Operation Barga

What caused the productivity surge?

A project by:

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Abstract:

The subject of the productivity surge in West Bengal's agricultural production following the introduction of Operation Barga by its newly-elected left front Government in the late 1970s has been widely studied by several scholars, most prominently by Abhijit Banerji and Maitreesh Ghatak. While there is broad consensus that Operation Barga resulted in a productivity surge due to increased incentive to cultivators, there is still some lingering skepticism. This project first explores the history and effectiveness of tenancy reforms in West Bengal, and then floats and tests new hypotheses to explain the resulting productivity surge.

Contents

Brief History and Empirics

Tenancy in West Bengal is a tradition known to date back to Buddhist monks, who hired sharecroppers or tenants to work on their fields, since monks were not allowed to cultivate a field themselves. This eventually led to a situation wherein tenancy became a deep-rooted tradition in West Bengal.

After independence, land reforms were left to the state governments, resulting in different levels of enforcement of land reforms in different parts of the country. While most states performed reasonably well on land ceilings, tenancy reforms were by and large a failure. The West Bengal Land Reforms Act 1955 in its Chapter III did deal with tenancy reforms (see appendix 3), but these measures were not implemented vigorously in the state.

There were two reasons why tenancy reforms in West Bengal till Operation Barga were unsuccessful:
  (1) Tenants were threatened by the powerful landlords against registering with the Department of Land Revenue
  (2) The 'personal cultivation' clause was misused by landlords to abruptly terminate the tenancy of even registered tenants, and there were virtually no checks here on the power of the landlords

A left-wing Government came to power in 1977 in West Bengal, in the wake of the anti-Congress wave sweeping the country following the imposition of emergency by the Indira Gandhi Government. Within a year, the state government decided to launch Operation Barga (Bargadar in Bengali means a sharecropper tenant). There were two main ways in which Operation Barga represented a break from the past:
  (1) Unlike previously, when tenants had to go to the Department of Land Revenue to register themselves, the officials of the administration now held registrations in the villages. These registration drivers were massively publicized, and any form of coercion by the landlords was beaten back by the cadre of the left wing parties
  (2) Simultaneously, an amendment of the 1955 Land Reforms Act was passed, and the scope of the 'personal cultivation' clause was narrowed down, so that it could not be exploited. Now, only if the landlord or his immediate family wanted to resume cultivation on the land, was termination of tenancy allowed.

It has been widely documented, for example in Banerjee and Ghatak (2004), that Operation Barga was followed by an increase in productivity in West Bengal. Hence, this project does not dispute that there *was* an increase in productivity.

By 1993, more than 65% of an estimated 2.3 million share tenants had been registered, compared to 15% before the reforms were initiated.

Banerjee, Gertler and Ghatak (2002) surveyed a stratified random sample of 480 sharecroppers from 48 villages in West Bengal. They concluded that Operation Barga brought about significant improvement in the terms that tenants faced.
(1) The proportion of tenants getting more than 50% of output increased from 17% to 39%
In the pre-reform period:

(2) 74% of tenants surveyed said that their leases did not have a specified duration and were subject to arbitrary termination by the landlord
(3) 80% reported that landlords in their village had used eviction threats
(4) 30% said that they or their fathers had been threatened
(5) The reasons cited for the use of threats of eviction included:
   a. Low production – 40%
   b. Disputed with the landlord – 55%

After the reforms:
(6) 96% of respondents reported that evicting registered tenants is difficult or impossible
(7) 67% reported that evicting even unregistered tenants is difficult
(8) Only 30% of respondents said they knew of a tenant who was evicted in the last 10 years

The chart here, reproduced from Banerjee, Gertler and Ghatak (2002), shows that the proportion of tenants getting rents higher than 50% increased after Operation Barga was initiated.

FIGURE 1
Tenant's Crop Shares Before and After Operation Barga
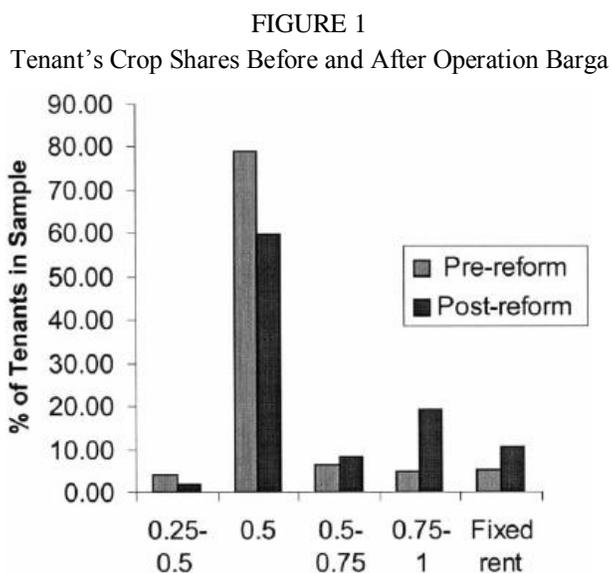
Effect on the Land Market

Between 1977 and 1775, an amount of land constituting over 30% of total cultivated area was sold. This shows that as an after-effect of Operation Barga, several absentee landlords chose to sell their land to their tenants. This reduced the price of land in West Bengal, and probably this could be a possible source of productivity surge in West Bengal seen after the reforms.

When land becomes cheap, several share-tenants started buying land. *It is thus possible that the reason for increasing productivity was not increased security of tenancy, but a full-scale transfer of land to those who were previously only tenants*.

Factors affecting the success of Operation Barga

Several factors determined the degree of success of Operation Barga in the districts of West Bengal. The table shown below, reproduced from Banerjee, Gertler and Ghatak (2002), shows the results of a model that takes into account various factors to explain the year-by-year rice yields in districts in West Bengal

TABLE 1

Effect of Registration on the log of rice yield in West Bengal, 1979-93

Sharecropper (registration one year lagged)	.36 ***
Log (rainfall)	- .08 *
Log (public irrigation)	.02
Log (roads)	.22
HYV share of rice area	.47 **
South x Year [a]	4.38 ***
Left Front x Year [b]	2.65 **
Sharecropping x Year [c]	.12
District Fixed Effects	7.68***
Year Fixed Effects	12.17 ***

a represents a set of variables obtained by interacting a dummy variable that takes the value 1 if that district is in southern WB with each year

b represents a set of variables obtained by interacting a dummy variable that takes value 1 if that district had a Left Front majority in 1977

c presents a set of variables obtained by interacting the initial extent of sharecropping in a district with each year

* significance at the 10% level, ** significance at the 5% level, *** significance at the 1% level

Some of the conclusions that we draw from Table 1 are:

(1) Rainfall, public irrigation and roads are able to explain very little of the increase in rice yields in West Bengal, and hence the increase in rice yield has to be explained by something except for these weather and connectivity issues

(2) The fact that a district is in South Bengal is able to explain its rice yields significantly. This, of course, is not because of climatic conditions (which have been included elsewhere in the model), but probably because of the fact that these areas are closer of Kolkata, which is the nerve-center of politics in West Bengal

(3) The dummy variable used for 'Left Front' shows a significant effect on explaining rice yield. This shows that the political clout enjoyed by leftist parties was a determinant in explaining yield.

(4) The initial extent of sharecropping had little role in explaining the rice yields.

For a theoretical explanation of how Operation Barga can lead to a productivity surge, refer to Appendix 1.

Empirical Study 1

Aim of the Study:

To measure the recent performance of West Bengal against other major rice producing states since the 1990s, a time period which is widely recognized to be the beginning of an agricultural crisis in India. This study is expected to show the effect of agricultural reforms in Bengal (including Operation Barga) on the long-term stability of growth of agriculture in the state in the face of this crisis.

Methodology:

For this study, we have selected seven of the large rice-producing states of India. Ideally, Bihar should have been considered in the study. However, for the pre-2000 years, only consolidated figure for Jharkhand and Bihar is available, and hence Bihar cannot be included in this study. The same also stands for Uttar Pradesh. However, rice production in Uttarakhand is miniscule as compared to that in Uttar Pradesh and hence, can be ignored.

Figure 1: Output of Rice in Major Rice Producing States
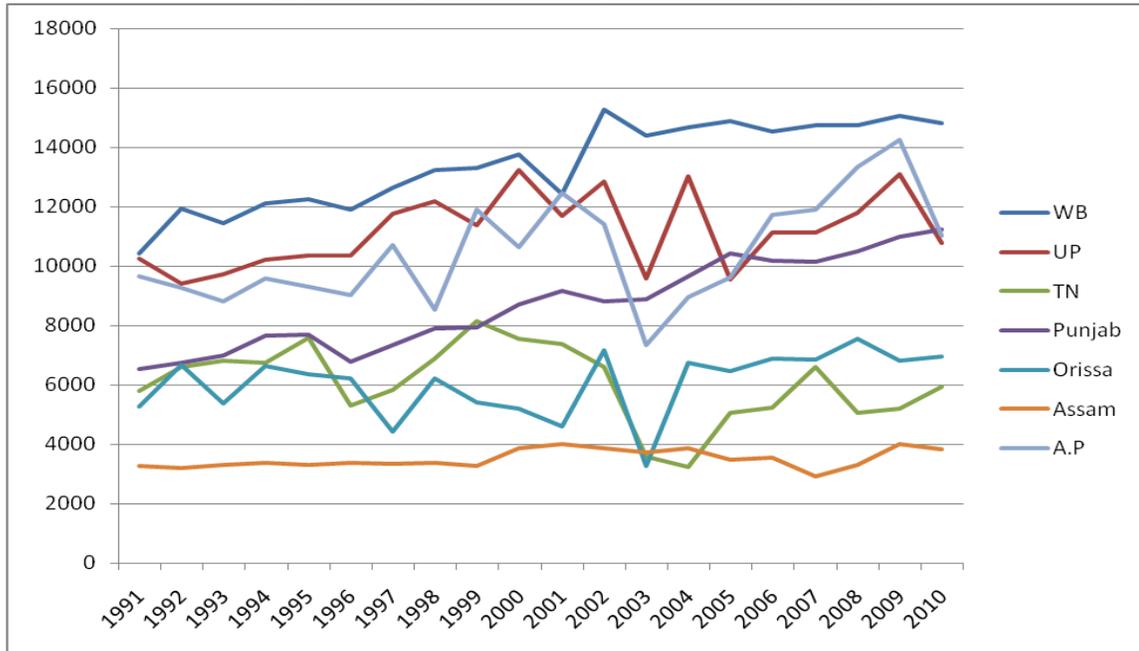
Source: RBI Handbook on Statistics on the Indian Economy (2010)

For every state, we carried out a time-series linear regression and some basic statistical treatment of the data [refer to the table below]. While the simple average of annual rate of growth of rice output in West Bengal has been poor, the long-term trend in agricultural output has been encouraging.

To account for the *base effect*, i.e. states with a higher production of rice will be able to show, in absolute terms, higher increase in output over the years, we have also divided the slope of the regression line by the average output over the years to arrive at the 'Index of Average Increase'. This value shows how significant the increase in long-term output has been as compared to what was being produced already.

	West Bengal	Uttar Pradesh	Tamil Nadu	Punjab	Orissa	Assam	Andhra Pradesh
Simple average of annual rate of growth of output (%)	2.09	1.38	2.59	3.04	6.21	1.2	2.27
Slope of regression line (in million tonnes)	221.98	86.83	-88.03	248.76	62.75	22.28	167.62
P-Value	3.2×10^{-8}	0.07	0.08	1.4×10^{-12}	0.14	0.06	0.01
Index of Average Increase (Slope/Average Production)	16.54	7.77	-14.56	28.54	10.38	6.35	16.03
R-square value (linear regression)	0.83	0.17	0.16	0.94	0.12	0.18	0.32

Source: RBI Handbook on Statistics on the Indian Economy (2010)

We observe from the above table that at the 5% level of significance, only Punjab, West Bengal and Andhra Pradesh have shown a significant long-term increase in paddy production, with the long-term trend being the highest in the first and lowest in the third.

Given that Punjab is considered an agricultural powerhouse in India, where since British times agriculture has seen prosperity; for an impoverished peasantry such as that seen in West Bengal to keep pace with that in prosperous Punjab is in itself a remarkable feat.

A few important aspects of this study are the correlation coefficients between:
   (1) the slope of the regression line and the r-square value : **0.82**
   (2) the Index of Average Increase and the r-square value : **0.71**

What that implies is that states that have shown a better long-term increase in their agricultural output are also the ones that have shown more consistency in this long-term growth. Hence, the states of West Bengal and Punjab, which have shown the best long-term growth rate in rice production, are also the ones which have shown the most consistent increase.

A word of caution for readers: India is a vast country, and hence rainfall conditions vary immensely from state to state, and hence all these figures are not comparable directly. However, comparing West Bengal to other states with similar agro-climatic conditions, such as Orissa and to a lesser extent Assam, one can see that the performance of West Bengal has significantly been better than that of either Orissa or Assam.

Conclusions

Hence, this study refutes taking the simple average of annual rate of growth of output as a measure of prosperity. This is because such a measure suffers from the base effect (i.e. if agricultural output one year is low, then the rate of growth in the next year will be high) and also ignores the long-term aspect of this growth.

When linear regression is done, we see that Punjab, West Bengal and Andhra Pradesh have been consistent growth engines in rice output in India. This study can be further expanded by taking into account average yield of the land and state-wise rainfall.

Alternate Hypothesis 1

We now test the alternative hypothesis that there were other factors (which showed a high degree of correlation with the registration density of tenants in Operation Barga) that were responsible for the increase in agricultural productivity. The most commonly cited such factor in the literature pertaining to Operation Barga is the strength of the left parties in West Bengal. If this alternate hypothesis holds, then the growth in agricultural productivity will show correlation with the strength of the left parties in West Bengal. Also, if such a hypothesis *does* hold, then it would be independent of Operation Barga, and hence we can assume that it would continue later, and hence we consider output data from 1991 onwards.

We take two measures of the strength of the left in West Bengal. Firstly, the vote share of the left parties reflects how popular the left ideology is in the rural areas. Secondly, the seat share of the left parties will show the legislative power of the left parties (refer to Appendix 2). Here we get our first interesting result that the vote share and seat share of the Left parties in the legislative assembly elections show a mildly negative correlation of -0.14. Hence, we would get contradictory results with regards to this study when we consider the dependence of production.

Here we consider the production of only rice. To control for exogenous factors such as weather, economic liberalization etc, we construct two indices of rice production since 1991:

$$(1) \ \text{East India (EI) Index} = \frac{\text{Paddy Production in West Bengal}}{\text{Paddy Production in Orissa and Assam}}$$

$$(2) \ \text{All India (AI) Index} = \frac{\text{Paddy Production in West Bengal}}{\text{Paddy Production in AP, Punjab, UP, Orissa, TN, Assam}}$$

The first index will control better for local factors such as monsoon failures etc, while the second index will control better for macroeconomic factors, such as investment in agriculture, economic liberalization etc.

Also, to account for the *base effect*, we divide the period 1991-2010 into four distinct five-year periods, coinciding with the Legislative Assembly elections and take the *trend* increase in the indexes rather than the arithmetic mean of the increase. Surprisingly again, the EI index and the AI index trend growths show a mildly negative correlation of -0.10.

Before we give the results of our analysis, we would like to restate between what factors we are finding out the correlation. On one hand, we take the vote share and the seat share of the Left parties in India. On the other hand, we use the trend increase in the EI and AI indices. These indices will tend to show a negative value when West Bengal has fallen behind other states w.r.t agricultural production and will show a positive value when it has outperformed other states.

Reproduced below is the summary of our study. For complete details, kindly turn to Appendix 2:

Table 1: Correlation Coefficients

	Vote Share	Seat Share
AI Index	-0.68	-0.57
EI Index	0.24	-0.57

What we observe is that there is, in fact, a negative correlation between almost all the factors, and of a significantly high degree. While this must be read with the caveat that we used only four data points, yet the fact that the correlation is negative, despite the negative correlations within the indices themselves, is something that we must consider.

Conclusions:

This area of research can be further extended by considering a longer time span, considering crops other than rice etc. Yet, we feel that the negative correlations that we have obtained above are reason enough for us to reject alternate hypothesis 1.

We conclude that there *was* something else happening in West Bengal specifically during the time of Operation Barga which resulted in an increase in productivity. This might have been a consequence of the Left government coming to power, but was not directly a result of the same.

Alternate Hypothesis 2

Alternate Hypothesis 2
It was not tenancy reforms *per se*, but change in ownership of land that came about as a result of stringent tenancy laws in Operation Barga that resulted in the productivity increase.

Evidences
As can be seen from table 1, only 8.25% of the net arable land in West Bengal was covered by Operation Barga. Hence, any productivity increase in this share of the land would show only one-twelfth of an effect on the total productivity in the state.

It is also seen from table 1 that redistribution of surplus land over and above the ceilings set by the Land Reforms Act 1955 was in itself an exercise equivalent in coverage to tenancy reforms, and thus can very well compete with tenancy reforms as the cause of the productivity increase.

Table 1: Extent of Land Reforms

		Percentage of Total
Net Arable Land	13.34 million acres	100%
Land Covered by Operation Barga	1.1 million acres	8.25%
Redistributed ceiling surplus land	1.04 million acres	8.23%

Source: 2001 Census of India (www.censusindia.net)

However, a widely acknowledged fact is that Operation Barga resulted in many landowners giving up a part of their land to their tenant, in return for the tenant giving up his inheritable tenancy rights over the other part of the land.

Such transactions generally proceeded in two steps. First, the landowner 'sold' the entire land to the tenant. Since the tenant now became the landowner, his tenancy rights over the land ceased. In the second step, the tenant sold back a pre-determined part of the land back to the landowner, who now used the land for cultivation without having to bother about the tenancy legislations.

According to Banerjee, Gertler and Ghatak (2002), almost 30% of the net arable land in West Bengal in this period had a change of ownership. It is clear that this was far greater than the 8.25% of land that was directly affected by Operation Barga. Even if we include the possibility of double-entry due to the two-stage land transactions prevalent in this time, it leaves almost 14% of transactions unexplained. A possible explanation could be the rising economic status of the tenants, which enabled them to buy land other than those which they previously cultivated as tenants. Another possible cause could be the decreased interest of owners of land in the land due to the constraints set up by Operation Barga.

The Rural Development Institute (RDI) carried out three surveys in various districts of West Bengal to study the awareness level of people to this two-step land transfers that took place as a result of Operation Barga. 38% of all respondents (and 46% of respondents who were Bargadars) had heard of at least one such transaction. Some of their responses that are of importance to our study are reproduced below:

Table 2: Transactions in Barga Land

	% of bargadars	% of all respondents
Transactions were mostly/always mutual and voluntary	98%	96%
Bargadars relinquished tenancy rights on remaining land	80%	80%
Tenant received all the land in exchange for money	33%	32%
Tenant might give up tenancy rights in exchange for money	92%	84%

Source: RDI Report #121 (June 2004), Robin Nielsen and Tim Hanstad

This series of surveys also reported that the share of land that was typically given to the tenant ranged from 24% to 60%, or a cash equivalent, with the most common share being 50%. Researchers received no reports that such transactions were coercive.

Such transactions would enable those bargadars who received a cash equivalent of the land value to buy land that was not previously under tenancy. This would bring a certain amount of mobility to the land ownership market.

Conclusion

There is strong evidence to suggest that the increase in transactions in land, rather than the tenancy reforms *per se*, were responsible for the increase in productivity.

This might be true because, in our simple theoretical model, this would make δ take the maximum attainable value of 1, and hence would increase the investment level the most. Also, since eviction is no longer an issue, the output f ceases to be a function of the level of eviction threat e, and hence this variable can be removed from the model.