Exploring the Influence of Homophily and Contiguity on Agricultural Policy Diffusion in India

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Abstract

Research on the transmission of agricultural policies is essential to understand and analyse how to facilitate this process. It is especially important for countries like India, where approximately a fifth of the economy is dependent on the agricultural sector. We inspect the role of agricultural homophily and geographic proximity on the diffusion of the National Food Security Mission (NFSM) in the year 2020-2021 in India. Using descriptive statistics of network graphs we created, we find that factors of homophily like similar agricultural conditions and cultivable area of states aid the diffusion of NFSM policies across Indian states. This paper also paves the way for future research possibilities since we fail to find any regression models with statistically significant results.

Introduction

In our research, we look at the diffusion of agricultural policies across Indian states and the factors affecting the diffusion. To conduct our research, we decided to look at the diffusion of different policies of the National Food Security Mission (NFSM) across Indian states in the year 2020-2021. India is an agriculture based economy, with agriculture not only playing an important role in food security, but also contributing significantly to India's Gross Domestic Product (GDP). Thus, looking at the diffusion of agricultural policies across Indian states will give us an understanding of how agricultural policies spread in India.

By 2013, the National Food Security Mission (NFSM) had been implemented across 561 districts across 27 states in the country (Manjunatha et al 2019). However, each state has autonomous power in regards to the allocation of funds for the schemes and choosing which schemes they want to implement. Certain states like Odisha have implemented all schemes, while others like Goa have implemented none. Moreover, there is wide variation in the allocation of funds for these schemes among different states; for example Assam allocated 19158.53 lakh rupees for NFSM in the financial year 2020-2021, while Meghalaya allocated just 207.3 lakh rupees in the same year (Ministry of Agriculture & Farmers Welfare, Government of India).

The aim of this paper is to look at the factors affecting the adoption of NFSM policies by the states of India in the year 2020-2021. We hypothesize that several factors play into its diffusion across Indian states. Considering the geography of India, we believe that similar geographic and agricultural regions, or geographic proximity, might affect the diffusion of the programme across Indian states. Furthermore, the proportion of cropped land in the states of India might be another determining factor in the implementation of NFSM. Using data collected on these variables, we conducted descriptive and inferential statistical analysis to test our hypotheses.

In this paper, we fail to find statistically significant results compliant with our hypotheses. However, the descriptive statistics presented in this study do suggest that even though contiguity and geographical region may not play an important role in policy diffusion of NFSM policies across Indian States, the interaction between the two variables might. Additionally, the network shows that the proportion of cultivable area of states may also play a significant role if examined with other variables. Though this study was unable to discover statistically significant findings, it does provide clarity in regards to factors of agricultural diffusion and policy diffusion in India.

The Role of Geography in Diffusion

Geographic proximity has been widely established as a key variable in policy diffusion, especially in the United States of America (Berry and Baybeck 2005; Pacheco 2012; Onder et al. 2018; Salvatore 2018). Scholars have long argued for a positive regional effect and the tendency for actors to adopt a policy if actors in their immediate geographic proximity have adopted it. States with shared borders or with close proximity have higher inter-state interactions than a random selection of states. Therefore, there is a higher possibility of the facilitation of diffusion between states with a larger amount of inter-state interactions (Salvatore 2018). Additionally, variations originating from cultural and geographical traits can be minimized between neighbouring states compared to random selection of states (Onder et al. 2018). It can also be argued that contiguity results in a social contagion effect, which aids policy diffusion. (Pacheco 2012).

In recent times, several scholars have made arguments against geographic proximity in the diffusion of policies in the United States (Desmarais et al 2015; Bricker & LaCombe 2021; Mallinson 2021). For example, Mallinson (2021) argues that the role of political ideology plays a larger part in policy diffusion than geographic proximity. However, Mallinson also acknowledges that his findings are largely due to the polarized nature of U.S. politics. Nonetheless, the subject of these scholarly articles revolves around the federal system of the United States and hence, may not be translatable to countries with different political systems, like the unitary-federal system of India.

The Role of Homophily in Diffusion

Homophily has a critical part in policy diffusion. There have been a number of prior studies that have emphasized the essential role played by homophily in diffusion (Grossback et al. 2004, Desmarais 2015; Kramer & Namhata 2018; Onder et al. 2018; Mallison 2021; Bricker and LaCombe 2021). Similar to the concept of *birds of a feather flock together,* homophily refers to the tendency of nodes to form ties with similar nodes in a network. Homophily is characterized by actors who tend to form ties with actors they share similar backgrounds, attachments, interests, etc., with (Desmarais et al 2015; Onder et al. 2018). The literature around the role of homophily in policy diffusion stresses on the primary role of the internal determinants of actors in the network and their characteristics. In their study, Desmarais et al (2015) find that "internal capacity and pairwise similarity" held great significance. States with similar internal characteristics tended to have ties with each other. Mallison (2021) argues for the increasing importance of similarity among U.S. states as a predictor of policy diffusion. Similarly, on an international level, Kramer & Namhata (2018) find that countries adopt policies similar to countries with similar structural positions and backgrounds. Additionally, ideological similarity between states can reduce variations associated with ideology differences and similarities (Grossback et al. 2004).

Homophily and NFSM in India

India's economy is dependent on agriculture, with the agricultural sector contributing nearly 20% to India's Gross Domestic Product (GDP) in the financial year of 2020-2021 (Manjunatha et al 2019). Ensuring food and nutritional security for the increasing population of the country is a huge challenge. The Sustainable Development Goals of '*No Poverty'* and *'Zero Hunger'* can be solely achieved by ensuring food security. However, the last three decades indicate that the growth rate of food grain production has decreased from 2.93 percent during the period 1986-1997 to 0.93 per cent during 1996-2008 (Manjunatha et al 2019) . The declining growth of food grains production was partly contributed by the decline of cultivable area, but largely by the decline in agricultural yield.

To combat the challenge of food security, the National Development Council of the Government of India introduced the National Food Security Mission (NFSM) in 2007 - 2008 at the beginning of the 11th Five Year Plan (FYP) (Ministry of Agriculture & Farmers Welfare, Government of India). The programme aims at raising the production of rice, wheat and pulses by using a two-fold strategy. The first step focuses on expanding cultivable area and the second focuses on bridging the productivity gap between potential and existing agricultural yield (Ministry of Agriculture & Farmers Welfare, Government of India). NFSM has subdivisions targeted at the expansion of cultivation of specific crops — NFSM Commercial Crops, NFSM Crops, NFSM Oilseeds, Special Plan Nutri-cereals, and Rice Fallow Areas. The NFSM Commercial Crops include cotton, jute and sugarcane; NFSM Crops include rice, wheat, pulses, nutri-cereals and coarse-cereals; NFSM Oilseeds include oilseeds, oil-palms and tree-borne oilseeds (TBOs) (Ministry of Agriculture & Farmers Welfare, Government of India).

In this paper, we aim to study the external and internal determinants of agricultural policy diffusion through the diffusion of NFSM across the states of India. There is a lack of prior research on the factors that affect diffusion of agricultural policies across the states of India specifically, but also policy diffusion in India in general. This paper will focus on shared borders and geographic regions as proxies for geographic proximity as external predictors and properties of individual Indian states like respective proportion of cropped areas and allocation of funds for NFSM as proxies for agricultural homophily as an internal predictor of policy diffusion.

We expect to see neighboring states and states in the same geographical regions to have similar climatic conditions, including similar land types, soils, elevation, rainfall patterns, precipitation levels, etc. States with similar climatic conditions will grow the same or similar varieties of crops. States in the same region also share similar history, culture, socio-economic conditions, and governance (Onder et al. 2018). For example, the seven north-estern states have been historically marginalized and have formed a regional planning body, The North Easten Council (NEC), that facilitates regional developmental programmes and schemes as well as sanctions and endorses national programmes and schemes. These factors could affect whether states opt for NFSM schemes or not. Therefore we hypothesize that geographic proximity or contiguity might have a role to play in the diffusion of NFSM schemes across Indian states.

Since decolonisation, India has had dynamic state boundaries as a result of various political and social conflicts on the grounds of language, economic, religious, and ethnic differences. There have been demands for regional autonomy on several fronts (Cohen and Ganguly 2014). By supporting the demands for regional autonomy, national political parties are able to provide stable and responsive political regimes (Tillin 2011). In 2000, the east-central state of Chhattisgarh came into existence due its historic and linguistic differences and was hence separated from the state of Madhya Pradesh. Similarly, in 2014 the state of Telangana was carved out of Andhra Pradesh due to the differences between the wet coastal districts and the dry hinterland regions (Cohen and Ganguly 2014). Since India has been creating new states and redrawing its map, we decided it would be suitable to include geographic regions as a proxy of geographic proximity in addition to contiguity.

For the purpose of this paper, we use cropped areas as an internal predictor of agricultural policy diffusion. Similarities in the proportion of areas that are used for cultivation by states could indicate similarities in their respective agricultural sectors. For instance, large agricultural states may have more incentive to participate in agricultural programmes and schemes like NFSM since they may be cultivating a diverse variety of crops and their economy may be dependent upon agriculture. Similarly, the proportions of cultivable land in a state could suggest the importance of agriculture in that state. Hence, states with similar proportions of cropped areas could have similar roles for agriculture in the economy or give similar importance to agriculture.

There could be several predictors of the diffusion of NFSM schemes or agricultural policies among the states of India. Factors like ideological or political similarity, demographics, socioeconomic statuses, etc. can all be considered as determinants, but do not have any prior research regarding them. Therefore, for the purpose of this paper, we will be only focusing on geographic proximity and agricultural land based homophily as external and internal predictors of agricultural policy diffusion.

Research Design

Data Collection

To conduct our research, we first collected data on the adoption of each of the NFSM policies for each state in the financial year 2020-2021. The NFSM policies in this year were NFSM Crops, NFSM Commercial Crops , NFSM Oilseeds, Rice Fallow Areas, and Special Plan Nutri-Cereals. However, since the data was in monadic form, we first converted it to dyadic form for purposes of network analysis. Moreover, we created an undirected network (Network 1) using this data to get a general overlay of the similarity of adoption of NFSM policies across Indian states.

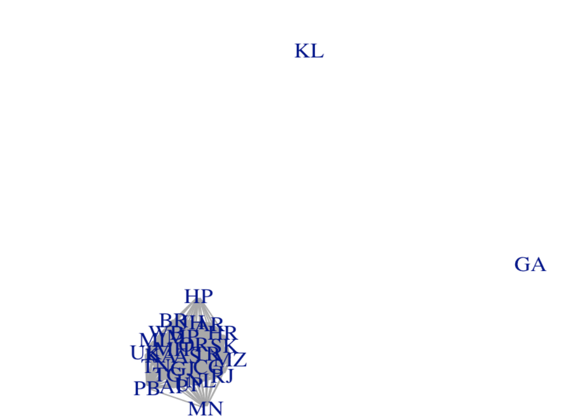

Figure 1: Network 1

In this network, each node represents an Indian state and edges represent whether two states have any NFSM policies in common. Furthermore, each tie is weighted according to the number of NFSM policies the two states have in common. This implies that each tie could have a maximum weight of 5, if two states have adopted all of the 5 NFSM policies, and a minimum weight of 1, if two states have only 1 NFSM policy in common. Notice from Figure 1, that there are two isolates in our network - Kerala (KL) and Goa (GA). We would have such isolates if the two states have adopted NFSM policies which no other state has adopted, or if they have not adopted any NFSM policy. However, from the distribution of the weights of the ties (Figure 2), we see that there is one tie with weight 5, which means that there are two states that have adopted all 5 NFSM policies. This means that if Goa and Kerala had adopted even one NFSM policy, they would have a tie of at least weight 1 with at least these two states. This indicates that Goa and Kerala have not adopted any NFSM policies.

Besides this, we see (in Figure 2) that the median value of shared NFSM policies is 2, which is similar to the mean of 2.37. This means that in general, Indian states that have adopted NFSM policies tend to have two shared policies, as compared to the maximum of 5. This does not mean that most states tend to have adopted 2 NFSM policies, only that they generally have two NFSM policies in common with other states. However, we explore only the distribution of existing ties, which means that we do not take into account isolates or the effect of the lack of ties between them and other states on the distribution of the weights of the ties.

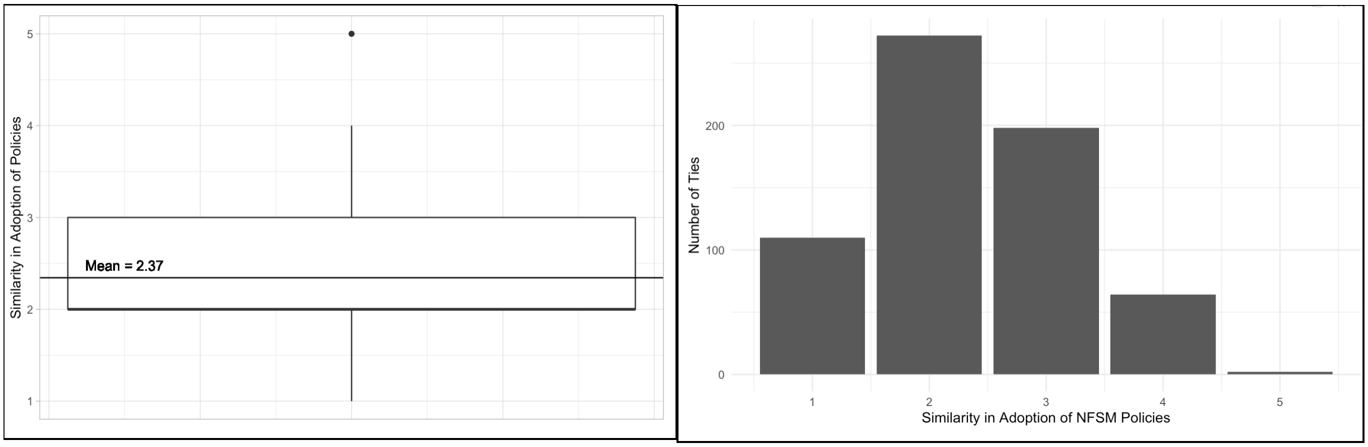

Figure 2: Distribution of weights of ties network 1

We now look at the summary statistics of our network to further understand the similarity in adoption of NFSM policies across Indian states, before exploring other factors that could affect the diffusion of the same. We see that our network has 28 nodes and 323 edges out of a potential 378. Thus, our network has a density of 0.8544974. This means that our network has 85.45% of the potential total ties. We also see, from a univariate cug test (Figure 3), that our network of similarity in adoption of NFSM policies among Indian states is denser than a randomly generated network with the same number of nodes. This implies that there is some driving force in the adoption of NFSM policies, and thus, the diffusion of NFSM policies across Indian states. Hence, having looked at this CUG test, we decided to proceed with our study to test some possible driving factors behind this diffusion.

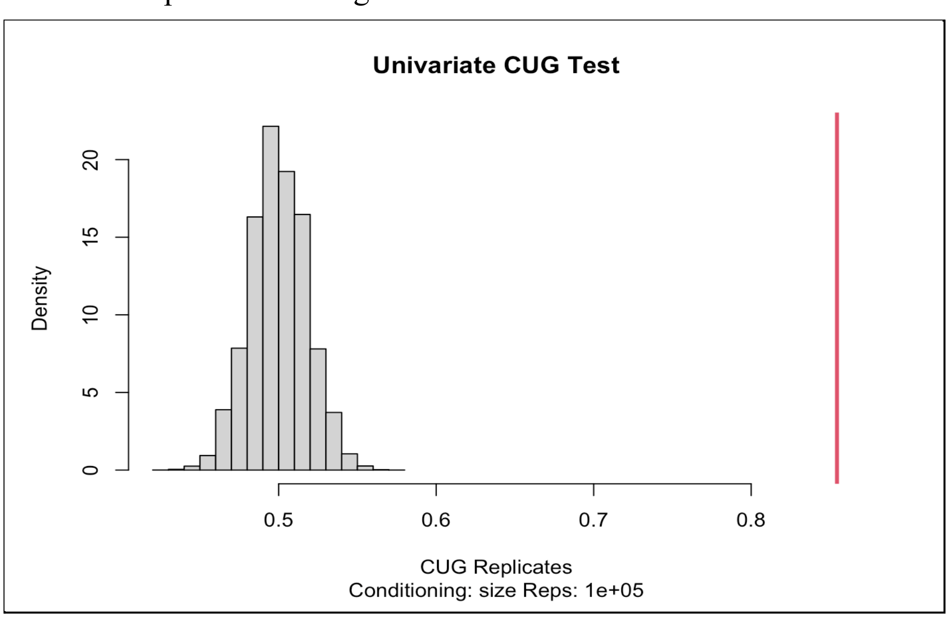

Figure 3: Univariate CUG Test for density of Network 1

Having looked at the similarity in adoption of NFSM policies by Indian states, we moved on to collect data on factors that could affect the diffusion of the same. We collected data on the contiguity of the states of India in the form of an adjacency matrix. We indicated contiguity using a binary variable "Shared Border", which took the value of 1 if two states share a border, and 0 otherwise.

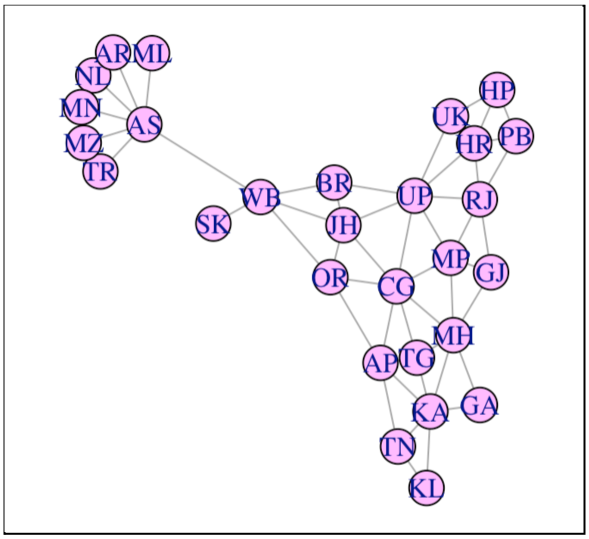

Figure 3: Contiguity of Indian states

In addition to collecting data on contiguity, we divided the states into 6 general categories according to their geographic regions - "Deccan Plateau", "Foothills Himalayas", "Northeastern", "Indo-Gangetic Plain", "Chota Nagpur Plateau", and "Other". We divided the states according to their region because each geographic region has characteristic agricultural conditions. For example, rivers flowing through the Indo Gangetic Plain, like River Ganges, influence the soil in the surrounding basins, resulting in similar agricultural conditions. For purposes of network analysis, we converted this data to dyadic form and created a binary variable "Same Region" equal to 1 if the two states lie in the same geographic region and 0, otherwise. We use this as a proxy for homophily among states, to check whether agricultural similarity has a correlation with the adoption of NFSM policies.

Besides agricultural similarity, we collected data on cropped area in each state. Cropped area refers to the cultivated area of a state. To account for the different sizes of states, we calculated cropped area as a percentage of the total area of the state. We then converted this data to dyadic form and created a variable called “Ratio of Cultivable Area”. This variable is the ratio of the percentage of cultivable area in both states. To create this variable, we only took the ratio of the smaller number to the bigger number to ensure that it has a maximum value of 1. Thus the closer the ratio is to 1, the more similar the two states are. We use this variable as a measure of homophily in terms of importance given to agriculture and thus, how it affects the diffusion of NFSM policies across Indian states.

Finally, we collected data on the allocation of funds for NFSM policies for each state (in lakhs of Indian rupees) and then converted it to dyadic form. To look at similarity in allocation of funds for different states, we calculated the absolute value of the difference between the allocation of funds for each pair of states as a variable called “Allocation Diff”.

Using a combination of these variables, we explore the factors that affect the diffusion of NFSM policies across Indian states.

Method of Analysis

To conduct our analysis, we use a combination of descriptive and inferential statistics. We test two hypotheses and build on each of them step-wise. To measure the role of geographic and agricultural proximity of different states on the diffusion of NFSM, we use shared borders and geographic regions of Indian states. Here, shared borders indicate geographic and climatic proximity, and the geographic regions indicate homophily in terms of similar agriculture and availability of agricultural lands. Furthermore, we also use the similarity in allocation of funds for NFSM policies by each state as an independent variable.

Hypothesis 1: *If two states lie in the same geographic region, have shared borders and have allocated similar funds for NFSM, we hypothesise that the two states will have adopted similar NFSM policies.*

To test this hypothesis, we first built on the initial network we created describing the similarity in adoption of NFSM policies across Indian states (Network 1). Since there were two isolates in the network that made it difficult to observe the existing ties, we removed the isolates for better observation of this network. As a reminder, each node in this network is a state and the ties are representative of whether two states have adopted any common NFSM policies. Furthermore, the ties are weighted by the number of NFSM policies the two states share. Secondly, we coloured the edges between two states by whether they lie in the same geographic region, where purple indicates that the states lie in the same region and blue indicates that they do not. This network gives an overview of the correlation between two states lying in the same region and similarity in adoption of NFSM policies by them. (Figure 4 - Network 2)

Now to account for the role of geographic region, contiguity and similarity in allocation of funds for NFSM on its diffusion, we conduct a network multiple regression. In this regression, our dependent variable is the similarity in adoption of NFSM policies, which is a continuous variable. Our independent variables are the binary variables - "Shared Border" and "Same Region" and the continuous variable "Allocation Diff". We expect a positive coefficient for "Shared Border" and "Same Region" and a negative coefficient for "Allocation Diff".

Secondly, we look at the similarity in the cropped area of two states on the role of diffusion of NFSM policy. We use the variable "Ratio of Cultivable Area" as a proxy for homophily between two states in terms of importance given to agriculture. First, we create an undirected network with states as nodes and ties indicating whether the "Ratio of Cultivable

Area" of two states is greater than 0.5 (Network 3). We use 0.5 as a threshold for this variable since if the ratio of the percentage of cultivated area of the two states is less than 0.5, it signifies that one state has less than half of their total area cultivated than the other. This implies that if the "Ratio of Cultivable Area" is less than 0.5, then the percentage of cultivated area in these states are not similar. Furthermore, the ties are weighted according to the number of NFSM policies two states have in common. Since Goa and Kerala have not adopted any NFSM policies, we exclude these two states from the network.

Second, we conduct a network multiple regression to examine the role of similar cropped areas and allocation of funds for NFSM on the diffusion of NFSM policies across Indian states.

> ***Hypothesis 2:*** *If two states have similar cropped area and have allocated similar funds for NFSM, we hypothesise that the two states will have adopted similar policies of NFSM.*

The dependent variable in our network regression is the number of NFSM policies two states have in common. The independent variables in this regression are the absolute value of the difference in allocation of funds for NFSM by two states "Allocation Diff" and the ratio of the percent of cultivated land "Ratio of Cultivable Area" of the two states. We expect a positive coefficient for the "Ratio of Cultivable Area" and a negative coefficient for "Allocation Diff".

Results and Analysis

As outlined above, we first created a network describing the correlation between states lying in the same region and the similarity in adoption of NFSM policies (Network 2). Remember that the ties are weighted according to the number of NFSM policies the two states share and they are coloured according to whether the states lie in the same geographic region. They are purple if the states lie in the same region and blue, otherwise. Here, we see that there are more blue ties than purple ones, which means that there are more states which do not lie in the same region that share some NFSM policy(ies). However, on further observation, we see that the purple ties are thicker than the blue ties. This means that if two states lie in the same region and there is a tie between them, then it is more likely that the two states have more NFSM policies in common than two states that do not lie in the same region. This is confirmed by further examination, where we find that of all the ties among states that lie in different regions, 33.97% have a weight of more than 3, while for states that lie in the same region, 39.39% of ties have weights of 3 or more. We chose 3 as the threshold for the weight of ties since we wanted to look at the proportion of ties in each category with more than the median weight.

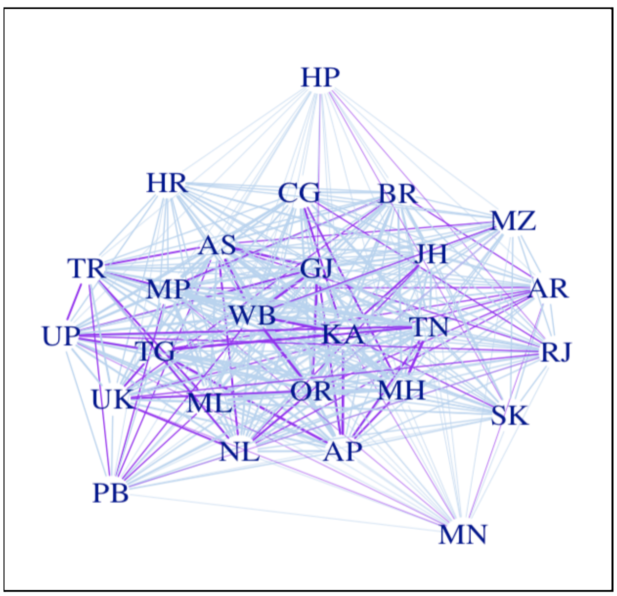

Figure 4: Network 2

We now look at how the relationship between similarity in adoption of NFSM policies and states lying in the same region is affected when accounting for contiguity. To do so, we create a bar plot faceted by whether states lie in the same geographic region. Moreover, we colour the bar plot by whether states share a border (Figure 5). Notice that we have included data for Goa and Kerala in the bar plot. Firstly, this bar plot reiterates that there are more ties between states that lie in different geographic regions than states that lie in the same region. However, an interesting observation from this plot is that when states lie in the same region and have shared borders, they tend to have more policies in common than states that do not share borders. This means that the combined effect of shared borders and same geographic region might imply more NFSM policies in common. This is in accordance with part of our first hypothesis that shared borders and same region aid the diffusion of NFSM policies across the states of India.

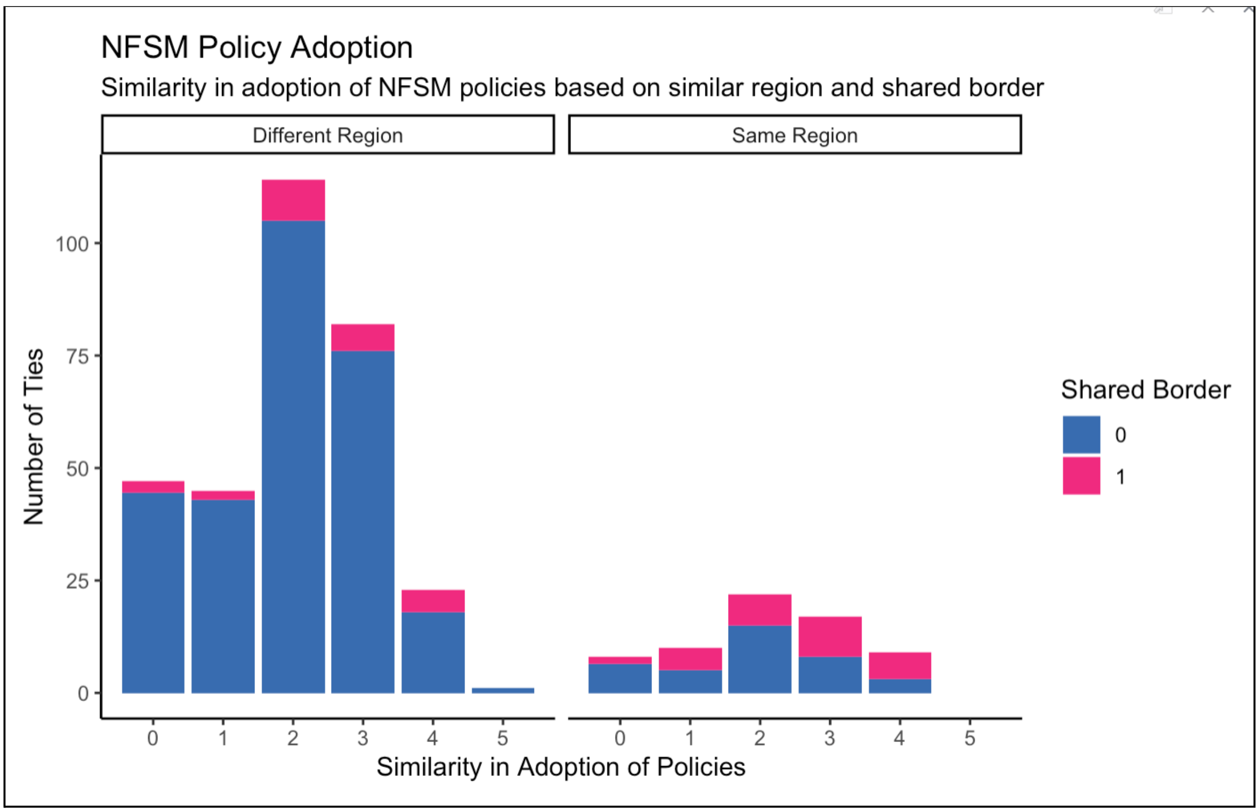

Figure 5: Similarity in NFSM policy adoption based on contiguity and same region

To now analyse the combined effect of contiguity, same region and similarity in allocation of funds for NFSM on the diffusion of NFSM policies across Indian states, we run a network multiple regression. Here, our regression is of the form:

$$\widehat{NFSMAdoptionSim} = \beta_0 + \beta_1 * (SharedBorder) + \beta_2 * (SameRegion) + \beta_3 * (AllocationDiff)$$

and we test the hypothesis:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$
$$H_A : \beta_1 \neq 0 \text{ and/or } \beta_2 \neq 0 \text{ and/or } \beta_3 \neq 0$$

On running our regression, we obtain the following regression model:

Table 1: Summary of regression run for Hypothesis 1

	Estimate	p-value
Intercept	1.640129e+00	0.000
Shared Border	6.525597e-02	0.684
Region	1.670329e-01	0.331
Allocation Diff	1.508925e-05	0.646

In this model, we obtain positive coefficients for “Shared Border” and “Same Region”, which is in accordance with our hypothesis. On the other hand, “Allocation Diff” also has a positive coefficient, which is contrary to our hypothesis because it implies that the greater the difference in allocation of funds for NFSM between two states, the more NFSM policies they will have in common. However, none of these coefficients are significant since their p-value are much larger than the threshold value of 0.05, as can be seen in the summary of the regression model. Thus, we fail to reject the null hypothesis and do not have enough evidence to say that “Shared Border”, “Same Region” or “Allocation Diff” have any effect on the diffusion of NFSM policies across Indian states.

To test our second hypothesis, we first look at the correlation between similarity in percentage of cropped area of two states and their similarity in adoption of NFSM policies. To do this, we look at the network we created with states as nodes and ties between them if the “Ratio of Cultivable Area” of two states is above 0.5. Moreover, the ties are weighted according to the number of NFSM policies the states have in common. Since Goa and Kerala did not adopt any NFSM policies in the year 2020-2021, we exclude them from our graph in order to get a more detailed observation of our network.

This network has 25 nodes and 150 ties, as compared to a potential 300 ties between the states. This implies that our network has a density of 0.5. The count of nodes of our network is an interesting observation. We expect there to be 26 nodes since after excluding Goa and Kerala from our edgelist, we are left with a total of 26 states. However, we see that the network only has 25 nodes. This is because of the threshold value of 0.5 that we set on the "Ratio of Cultivable Area" to check whether the percentage of cultivated area is similar. Upon further analysis, we see that the state of Arunachal Pradesh is excluded from the network since the percent of cultivated area in Arunachal Pradesh is less than the percent of cultivated area of any other state by a factor of at least 0.5. This is because of the lack of quality education & research, adequate infrastructure, low productivity, inadequate marketing and lack of knowledge on modern farm technologies in Arunachal Pradesh. (Department of Agriculture, Government of Arunachal Pradesh, 2021)

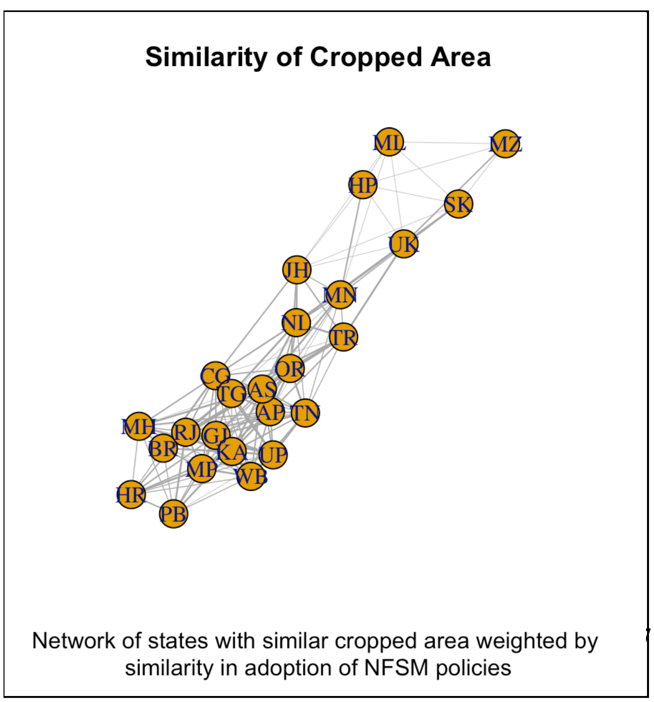

Figure 6: Network 3

We also observe that ties have greater weights among states that have ties with many other states than states which do not have ties with many other states. This means that states which have a similar cultivable area compared to many other states have adopted a larger number of similar NFSM policies as other states. This is in accordance with part of our second hypothesis since it indicates that if states have similar cropped area, then they will adopt similar NFSM policies and thus, similar cropped area affects the diffusion of NFSM policies across India. To further test this hypothesis, we conduct a network multiple regression of the form:

$$\widehat{NFSMAdoptionSim} = \beta_0 + \beta_1 * (\text{Ratio of Cultivable Area}) + \beta_2 * (\text{Allocation Diff})$$

with the hypotheses:

$$H_0 : \beta_1 = \beta_2 = 0$$
$$H_A : \beta_1 \neq 0 \text{ and/or } \beta_2 \neq 0$$

On running our network multiple regression, we obtain the following regression model:

Table 2: Summary of regression run for Hypothesis 2

	Estimate	p-value
Intercept	1.620480e+00	0.000
Ratio of Cultivable Area	3.007716e-01	0.220
Allocation Diff	1.319015e-05	0.687

In this model, we obtain a positive coefficient for “Ratio of Cultivable Area”, which complies with our hypothesis and observations from our network model. This positive coefficient reiterates that the more similar the percent of cultivable area in two states, the more NFSM policies the two states have in common. This implies that similarity in cultivable area could have a positive effect on the diffusion of NFSM policies across India. On the other hand, "Allocation Diff" also has a positive coefficient, which contradicts our hypothesis. However, neither of the coefficients of our variables are significant since their p-values are much larger than the threshold value of 0.05. Thus, we fail to reject the null hypothesis and hence, we do not have enough evidence to say that similarity in cultivable area and similarity in allocation of funds for NFSM of two states affect the diffusion of NFSM policies across Indian states.

Limitations

We faced several obstacles while conducting our research, which could have potentially affected our results. However, there were two main limitations that we encountered. The first major limitation was the lack of data. Due to differences in the nature of policies, both at the centre and state level, there is a dearth of organised data collection on policies in Indian states. Thus, we needed to collect our own data. Given the short duration of this research, we were unable to go beyond just the NFSM. This could result in a sampling bias, which could have influenced our results.

Additionally, we only looked at the adoption of NFSM policies in the fiscal year of 2020-2021 (1st April, 2020 - 31st March, 2021). Besides introducing sampling bias, this could also affect our results since we considered a particularly unique year. The fiscal year of 2020-2021 was ravaged by the coronavirus pandemic. Thus, the economy of India as a whole was adversely affected; the economic growth of India reduced to 3.1% in the fourth quarter of the fiscal year 2020-2021(Jagannath 2020). Therefore, the capacity of Indian states to implement NFSM could have decreased. Furthermore, the pandemic affected the production and marketing of agricultural products through labour and logistical constraints (Cariappa et al., 2021). Hence, the overall adoption and implementation of NFSM policies could have reduced in the financial year of 2020-2021. This reduction could have skewed our data to represent a smaller extent of diffusion of NFSM, as compared to other years. It could also imply that the year we selected is not representative of the general trend of the diffusion of agricultural policies in India.

Conclusion

Although agriculture is a vital part of India's economy, there has not been much research on the diffusion of agricultural policies across India. We thus explore one such agricultural policy, the National Food Security Mission (NFSM) and its diffusion across Indian states in 2020-2021. While we acknowledge that there could be confounding variables such as political relations among states, especially in a quasi-federal system like India, we examine the effects of homophily and contiguity on the diffusion of NFSM policies across India.

We first examine diffusion as a function of shared borders, same geographic region and similarity in allocation of funds for NFSM. While a network graph and bar plot support part of our hypothesis, we do not find any significant results in our network multiple regression model. This could be because of the lack of data since we only collected data over the year 2020-2021. Since network visualisations are in accordance with our hypothesis, further research on this topic could produce a regression model with significant results, which would also support our hypothesis.

Secondly, we investigate the role of similarity in the proportion of cropped areas of two states and similarity in allocation of funds for NFSM on the diffusion of NFSM policies across India. Like the first hypothesis, a descriptive network of the data complies with part of our second hypothesis. However, we do not find any statistically significant results in the network multiple regression model for our second hypothesis either. Nevertheless, since our network supports our hypothesis, we suggest further research on this hypothesis with a larger selection of data.

Further research on this topic using data on several agricultural policies collected over several years will help in identifying the factors influencing diffusion of agricultural policies across the states of India. This research offers a starting point in this process, which might ultimately aid the smoother diffusion of agricultural policies in India.

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