Analysis of the 2012 Mexican Presidential Elections

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Abstract

Historically, Mexican Presidential elections come along with allegations of results manipulation, alteration of ballots and vote-buying. Using GIS an analysis of the 2012 Mexican Presidential elections results was performed. This analysis was dividend in two steps. The first step was the visualization of the voters' preference in the country almost on real-time. The official results, published by the Federal Electoral Institute, were used to create maps from different states and some cities 30 minutes. These maps show voter's preference and they were created using ArcMap and python scripting. In the second step, a statistical analysis was performed to identify irregularities in the percentage of assistance and the percentages of votes for each candidate. The results show important anomalies in several regions of the country, especially in the poorest districts and from the winner candidate.

Introduction

In Mexico, a president is elected by direct, popular, and universal suffrage. A difference with other countries there is not two-round system or run off which has generate disagreement from people, especially when no candidate has an absolute majority in votes.

From 1928 to 1982, the Institutional Revolutionary Party *(Partido Revolucionario Institucional (PRI) in Spanish*) rule Mexico as a virtual one-party state. The PRI got the vast majority of the votes, usually with more than 70% of them, but with a participation of only 30% of the people who were registered to vote. In 1988, the story was different; it was the first time that PRI won the elections with a little more than 50% of the votes, and with multiple fraud accusations. Since then, Mexican presidential elections has not meet international standards of transparency and cleanliness.

Since then, every 6 years elections come along with allegations of results manipulation, alteration of ballots and vote-buying. Even though there have been countless evidence of fraud, irregularities in the electoral process, and vote buying no elections have been cancelled. With that result, with the use of Geographic Information Systems (Arc Map) an analysis of result of the 2012 presidential elections was performed in order to identify possible irregularities in the process.

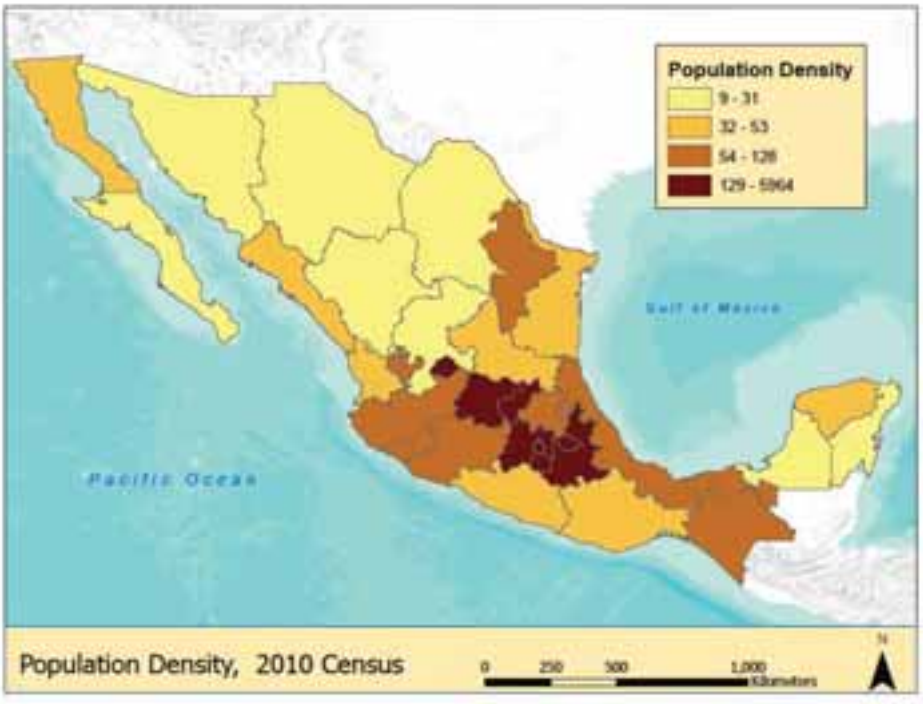
The Federal Electoral Institute *(Instituto Federal Electoral (IFE) in Spanish*) is the responsible of the organization of Federal Elections in Mexico. The IFE divides the Mexican territory according to the following classification:

- 32 states
- 300 districts
- 67,068 sections
- 143,514 polling sites

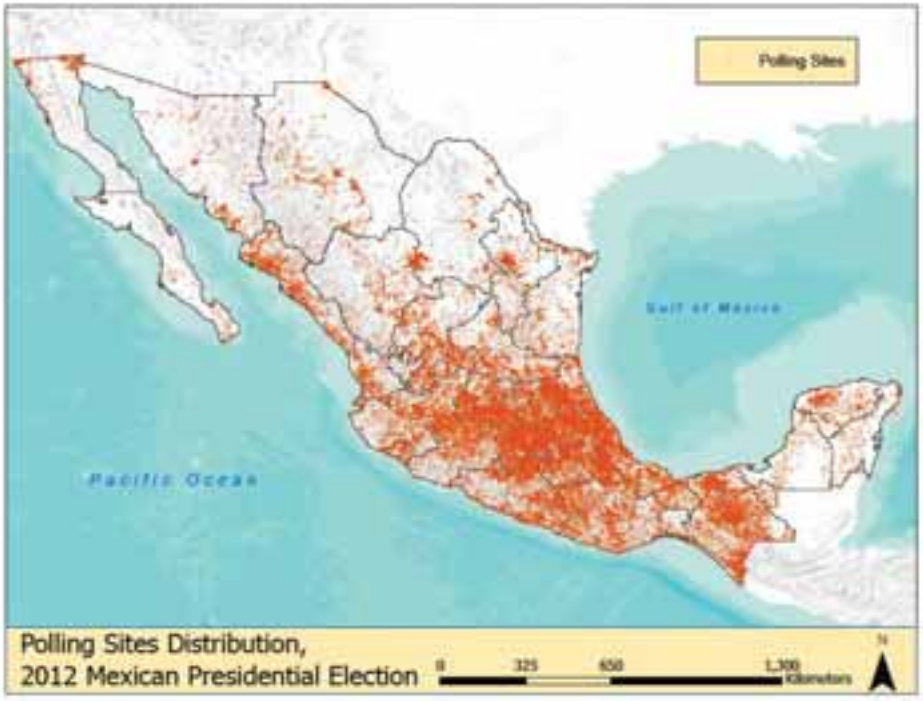
For the purpose of this analysis, the 300 districts were use as unit of analysis, because state were did not give enough information and section and polling sites were too small to be display.

Map 1 shows population distribution base on 2010 census. The majority of the inhabitants are located in the center and south of the country. With a population density of 5964 people every 1 km^2 (5964 people every 0.38 Mi^2), Mexico City is, by far, the most populous state in Mexico. Followed Mexico City are Mexico, Morelos, and Tlaxcala states. The bottom least populous states are located in the north region: Baja California Sur, Durango, Chihuahua, Campeche, and Sonora (Instituto Federal Electoral, 2010). .Appendix 1 shows the complete population density table.

Following the same pattern, map 2 shows polling sites distribution. It is clear that more population cities have more polling sites. Similar to map 1, there is an important concentration of polling sites in the center and south of the country.



Map1 shows the Mexico's center and south have a greater population density that the north.



Map2 shows the location of the 143,514 polling sites for the 2012 Mexican Presidential Elections. A vast number of polling sites were located in the center and south of the country following population distribution.

The four parties that participate in the elections were National Action Party (*Partido Acción Nacional, (PAN) in Spanish)* represented by number one and color blue; Institutional Revolutionary Party *(Partido Revolucionario Institucional (PRI) in Spanish*) represented by number 2 and red color*;* Party of Democratic Revolution *(Partido de la Revolución Democratica (PRD) in Spanish)* represented by number 3 and yellow; and New Alliance Party *(Nueva Alianza Partido (PANAL) in Spanish)* represented by number four and pink color. Table 1 shows a summary of the above information.

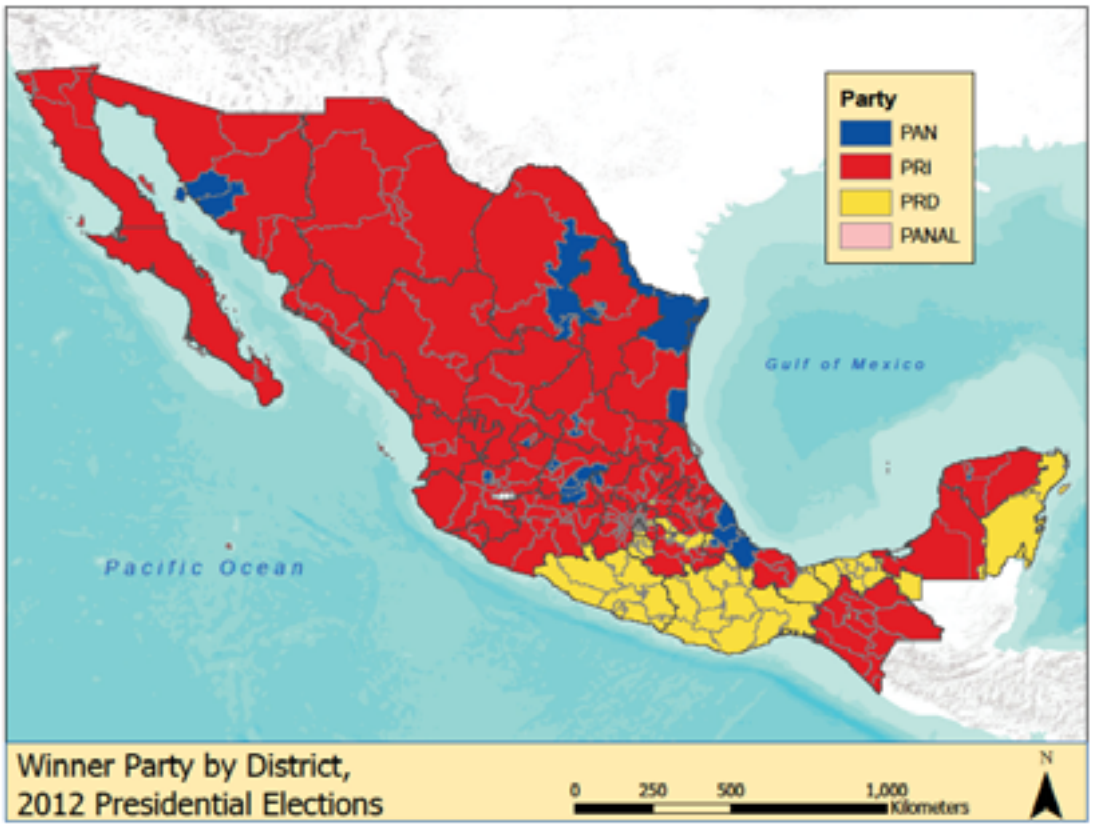
Table 1: Parties classification

Party	***Acronym***	***Number***	***Color***
National Action Party	PAN	1	Blue
Institutional Revolutionary Party	PRI	2	Green
Party of Democratic Revolution	PRD	3	Yellow
New Alliance Party	PANAL	4	Pink

Analysis

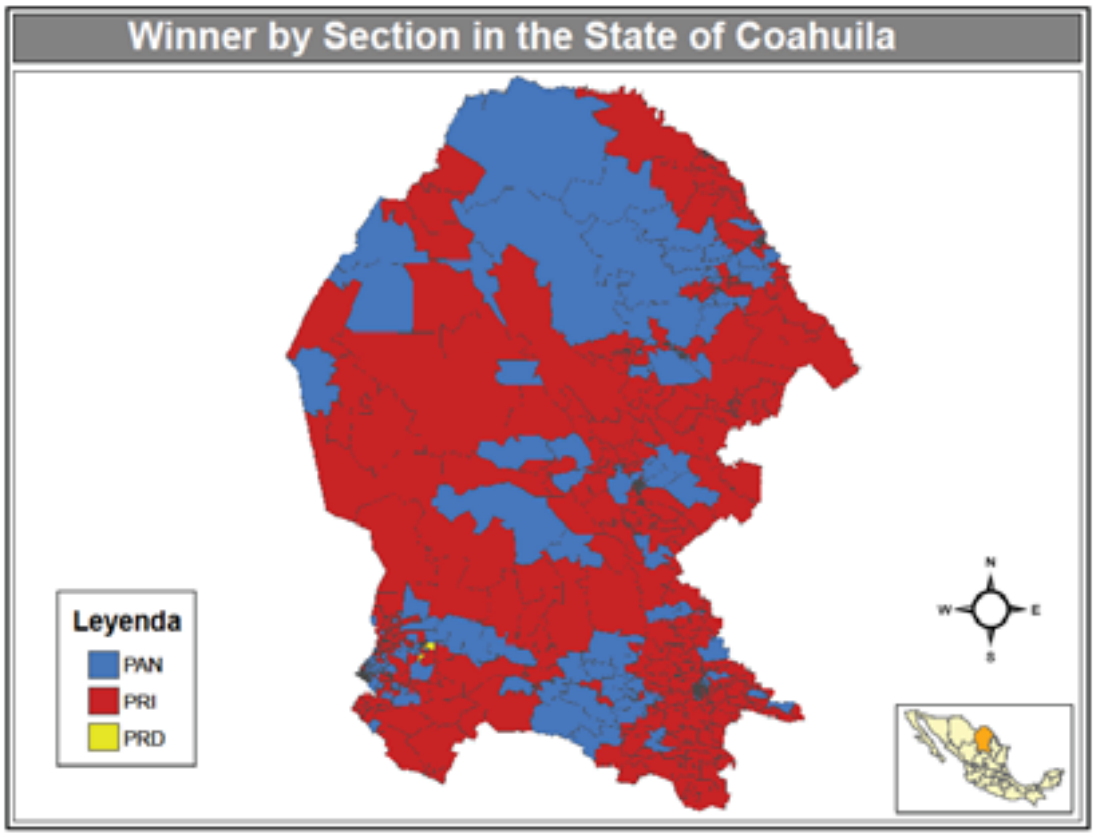
This analysis was dividend in two steps. The first one was the visualization of the voters' preference in the country almost on real-time. The official results, published by the IFE, were used to create one map with the voter preference by districts and 32 maps showing voter preference in every state by sections every 30 minutes, depending on when new data was available. The IFE published the results as they come from the polling sites. This process took hours because of the large number of polling sites along the country and because the difference in time zones. It is important to mention that votes were counted by people since there was no electronic mechanism in the elections. Since there were 33 maps, it was time consuming to update the database for each map. To optimize the process a python script was used to update and export all the maps to pdf format.

Map 3 shows the voter preference by district (300 districts) in different geographic areas. They also show district with irregular vote preference tendency without a logic reason within the same geographic area. As map 3 shows, PRI won in the majority of the districts in the North of Mexico. The PRD got more votes in Mexico City, Guerrero, Oaxaca, Tabasco and Quintana Roo. Just a few districts selected the PAN as their favorite party.

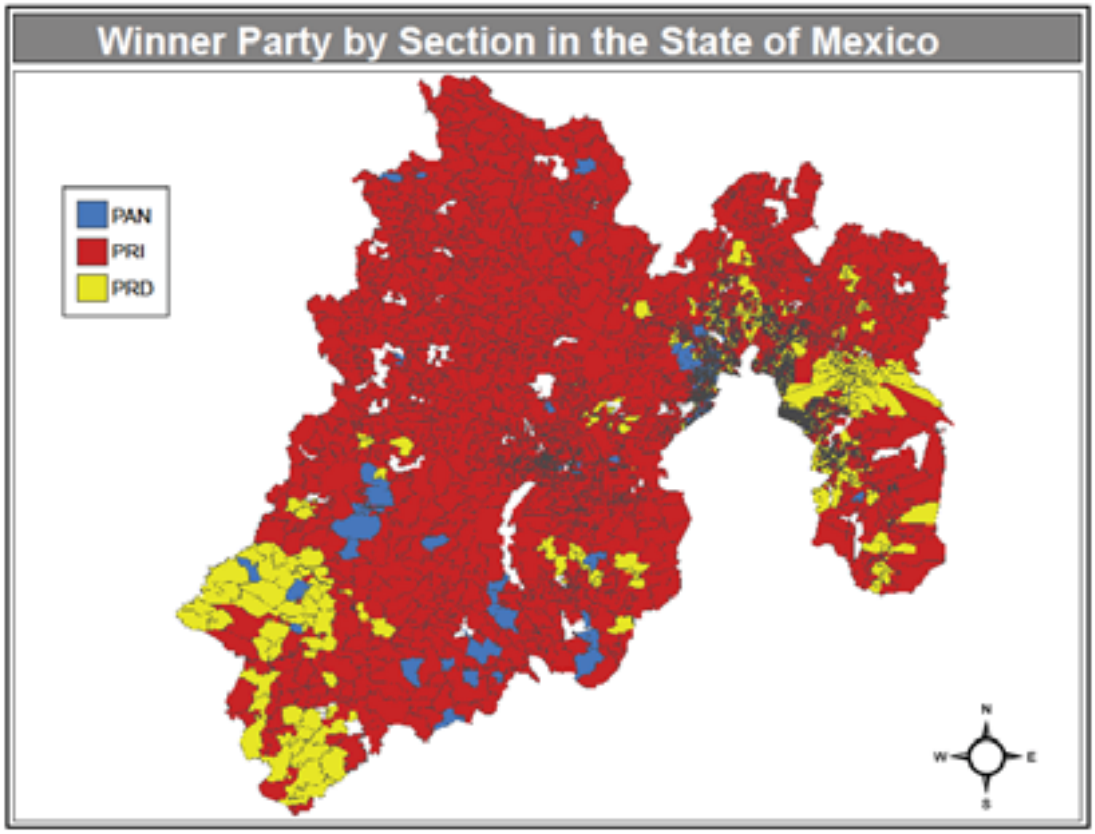


Map 3 Winner Party by district in the 2012 Mexican Presidential Elections

A smaller unit of analysis could give more information about voter's preference in each state. Map 4 show party winners by section in Coahuila and Mexico, two states that were won by PRI.



Map 4 Winner party by section in the State of Coahuila in the 2012 Mexican Presidential Elections



Map 5 Winner party by section in the State of Mexico in the 2012 Mexican Presidential Elections

As a second step, a statistical analysis was performed to identify irregularities in the percentage of assistance and the percentages of votes for each party in relation to poverty. Map 6 shows poverty measurement taken by the National Council for Evaluation of Social Development Policy *(Consejo Nacional de Evaluación de la Politica de Desarrollo Social (CONEVAL) in Spanish)* in 2010. *CONEVAL* generates information related to poverty measurement in Mexico. It divides the Mexican territory in 2,456 municipalities, and for each one, it indicates the percentage of population that live in poverty.

Map 6 shows in light yellow municipalities where with 20% or less of the population live in poverty. On the other hand, brown color shows municipalities where 80% or more people live in poverty. The poorest states in Mexico are Chiapas, Oaxaca and Guerrero.

Map 6. Percentage of people living in poverty.

Taking into account that citizen participation in 2006 was 58.55% and 63.14 in 2012 (Instituto Federal Electroral, 2012) and that there was no other external factor that could influence the way in which people vote, it can be inferred that behavior and citizen participation in the 2012 election would be similar to the 2006. More specific this paper will compare the polling sites that had citizen participation above the average of the citizen participation in presidential election in 2006. The purpose is to identify any atypical increase in the participation and to compare it to the poorest areas in México.

Map 7 shows polling sites where citizen participation was above 65% and where PRD party obtained more votes.

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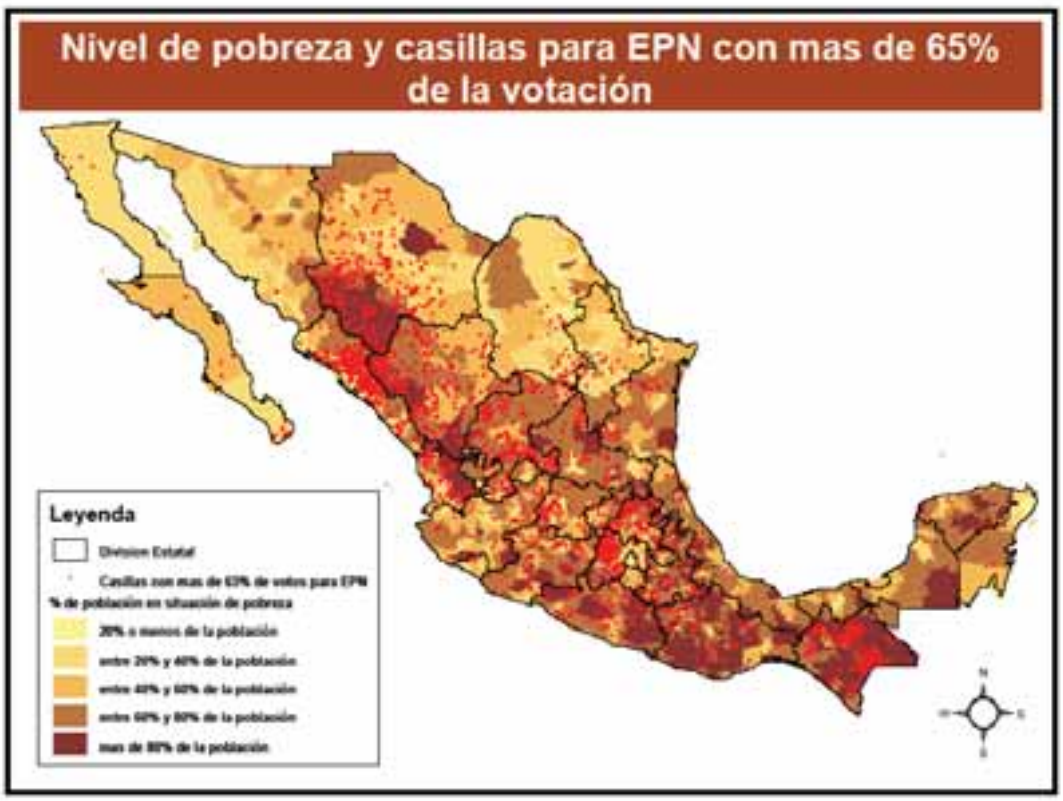
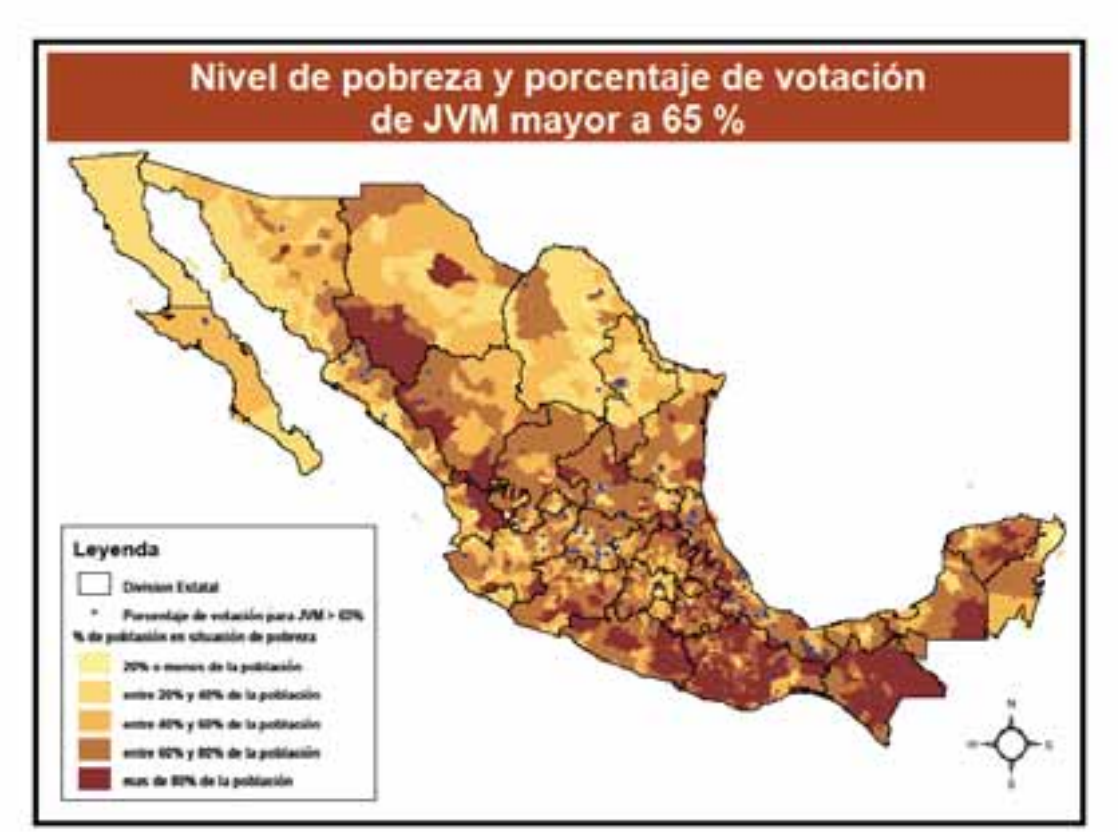


Map 8 shows polling sites where citizen participation was above 65% and where PRI party obtained more votes.



Map 9 shows polling sites where citizen participation was above 65% and where PAN party obtained more votes.

Conclusion

The map shows that not all municipalities with a poverty index of 4 or 5 have atypical citizen participation in comparison to 2006, but it shows there are three states that had several polling site with citizen participation exceeding 65% in comparison to 2006. These three states, Guerrero, Chiapas and Yucatan, are well known as poor states. Therefore, it can be conclude that there is not a direct relationship between atypical citizen participation in comparison to 2006 and the poorest Mexican municipalities. But it is atypical citizen participation in comparison to 2006 in the states of Chiapas, Yucatan and Guerrero. These states that have poverty index of 4 and 5. Therefore, it can be inferred that participation in these states could be due to vote buying and that vote buying did not occurred in all poor municipalities in the country.

As a consequence, it can be concluding that there is a possibility that the 2012 Mexican presidential elections were not a democratic exercise, because there is information that suggests that in Chiapas, Guerrero and Yucatan existed vote buying.

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Appendix 1

#	State	Surface Km2(1)	Total Population (2010)	Population Density
1	Aguascalientes	5,625	1184996	211
2	Baja California	71,546	3155070	44
3	Baja California Sur	73,943	637026	9
4	Campeche	57,727	822441	14
5	Coahuila de Zaragoza	151,445	2748391	18
6	Colima	5,627	650555	116
7	Chiapas	73,681	4796580	65
8	Chihuahua	247,487	3406465	14
9	Distrito Federal[a]	1,484	8851080	5964
10	Durango	123,367	1632934	13
11	Guanajuato	30,621	5486372	179
12	Guerrero	63,618	3388768	53
13	Hidalgo	20,856	2665018	128
14	Jalisco	78,630	7350682	93
15	México	22,333	15175862	680
16	Michoacán de Ocampo	58,667	4351037	74
17	Morelos	4,892	1777227	363
18	Nayarit	27,862	1084979	39
19	Nuevo León	64,203	4653458	72
20	Oaxaca	93,343	3801962	41
21	Puebla	34,251	5779829	169
22	Querétaro de Arteaga	11,658	1827937	157
23	Quintana Roo	42,535	1325578	31
24	San Luis Potosí	61,165	2585518	42
25	Sinaloa	57,331	2767761	48
26	Sonora	179,516	2662480	15
27	Tabasco	24,747	2238603	90
28	Tamaulipas	80,148	3268554	41
29	Tlaxcala	3,997	1169936	293
30	Veracruz-Llave	71,856	7643194	106
31	Yucatán	39,671	1955577	49
32	Zacatecas	75,416	1490668	20
	Total	**1,959,248**	**112,336,538**	

Source:

(1)INEGI. Marco Geoestadístico 2005.

(2)INEGI. Censo de Población y Vivienda 2010.

http://cuentame.inegi.gob.mx/impresion/poblacion/densidad.asp