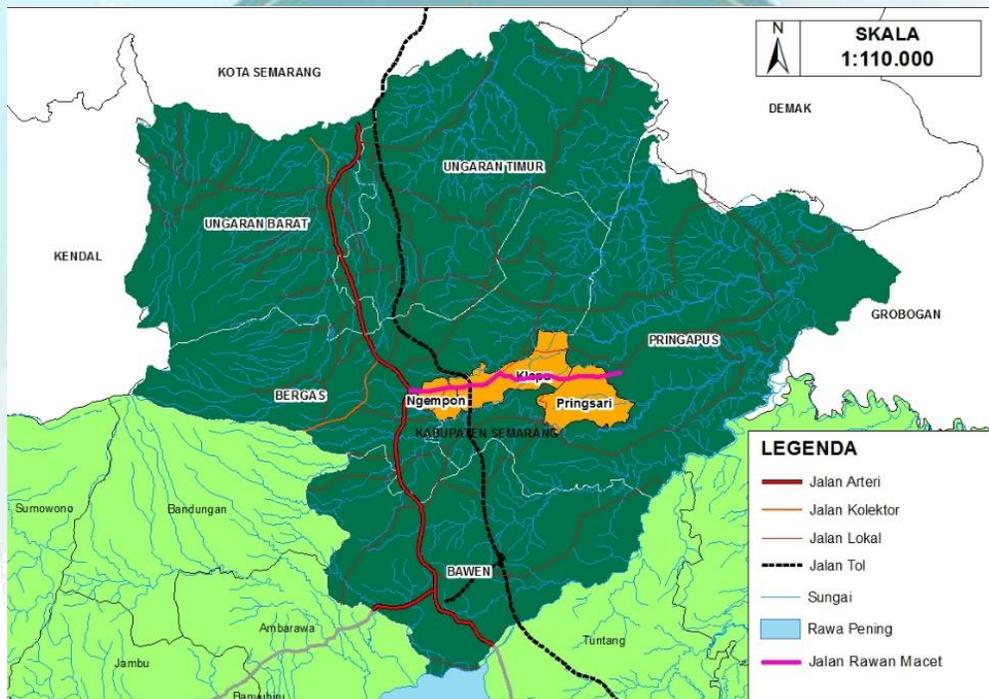
c) Congestion In The IndustryArea

The congestion in the industry area in particular, occurred in Pringapus sub-district. The congestion usually occurs when the peak hours, ie at 7:00 a.m. to 8:00 a.m. and at 4:00 p.m. to 5:00 p.m.. This congestion occurred due to lack of infrastructure readiness in facing the Pringapussub-district function as an industrial area. This lack of preparedness is because of the road width do not meet. The width of the existing

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Ungaran Sub Region

road approximately 6 meters while according to the Regulation of the Minister of Industry of the Republic of Indonesia On Technical Guidelines Industrial Area which is the width of the main road is one lane and two way street which has a minimum width 8 meters. Besides that, there's a lack of preparedness in terms of official mass transportation services for industrial laborers from the government, because currently in the industrial area there is only public transport from the community around for serving workers in the industry. So often the public transport stop indiscriminate when raise or lower the passengers.



Congestion in Industry Area Map Location

Traffic jam during peak hours is because inadequate area of roads traversed. The project in Pringapus to do see numerous species of activity that goes. Mobility of the road users of be stunted thus reducing their productivity in working. Another side provision of this mode of public transport very helpful the labor in the and causes in achieving its objectives to unravel congestion often occurring in peak hours moreover the majority in this area is laborers commuter that carries of personal vehicles that have hours going to work and go home work which is equal.

D. Challenges Resilience Issues

Based on the issues described previously, there are challenges which may later be able to happen in the future:

- Flood runoff water to the Semarang City → challenges facing IE how to overcome coversi of land on upper area in the future, so as not to flood runoff water from upstream areas i.e. Semarang heading downstream city of Semarang
- Flash floods due to sedimentation → the challenges faced, namely how to reduce sedimentation in the downstream of the river Ngrawan to prevent flash flooding it so do not occur in the rainy season which has high rainfall intensity.
- Drought on agricultural land → challenges facing IE how do I adapt to the farmers in the face of climate change and how to address the availability of food in the event of a crop failure
- Congestion on the area's industrial → challenges facing IE how to provide appropriate infrastructure for the industrial regions and provide good mass transportation for the industrial workers

E. Resilience Strategy

In achieving an area can be considered to have a good resistance, then the necessary resilience strategies in dealing with the issues and challenges of the resilience that has been previously described. Based on the issues of resilience that has been examined before, obtained as a strategy in addressing the issues and challenges of resilience . Each strategy will be how to solve IE planned issues and these challenges directly or direct impact on issues

and challenges. Broadly speaking, the strategy performed i.e. in the form of efforts to resolve the issue with the provision of physical infrastructure and with improvements to the system as well as the utilization of technological advances in creating a resilience. In an endurance strategy will be provided, there is a main pillar of the strategy, the strategy, as well as the initiation of the program.



Source: Analysis Result from Group A1 2016's Planning

Figure 7
3 main pillars of the strategy the resilience of Ungaran Region

Based on the main pillar of the resistance strategy scheme area of Ungaran Raya, there are 3 main pillars that affect durability. The main pillar is intended, namely technological innovation management of water resources, the control of Watershed, and an integrated Industry. Invisible dotted line indicates that the third pillar of the associated active in

creating resilience Region Ungaran Raya. After obtained 3 main pillars, will be broken out into 8 strategy. The intended strategy as follows,

- ❖ Technological innovation management of water resources, through this first pillar Areas Ungaran Raya will use the technological innovation in the management of water resources. The following details the main pillars of the strategy the strategy of technological innovation management of water resources:
 - Increase water absorption technology innovation on upstream
 - Water storage system provides for the preparation of drought
 - Provide an irrigation system on agricultural land
- ❖ The control Watershed, through the second pillar of this Region will have a Feast Ungaran watersheds the lancer because sedimentation during this caused flash flooding has been addressed. The following details the main pillars of the strategy the strategy Control Watersheds:
 - Control of sedimentation in streams
 - Reduced sedimentation downstream river
- ❖ Integrated Industry, through this third pillar of the of Ungaran Region later will have an industrial area that has an integrated system that covers goods distribution system as well as the system of movement of workers. The pillars of this strategy will provide a direct impact against the existing congestion problem on the territory of Ungaran Region particularly Pringapus Subdistrict. The following details the strategies of the main pillars of integrated Industries:
 - Improve the system of supply chain management
 - Fix the supporting industry infrastructure
 - Hosts every movement of industrial workers

Based on these strategies, details 8 will be more broken out into 10 initiation program so that the details of the strategies that have been established before more applicable towards the issues and challenges. It can be seen in table strategy that where there are issues of resilience which contains issues that have been fixed in advance, then the deciding thing which contains indicators of the success of the initiation of the program will be done, then the output that contains the output of the initiation of the program, then the outcomes which

contains about the influence of output before, then the impact which contains on the impact of the expected end of the initiation of the program. The following table resilience strategies that have been formulated

Table 1
Recelience Strategy of Ungaran Raya

Resilienc Isuee	Strategy	Program Initiation	Indicator	Output	Outcome	Impact
Flood caused runoff water that heading to semarang	Increasing inovation of water absorption technology at headwaters area	Construction of Biopori's absorption hole	Biopori's Abs orption Hole(LRB)for absorption in headwaters area	Increase of Water absorption at headwaters area	Decrease of runoff water that heading to headwaters area	Flood potency that caused by runoff water in semarang City decreased
		Rain Water Harvesting (RWH)at headwaters area	Availability of equipment container for Rain Water Harvestingat headwaters area	Water absorption at headwaters area and rainwater utilization	Decrease of runoff water that heading to headwaters area	Flood potency that caused by runoff water in semarang City decreased
Flash flood caused by sedimentati on of Ngrawan River	Controlling sedimentation sedimentasiat river flow	DAMasa sediment controller at headwaters area	Availability of sediment's controller equipmentsat headwatersarea	Increas of sediment's controller equipment at headwaters area	Sedimentation at headwaters area are under controlled	Sedimentation which moving andsettling at downstream are decreased
		Provide particular places at the river bank for	Availability of particular places at the river bank	Sediment embodied in particular	Decrease of sedimentation which	Flash flood potency decreased

RESILIENCE IN PERI - URBAN AREA

Ungaran Sub Region

Resilienc Isuee	Strategy	Program Initiation	Indicator	Output	Outcome	Impact
		sediment's precipitation	for sediment's precipitation	places of river bank	obstructing river flow	
	Decreasing sedimentation at downstream area	Dredging sedimentation at estuary	There be found decreasing of sedimentation at estuary	Sedimentation at estuary decreased	Obstacle caused by sedimentation at estuary decrease	Flash flood potency decreased
	provide water storage system for dry weather stocks	Construction water reservoir as water supply storage	There be found water reservoir for water supply storage	Water supply for Agriculture increased	Meningkatnya kapasitas produksi pangan	Food security increased and farmers live prosperously
Drough on agricultural land	Provide irrigation system on agricultural land	Construction and Maintenance of agricultural land irrigation system	Availability of irrigation channel which could yang dapat mengalir air dengan baik pada lahan pertanian	Water supply for Crops in agriculture land increased	Food capacity production increased	Food security increased and farmers live prosperously
Kemacetan pada daerah industri	Fixing system supply chain management	Integrating small industrial cluster with large industrial cluster in one district	There are integration between small industrial cluster and large industrial cluster in one district	Supply Chain Management integrated with small industrial cluster and large industrial cluster	Amount of movement that caused by logistic movemen are minimized	Traffic jam that caused by Logistic are reduced

Ungaran
Sub Region

Ungaran Barat • Ungaran Timur • Bergas • Bawen • Pringapus

RESILIENCE IN PERI - URBAN AREA

Ungaran Sub Region

Resilience Issue	Strategy	Program Initiation	Indicator	Output	Outcome	Impact
	Fixing industrial infrastructure support	Increasing road network performance by widen the road size until 8m minimum width lebar 8 meter	Minimal road width is 8m	Road Infrastructure has 8m width for supporting Industrial area.	Facilitate accesibility at industrial area	Reducing trafficking conjunction in industrial area
	Accommodating every movement of industrial workers	Providing buses for industrial workers	There are official buses from government that serve industrial workers	Industrial workers are easily mobilized by official buses from government	The number of illegal public transportation that stop carelessly are reduced	The number of illegal public transportation that stop carelessly are reduced

Source: Analysis Result from Group A1 2016's Planning

F. The Implementation of Resilience Program

The indication of resilience program is being the hint of defined program before. These hints are the further guidance which contain the period stages of the implementation program, the location where the program will be held at, and the stakeholder which will lead to an inclusive development concept. This plan will be held in the upcoming 20 years which can be divided into 4 time periods such as short time period (2016-2021), intermediate time period (2021-2026 and 2026-2031) and long time period (2031-2036). These are the implementation program which will be applied soon:

Table 2

The Stages of Resilience Program Implementation

Strategy	Program	Period (Year)				Location	Stakeholder
		2016-2021	2021-2026	2026-2031	2031-2036		
Increase the potency of water absorption on headwaters area	Construct a Biopori Absorption Hole					West Ungaran	Living Environmental Agency of Semarang District, PSDA/ESDM Agency of Semarang District, Environmental Community, Society
	Rain Water Harvesting (RWH) on headwaters area					West Ungaran	Public Work Agency of Semarang District, Living Environmental Agency of Semarang District, Environmental Agency
Control the sedimentation on the river flow	Construct DAM Control the sedimentation on the headwaters area					Bawen	Public Work Agency of Semarang District, PSDA/ESDM Agency of Semarang District,

RESILIENCE IN PERI - URBAN AREA

Ungaran Sub Region

Strategy	Program	Period (Year)				Location	Stakeholder
		2016-2021	2021-2026	2026-2031	2031-2036		
	The provision of special area in the riverside for the sediment precipitation					Bawen	Public Work Agency of Semarang District, PSDA/ESDM Agency of Semarang District
Decrease the sedimentation at downstream of a river	The dredging process of sedimentation at the outfall of a river					Bawen	Public Work Agency of Semarang District, PSDA/ESDM Agency of Semarang District
Provide a water retention system for the season supply	Construct embung for the water supply and storage					East Ungaran and Pringapus	Public Work Agency of Semarang District, Agricultural, Estate and Forestry Agency of Semarang District
Provide an irrigation system on agricultural land	Construct and Improve the irrigation system for agricultural land					East Ungaran and Pringapus	Public Work Agency of Semarang District, Agricultural, Estate and Forestry Agency of Semarang District and Farmer

RESILIENCE IN PERI - URBAN AREA

Ungaran Sub Region

Strategy	Program	Period (Year)				Location	Stakeholder
		2016-2021	2021-2026	2026-2031	2031-2036		
Improve the supply chain management system	The integration of small cluster industry with big cluster industry in one area					Pringapus	Industry and Trading Agency, Industry Company, UMKM
Repair the infrastructure of industry support	The enhancement of road network performance by widen the area at least about 8 meter					Pringapus	Public Work Agency of Semarang District, Communication Liaison and Informatics Agency of Semarang District
Accommodate every movement of industry workers	The provision of bus for industry workers					Pringapus	Communication Liaison and Informatics Agency of Semarang District

Source: Analysis Result from Group A1 2016's Planning