

Spatial Risk Assessment for African Swine Fever in Raho1 region, Vietnam

Vietnam Team

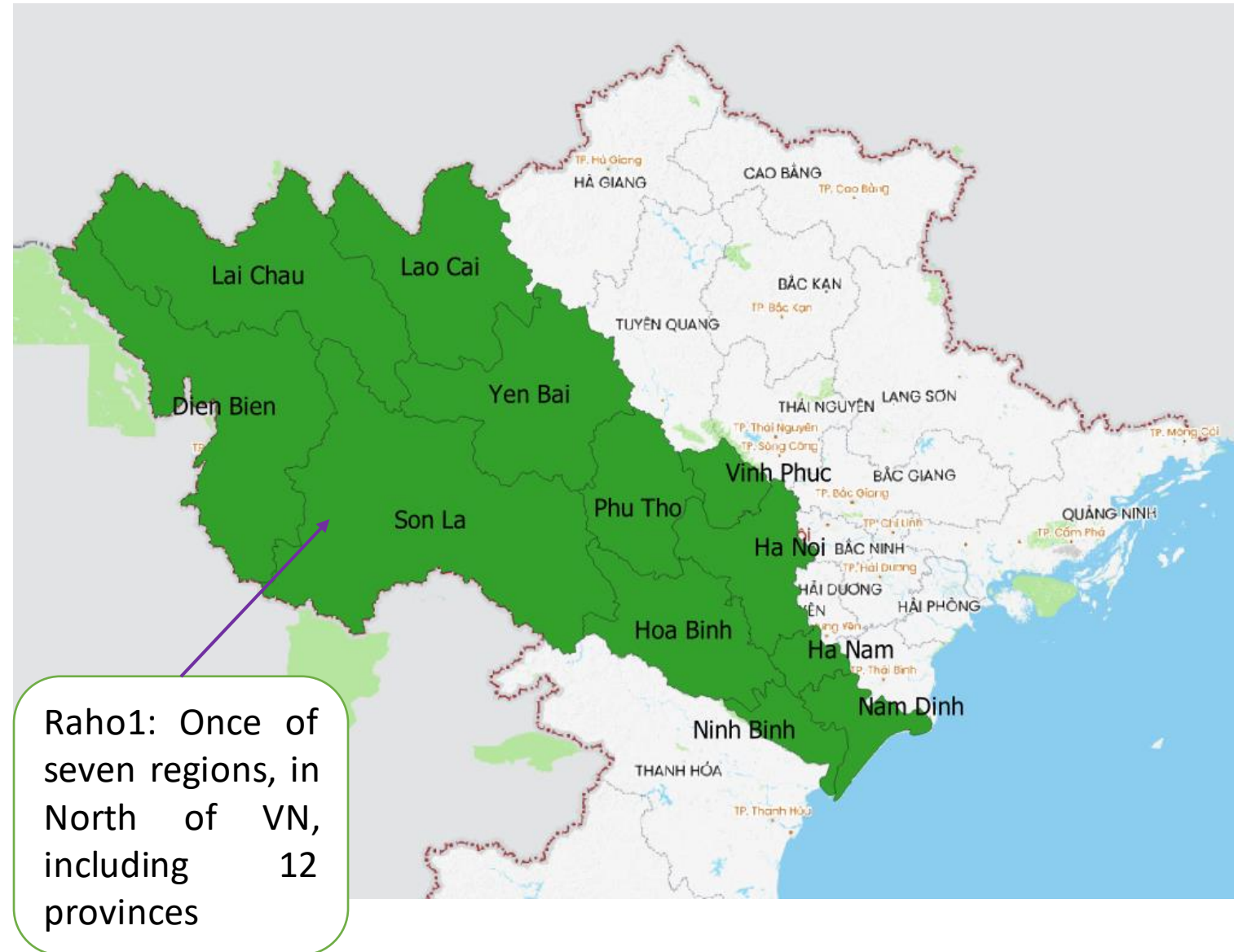
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Ha Noi, Aug-2021

Background

ASF outbreaks

- Viet Nam: In the early of February 2019 in Hung Yen province
- In 2019: Total of 8,553 outbreaks from 63 provinces and over 5 million pigs died and culled
- In 2020: Total of 1,596 outbreaks from 50 provinces and over 86 thousand pigs died and culled
- Raho1: In 2019, had 1,975 outbreaks and over 1 million pigs died and culled. In 2020, 397 outbreaks and about 30 thousand pigs died and culled
- The main object of project would be to create risk assessment map for ASF in region

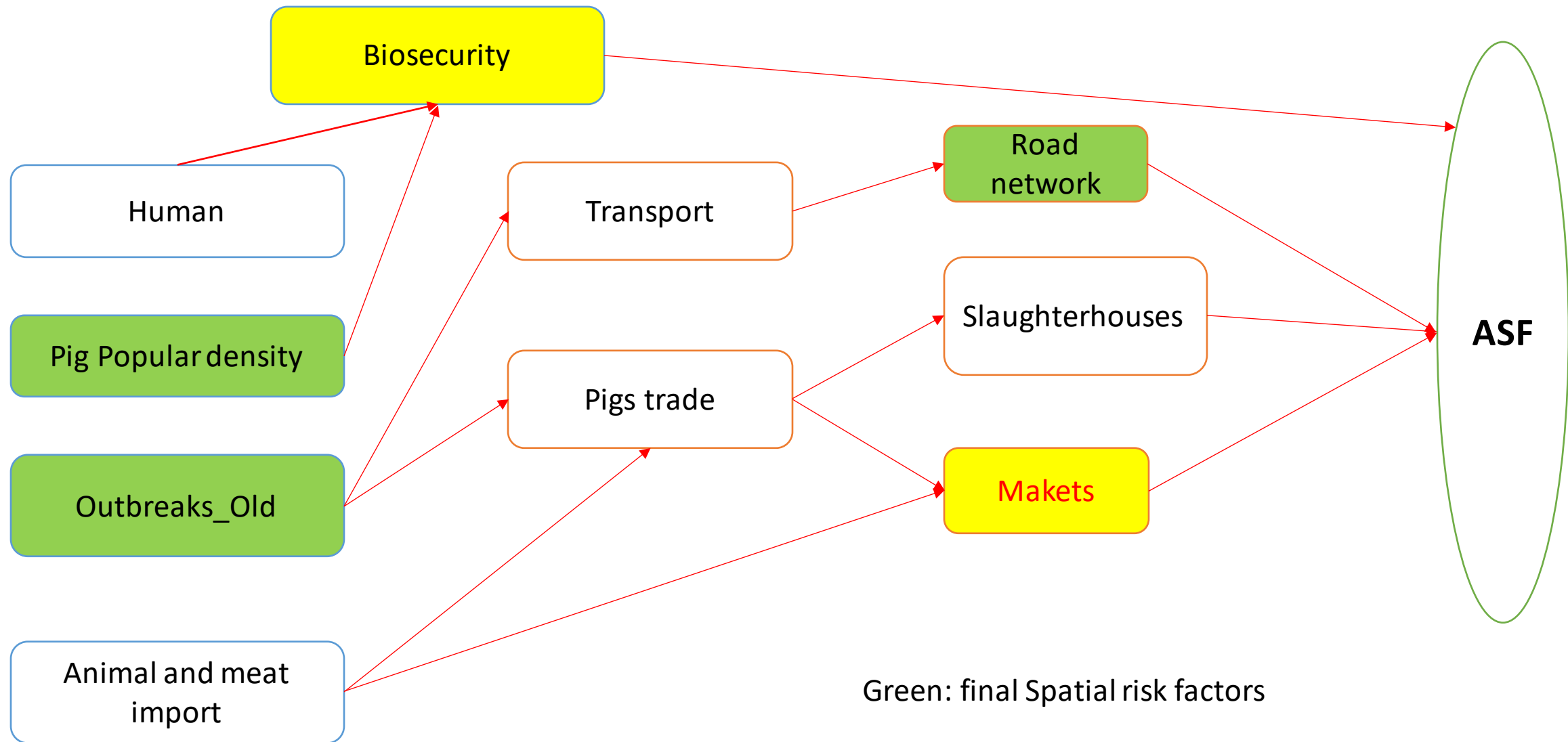


Methodology

To list risk factors for ASF

	Risk factor with a spatial component	Risk factor without a spatial component
Risk factor for incursion	<ul style="list-style-type: none">• Pig popular density• Outbreaks_Old	<ul style="list-style-type: none">• Biosecurity (in small farms, use discarded food from restaurants,...)• Animal and meat import
Risk factor for spread	<ul style="list-style-type: none">• Makets (live animals/ meat)• Slaughterhouses• Road network (Hight way, International way, water way,...)	<ul style="list-style-type: none">• Transport (animal from disease area to other,• Human (vet, or people despose pig disease, ...)• Pigs trade/activity (Salemane,...)

Final spatial risk factors for incursion and spread of ASF



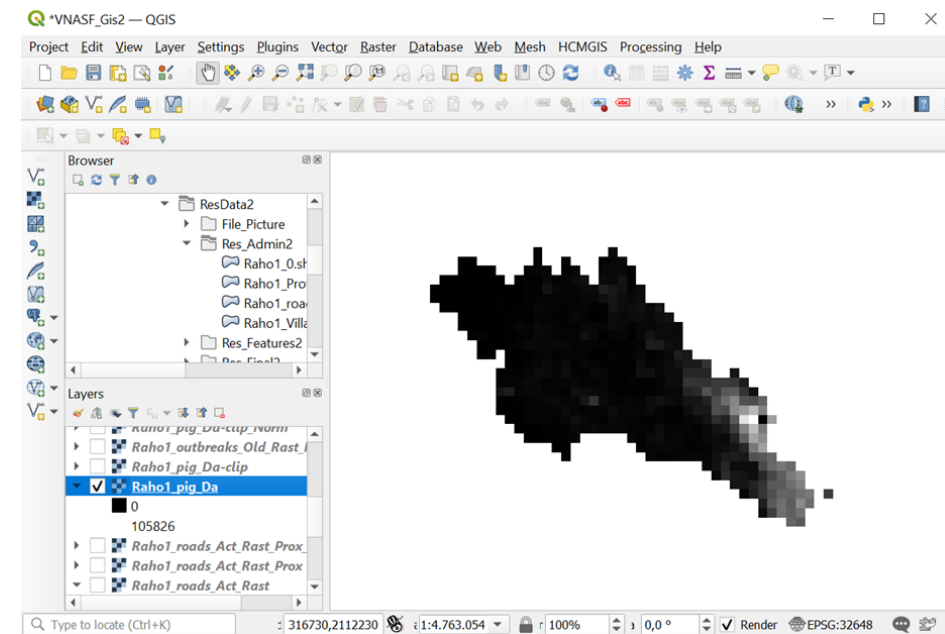
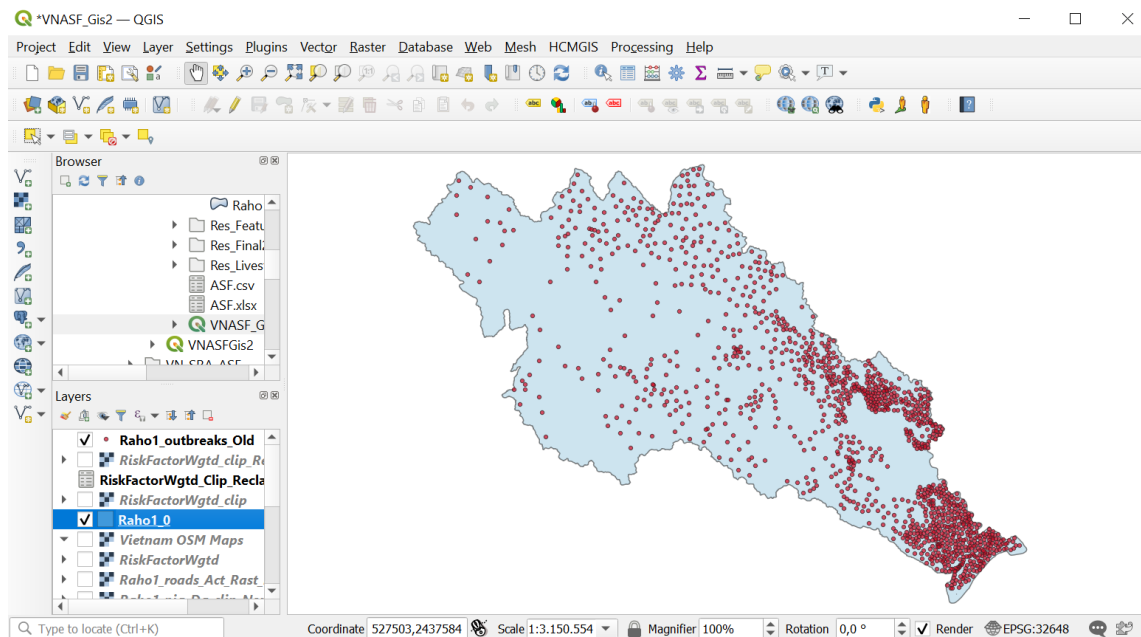
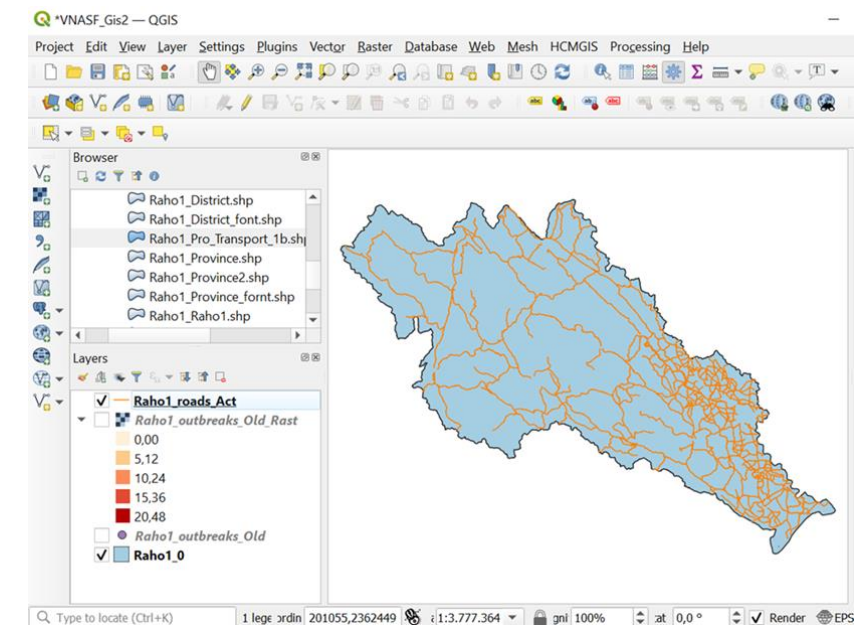
Questionnaire and result data

- with 3 questions
- Send and received 22 answers

	A	B	C	D	E	F	G
1	Median scores for risk factor comparisons						
2			Risk factor 2				
3			Road networks	Pig population density	Outbreaks_Old		
4	Risk factor 1	Road networks	0	-1	-1		
5		Pig population density	1	0	-2		
6		Outbreaks_Old	1	2	0		
7							
8	Transformed scores, geometric means & weights						
9			Transformed score for each risk factor comparison				
10			Risk factor 2				
11			Road networks	Pig population density	Outbreaks_Old	Geometric row mean	Weight for spatial risk layer
12	Risk factor 1	Road networks	1,00	0,74	0,74	0,77	0,25
13		Pig population density	1,35	1,00	0,55	0,88	0,28
14		Outbreaks_Old	1,35	1,83	1,00	1,48	0,47
15							1,00

Use spatial risk datas

- Road network (Raho1_roads)
- Pig popular density in Raho1 (Vietnam_Raho_pigDen_FAO)
- Outbreaks_Old (ASF_outbreaks_2019)



Create final raster risk layer

Raster Calculator

Raster Bands

- Raho1_outbreaks_Old_Rast@1
- Raho1_outbreaks_Old_Rast_Norm_NoNA@1
- Raho1_outbreaks_Old_Rast_Norm@1
- Raho1_pig_Da-clip_Norm@1
- Raho1_pig_Da-clip@1
- Raho1_pig_Da@1
- Raho1_roads_Act_Rast_Prox@1
- Raho1_roads_Act_Rast_Prox_Norm@1
- Raho1_roads_Act_Rast_Prox_Norm_Inv@1
- Raho1_roads_Act_Rast@1

Result Layer

Output layer: F:\ResData2\Res_Final2\RiskFactorWgtd

Output format: GeoTIFF

Selected Layer Extent

X min: 205941,21370 X max: 667898,79500

Y min: 2196320,59870 Y max: 2526578,68530

Columns: 275 Rows: 197

Output CRS: Project CRS: EPSG:32648 - WGS 84 / U

☒ Add result to project

Operators

+ * sqrt cos sin tan log10 (

- / ^ acos asin atan ln)

< > = != <= >= AND OR

abs min max

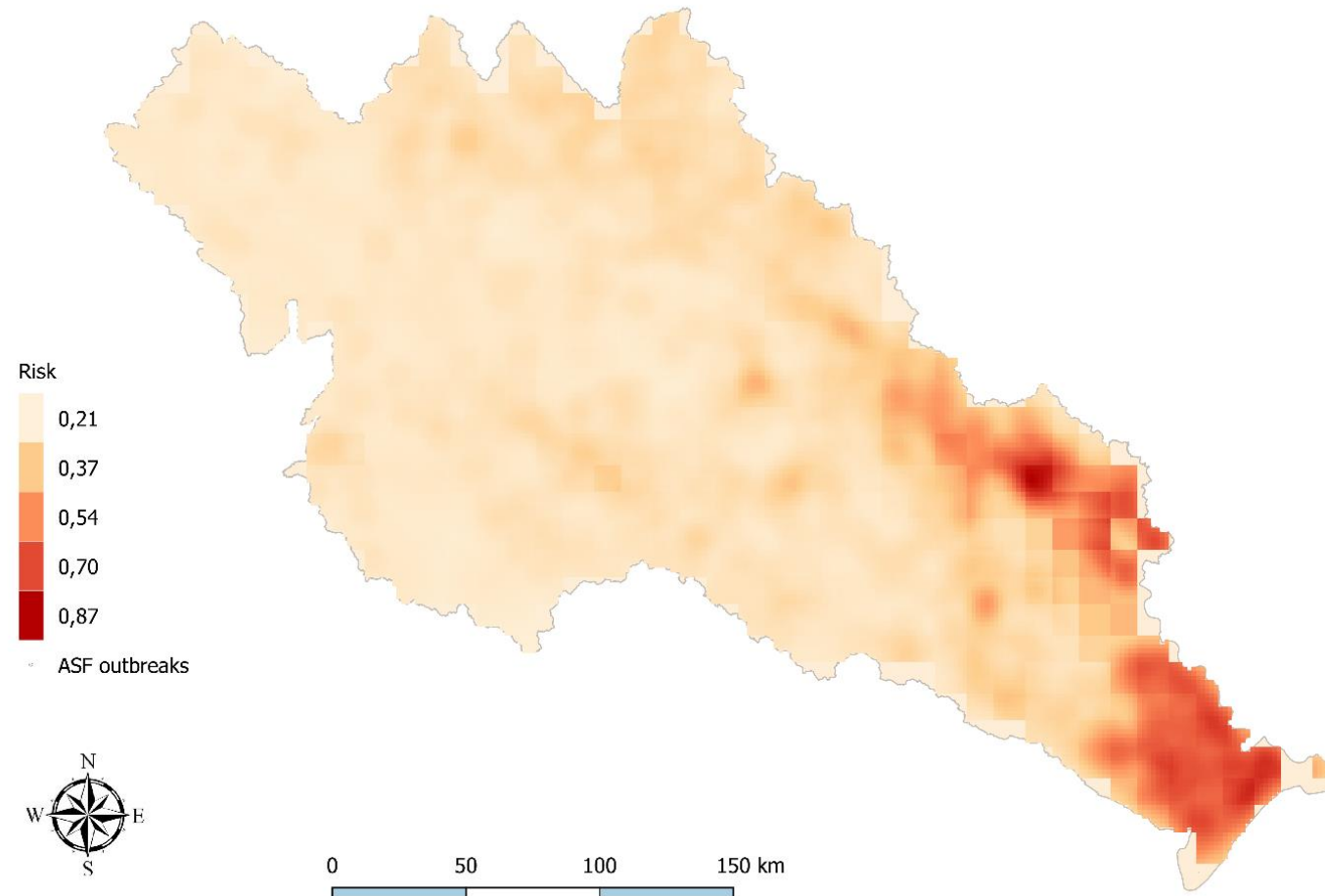
Raster Calculator Expression

```
("Raho1_roads_Act_Rast_Prox_Norm_Inv@1"*0.25)+("Raho1_pig_Da-clip_Norm@1"*0.28)+("Raho1_outbreaks_Old_Rast_Norm_NoNA@1"*0.47)
```

Expression valid

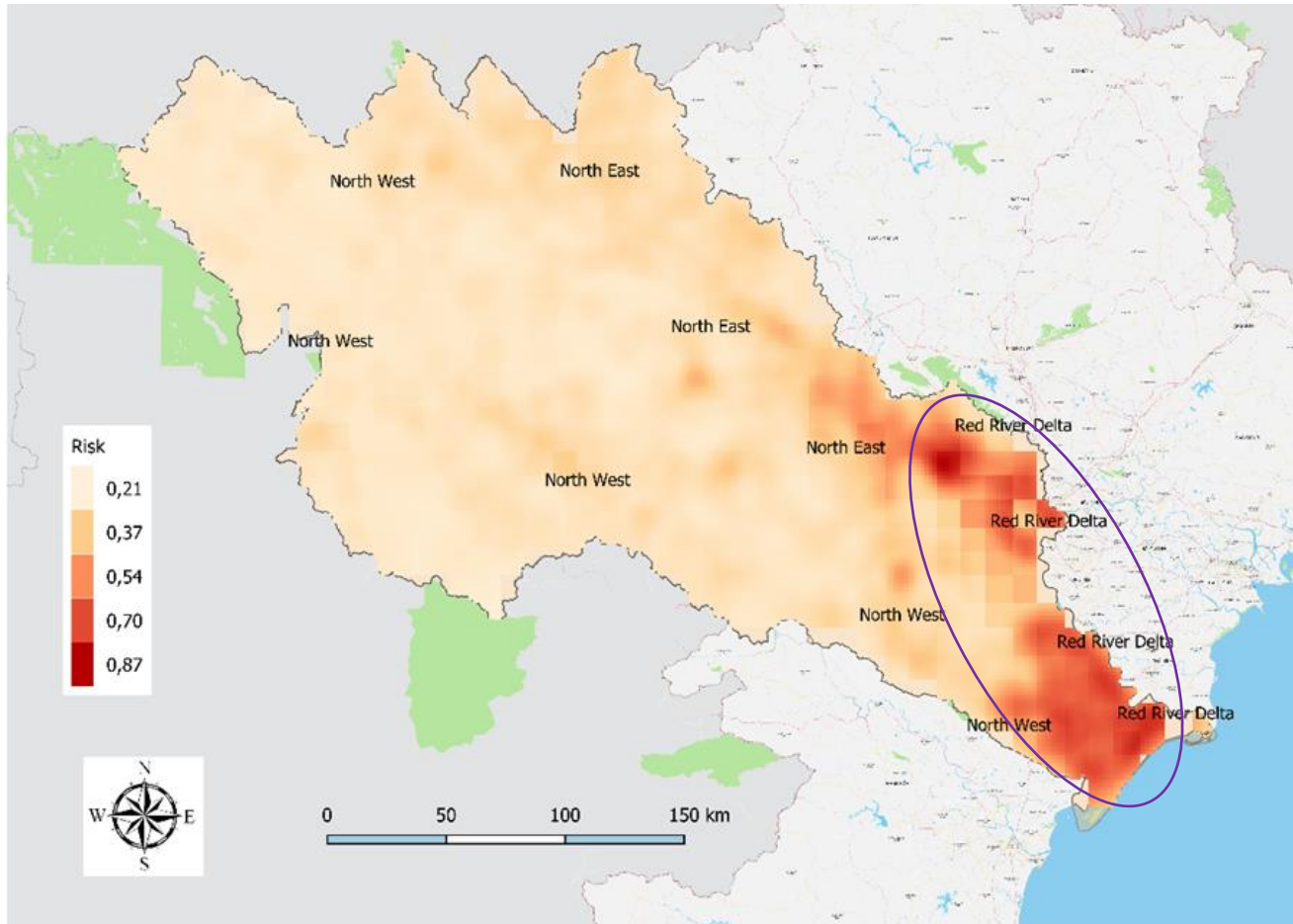
OK Cancel Help

Result and discusion



Spatial risk assessment map for suitability incursion ASF in Raho1 region (VN)

Result and discussion



- Highest risk area
 - ✓ Red River Delta area (RRD)
 - ✓ Total pigs and pig popular density most in region

Spatial risk assessment map for suitability incursion ASF in Raho1 region (VN)

Result and discusion

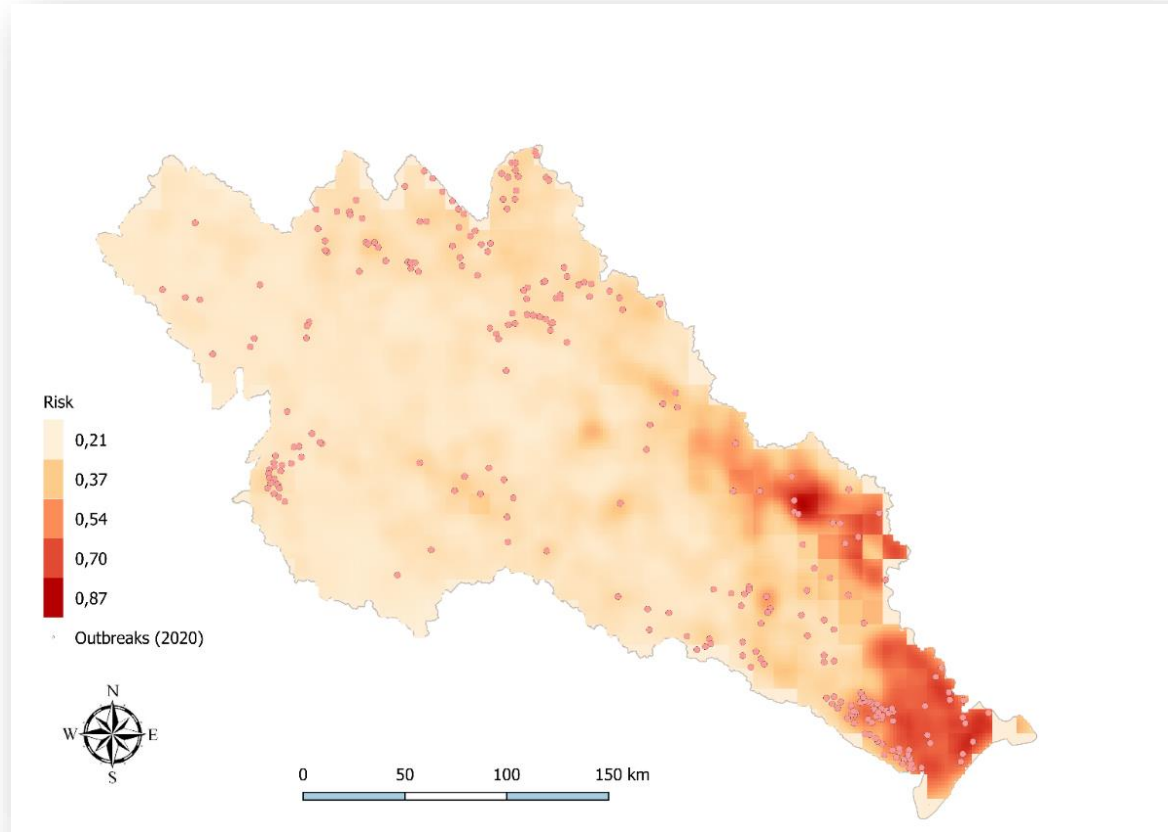


Figure A: Risk assessment map and ASF outbreaks in 2020

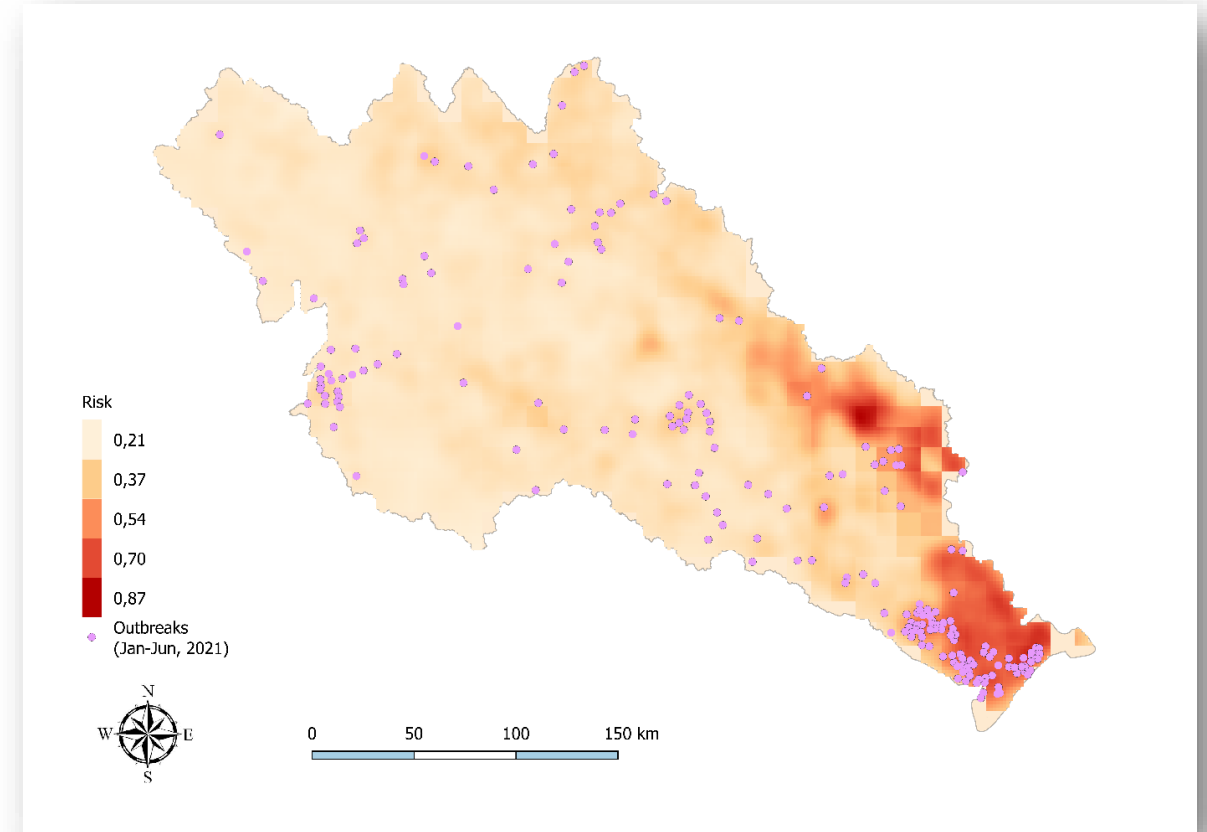


Figure B: Risk assessment map and ASF outbreaks in 2021 (Jan-Jun)

- Add outbreaks in 2020-2021
 - A large amount of outbreaks located in RRD area

Discussion and Conclusion

- Future
 - ✓ Improve prediction of SRA for ASF with more information, spatial risk data and answers data to use

Thanks for your attention