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Baruah, Joydeep

OKD Institute of Social Change and Development

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Joydeep Baruah

Assistant Professor
OKD Institute of Social Change and Development
VIP Road, Upper Hengrabari, Guwahati (Assam), 781036

joydeep.baruah@gmail.com

Abstract

Consequent on the recommendations of the second Administrative Reforms Commission, the Backward Region Grant Fund (BRGF) programme awaits some major restructuring in the 12th plan. Blocks are expected to replace the districts as primary units for redressing regional backwardness. This necessarily warrants objective identification of backward blocks based on composite criteria for targeted subvention. Relying on the joint distribution of a set of backwardness indicators, this paper offers an identification scheme that fulfils a few desirable welfare properties. The proposed scheme yields efficient and equitable results, also insightful policy implications.

On Identification of Backward Blocks

The second Administrative Reforms Commission (ARC) in its seventh report recognises that inter-state disparities in development is merely one aspect of balanced regional development, equally important is the intra-state disparities; and, hence, recommends that *blocks* should be the unit of identification of backward *areas* as "districts encompass fairly large areas and populations with diverse characteristics and varying stages of development" (GoI 2008, p139). It, therefore, mandates the planning commission to develop a "composite criterion" for identifying "backward blocks" based on "indicators of human development" along with "indices of social and economic infrastructure" in the 12th plan. The ARC, inter alia, also recommends that union and state governments should adopt "a formula for block-wise devolution of funds targeted at more backward areas" (ibid, p141). The Commission, in fact, is of the opinion that state specific block-level indices need to be applied not for a given set of schemes but as "general guidelines" for allocation of all resources and plan funds. It, however, observes that the strategy of reducing and minimising regional imbalances by targeting backward blocks within the context of each state needs a formal nod from the planning commission (ibid, p139).

Various attempts, both national as well as state level, at identifying backward *areas*, and consequently, introduction of myriad *area* specific (subvention) programmes in the country from time to time are, perchance, widely discussed and presumably well-known. The Backward Region Grant Fund (BRGF) programme is the latest addition to this league, covering 250 identified backward districts[1], subsuming the 147 districts of erstwhile

[1] 30 new districts were curved out later on out of the 14 original BRGF districts. The updated list of newly curved out district is available at http://panchayat.nic.in/data/1292484971678~Lr%20to%20TSI%20applicants%20re%20newly%20carved%20BRGF%20dists%5B1%5D.pdf, accessed on February 23, 2011. The number of BRGF districts, thus, has increased by 16.

Rastriya Sam Vikash Yojna (RSVY), and amongst which 55 districts, altogether, are labelled as "left wing extremism affected"[2].

Understandably, the BRGF intends to “redress the regional imbalances” in the country by aiming at first, “bridging critical gaps in local infrastructure and other development requirements” that are not adequately met through the "existing inflows of fund under the various Centrally Sponsored Schemes" (CSS); second, “strengthening the grassroots level institutions” to facilitate the participatory planning, decision making, implementation and monitoring to reflect local felt needs; and third, providing the professional support to local bodies for planning, implementation and monitoring of their plans at different stages and times (GoI, 2007). The programme covers the period of 11th Five Year Plan i.e. 2007-2012 and it appears, in all probability, that the programme will continue even in the 12th plan given the approach favoured by the ARC (GoI 2008, p136)[3].

Evidently, therefore, in the light of recommendations of the ARC, some fundamental restructuring of the BRGF is anticipated in the 12th plan. Already, a few such attempts could already be noticed at the level of ministry of panchayati raj (MoPR), government of India, which is the nodal ministry for the programme. It is found that the programmable index of backwardness (PIB) proposed earlier by this author (Baruah 2010)[4] has been used to guide the process till "an alternative model is adopted". It may, however, be mentioned that the notion of PIB was proposed in altogether a different context and conceptual framework. Adoption of the same as an instrument to realise the recommendations of the

[2] State intervention through subvention on grounds of balanced regional growth has witnessed a remarkable change in perspective in recent times. Notably, the ARC report posits a direct and positive correlation between growing regional disparity and regional conflicts. In fact, the report is titled on that premise i.e. *Capacity Building for Conflict Resolution*. Some important recent documents, for instance, *Development Challenges in Extremist Affected Areas* - report of an Expert Group constituted by the planning commission (April, 2008) also bear similar overtone. The report of the High Level Commission to the prime minister on *Transforming the Northeast* (March, 1997) also called for "considerable increase in outlay and capacity-building" for tackling backlogs in basic minimum services and infrastructural needs (p5). This change in perception itself merits some critical discussion.

[3] The ARC in its report (2008) identifies two broad approaches to balanced regional development, i.e. "to fortify the backward areas adequately and target them with additional resources and investments to help them overcome structural deficiencies" contributing to their backwardness (p136). This, precisely, is the approach of the BRGF.

[4] The study, although, appeared in *EPW* on 6 February, 2010, was completed and sent to all stakeholders much earlier.

ARC, therefore, invites some thorough revisions. This paper makes an attempt at this and tries to present an alternative framework for identifying backward blocks, which is consistent with the ARC's recommendations. The alternative suggested enjoys some major advantages over the earlier approach and yields efficient and equitable outcomes. Discussion that follows highlights several interesting policy implications.

The Context

The fact that the BRGF programme awaits some fundamental restructuring in its approach could be sensed when honourable President addressed the joint session of Parliament on 4 June, 2009[5]. Subsequently, the World Bank's independent review of the BRGF observed that not only present allocation of BRGF is inadequate but also alleged that inter-se allocation criteria used tend to ignore indicators of backwardness (World Bank 2010). As such, the report urged on "increasing the volume of fund under the programme" and "improving the targeting of flow of fund to backward areas" (ibid p67). The mid term appraisal of the eleventh plan, placed before the National Development Council on 24 July 2010, further looked into the programme and approved of the observations of the World Bank. It agreed that "the volume of funds provided under BRGF is insufficient to bridge development gaps and address backwardness" and that "the best way to improve targeting of BRGF is to move the focus of intervention downwards towards the block" (GoI 2010, p291). It also observed that there are many instances in India of relatively advanced districts with pockets of backwardness within. It, therefore, underlined the need for restructuring of the programme (ibid, p293).

Against this backdrop, on 13 January 2010, the MoPR, government of India convened a national consultation on development of an index of backwardness based on *block* as a unit wherein "*imperative* to identify backward areas with blocks as units based on a composite criterion" was deliberated upon. The meeting, well attended by government officials and people from academia, concluded, inter alia, (1) for all practical purposes "blocks" are required to be considered as *the* unit for addressing backwardness; (2) the composite index should be limited to 6 to 10 indicators based on sources like census, which are available uniformly in country; (3) till an alternative model is adopted, PIB

[5] See section 32 of the Address available at the URL http://presidentofindia.nic.in/sp040609.html, accessed on February 11, 2011.

approach may be pursued for further refinement; and (4) the selected sectoral indicators may be used for planning and implementation of various sectoral schemes and programmes, whereas the composite index may be used for BRGF, 13th Finance Commission's award and other policies addressing backwardness[6].

It may also be mentioned that even before the consultation was held, adopting the PIB approach, the MoPR, with the assistance of the National Informatics Centre (NIC), had already started a web portal where all the blocks were ranked as per PIB method based on census 2001 data. The state governments were also requested to upload the *latest* data regarding block level indicators used in the PIB framework. Presently, altogether 9 states have been found to have uploaded the data for all blocks to the portal[7].

The then minister of panchayati raj, during the consultation, remarked that the PIB as the composite index of backwardness could be used for determination of inter-se distribution of BRGF funds in the identified districts and also could be used for preparing a proposal seeking additional grants for other blocks outside the 250 districts, which are found to be backward as per the analysis. The MoPR indeed moved a proposal for enhancement of grant under the programme in May 2010 and while looking at it, the Expenditure Finance Committee had recommended to set up an inter-ministerial group (IMG) headed by the secretary, MoPR for "identifying the criteria and geographical unit for determination of the levels of development/backwardness and allocation of funds". Accordingly, around June-July, 2010 the IMG was constituted.[8]

The First meeting of the IMG was held on 30 July, 2010. The IMG meeting discussed the PIB approach and members' opinion on the framework ranged from "optimally useful" to

[6] All these are as per the circulated minutes of the meeting. The author received a copy of it on 3 February 2010 as a participant.

[7] The URL is http://panchayat.gov.in/priprofiler. The stated status was when the portal last accessed on 11 February, 2011. The data reference period and source, however, varies from state to state as well as indicator to indicator. In many cases simply census data are repeated. The sources of uploaded data are also not indicated for several cases e.g. Assam. This precisely indicates the practical problems and issues in relying on different sources for supply of data. Uniform sources like that of census are, therefore, preferred even though data are being criticised as "dated".

[8] The author received a mail from the MoPR on 7 July 2010 stating that the IMG has been constituted, although, the date of constitution is not stated.

"rather simplistic".[9] The meeting observed that "recommendations of the IMG would be critical for taking a view on the regional backwardness and the role and scope of the BRGF in the 12th Plan period".[10] With the starting of the process of preparation of the approach paper for the 12th plan, which is expected to be ready by early part of 2012, given the context, it is, therefore, time that issues of identification of backward blocks based on *objective* criteria receives adequate attention.

Limits to PIB

Before delving into the limits, it may be helpful to briefly underline the specific context and rationale of the PIB framework for putting the issues in proper perspective. The BRGF guideline states that each identified district would receive an annual share of Rs 10 crore and the remaining (i.e. amount in excess of Rs 2500 crore) would be shared according to population and area of the district with 50% weights each (GoI 2007, p.5-6). The World Bank report points out that the formula does not reflect any backwardness criteria, contrary to the stated objectives of the programme (World Bank 2010, p9). In fact, report shows that there is no correlation between population and per capita allocation in the districts, neither there is any positive correlation between the per capita allocation to districts and their backwardness rankings determined by the planning commission while identifying them. The report, conversely, finds "a significant number of the relatively well-off districts receive BRGF funding, sometimes at a very high per capita allocation level" (ibid, p9).

The guideline further mandates that once the amount is received by the district, it is to be allocated first between panchayats (rural share) and municipalities (urban share) and then inter-se shares of each panchayats and urban local bodies is to be determined. To do so, guideline proposes that each state should design an "index that is prepared and accepted within the state, which reflect backwardness or level of development" The World Bank report has found that none of the states have actually adopted any indicators of backwardness in allocating rural and urban shares of the BRGF fund (World Bank 2010,

[9] The minutes of the meeting are available at the URL http://panchayat.nic.in/data/1283277868404~MOM%20of%20Inter%20Ministry%20Group%2030Aug2010.pdf, accessed on 11 February, 2011

[10] The MoPR has continued personal discussion with the author even after the IMG meeting. Very recently, the planning commission too has shown interest in the study.

p10). The report has also revealed that while deciding the vertical shares i.e. shares of different tiers of local bodies, mostly lower tier is given the highest weights. However, in so far as the horizontal allocations across the local bodies are concerned, simple array of indicators like proportion of SC/ST population, BPL population, proportion of illiterate population were used, which reflects some backwardness elements. The PIB framework was, in fact, developed to fill this critical void by supplying some backwardness criteria for directing resources under BRGF in the state.

It is, therefore, evident that there are four levels of allocation involved in the process viz. allocation to the identified backward districts, allocation of rural and urban shares within the district, vertical allocations within the various tiers of local bodies for both the rural and urban components, and horizontal allocations across the local bodies. The PIB framework was specifically proposed as an operational instrument towards the last one, that too only for the rural local bodies at the intermediate level.[11] The construct of PIB, thus, naturally suffers from *structural* limitations with regard to its scope as well as theoretical underpinnings. It may, however, be shown that the framework is extendable in general for directing the other three allocation principles provided data on the selected indicators are suitably reorganised.

A careful look at the PIB construct would show that formula used to measure the *relative level of achievement* takes a "changing origin" since the series minimum has been considered. This, indeed, allowed relative rankings of blocks in terms of the worst performing block with respect to a particular indicator. Given the series of *all* block level values with respect to all selected indicators, the PIB approach is, thus, easily extendable for relative rankings of the blocks in the state as a whole. Notwithstanding, two problems are pointed out in directly adopting it to identify the backward blocks in a state. First, if dispersion of values related to an indicator happens to be low, or in other words, if the series is found to be more or less homogeneous i.e. all individual values are near to series minimum (this may happen in case the blocks are equally backward or developed), the level of achievement approaches to zero. Second, since the ARC recommends *state*

[11] It may be pointed out that block boundaries, in general, are co-terminus with the intermediate panchayat boundaries i.e. the boundaries of *Anchalik Panchayats*. Ranking of the blocks with respect to their *relative* backwardness, therefore, amounts to relative rankings of *Anchalik Panchayats*.

specific index, the idea of changing origin might generate the problem of non-comparability across the states. Both of these can, nonetheless, be overcome by replacing the *series minimum* with some *benchmark* values like of the national average or state average. Even then, a caveat will still remain in using any of these averages should the data are non-normal and/or contain some outliers.

The other major concern raised over the PIB has been the equal weights assigned to the chosen indicators. The equal weight scheme was proposed, fundamentally, because the PIB favoured a "programmable approach". It was argued that given the programme specific strategy towards development, any indicator, i.e. any dimensional index to that effect, needs to guide investments and allocation of resources under the programme concerned without referring to similar other programmes[12]. It is, however, possible that outcomes of two or more programmes may be related in some way, which the equal weight scheme clearly fails to recognise. There have been suggestions to adopt some "endogenous weight schemes" to factor in such correlations amongst the indicators, and for doing so, techniques of factor analyses were recommended as solutions.

Further, the PIB construct is flawed on ground of aggregate welfare principles. Dutta, Pattanaik & Xu (2003) have demonstrated the problem of measuring multi-dimensional deprivation on the basis of aggregate data. A typical welfare framework proceeds first, by measuring overall deprivation of each individual unit on the basis of the individual's deprivation per attribute followed by the aggregation of the individuals' overall deprivations to arrive at the overall social deprivation. This framework, however, is feasible only in presence of "joint distributions" of attributes for all cases. Any measurement like that of PIB which seeks to measure multidimensional deprivation on the basis of aggregate rather than joint distribution would tend to understate the deprivation and the two should yield identical results only under very "stringent conditions" (ibid 2003). This can be exemplified by a simple 2x2 situation: assume two blocks with two villages in each and with two attributes under consideration. Let us also assume that in the first block the village 1 has attribute 1 and village 2 has attribute 2. In the second block, say, village 1 has both the attributes while the village 2 possesses none of the attributes.

[12] The meeting on 13 January 2010, in fact, resolved that selected sectoral indicators of PIB may be used for planning and implementation of various sectoral schemes and programmes since "ongoing sectoral schemes have not addressed this aspect". See minutes available at http://panchayat.nic.in/data/1283277868404~MOM%20of%20Inter%20Ministry%20Group%2030Aug2010.pdf, accessed on 11 February, 2011

Given the joint distributions, the village 2 of the second block is surely the most backward. However, the aggregate data of both the blocks taken together would yield the same level of deprivation (or achievement) i.e. 50% in case of each of the attributes and thus, clear case of the "most backward village" would go unsighted and unattended.

An Alternative Approach

The proposed alternative to PIB emerges naturally when above limitations are systematically treated and remedied. Let us begin with the choice of indicators. Evidently, the choice is constrained by the requirement of the "joint distribution" if one wishes to follow an improved welfare criterion as stated previously. The choice would be limited to only those indicators (a) which reflect dimensions of backwardness or development preferably with respect to a sector; and (b) for which data are available *jointly* for all constituent units preferably from same source and with same reference point in time. Although demanding, note that both these requirements are, indeed, fulfilled by the set of indicators used earlier in PIB framework, with the exception that all *aggregate* measures now need to dropped. The Table 1 provides the reframed set of indicators wherein the last two indicators i.e. I9 and I10 are newly incorporated.

Table 1: Selected indicators along with sectors and their source

Sector/ Dimension	Indicators (notation)	Data Source	Observation
Road	Villages having paved approach road (I1)	Village Directory, Census 2001	Data type nominal (Yes/No)
Agriculture	Area of land irrigated (I2)	Village Directory, Census 2001	Data type interval
Drinking Water	Villages with safe source of drinking water (I3)	Village Directory, Census 2001	Data type nominal (Yes/No)
Power	Villages with electricity (I4)	Village Directory, Census 2001	Data type nominal (Yes/No)
Education	Proportion of literate people (I5)	Primary Census Abstract, 2001	Data type interval
	Villages with education facility (I6)	Village Directory, Census 2001	Data type nominal (Yes/No)
Health	Villages with healthcare facility (I7)	Village Directory, Census 2001	Data type nominal (Yes/No)
Employment	Proportion of main workers to total workers (I8)	Primary Census Abstract, 2001	Data type interval
	Proportion of marginal workers to main workers (I9)	Primary Census Abstract, 2001	Data type interval
Gender	Gender gap in literacy (I10)	Primary Census Abstract, 2001	Data type interval scale

The fact that indicators chosen reflect some elements of development is, perhaps, self evident and need no elaboration. These are, in fact, most commonly used set of indicators for measuring the level of backwardness or development. Besides, the indicators preserve the notion of "programmability" put forth in case of PIB. Also note that the data relating to them are available *jointly* at the *village level* "constituting" the blocks. The number of indicators chosen is also well within the "manageable limit" and data pertaining to them is available from the same source i.e. census, which is generally acceptable, and for the same reference point of time i.e. 2001. It may be mentioned that using the unique village codes both the census sources viz. primary census abstract and village directory can be merged into a single database containing data on all ten indicators. Clearly, therefore, the indicators chosen appear to be "optimally useful".

Notwithstanding the so-called "optimality", data related to the selected indicators are found to be of two types: dichotomous i.e. "yes" and "no", and interval type. The data in the village directory are presented by 0 and 1 where 0 indicates "absence" and 1 indicates "presence" of an indicator. Whereas, data in the primary census abstract are presented in interval scale with actual values. Interpretation of the first set of data is a bit problematic as 1 i.e. presence of a phenomenon is rather vague. For instance, if a village is having 20 households, the value of an indicator say "villages with electricity" will be 1 irrespective of the actual number of households with electricity. Therefore, value of 1 as "level of achievement" is very much elusive. However, interpretation of 0 is relatively obvious: "not a single household possess the characteristic". This may safely be considered as a sign of "non-achievement", and hence, backwardness.

The second issue herein relates to data measured in the interval scale. While the nominal data cannot be translated into interval or ratio scales, it is possible to convert the interval data into dichotomous values with respect to a *threshold* or *cut-off* by considering it as the "shifted origin". For instance, if x_i; i=1,2,3…n is any value measured in either interval or ratio scale; then shifting the origin to the threshold say z*, we may express the values in the form of x_i-z* such that all *negative* x_i-z* are indicative of "failure to achieve the desired threshold level". The *positive* x_i-z*, conversely, denote the desired "success". In our case, using the *national averages* as the "thresholds" for indicators measured in interval scale (i.e. I5, I8, I9, I10) the values are converted to 0 and 1 denoting "failure" and

"success" respectively as explained above. The rationale of choosing the national averages as the threshold lies in the common expectations in most of the government programmes to "bring the values of indicators *at least* to the level of national averages". Also note that, the value of national average is a *function* of individual values at some levels so that any upward movement in one or more individual value(s) would exert an upward push the national average itself. This allows constant revision of expectation and thus, regular adjustments to the idea of the failure and success defined earlier. After this conversion we have a fully consistent database with jointly distributed values of ten selected indicators all measured in nominal scales with values of 0 and 1 denoting failure (backwardness) and success (development) respectively.

Next, one needs to arrive at some measure of individuals' aggregate level of failure (or backwardness). Simplest way, perhaps, though sounds crude, is to count total number of 0s across the distribution of ten indicators. The value ideally should reflect the *extent* of backwardness in aggregate sense. For example the value 5 i.e. total 5 number of 0s reveals that the village concern is lagging behind with respect to five indicators, which allows some sorts joint comparison across villages. There are, however, two serious problems involved in this scheme.

Backwardness, or for that matter, development is best treated multi-dimensionally. Although it is possible to regard the selected indicators as *dimensions* of the "construct" backwardness, no correlation amongst them is allowed, which in all probability may exist in reality. It is, therefore, quite possible to *objectively* reduce the number of *dimensions* to improve the construct of backwardness by "endogenising" the possible correlations amongst the selected indicators. Second, counting would produce only a discrete scale, ranging values from 0 to 10, against a phenomenon, which is clearly continuous. Both the issues require some treatment.

Simplest way, perhaps, of treating "dimensions" of a "construct" is to think them in terms of "optimal number of *number lines*" defining a space with that dimension. Obviously, the selected indicators need to be in the space so defined each corresponding to each one of the dimensions. The key issue is, thus, obtaining the *optimal* number of dimensions *objectively* i.e. based on data on the selected indicators. Well known method of accomplishing this is principal component analysis (PCA) which, speaking simply, seeks

to express individual dimensions as weighted sum of indicators used. Weights associated with the individual indicator signify the relative importance or "factor load" on to the dimensions commonly called as "factors". Assuming *k* number of dimensions (d) with *n* number of indicators (I), PCA allows obtaining $d_j = \sum_{i=1}^{n} w_i I_i$ such that j=1,2,3…k; where w_i is the *objectively* (or endogenously) estimated weights that maximises the squared correlations (r^2) between *d* and *I* (Kim & Mueller 1978). Note that when *w* is taken as 1, *d* is simply the total score of the values of *I*. The method of PCA has it wide applicability among the social scientists for its diverse merits (Rao 1964).

Although PCA seems to provide an answer to the issue of dimensionality, application of the same in our case remains to be problematic. It may be noted that the basic input of the PCA is the Pearsonian correlation matrix (or co-variance matrix) which is gettable only for variables measured in interval or ratio scale. In the present case since all indicators are measured dichotomously, Pearsonian correlation matrix, practically, cannot be obtained. One, therefore, needs to resort to approximation of the tetrachoric correlations amongst the selected indicators. One common *approximations* of tetrachoric correlation for dichotomous variables have been suggested by Edward and Edward (1984). They suggested that for a 2 by 2 contingency tables, the tetrachoric correlation can be approximated as $(\alpha^{\pi/4}-1)(\alpha^{\pi/4}+1)$, where

α is the cross-product ratio (i.e. *ad/bc*) of the contingency table. There are other approximations as well, for instance Brown (1977) and Digby (1983), which in some sense are "proximate" to the one suggested by Edward and Edward (ibid). Once the tetrachoric correlation matrix is obtained, this may be supplied as input to the standard PCA method, which then follows the usual proceedings. An attempt has been made towards this end and following section briefly describes the results and their policy implications.

Results and Implications

We have applied the alternative scheme described above sequentially to the census 2001 database comprising of the selected indicators for 25124 inhabited villages in Assam covering all 223 blocks in 23 districts in order to identify the "backward blocks". After converting all the indicators to dichotomous values of 0 and 1 following the procedure

explained above, the tetrachoric correlation matrix was approximated using the method suggested by Edward and Edward (ibid)[13]. The correlation matrix thus approximated, usually denoted by ρ, is given in Table 2.

Table 2: Tetrachoric Correlation Matrix of the Indicators for Villages in Assam

Indicators	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10
I1	1.000	0.117	0.388	0.451	0.155	0.265	0.252	0.031	0.200	0.135
I2	0.117	1.000	-0.181	0.042	-0.173	0.236	-0.029	0.030	-0.145	-0.094
I3	0.388	-0.181	1.000	0.719	0.404	0.612	0.690	-0.104	0.558	0.342
I4	0.451	0.042	0.719	1.000	0.332	0.543	0.532	0.047	0.456	0.315
I5	0.155	-0.173	0.404	0.332	1.000	0.242	0.107	-0.077	0.110	0.745
I6	0.265	0.236	0.612	0.543	0.242	1.000	0.772	-0.035	0.299	0.269
I7	0.252	-0.029	0.690	0.532	0.107	0.772	1.000	0.093	0.274	0.149
I8	0.031	0.030	-0.104	0.047	-0.077	-0.035	0.093	1.000	0.141	-0.044
I9	0.200	-0.145	0.558	0.456	0.110	0.299	0.274	0.141	1.000	0.091
I10	0.135	-0.094	0.342	0.315	0.745	0.269	0.149	-0.044	0.091	1.000

**Correlation Matrix is Positive Definite, N=25124*

Supplying the ρ-matrix as the input to standard PCA procedure[14] one can easily obtain the matrix of the eigenvectors along with the corresponding eigenvalues. Taking the eigenvectors with associated eigenvalues greater than unity as the principal components, and then multiplying the principal component matrix with the square roots of the corresponding eigenvalues, one can arrive at the required "factor loadings". In our case, four principal components could be extracted cumulatively explaining 75.30% of total variance. Alternatively, these four "principal" components form our "optimal" and "objective" (and also endogenous) "dimensions" in defining the construct "backwardness" which is good in explaining about three-quarter of *the* construct. In order to standardise the "loadings", the principal component matrix was pre-multiplied by the inverse of the ρ matrix. The new matrix provides the "factor score" matrix wherein the respective "factor scores" give the required weights (w_i) so that the values of d_j can be obtained as weighted linear combinations of the values of the selected indicators. $D = \sum_{j=1}^{4} d_j$ where $d_j = \sum_{i=1}^{10} w_i I_i$, thus, give the aggregate score describing the overall level of backwardness. Lesser is the

[13] It may be mentioned that the *tetrachoric* routine in STATA is based on algorithm proposed by Edwards and Edwards (1984). One can also approximate tetrachoric correlation following Brown (1977) by using the programme "tetmat" designed and distributed by John Uebersax (2007). The programme can be obtained freely at http://ourworld.compuserve.com/homepages/jsuebersax. Both the approximates, however, differ marginally.

[14] For instance one can supply the ρ matrix in STATA with "pcamat" command to get the eigenvalues and eigenvectors (principal components) of it.

value of *D*, more is the level of backwardness and vice versa. The negative values of *D*, if any, should not cause problem as it is possible to re-scale the entire distribution by shifting the origin to the minimum *D* without disturbing the interpretation. The "factor loads" and "factor scores" of the selected indicators are presented in Table 3. The value of *D*, therefore, provides an improved measure of multidimensional backwardness by reconciling the issues of objective and endogenous weights, continuity in measurement and joint distribution of indicators.

Table 3: PCA "factor loads" and "factor scores" of the selected indicators

Indicator (I)/ Component (C)	Factor Load				Factor Score (w_i)			
	C1	C2	C3	C4	C1	C2	C3	C4
I1	0.499	-0.175	0.167	-0.236	0.133	-0.111	0.141	-0.232
I2	-0.046	-0.446	0.759	-0.256	-0.012	-0.283	0.640	-0.252
I3	0.902	-0.009	-0.171	0.206	0.241	-0.005	-0.145	0.203
I4	0.828	-0.111	-0.007	-0.081	0.221	-0.071	-0.005	-0.080
I5	0.520	0.740	0.144	-0.182	0.139	0.470	0.122	-0.179
I6	0.774	-0.278	0.295	0.137	0.206	-0.176	0.249	0.135
I7	0.752	-0.347	-0.009	0.182	0.201	-0.220	-0.007	0.179
I8	0.006	-0.273	-0.330	-0.836	0.002	-0.173	-0.278	-0.824
I9	0.555	-0.170	-0.534	-0.062	0.148	-0.108	-0.450	-0.061
I10	0.508	0.697	0.224	-0.238	0.136	0.442	0.189	-0.234

It may be noted that each of the 25124 villages across 223 blocks will correspond to a specific value of *D*, so that we have the distribution $D_k, 1 \leq k \geq 25124$. Following the welfare principle of aggregation, the block level backwardness should be the sum of individual backwardness i.e.D_k. However, number of villages (n) being unequal block-wise, one has to depend on some reliable summary statistics to classify blocks with regard to their level of backwardness or development. To overcome the issues of normality and outliers, we have depended on median, which is relatively stable compared to mean. Based on D_k, median values of respective blocks (D_m) were calculated denoting block level "summary" of level of backwardness. Next, distribution of the median values was further divided into four quartiles based on quartile values e.g. most backward, backward, somewhat developed and developed. Accordingly, all 223 blocks were classified and analysed.

The results show that out of 223 blocks, 108 (about 48%) blocks in Assam can be identified as backward blocks. Amongst the backward blocks, 57 blocks are identified as *most* backward and 51 blocks as *relatively* backward. As per the ongoing BRGF programme in the state, 89 blocks are backward spreading across 11 backward districts. It could be seen from the analysis that our list of backward blocks retains only 44 of the backward blocks presently under BRGF. Therefore, altogether 64 blocks out of 108 (about 60%) are newly identified backward blocks not under the present coverage of BRGF. Further, 45 blocks presently under BRGF (about 50%) are identified as non-backward by our analyses. These results are consistent with the findings of the World Bank (2010) that many backward areas (blocks) remain outside the present coverage of the BRGF whereas some of the developed areas (blocks) continue to receive additional fund under the programme. This has both efficiency and equity implications. Providing additional fund in the name of backward area programme to the areas which are non-backward not only indicates resource wastage but also increases the aggravates the regional disparity by widening the development gaps over the space and time. The proposed restructuring of the programme with blocks as units of backwardness, therefore, carries some definite merits on account of both equity and efficiency.

Introducing inequality into the scene one can derive a few more interesting insights. Let us consider the distribution of D_k for the villages indicating the village level backwardness along with distribution of median values D_m derivable from D_k describing overall block level backwardness and distribution of median values, say, $\overline{D}_m$ derivable from the series of D_m in similar fashion denoting the district level summary of backwardness. The common inequality measures presented in Table 4 reveal that inequality or disparity in development is best addressed at the lowest possible level i.e. at the level of villages. Notwithstanding, this would warrant joint distribution of data at the household level, which is practically un-manageable. Hence, blocks appear to be most appropriate unit for addressing the issue of regional development disparity. Also note that there is lower tail sensitivity in development disparity across the blocks indicating greater policy implications in the backward ones for bringing about a balanced regional development.

Table 4: Estimated inequality measures based on the composite index of backwardness

Unit	Atkinson Measure			Generalised Entropy (GE)			Gini
	ε=0.5	ε=1	ε=2	α=0	α=1	α=2	

District level	0.0059	0.1183	0.2355	0.0119	0.0120	0.1219	0.0783
Block level	0.0153	0.0317	0.0681	0.0322	0.0298	0.0287	0.1309
Village level	0.0493	0.1060	0.2544	0.1121	0.0920	0.0845	0.2356

Sub-group level decomposition of the aggregate block level inequality provides further policy inputs. Decomposition of block level inequality with respect to levels of backwardness as well as proportion of SC and ST population therein has been attempted to see sub-group contributions to inequalities (Mussard et al 2003). The decomposed inequality indices presented in Table 5 show that highest subgroup level indices are recorded for most backward blocks covering 26% of the total blocks when sub-grouping is done on the basis of level of backwardness. Also, more than 74% of the total inequality in this case is accounted by the inequalities between groups thereby suggesting strong policy implications in these most backward blocks. On the other hand, when sub-grouping is done on the basis of proportion of SC and ST population disparity between the groups is found to be around 10% only. These means that no matter what the proportion of SC and ST populations there is an overall backwardness spreading across the state. This, however, does not undermine the special attentions required by this section of population. The analyses suggest that nature of the development disparity in the state is all pervasive and does not necessarily subject to any localised feature. This strongly urges for other supportive measures and programmes along with special area programmes like BRGF.

Table 5: Sub-group level decomposition of inequality indices

Subgroups	Population Share	Generalised Entropy (GE)			Gini
		α=0	α=1	α=2	
Level of Backwardness					
Most Backward	0.26	0.0272	0.0249	0.0233	0.1198
Backward	0.23	0.0003	0.0003	0.0003	0.0144
Somewhat Developed	0.27	0.0008	0.0008	0.0008	0.0227
Developed	0.24	0.0045	0.0045	0.0046	0.0528
Between group inequality		0.0238	0.0235	0.0235	
Within group inequality		0.0083	0.0063	0.0053	
Proportion of SC/ST Population					
less than 30%	0.73	0.0346	0.0321	0.0312	0.1338
30 to 50%	0.15	0.0117	0.0118	0.0120	0.0860
50 to 75%	0.09	0.0176	0.0173	0.0171	0.1057
More than 75%	0.03	0.0127	0.0117	0.0109	0.0760

Between group inequality	0.0033	0.0033	0.0035
Within group inequality	0.0289	0.0264	0.0253

Lastly, the scope of sectoral "programmability" needs to be looked into in the proposed framework. Since the ARC mandates use of the composite indicator as general guidelines for other sectoral programmes and schemes, it is desirable that the framework proposed contain some direction to this end. The basic question is how the relative weights of single indicators may be used in allocation rule for development funding. Two ways can be suggested: first, one can directly apply the *absolute* factor scores of the first principal component as relative weights for fund allocation; second, using the *nominal* categories of level of backwardness one can also adopt some chi-square based measures like Cramer's V for approximating relative weights of sectoral indicators (Thomas & Cage 1977; Acock & Stavig 1979).

Conclusion

The paper makes an attempt to explore the practicability of identifying backward blocks within a state with the help of a formal framework consistent with the recommendations of the second ARC. The framework proposed here marks some significant improvements over the PIB approach suggested earlier, which has been adopted for identification of backward blocks in the country so as to restructure the present programme of BRGF. The alternative approach discussed here systematically remedies the shortcomings of the earlier approach by addressing and incorporating the issues of multi-dimensionality of backwardness as a notion, endogenising the weight scheme and improving continuity of the scale of measurement of development as a process. Moreover, since it is based on joint distributions rather than aggregate values, the alternative method of identification of backward blocks stands strong on grounds of welfare principles. It has, therefore, been shown that objective and optimal identification of backward blocks following the ARC recommendations is gettable. It also carries a clue for designing an objective allocation principle to serve as general guidelines.

Results of the analyses further demonstrate that blocks as primary units of backward region are optimal both in terms of efficiency and equity. Disparity in development increases hierarchically from state to district and from district to block levels, and disparity displays a greater sensitivity towards the negative tails. Besides, larger part of the

aggregate disparity has been found to be contingent upon the lower echelons of development. All these favour a strong area development programme to address the issue of balanced regional development. Notwithstanding, it has also been shown that phenomenon of regional backwardness, as in the case of Assam, may be all pervasive warranting a set of comprehensive policies rather than a single area development programme.

The suggested method, though seems attractive, is limited by selection of indicators and quality of data used. Indicators used for this type of formulations often reflect "outcomes" rather than "causes". Need for timely and reliable and comprehensive set of data and capacitating the national agencies towards meeting this end can, therefore, may be reiterated. The major problem with the block level approach, in any case, as envisaged by the ARC, lies in the fact that it completely ignores the urban areas. The present district approach of BRGF contains the urban share. Blocks particularly falling within rural administration, one needs to look for a space to accommodate urban. Key question, however, remains: can subvention per se really beget development? ■

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