

REPUBLIC OF RWANDA

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Rwanda Fiscal Decentralization Project

Intergovernmental Transfers Reform and Equalization Formula Design for the
Republic of Rwanda

By

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Abbreviations and Acronyms

CBA	Cost Benefit Analysis
CDF	Common Development Fund
CG	Central Government
CoK	City of Kigali
DFPI	District Fiscal Performance Index
DGDP	District Gross Domestic Product
DMFG	District Mean Fiscal Gap
DPI	Decentralization Policy Initiative
DTA	Director of Territorial Administration
FD	Fiscal Decentralization
FDD	Fiscal Decentralization Data
FIT	Fiscal Intergovernmental Transfers
FNI	Fiscal Need index
FPI	Fiscal Performance Index
GoR	Government of Rwanda
LABSF	Local Authorities Budget Support Fund
LG	Local Government
LGFD	Local Government Finance Department
MEXP	District Mean Expenditure
MFG	Mean Fiscal Gap
MINALOC	Ministry of Local Government, Information and Social Affairs
MINECOFIN	Ministry of Economy and Financial Planning
MREV	District Mean Revenue
NDP	National Decentralization Policy
NTS	New Transfer System
OLS	Ordinary Least Squares
OTS	Old Transfer System
PCCDF	Per Capita Common Development Fund
PCMEX	Per Capita Mean Expenditure
PCMFG	Per Capita Mean Fiscal Gap
PCMREV	Per Capita Mean Revenue
POVRATE	Poverty Rate
DPDSITY	District Population Density
RoR	Republic of Rwanda
RRA	Rwanda Revenue Authority
SA	South Africa
SLEF	Straight Line Equalization Formula
TNA	Transitional National Assembly
USA	United States of America
WPI	Welfare Poverty Index

Abstract

The current study examines aspects of Fiscal Intergovernmental Transfers (FIT) for Rwanda. First, it seeks to assess the prevailing intergovernmental fiscal relations by looking at the Local Authority Budget Support Fund (LABSF) and then the Common Development Fund (CDF). The former is a general-purpose grant aiming at enabling the towns, districts and the City of Kigali (CoK) to overcome current budget difficulties. The latter, is conditional in nature with an object to provide the same Local Governments (LGs) with resources to implement public investment projects of their priority. The study argues that due to low fiscal capacity as captured by mean revenues and high fiscal needs as approximated by mean expenditures, it is necessary for the center to offset the resulting mean fiscal gaps among the sub-national governments.

Secondly, the study designed two new equalization formulae dubbed straight line equalization formula 'SLEF' that address the existing vertical and horizontal imbalances as reflected in the inter and intra jurisdictional mean fiscal gaps. It introduces fiscal gap into the analysis in a more reasonable fashion. In devising the LABSF and CDF formulae plausible welfare based poverty index (WPI) from the 2002 census data is introduced. In addition, a new proxy is constructed, fiscal performance index (FPI) to capture the behavior of LGs in terms of revenue generation and expenditure execution within LABSF formula. Moreover, the design of the CDF formula incorporates proxies that are district specific and relevant for public investment decision criterion, famous in Cost Benefit Analysis (CBA). In both formulae appropriate weighting parameters are invoked based on particular importance of each proxy to the districts and towns transfer requirement. Due to serious data problems the study applies actual figures but with good intention.

Thirdly, the study recognizes the importance of simple, transparent and participatory approach in formulating the said formulae. Aside, to avoid any imputation difficulties in implementing the transfers using the formulae, 'distribution toolkit' has been created. This has the advantage of running the raw data into transfer allocations without learning the rigors of understanding the mathematical formulae.

Finally, results from data simulations show that the designed formulae are both equalizing.

Key Words: Transfers, Grants, Fiscal Intergovernmental Transfers, Equalization Formula, Rwanda, Decentralization, Sub-national, Local Government.

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Intergovernmental Transfers Reform and Equalization Formula Design for the Republic of Rwanda*

By

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1. Introduction

The current study attempts to re-examine the intergovernmental transfers and re-design a more plausible equalization formula for the Republic of Rwanda (RoR). The objective is in line with the current government policy of implementing decentralization initiative of 2000¹. The initiative aims at reversing the negative impacts of 1994 genocide and that of the ensuing internal wars. This will be attained partly by reducing poverty and stimulating economic growth mainly in rural areas and some urban localities. In addition, the initiative seeks to enhance national unity, reconciliation, power sharing and stimulating participatory approach in decision making.

The government of national unity implements four types of transfers or subsidies. They include conditional grants, unconditional subsidies, equalization or common share transfers and delegated funds². The current study examines all except the delegated funds.

The plan of this paper is as follows; Section 2 answers the question whether intergovernmental transfers are really needed to support the sub-national governments

*Thanks for Odile Nzirabatinya for research support, typing and formatting the equations. Sam Rwahama and Desire Nsabimana of MINALOC for providing me with data on transfers and availed to me the arithmetic of the distribution. Augustus Seminega of CDF acted promptly when my phone rang with succinct answers.

[‡] I developed this equalization formula while working as Sr. Advisor, Fiscal Decentralization Project-Rwanda, USAID/ARD. Inc.,

¹ Read National Decentralization policy (2000) and Fiscal and Financial Policy (2001) documents.

² See Financial and Accounting Manual (2003)

in Rwanda. Section 3 elaborates the stylized facts of a good transfer system. Data sources forms section 4³. Section 5 describes the assessment of old transfer system (OTS) and provides its mathematical representation. Section 6 provides the analytics of the proposed new transfer system (NTS) and introduces new plausible proxies and weights. In section 7 evaluations of the transfer systems is expounded using econometric analysis. Next is the penultimate section dwelling on policy recommendations. Finally, section 9 concludes and caveats are drawn.

2. Are Transfers Needed?

The current section tries to answer the question whether Fiscal Intergovernmental Transfers (FIT) are prerequisites for the sub national governments in RoR. The study uses 2003 actual figures unless said otherwise. We examine four key aspects below.

2.1. District Mean Revenue (MREV):

This study uses district mean revenues from their own sources (MREV) for the year 2003 to reflect revenue capacity of towns and districts. These are considered at per capita levels and show that district and towns have low revenue capacity and therefore need more stringent revenue enhancement strategies. Districts in the same provinces in Rwanda have heterogeneous tax bases that lead to different tax capacity. The situation is more pronounced when urban-rural stratum is considered.

Table 1 shows that the mean per capita MREV turns out to be 88.48 RWF, while the maximum and minimum turns out to be 742.63 RWF and 5.27 RWF

³ The data used in this study comes from Fiscal Decentralization Data (FDD) readers may consult (Shirima, 2004)

respectively. This tells us that most of the population may not benefit from the public spending it intends to finance.

Table 1 PCMREV and MREV Compared

	PCMREV	MREV
Mean	88.47738	6208417
Median	45.44791	3301017
Maximum	742.6318	76520613
Minimum	5.266436	548641.5
Std. Dev.	118.9743	9693552
Skewness	3.334457	4.844123
Kurtosis	15.40514	31.27004
Observations	106	106

Source: FDD Authors Own Calculations

This argument is supported by the largest standard deviation of 188.97 RWF. Thus the revenue assignment as shown in box 1 below may not be adequate and Central Government (CG) has to empower the local government (LG) in terms of more revenue powers.

Box 1: Own Source Revenue for Districts and Towns of Rwanda

Decentralized Taxes and other local taxes (Revenue Assignment) such as:

- Taxes and fees of the District or Town;
- Funds obtained from certification services rendered by District or Town;
- Funds from movable and fixed assets;
- Profits from investment by the District and Town, and interest from their own shares and income generating activities;
- Fines;
- Loans;
- Government subsidies;
- Legal cost and proportional rights as charged by Canton Courts;
- Funds obtained from services rendered by District or Town or from different public infrastructures;
- Donations and legacies.

The following taxes that were formerly collected by Central Government are now transferred to the Districts, Towns and City:

- Property tax;
- Trading license tax;
- Tax on rent.

All the expected receipts by the Districts or Towns are made part of the Districts or Towns annual budget.

Source: Law N° 17/2002 Articles N° 2 and 4

Examining the lower part of the box above it appears that too few taxes have been devolved. A careful study is being implemented by FDP to determine what other taxes should be devolved and if tax sharing is a possibility.

2.2. District Mean Expenditure (MEXP):

Analogously, district mean expenditure is used to capture information on districts and towns' expenditure needs. Again, when this is looked in terms of per capita analysis, one observes that they are quite very low by all standards and does not suffice to provide minimum national standard of public goods and services.

Table 2 PCMEX and MEXP Compared

	PCMEX	MEXP
Mean	109.0027	5652265
Median	65.70315	4953228
Maximum	747.80	56495919
Minimum	16.69	1090845
Std. Dev.	118.2807	6221861
Skewness	4.136860	5.648302
Kurtosis	27.03866	44.39439
Observations	106	106

Source: FDD Author's Own Calculations

This is evidently very low with a mean per capita MEXP of 109.0027 RWF and large standard deviation of 118.2807 RWF. In addition the maximum mean per capita MEXP is at 747.80 RWF with a very low minimum value of 16.69. Apart from the two main assigned expenditure responsibilities in health and education, district specific recurrent obligations are enormous and all this leads to a high degree of fund fungibility. Also 'fly paper' effects may not be uncommon. Box 2 below shows that indeed LGs have more expenditure to meet that explains partly the huge fiscal gaps. The fiscal gaps create a wide disparity in terms of horizontal imbalances within inter and intra provincial jurisdictions.

Box 2: Districts and Towns Expenditure Responsibility Assignment

The District assumes the duties and responsibilities that are assigned to it by law and regulations, notably with regards to policy, administration, the economy, the welfare of the population and culture. The district is especially responsible for the following sectors:

- Agriculture, Animal Resources and Forestry;
- Commercial activities in the District;
- The development of small scale industries working within the District;
- Sanitation in the District;
- Primary and secondary schools within the District, the training of these schools' teachers, knowing the programs of these schools to follow and to carry out inspection on them;
- Health Centers in the District;
- Water works and their maintenance;
- Tourism and the environment;
- Land use, organization and distribution of plots in the District;
- Association and cooperatives in the district;
- Care for the needy;
- Road network in the District;
- Emergency Services in the District;
- Graveyards and Genocide memorial sites within the District;
- Attend to youth, culture and leisure;
- Attend to programmes for women and gender development;
- Attend to child rights;
- Attend to youth and women programmes.

Source: Law n° 04/2001 Article 9

Finally poor expenditure prioritization leads to a surge in fiscal needs shown in the escalating mean fiscal gap levels of the sub-national governments as expounded below.

2.3. Mean Fiscal Gap (MFG)⁴:

Nevertheless, the assigned expenditure responsibilities in many occasions exceed districts' and towns' ability to finance them via their own sources of revenues. This situation exemplifies vertical imbalances and is reflected in this study by the colossal district mean fiscal gap (DMFG). Three scenarios are a possibility. First, MFG can be negative which implies that respective districts expenditure assignment falls short of its revenue assignment. The current study does not recommend these districts and towns to donate to the transfer pool, rather to attract zero transfer based

⁴ MFG is the difference between MEXP and MREV

on this criterion. Secondly, MFG can be zero meaning that, MREV and MEXP are exactly equivalent; in the current study such a case did not obtain.

Thirdly, is the ubiquitous case that permits expenditure responsibilities in excess to the revenue capacity and positive MFG results. This is the interesting case, which implies that districts and towns need subsidies from the CG. This in turn relates to a variation of wide magnitude within different districts and towns, which is a manifestation of a horizontal imbalance explained somewhere else in this study. Results from FDD shows that only 26 districts or 27% have negative MFG implying that their mean expenditures are less than their mean revenues. As such their quest for transfer needs is expected to be less pressing.

Table 3 PCMFG and MFG

	PCMFG	MFG
Mean	48.2470	2977072
Median	16.38619	1035448
Maximum	395.03	18134039.5
Minimum	0.86	80787.2
Std. Dev.	56.3544	2848348
Skewness	3.606	2.639
Kurtosis	18.503	10.262
Observations	79	79

Source: FDD Author's Own Calculations

Statistically, from the table above the minimum values are set to equal zero by construction, after we have allowed LGs with negative MFGs to imply that they can finance all their expenditure assignments with hard budget constraint and may need no transfer under this criterion as will be explained. An alarming situation is that the maximum mean per capita MFG of 160.14 RWF exceeds both mean per capita values of MEXP and MREV. All these are the main sources and rationale of the intergovernmental transfers.

2.4. Central Government Transfers and Entitlements⁵:

Given the above explanations and based on the meager revenue assignment coupled with narrow local tax base, the need for transfers to the sub national governments is enormous. When one examines the list of expenditure assignments in box 2 it reveals that they are not sufficiently addressed and the population lives in abyss poverty.

Table 4 POVRATE and DPDSITY Illustrated

	POVRATE	DPDSITY
Mean	79.33585	699.2809
Median	85.5	378.5859
Maximum	96.2	19220.64
Minimum	9.2	18.05725
Std. Dev.	18.96952	1921.105
Skewness	-2.08116	8.720856
Kurtosis	6.710491	83.38876
Observations	106	106

Source: FDD Calculations by the Author

Table 4 shows above that the maximum welfare poverty index (WPI) from 2002 census rate is 96.2 percentage points and the minimum is 9 percentage points. The mean district poverty rate seems to be very high at 79 percentage points. The table also reveals that with such a huge population density, provision of public goods and services poses significant problems. This implies that imposing expenditure cut policies will hurt the poor more.

⁵ In this study transfer implies the actual amount of funding going to districts and towns as disbursed by either the CDF or MINALOC. Entitlement is used here first, to mean the amount of funding eligible to the distributing agency from MINECOFIN as stipulated by the law. Secondly, is used to mean the actual amount released by the MINECOFIN to the distributing agency, which has been realistically lower than the legal provision.

Table 5 RRA Revenues and CG Transfers to Towns and Districts: 2001 – 2004 (in RWF)

Fiscal Year	RRA Revenues.	CDF Allocations to Districts	CDF Entitlements from MINECOFIN	LABSF Allocations to Districts	LABSF Entitlements from MINECOFIN
(1)	(2)	(3)	(4)	(5)	(6)
2001	79 514 756 964	N/A	N/A	N/A	N/A
2002	93 949 100 000	1 035 000 000 ¹	7 951 475 696 1 000 000 000 ^e 54 000 000 ^f	1 331 500 000 ^a	1 192 721 354
2003	111 201 700 000	1 003 080 036 ^c	9 394 910 000 4 000 000 000 ^e	1 243 500 000 ^b	2 818 473 000
2004	-	-	-	800 694 316 ^d	-

Source: RRA, Statistics Unit, Extracted and computed by the Author

^aLABSF supposed to be 1.5% of RRA 2001 collections.

^bLABSF supposed to be 3% of RRA 2002 collections.

^cCDF figures including the 2002 are 10% of the 2001 and 2002 allocations.

^dLABSF 2004 includes the first and second quarters

^eActual CDF entitlement from MINECOFIN

^fFunds inherited from the previous agency

¹Part of this was allocated in 2003

Table 5 above depicts the amount of funding distributed to districts and towns on the two grants namely LABSF and CDF. In the year 2002, LABSF allocated to districts was more than the entitlement by 12 percentage points. In 2003, it was less by 56 percentage points of the expected legal entitlement. Examining CDF entitlement for 2002 we see that only 13-percentage point was honored. However, in the same period CDF were able to distribute about 98-percentage point of the actual entitlement. In the year 2003, the actual entitlement was only 43-percentage points of the legally expected entitlement. Nevertheless, CDF management was able to allocate only a small proportion of 25-percentage point of the actual entitlement in that year. CDF allocation efficiency is hampered by the inefficiency of districts and towns to submit right projects and on time. Secondly, districts and National Tender Boards procedure are too cumbersome and cause significant delays to award contracts to the successful bidders. Solutions to these problems partly involve restructuring and

reforming of the tender procedures. On the other hand, there is a need to enhance capacity building and sensitize the LGs on CDF project requirements.

3. The Stylized Facts of a Good Transfer System⁶

3.1. Autonomy

Autonomy in Rwanda has been a core of implementing and designing the Decentralization Policy Initiative (DPI). Contrary to the three tier government arrangements common in fiscal federalism found in Canada, USA, SA and many other countries (Broadway and Hobson 1993, Shah 1991, Jun Ma 1997), Rwanda adopted a new form. It may be referred to as a one-tier arrangement, which assumes three decentralization modes that include deconcentration at the provincial level, delegation and devolution⁷ at the districts and towns level. This new form has moved the Central Government (CG) closer to the people and gave the sub-national governments more powers in taxing, spending and decision-making. The implementation was confirmed by Transitional National Assembly (TNA) when it passed LW 43/2000⁸. Sequentially, the RoR government has adopted three phases³ to allow for the preceding phases to consolidate the gains of the precursors/predecessors.

3.2. Revenue Adequacy

There is a significant variation between actual revenues collected from all districts in Rwanda to projected revenues. This may be explained in three ways. First, there is no scientific approach in making their forecasts, no fundamental assumptions and it involves only subjective decisions at LGs. Secondly, there is a lack of capacity and

⁶ For background see Jun Ma (1997), Bambang and Jorge (2002), Shah (1997) and Searle (1994).

⁷ See page 5 National Decentralization Policy (NDP)

⁸ See page 9 NDP

know-how of technicians in the field of accounting and fiscal management within the local authorities. Thirdly, the unavailability of reliable data on the fiscal performance and position of the districts hampers the effort.

Moreover, there is insufficient own source revenue assignment to the districts in the form of tax collection powers as shown in box 1 earlier. This is coupled by the non-existence of the tax-sharing scheme to provide the local governments access to more revenue sources.

Aside, there is a serious weakness in identifying, discovering and registering the existing property owners. In addition, lack of physical cadastre records and property rights enforcement poses a huge threat now and in the immediate future. Other salient problems are in the areas of valuation, assessment, billing, verification, enforcement, auditing and computerization. It is also obvious there is immense ignorance of the law on the part of the taxpayers and revenue collectors. Further, the existence of weak administrative mechanisms on the part of local units, which is manifested in the inability to explore and exploit other potential sources of revenues, exacerbates the situation.

3.4. Predictability and Efficiency Consideration

The release of the transfer pool from the MINICOFIN to CDF and MINALOC accounts has not been without delays and is not in the full amount as stipulated in the laws establishing the two grants. Evidently, CDF receives about half of the 10% legally entitled (see table 5 above). In 2002 LABSF was released in full amount, where in 2003 only three out of four quarters were made available. Needless to say, transfers are unpredictable from MINICOFIN and final disbursement to districts and

towns are erratic again due to mainly administrative bottlenecks especially for LABSF. The implication is that OTS in Rwanda contravenes the efficiency criterion.

3.5. Simplicity

The allocation formula currently applicable in Rwanda pauses some difficulties in implementation. It is not easy to comprehend and sometimes the imputations are incorrect. FDP, together with this study designed a toolkit that will enable the MINALOC officials avoid to grapple with the rigors of the mathematical formulation represented in this study.

3.6. Incentive

OTS does not have the required characteristics that ensure compliance with sound fiscal performance and position improvement. For example, there is no sufficient accounting reporting systems from districts and towns to reveal their revenue collection or expenditure control abilities. This requires strict regulations, monitoring and evaluation manned by good professionals in the field of accounting and finance. The newly introduced fiscal performance indicator (FPI) formulation is a precondition to the improvement in the reporting of the districts and towns in Rwanda. It provides incentive for the local authorities first, to increase their revenue collection ability and secondly to adhere to the principles of financial statement preparation.

4. Data Sources

The data used here comes from Fiscal Decentralization Data (FDD) collected from various sources⁹. FDD is constructed from two main sources; the local

⁹ See the FDD Manual (Shirima, 2004)

government fiscal reporting systems and the Central Governments (CG) data mainly from ministries and government agencies.

From Ministry of Local Government, Community Development and Social Affairs (MINALOC) we obtained data on LABSF and other fiscal and financial aspects of the LGs. The Ministry of Finance and Economic Planning (MINECOFIN¹⁰) supplied us with data on district welfare rates obtained from the National Service Census (NSC) such as number of households with fixed phone lines, number of households with piped water, number of households with electricity, number of primary and secondary schools, urban population, number of unemployed, number of old age, number of children (<14 years), disability due to genocide, all disabilities including all the above. Health related variables were obtained from the Ministry of Health (MINISANTE) and they include number doctors in public services, number of nurses and medical aides in public services and number of public hospitals, clinics and dispensaries. Data on infrastructure (number of bridges and overpass) and length of roads (tarmac and gravel) was availed to us from the Ministry of Infrastructure (MINIFRA). Ministry of Education (MINEDUC) furnished us with data on number of primary and secondary schools, number of primary and secondary schools teachers, number of students in primary and secondary schools, budget on primary and secondary schools, actual disbursements to primary and secondary schools, salaries for primary and secondary schools teachers.

Several government agencies proved to be very supportive in terms of data provision. First, the Rwanda Revenue Authority (RRA) gave us data on central government revenue collections and acted as a backup for the district level data

¹⁰ Data come from Dept of Statistics and the National Census Coordination Unit.

mainly on the revenue side after and before the decentralization initiative. Secondly, the Central Bank of Rwanda (BNR) provided us with growth, GDP and inflation data. CDF presented us with all their transfers and entitlements allocated.

Rwanda like any other developing country faces huge data availability problems. First, RoR is at its infancy stage in implementing fiscal decentralization (FD) and currently has no sufficient literature on the Rwandan context. Secondly, it lacks capacity in the field of accounting and financial management that are key ingredients in implementing FD. These in turn lead to the third problem that of making meaningful predictions and estimations to ascertain what the future state of fiscal and financial conditions would look like¹¹.

To circumvent the above observations, the study will try to use actual figures whenever possible and avoid estimations and approximations based on the already poor, incomplete and unreliable data¹². The implication of the above claims emanated from the fact that districts cannot realistically establish their potential revenues, as there is no sufficient information on the potential local tax bases including that of devolved taxes. In addition, there is no reliable estimation of the provincial or districts' gross domestic product (DGDP) that may form substitute proxy for local tax capacity.

The determination of the government pool of transfers by law in Rwanda is based on the previous year's revenue realizations by RRA. For instance, the 2003 fiscal year pool of transfers is derived from the 2002 RRA actual revenue realization.

¹¹ Interested readers are advised to see the FDD Manual chapter v.

¹² The study recognizes the merits and demerits of using actual figures, further discussion see (Jorge 2002, Boex 2002, Bahl and Linn 1992) but for the Rwandan case this approach is the only feasible option.

Analogously, the current study recognizes this fact and relies on actual revenues and expenditures of the previous year to be proxies of the revenue capacity and expenditure needs. This approximation realistically provides the “exactness” that underpins effectiveness of intergovernmental transfer design.

However, the critics of this approach argue that the local government administration may deliberately lower their tax collection efforts to qualify for transfers or may inflate, overstate their expenditure needs (Kelly 1999, Jorge 2002). This argument may not be true for Rwanda, for practical reasons:

- (i) The size of LGs in Rwanda are too small and any collaboration to lower (or understate) revenues or inflate (overstate) expenditures cannot be unnoticed;
- (ii) The size of these transfers are very small not worth for districts to lower their revenue generation capacity;
- (iii) Exceptionally, GoR officials have a zero tolerance policy on “corrupt elements” therefore chances of expenditure – revenue mismanagement are at minimum (anti corruption index);
- (iv) With the launch of LGFD, monitoring the performance of LG will be easy based on the fiscal performance index (FPI)¹³ trend. District officials will be required to explain any negative deviations observed in the FPI. That is, it will be a useful benchmark for monitoring and evaluation (M&E) for the LGFD. This sort of performance measure has been applied in various ways with

¹³ This is elaborated further in section 6.3

Revenue Authority Bodies across the world and results are encouraging (Tanzania and South Africa).

At this juncture, the section that follows expounds the current transfer system and proposes a new mechanism that requires minimum data and is simple to implement relevant to Rwandan context.

5. Review of the Old Transfer System (OTS)

5.1. Common Development Fund (CDF)

In the year 2002 the government of RoR established a conditional fund known as Common Development Fund (CDF) to support districts, towns and City of Kigali (CoK) to finance development projects. The agency to manage the fund is named “CDF” after the fund. The details and operations of CDF are found in the Law N°20/2002 of 21/05/2002 here referred to as LW 20/2002. The CDF pool of funding originates from two main sources. First, the CG is required under the same law to transfer at 10% of its domestic revenue mobilization based on the previous fiscal year¹⁴ revenue realizations to CDF. At this point CDF allocation from MINECOFIN depends on approved projects submitted by districts for funding whereby CDF applies for the same amount from the MINECOFIN. Secondly, CDF may acquire funding from donors (foreign and domestic).

The criterion used now for allocating this to LGs is not based on any formula and this study seeks to devise a plausible formulation. Each LG was supposed to submit proposals not exceeding 40 Million RWF for the year 2003 and 10 Million RWF more for the year 2004 for CDF funding.

¹⁴ At this point CG transfers approximately only 5.4% of this. The operation of CDF started officially in September of 2002, but fund disbursement came in the first quarter of 2003.

5.2. Local Authorities Budget Support Funding (LABSF)

The second fiscal intergovernmental transfer (FIT) is unconditional and Akarere governments have discretion on how to spend LABSF. The provisions of the law N°17/2002 of 10/05/2002 (LW 17/2002) provides that 1.5% of CG domestic revenue collection should be transferred to the sub national governments. The main objective is to bridge the fiscal gap in financing their current budget. The LW 33/2003 raised the threshold to the range of 3% to 5.3% repealed the earlier LW 17/2002, and pegged the current rate at 3% of the CG domestic revenue mobilization.

5.2.1. OTS LABSF Model

The allocation of the unconditional transfer to the districts takes into account four parameters that include district population, equity common fund, square area and revenue capacity element¹⁵.

Analytically let ;

Ω^0 = Total old transfer system pool

η_i = District i population

N = Total population of all districts

σ_i = Equal share entitlements for district i

$m = 106$ that is, count of districts numbers

γ_i = District i square area

θ = District revenue range used as a revenue capacity element

φ_i = District i population revenue share for OTS

ρ_i = District i area-based revenue share for OTS

¹⁵ This has been wrongly used as a proxy for poverty levels of the districts.

ψ_i = Revenue category shares as a proxy of poverty categories A, B, C.

Ideally category A attracts 5% out of the total 40%, B and C claims 15% and 20% of the same respectively.

${}^A\Gamma$ = The share that goes to category A

${}^B\Gamma$ = The share that goes to category B

${}^C\Gamma$ = The share that goes to category C

In addition, the formula groups the districts in each group based on their ability to generate own source revenues, using the year 2002 actual collections of the first quarter as given within the ranges shown in formulation (1) below in Rwandan francs. The categories in numbers are in A we include 28 districts, while in B and C we find 41 and 37 respectively to ease the imputations.

Whence, we may denote this as:

β^A = Total number of districts in category A

β^B = Total number of districts in category B

β^C = Total number of districts in category C

$\omega_{i,j}$ = OTS weighting parameter for each index, where $i= 1... m$ and $j=1..4$

$$\theta = f \left\{ \begin{array}{l} C \Rightarrow 8,000,000 > \theta \\ B \Rightarrow 8,000,000 \leq \theta < 15,000,000 \\ A \Rightarrow 15,000,000 \leq \theta \end{array} \right\} \quad (1)$$

The distribution to the districts takes the following shares; population share 30%, common equalization funding 20%, district surface area 10% and revenue

category accounts 40%. These rates are subjectively determined and their economic rationale is not obvious. Moreover, they form a crude transfer system.

The determination of the OTS funds currently implemented by the MINALOC mathematically takes the form:

District i population transfer share:

$$\varphi_i = \frac{\eta_i}{N}(\omega_1)\Omega^0 \quad (2)$$

District i area-based transfer share:

$$\rho_i = \frac{\gamma_i}{\sum_i^m \gamma_i}(\omega_2)\Omega^0 \quad (3)$$

Equal share transfer entitlements for district i:

$$\sigma_i = \frac{1}{m}(\omega_3)\Omega^0 \quad (4)$$

Recall m captures the total number of districts. The OTS recognizes that there are 106 total administrative districts and towns in the whole of RoR¹⁶.

Now for mathematical tractability we can write:

Transfer share according to each category for district i

$$\psi_i = \frac{1}{\beta^n} \Gamma(\omega_4)\Omega^0 \quad (5)$$

Where $\omega_1 = 0.3$; $\omega_2 = 0.1$; $\omega_3 = 0.2$; $\omega_4 = 0.4$ and $n = A, B$ and C

Finally, summing all the transfer shares to the respective districts as shown in equations (2) – (5) one can write:

¹⁶ These administrative structures are as follows, 92 districts, 14 towns and 1 city (i.e. City of Kigali.) All these give a total of 107 administrative units.

$$\Omega^0 = \sum (\varphi_i + \rho_i + \sigma_i + \psi_i) \quad (6)$$

Equation (6) above summarizes the derivation of the old transfer system that is implemented by the MINALOC. In contrast, this study suggests a new approach on how MINALOC can elicit the necessary information from sophisticated sub-national governments in order to implement tax policies that equalize the marginal cost of public funds in all districts and towns.

5.3. OTS Inherent Weakness

However, the choices of the proxy parameters need to be refined. They possess valid weaknesses. Firstly, on the equity consideration (the equalization portion) where each district claims equal share of the fund as a ‘*balancing factor*’ is unjust since it ignores its intended purpose of equalizing the inherent differences between the sub national jurisdictions. The implication is that it neglects the other parameters including district specific attributes it is expected to address. Further, it treats all the towns and districts (urban and rural) equally, thus undermining its intended purposes. This study scales down its attached weight from 20 % to 10%. The only rationale for this grant portion is the claim that each district starts somewhere to provide for basic public goods and services.

Moreover, *district revenues*,¹⁷ which is used as a proxy for poverty, is unrealistic because it does not capture income distribution and more importantly does not account for variations in well being of the population. Again, OTS omits the *expenditure side* and its type. For instance, expenditure on education and health are of paramount importance to a country like Rwanda and yet not accounted for in the

¹⁷ Refer to table 4.

OTS. In addition, this type of arrangement culminates into a serious flaw, since it does not account for the *fiscal gap*; that underpins a good transfer system.

Herewith, statistical results prove that the allocation of LABSF based on the described criterion leads to inequity. It is also notable from table 6 below that 2002 values for LABSF in the fiscal year 2002 appear to be higher than those of 2003 for the reason explained earlier that, in the latter period districts and towns realized only 3 out of the 4 quarters of the grant entitlement.

Table 6 LABSF Actual Allocation Fiscal Years 2003 and 2002

	LABSF 2003	LABSF 2002
Mean	8644885	14260726
Median	8839795	14582309
Maximum	13503396	22274520
Minimum	3405604	5618011
Std. Dev.	2279404	3760084
Skewness	-0.365149	-0.3652
Kurtosis	2.750581	2.750515
Observations	106	106

Source: FDD Calculations by the Author

Specifically, for both fiscal periods the mean, median, maximum and minimum values show a wide disparity. This indicates that LABSF has not been equalizing.

6. The New Transfer System (NTS)

The design of NTS takes into account the local country specific characteristics such as population distribution, surface area and its attributes¹⁸, data availability and all the legal ramifications associated with the implementation of fiscal decentralization. Specifically, the formulation is different from other models

¹⁸ Especially the CDF.

implemented in countries like Indonesia, Canada, India and Australia.¹⁹ The study avoids replicating these models and imposing them to the RoR government for three main reasons.

First, they are mathematically complicated and no extra statistical gains in terms of results. Secondly, these models data demands are extremely very high and it is unnecessary for the Rwandan current situation. Thirdly, the estimation of the two sides of the formula i.e. the expenditure needs and the revenue capacity, involves using proxy of proxies and then these proxies are applied on estimated figures. In Rwanda it is very difficult to attain a reasonable estimates especially at local level. The main question is what is the line between expenditure needs and revenue capacity? Population and area for instance are used in the expenditure needs side but ideally both can fit in either side.

This is unrealistic for a country like Rwanda for several reasons. Rwanda is just 3 years old in the decentralization initiative, it is yet to establish necessary fiscal data requirements, their accounting systems are still at their infancy, local government tax bases is not known thus not able to estimating their potential revenues. Accounting profession in the districts and towns remains far below the country's expectations.

Following from above, the current study advances a simple model that uses the available data, uses proxies that are representative of the actual state of the Rwandan economy, and they are district specific. It incorporates information on revenue capacity and expenditure needs in a more plausible approach. The new approach developed herewith may be called "Straight Line Equalization Formula' (SLEF)

¹⁹ The existing variants of equalization formulae found in literature are of four types depending on what they aim to equalize: (a) some seek to equalize fiscal gap (b) others equalize fiscal needs (c) thirdly equalize fiscal capacity (d) finally, may aim at equalizing the regional per capita output.

based on its mathematical representations as it will be shown below. Aside, it is participatory in modeling where the districts and towns were consulted at each stage of development and results were discussed before its application. It is transparent in implementation. The next section starts with the CDF program.

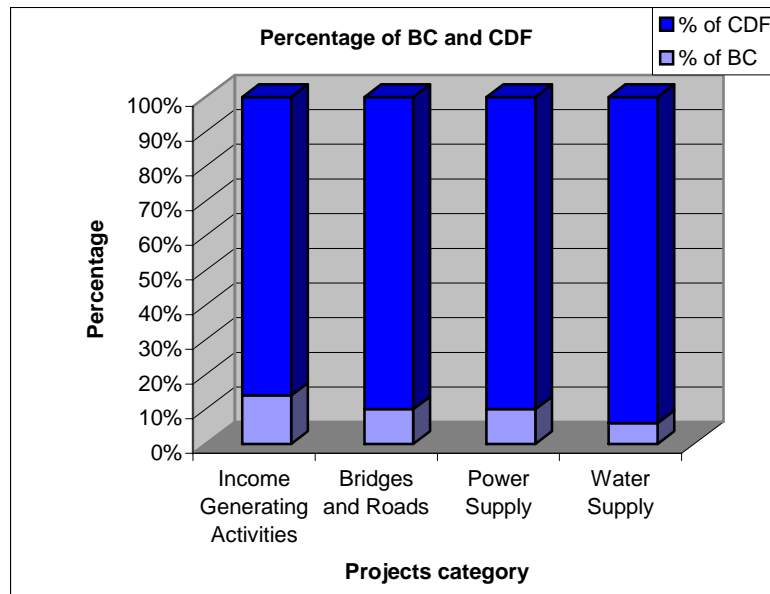
6.1. CDF Reform

The operation of CDF so far has been semi-autonomous, with board of directors reporting to the Minister of Local Government. This study suggests that in order to enhance efficiency, impartiality and objectivity in administering the equalization transfer scheme, there is a need to establish a 'Transfer Commission' an agency to be under the LGFD in charge of implementing both the current CDF, LABSF and any other transfers²⁰.

The study also observes that there is an immediate need to improve the approach of allocating CDF funds to the districts. Definite solution involves overhauling and setting of a new form of criteria based on cost-benefit analysis (CBA) relevant for public investment programmes. Above all, it must be implemented by an equalization formula. In this regard, CDF allocations should focus on several main factors that include projects' social impacts, environmental significance, economic drive and financial viability for instance see Gramlich (1987).

²⁰ Experience from other countries such as India and Australia shows that these kinds of agencies bring good results and strengthens the transfer mechanism. When LGFD is fully operational may be a good substitute for the Transfer Commission.

Figure 1 Shows All Districts Matching and CDF Contributions in % (2003)



Source: FDD Calculations by the Author

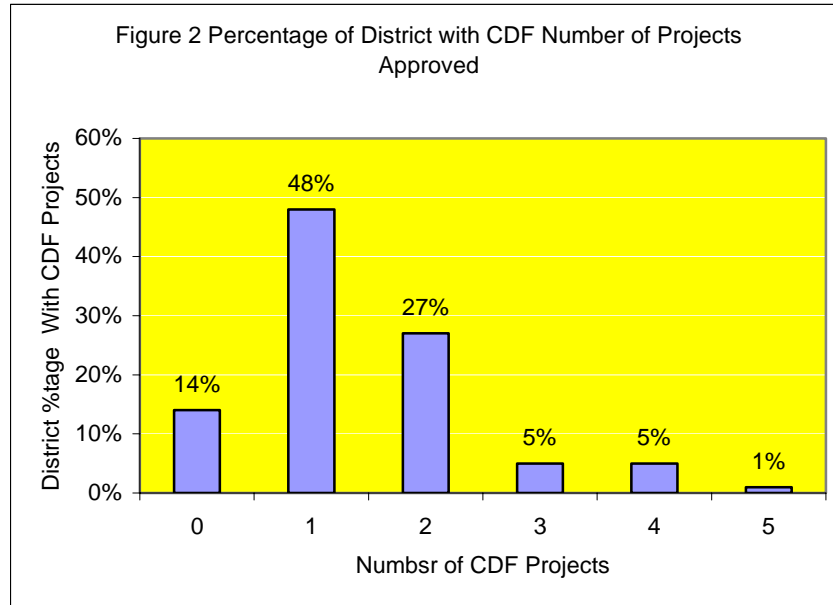
The paper also envisage that any applying district should be required to substantiate possibilities of matching part of the project cost from its own sources revenue mobilization. This has been applied in the past as depicted by the above figure 1. Specifically, the dark shaded portion (% of CDF) represents funding from CDF and the light shaded part (marked % of BC) shows the LGs' own budgetary contribution.

Aside, other considerations for CDF approval may be directed to projects of national priority and areas in which private investors are unlikely to undertake for various reasons.²¹

Figure 2 below indicates that there has been uneven distribution of projects among the different districts. For all 150 total projects approved by the CDF 14% of

²¹ A mention should be made of the 'crowding out effect' and of the 'free rider' problems that may result.

the districts in Rwanda have never benefited from CDF²². This tells CDF to study carefully what are the main problems within the districts to avoid them and facilitate project proposal submission for final approval.



Source: FDD Calculations by the Author

For correctness, 1% of the districts namely Ntongwe in Gitarama has attracted 3.3% of the projects totaling 5 in number. In addition, 48% of the districts had acquired only one project, while 27% of them have 2 project approved from the CDF. The remaining 11% have more than 3 but less than 5 projects funded by CDF over the same period. One can infer from figure 2 above that some districts managed to attract more funding than others, while some of them are more affluent with high tax revenues (and well defined tax base) than the rest of the other Rwandan districts.²³

Table 7 CDF Actual Allocation Fiscal Year 2003

	PCCDF3	CDF3
Mean	5.960335	9463019

²² This excludes the 5 million RWF released for sector offices of which every district benefited.

²³ This says that the arrangement that each district should receive 40 Mill. RWF for 2003 and 50 Mill. for 2004 seem to be illusionary.

Median	6.876712	7528617
Maximum	7.643564	44011238
Minimum	0.000000	0
Std. Dev.	2.448691	7984817
Skewness	-1.997827	1.364801
Kurtosis	5.098048	5.788968
Observations	106	106

Source: FDD Calculations by the Author

The table 7 above supports the claims of figure 2 above where the minimum allocation is zero RWF, while the maximum appears to have received 44,011,238 RWF. The median and mean allocations stand at 7,528,617 RWF and 9,463,019 RWF respectively. This is unequalizing by all standards.

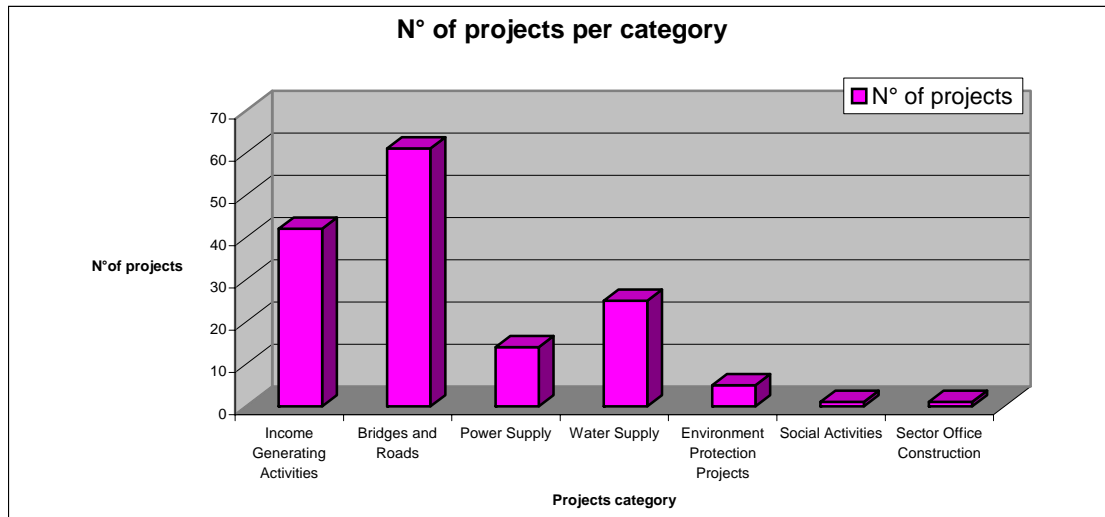
The big picture implies that CDF has to sensitize all districts and towns about the availability, diversification and the application procedures of these conditional subsidies to improve their investment pattern. CDF has to rethink and redesign an appropriate equalization project funding mechanism that takes into account regional specific attributes such as *resource endowment*, environmental hazards, core expenditure needs²⁴, revenue capacity and other socio-economic parameters. To speed up implementation of projects, tender and procurement procedures should be simplified by the National Tender Board and the LG Councils.

Therefore, the study preliminary findings are that CDF has to redesign a new distribution mechanism to fulfill its objective of promoting inter jurisdiction equality. It is pertinent now to recommend that formula driven allocation system may be a panacea rather than imposing ceiling on grant amount districts and towns may acquire in one financial year. Traditionally, since inception, CDF project funds have been supporting the following activities: income generating activities, bridges and roads,

²⁴ Mainly education and health.

power supply, water supply, environmental protection projects, social activities and sector offices constructions.

Figure 3 Shows Projects Approved by CDF According to Category (2003)



Source: FDD Calculations by the Author

Analogously, the study proposes the new CDF allocation be on the following determinants with the attached weight parameters and they warrant merit due to the explanations given herewith:

(a) District Population (10%);

The more the population, the higher the transfers. High population leads to increased demand for both private and public goods and services; ignoring surface area. The situation becomes even worse for GoR when age structure is brought into the picture. Life expectancy at birth stands at 40 years; where 43.7% of the total population lies within age group 0-14 and 16% is over 40 years.²⁵ This implies that using a crude measure then about 59.7% of the population is considered unproductive.

(b) Income Generating Activities such as Market and Slaughter Houses (10%);

²⁵ Based on 2002 Census Result and World Bank on Rwanda at Glance.

This includes the ability of districts to design projects that leads to income generation. Traditionally, markets and slaughterhouses form a major part of these economic ventures. This does not rule out other district specific projects such as motels, filling stations and etc. Markets in the African context, are outlets and sources of exchange of excess output and a place where to satisfy various needs of household in terms of goods and services. They are organized informally and in an open space; these need to be improved and modernized. Rwanda faces the same scenario; need modern market development. This will be a source of income to the daily petty traders of agricultural produce and artisan goods within their locality. Once formally developed will form also a good source of revenues to the district governments in terms of taxes. These kind of projects are expected to raise the per capita district revenues; create a positive spill over effects in the health sector such as clean food, improved organization, source of employment and sustainable source of income to the population. The more the district has these facilities, the more the funding to be allocated to modernize them.

(c) Disadvantaged Environmentally and Natural Calamities Prone Areas (10%);
Some districts are disadvantaged in terms of soil fertility, drought and etc. they need remedial measures such as irrigation schemes and tree planting in dry areas. In addition, some districts are swampy or marshy these will also be assisted to overcome these effects. While other areas need to control soil erosion. These are mainly the product of heavy rains such as flood, erosion, landslides and etc. Districts that are more prone to these natural calamities will be assisted to enable them cushion these

effects within their jurisdiction. These will be measured by the amount of rainfall and proportion of land affected e.g. the proportion of arid land.

(d) Infrastructure Development Activities that support basic public services such as Bridges, Road, Schools, Hospitals, and other public facilities construction works and improvements (25)%;

Districts will be encouraged to develop and maintain their roads, bridges/overpass, schools, offices, hospitals and dispensaries (health centers). Roads' length within a given district will form a good determinant of how CDF should be allocated; the same with the other areas of health and education. Thus the higher the proportion of this infrastructure need in per capita terms, the more support it may attract from CDF.

(e) Society Richness or Worthiness (15%);

Households enjoying electricity, piped water and telephone within their homes may reflect the above proxies. These are districts that happen to be well developed economically than others, they are naturally endowed due to various reasons. These will be inversely rewarded based on proxies for richness or worthiness such as type of housing, telephone possession, electricity connection or consumption.

(f) District Surface area (5%).

Area is included for various reasons. It accounts for differences in the cost of providing most of the public services. Public services provision for instance roads, telecommunications, schools and libraries face higher per capita production costs in sparsely populated regions than those densely populated regions. The more the area the more the districts' and towns' obligation to maintain and develop; more seriously when population is sparsely distributed.

(g) Poverty category based on welfare measures (25%)

Poverty index comes from the census data. It reflects the welfare condition of the country population. Rwanda districts and towns have very different poverty levels and welfare levels. This can be tied up by the provision and consumption of public goods and services. Districts that are mostly poverty-stricken and therefore have low well-being will be supported more to ease these hardships. Its advantage is that it is country representative in the sense that it covers all the 106 administrative districts of the GOR. It is imputed from the living conditions of the population such as type of housing floors, roofs, water source, lighting, cooking, distance from key social services and etc. No poverty line is involved and therefore no income or expenditure pattern of the household is considered. Seemingly, it captures better the well-being aspect of the population and forms a good proxy for poverty in our equalization formulation.

(h) Project Performance (5%)

Districts will be rewarded for adhering to the project cycle implementation schedule as agreed upon by the district administration and CDF management. This will be ranked on likert²⁶ scales ranging from 1 to 10, where the former implies lower and the latter higher efforts respectively (see appendix 1).

6.2 NTS CDF Model

Following the above, the study proposes the following distribution formula:

In addition to the earlier notations, let:

Ω^c - CDF Pool Available

²⁶ Likert scales in this study represents score ranking procedure based on question responses or specific criterion assignment from the CDF Management.

ε_i - Electricity Consumption for the i^{th} district

Ξ - All Rwanda Electricity Consumption

\perp_i - District i Telephone Services Consumption

\perp - All Rwanda Telephone Services Consumption

I_i - The i^{th} District project implementation performance index

∂_i - Number of Primary and Secondary Schools Students Enrollment in the i^{th} District

∂ - All Rwanda Primary and Secondary Schools Students Enrollment

h_i - Number of Health Care Workers in the i^{th} District

h - All Rwanda Health Care Workers

ℓ_i - Roads length and bridges for the i^{th} District

Θ_i'' = District i poverty incidence imputed from the census data used in CDF

formulation

κ_i - District i Roads length and bridges Index

$\tilde{\varepsilon}_i$ - Electricity Consumption Index for the i^{th} District

$\tilde{\perp}_i$ - Telephone Consumption Index for the i^{th} District

$\tilde{\lambda}_i$ - Richness or Worthiness Index for the i^{th} District

Δ_i - Health Index for the i^{th} District

∇_i - Education Index for the i^{th} District

\forall_i - Infrastructure Development Index for the i^{th} District

Λ_i - District i Number of Markets

Λ - Total Number of Markets

\cap_i - Income Generating Activities Index for the i^{th} District

∞_i – Rainfall measures for the i^{th} district

∞ – National wide rain fall

\neg_i - District i portion of Land Attribute (Dry, Swamp, Marsh)

\neg - All Rwanda Land Attribute

Mathematically the indeces formulation takes the form:

Electricity Consumption Index

$$\check{\Xi}_i = \frac{\Xi}{N} / \frac{\Xi_i}{\eta_i} \quad (7)$$

Telephone Consumption Index

$$\check{\Gamma}_i = \left(\frac{\Gamma}{N} \right) / \left(\frac{\Gamma_i}{\eta_i} \right) \quad (8)$$

Combining equations (7) and (8) above and taking the inverse one obtains the Richness or Worthiness Index represented as:

$$\check{\lambda} = \check{\Xi}_i \check{\Gamma}_i \quad (9)$$

Where an inverse relationship is invoked to penalize the more affluent districts and towns:

$$\check{\lambda}^{-1} = \frac{1}{\check{\Xi}_i \check{\Gamma}_i} \quad (10)$$

Next is the derivation of the three indices of health, education and road that will jointly determine the infrastructure index.

Health Index

$$\Delta_i = \frac{h}{N} / \frac{h_i}{\eta_i} \quad (11)$$

Education Index

$$\nabla_i = \frac{\partial}{N} / \frac{\partial_i}{\eta_i} \quad (12)$$

Road length/bridge Index

$$\kappa = \frac{\ell}{N} / \frac{\ell_i}{\eta_i} \quad (13)$$

Whence, using (10) - (12) together we establish the Infrastructure Development Index given as:

$$\forall_i = (\Delta_i)(\nabla_i)(\kappa_i) \quad (14)$$

Income Generating Activities Index

$$\cap_i = \frac{\wedge}{N} / \frac{\wedge_i}{\eta_i} \quad (15)$$

To capture the impact of natural calamities a use of rainfall as a proportion of land square area is used. The proportion of other land attributes such as dryness swamp and marshland supplements this as follows:

Rainfall Impact Index

$$\chi_i = \frac{\infty}{\gamma} / \frac{\infty_i}{\gamma_i} \quad (16)$$

Land Attribute Index

$$\wp_i = \frac{\neg}{\gamma} / \frac{\neg_i}{\gamma_i} \quad (17)$$

Combining equations (15) and (16) we obtain:

Environmental Impact Index

$$\in_i = (\chi_i)(\wp_i) \quad (18)$$

Finally, we allow for notational abuse for population, area and weight parameters defined earlier and write:

ω_i for the CDF weight parameter, $i = 1...8$

$$\varphi_i = \text{District } i \text{ population share for CDF} \quad (19)$$

$$\rho_i = \text{District } i \text{ area-based share for CDF} \quad (20)$$

Therefore, using relationships (10), (13), (14), (17) - (19) we can write the i^{th} district CDF allocation share as:

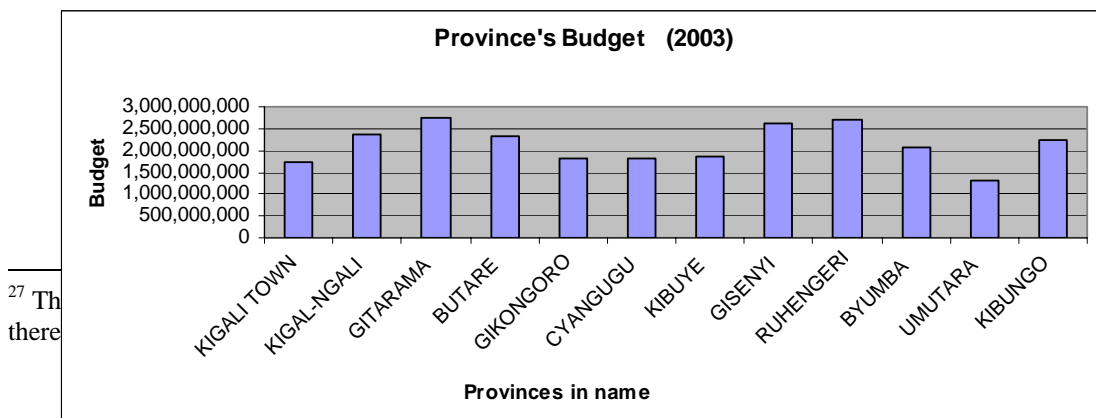
$$\Omega_i^c = \left[\omega_1 \lambda^{-1}_i + \omega_2 \forall_i + \omega_3 \cap_i + \omega_4 \varphi_i + \omega_5 \rho_i + \omega_6 \epsilon_i + \omega_7 \Theta_i + \omega_8 I_i \right] \Omega^c \quad (21)$$

6.3. LABSF Reform

The administration of LABSF currently is under the direct control of the MINALOC, supervised by the Director of Territorial Administration (DTA). The new transfer system aims at overcoming the weaknesses explained above. It recommends review of the CG budget allocation to the provinces²⁷ (Intara). This is because the current budget allocation from MINECOFIN seems to promote inequality among different jurisdictions as shown in the figure above. Figure 4 below confirms partly from that the ‘resource endowed’ provinces attract more resources e.g. Ruhengeri and Gitarama.

Secondly, the NTS incorporates all the attributes of the previous transfer system but in a more comprehensive way. The NTS includes additional information

Figure 4 Shows Province Budget for 2003

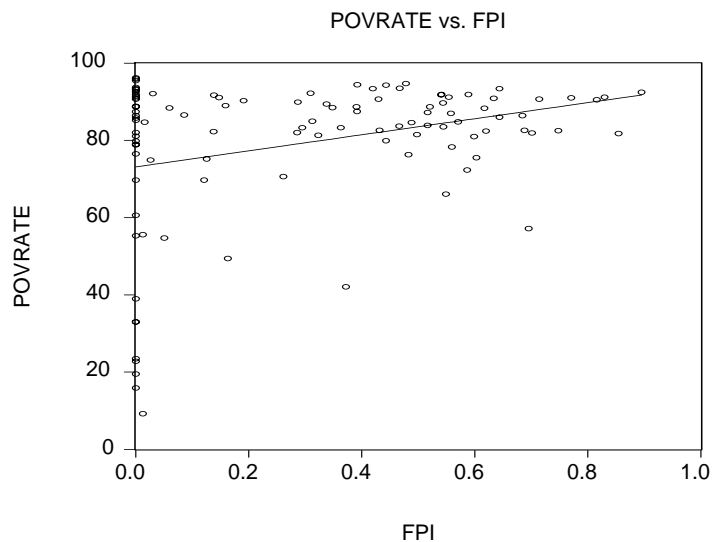


²⁷ There

about district fiscal performance, by incorporating Fiscal Performance Index (FPI). The index contains elements, which forms fiscal gap, that is, expenditure needs and revenue capacity. The imputation of FPI takes the following approach: take the difference between both mean district expenditure (MDE) and mean district revenue (MDR) as a proportion of the same mean district expenditure. The difference between the two means is referred to as the mean district fiscal gap (MDFG).

Thirdly, we introduce welfare poverty index (WPI)²⁸ from census data to capture the actual living welfare conditions of the households in the districts. Intuitively, poverty index will allow for variations in transfer amount based on the percentage of the district population considered to be poor; this rate is district specific.

Figure 5 Shows Scatter Plot With Regression Line for FPI and Poverty Proxy



Source: FDD Calculations by the Author

²⁸ It comes from 2002 GOR census and does not include income or expenditure measures; rather it reflects welfare conditions of the population and it is currently representative, not sampled.

Figure 5 above shows that there is a positive correlation between FPI and the WPI introduced in the analysis. The Pearson's coefficient²⁹ stands at 0.31 implying that as FPI increases, then WPI also moves in the same direction as captured by the fitted upward sloping regression line. The scatter plot also shows that most districts' poverty levels lie within the ranges of 75% to 96%. At the same time these poverty levels coincide with districts with high FPIs concentrated within the ranges of 50% to 70%. This says that the most poor districts and towns face budgetary difficulties either in raising own revenues or prioritizing for their expenditures.

Fourthly, NTS proposes an increase of the transfer pool rate available for allocation to districts and towns. The law LW33/2002 stipulates that the transfer should be in the range of 3% - 5.3% of the previous fiscal year domestic revenue collections. The current study proposes that the rate should be raised to 5.3% instead of the present 3% and it should be invariable/fixed at this rate legally for a minimum of 3 years. This is due to the fact that domestic revenues have been increasing continuously since 2001.³⁰ Moreover, district needs and expenditures requirements have grown significantly hence they require more central government support.

Finally, the study specifies subjectively a new set of plausible weights and normalization parameters to strengthen the FPI as more data becomes available. Alternatively these parameters may be confirmed by sensitivity analysis or by involving regression analysis³¹.

²⁹ Correlation is significant at the 1% level (2-tailed). The implication is that districts that are poor and unable to finance their need are heavily counted. This is good for a poor country like Rwanda.

³⁰ See RRA annual reports for the year 2001, 2002 and 2003 (see table 5).

³¹ The new weights are 10% Equalization, 10% Surface Area, 10% FPI, Population 30% and 40% Poverty.

6.3.1 NTS LABSF MODEL

In addition to the symbols defined above we have:

Ω^N = Total transfer fund pool based on the new formula

Φ_i = Total transfer funds available for districts

\mathfrak{R}_i = Fiscal capacity for districts ⁱ³²

\mathfrak{T}_i = Fiscal need or expenditure for ith district

Π_i = Fiscal gap for district i

Θ_i = District i poverty incidence imputed from the census data

^s Π_i = Fiscal gap share for district i

^s Θ_i = District i poverty incidence share

^s ξ_i = District i population share

λ_i = District i balancing or lumpsum share

ω'_i = New weighting parameter for each index, where i= 1... 5

Mathematically NTS can be modeled as shown below:

Hence (21) below represents the funding available for all the districts:

$$\sum \Phi_i = (\Omega^N) \quad (22)$$

Where individual district receives an average:

$$\zeta_i = \frac{\Omega^N}{m} \quad (23)$$

Recall $m = 106$ from above.

Let district i fiscal gap be:

³² \mathfrak{R}_i Captures the mean of all own sources of revenues.

$$\Pi_i = \mathfrak{S}_i - \mathfrak{R}_i \quad (24)$$

Hence, all regional fiscal gap can be written as:

$$\Pi = \sum (\mathfrak{S}_i - \mathfrak{R}_i) \quad (25)$$

It follows then if “ full equalization” is anticipated then social planner should set

$$\Phi = \Pi \quad (26)$$

Equation (25) above says that for each district/town to attain the minimum national standard of expenditure then they should be given LABSF just equivalent to their fiscal gap.

Below is district i proportionate fiscal gap also called Fiscal Gap Ratio

$$\text{Let } \hat{\Pi}_i = \frac{\mathfrak{S}_i - \mathfrak{R}_i}{\mathfrak{S}_i} \quad (27)$$

Equation (26) above may be used to capture fiscal performance behavior of the district officials and act as a basis for monitoring and decision making for districts and towns management.

We can also write the mean fiscal gap ratio as:

$$\bar{\Pi} = \frac{1}{m} \sum \left(\frac{\mathfrak{S}_i - \mathfrak{R}_i}{\mathfrak{S}_i} \right) \quad (28)$$

Considering the individual district shares of the fund we can write:

District i population share:

$${}^s \xi_i = \omega_1(\xi_i)(\Phi) \quad (29)$$

District i lumpsum or balancing share:

$${}^s \lambda_i = \omega_2'(\lambda_i)(\Phi) \quad (30)$$

District i poverty incidence share:

$${}^s\Theta_i = \omega'_3(\Theta_i)(\Phi) \quad (31)$$

Fiscal Gap Ratio share for district i:

$${}^s\Pi_i = \omega'_4(\hat{\Pi}_i)(\Phi) \quad (32)$$

Surface area share for the ith district

$${}^s\rho_i = \omega'_5(\rho_i)(\Phi) \quad (33)$$

Thus the total amount of transfers due to districts finally takes the form:

$$\Phi = \sum (({}^s\xi_i) + ({}^s\lambda_i) + ({}^s\Theta_i) + ({}^s\Pi_i) + ({}^s\rho_i)) \quad (34)$$

Where by substituting the above equations (28) – (32) in (33) and invoking (25) above one can get:

$$\Phi_i = [\omega'_1(\xi_i) + \omega'_2(\lambda_i) + \omega'_3(\Theta_i) + \omega'_4(\Pi_i) + \omega'_5(\rho_i)]\Phi \quad (35)$$

Or assuming full equalization.

$$\Pi_i = \Pi \left[(\omega'_1)(\xi_i) + (\omega'_2)(\lambda_i) + (\omega'_3)(\Theta_i) + (\omega'_4)(\hat{\Pi}_i) + (\omega'_5)(\rho_i) \right] \quad (36)$$

where $\omega'_1 = 0.3$; $\omega'_2 = 0.1$; $\omega'_3 = 0.4$; $\omega'_4 = 0.1$; $\omega'_5 = 0.1$

Equations (34) and (35) above says that the eligible LG receives transfer from the CG that is a function of five elements defined above and weighted simultaneously by plausible parameters to minimize regional resource disparities. These equations form the main results of our analysis.

7. Regression and Simulations Results

Table 8 below provides OLS regressions results for the two models. Model 1 LABSF allocations for 2003 (LABSF3) is regressed on its determinants: population (POP), Square area (AREA), Mean district revenues (MREV) which to some extent was used to classify districts in three poverty categories A, B and C. Results show

that all the signs turns out as expected and coefficients are highly significant at 1 percent level. However, the coefficient of determination is 33 percent, which means that the OTS explanatory variables do not explain well the variations we see in LABSF 2003. Surprisingly, despite being highly significant, standard errors appear to be too large.

Model 2 represents simulation results of the NTS using the same transfer pool. That is LABSF3S is regressed on the new proxies introduced, that is, FPI and POVRATE together with AREA and POP. The findings are that all variables signs turned out as expected and the coefficients are significant at 1 percent level. In addition the standard errors are very small confirming that the NTS is highly equalizing. It shows that, when district surface area increases by 1 percent, then total transfer claims will also rise by 35-percentage points. The reason is that districts will incur more resources to work on their vast land. Population carries more importance with the largest coefficient contribution to the transfer demand, as it increases by 1 percent, then transfer needs go up by 45 percentage points. This is due to the reason that higher population growth means more demand for public goods and services.

Similarly, poverty and FPI indices portrays the same image, that is, as both increases by 1 per cent then both will trigger increases in LABSF3S of 41 and 40 percentage points respectively. Interestingly, all variables together by construction explain exactly 100 percent of the variations observed on total transfers. These finding agrees with that of Indonesia analysis (Lewis 2002)

Table 8. OLS Regression. Dependent Variables- Model 1: LABSF3; Standardized Model 2: LABSF3S

Variable	Model 1	Model 2
(Constant)	511411.60 (581411.70)	386504.07 (0.008)
POP	0.397 (6.965)	0.454 (0.000)
AREA	0.394 (999.639)	0.349 (0.000)
MREV	-0.131 (0.020)	-
FPI	-	0.400 (0.007)
POVRATE	-	0.412 (0.000)
Adj. R ²	0.334	1.000
N° of Obs.	106	106

Source: FDD (2003) Computed by the Author
Standard errors in Parentheses
All coefficients significant at 1% level

A comparison of models 1 and 2 results appear to be very intuitive especially the coefficients of MREV which was a proxy for poverty and the new proxy for poverty (POVRATE). The impact of POVRATE on LABSF3S is higher by 28-percentage points in absolute terms than those of MREV regardless of their signs. In the next table 9 below per capita mean fiscal gap (PCMFG) is regressed on its main determinants. Results reveals that by construction as expenditure needs increase by 1 percent, captured by per capita mean expenditure (PCMEX) this will significantly lower the districts' mean fiscal gap by 26 percentage point. In addition, an increase in the revenue capacity by 1 percent as captured by per capita own source revenue (PCMREV) implies a decrease in mean fiscal gap by 17-percentage point.

Table 9. OLS Regression. Dependent Variable: PCMFG
Unstandardized coefficients

Model 2.	
Variable	
(Constant)	19.80 (3.605)
PCMREV	-0.166 (0.025)
PCMEXP	0.259 (0.035)
Adj. R ²	0.371
N ^o of Obs.	106

Source: FDD (2003) Computed by the Author
Standard errors in Parentheses
All coefficients significant at 1% level

However, the two independent variables explains about 37 percentage points of the total variations seen in the per capita mean fiscal gap. These results are very intuitive since the only way for districts to minimize their fiscal gaps is to implement simultaneously policies geared towards own source revenue generation enhancement and imposition of hard budget constraint.

Table 10 shows below double log OLS regression results where the coefficients can be translated as coefficients of elasticity. The signs of the district log mean per capita revenues (LPCMREV) and per capita mean expenditure (LPCMEXP) are as expected and appears to be highly significant. The model's explanatory power turns out to be 63 percentage points.

The implication is that enhancing revenue generation ability of districts and imposing expenditure reducing policies as proposed would have an equalizing effect. Specifically, 1 percent increase in revenue will lower transfers from the CG by 20 percentage points, holding districts' spending level constant.

Table 10. OLS Regression. Dependent Variable: LABSF3S
Unstandardized coefficients

Model 3.	
Variable	
(Constant)	5.990 (0.154)
LPCMREV	-0.204 (0.016)
LPCMEXP	0.142 (0.024)
Adj. R ²	0.628
N° of Obs.	106

Source: FDD (2003) Computed by the Author
Standard errors in Parentheses
All coefficients significant at 1% level

In addition, when districts increase their expenditure by 1 percent, their transfer levels will also increase by 14.2 percentage points.

8. Summary of Immediate Recommendations

The following are policy implications from the above analytics of the equalization transfer mechanism design specific for the government of RoR:

- (1) This study proposes a choice of new set of parameters measures and weights that are plausible to promote regional equity objective, efficient local tax system and stimulate prudence for sub national governments. This will correct the inherent valid weaknesses of the current system dubbed here OTS.
- (2) The current study proposes that the LABSF rate should be raised to 5.3% instead of the present 3% and it should be invariable/fixed at this rate legally for a minimum of 3 years. This is due to the fact that domestic revenues have been increasing continuously since 2001.
- (3) The NTS considers a comprehensive review of the budget allocations to Intara as well as to towns and districts. It seems that the current budget system does

not take into account province-specific expenditure responsibilities such as size of administrative units, area or population.

- (4) The reform of CDF should dwell on overhauling the present approach and setting a new form of criteria based on cost-benefit analysis (CBA) relevant for public investment programmes.³³ Several factors must be considered to qualify for CDF funding. These include projects' social impacts, environmental significance, economic drive, financial viability, projects of national priority and areas in which private investors are unlikely to undertake for various reasons. All these attributes should be implemented using the designed formula.
- (5) This study suggests that in order to enhance efficiency, impartiality and objectivity in administering the equalization transfer scheme, there is a need to establish a 'Transfer Commission' an agency to be under the MINALOC in charge of implementing both the current CDF, LABSF and any other transfers.
- (6) This paper also envisage an important conditionality be that CDF transfers must be matched partly by districts' ability to raise and meet project costs from their own sources of revenue, that is, local component contribution to the project.
- (7) The districts must be informed and educated on the availability and how to qualify for the CDF subsidy. This may require sensitization, transparency and

³³ I mentioned above that CDF may not qualify for modeling of an equalization formula.

participatory approach.³⁴ The approach will be to identify the 15 districts that were non-beneficiary of CDF and also those, which their applications were turned down and find out how they can be assisted to circumvent the bottleneck.

9. Conclusions and Caveats

The study has corrected the anomalies of the OTS practiced in Rwanda. Firstly, it has modified the LABSF and incorporated new proxies that are more informative, that embodies district specific characteristics and proposed new plausible weights parameters. Secondly, it has advanced CDF distribution formula based on CBA principles. The study also attempts to explain why the suggested approach known as ‘Straight Line Equalization Formula’ best explains the current needs of Rwanda than the generic approaches applicable in some developed and developing countries.

Therefore, the study provides a plausible and pragmatic model that Rwanda FIT will implement to address the existing intergovernmental inequities. Lastly, it has advanced several policy recommendations. It seems these recommendations are well integrated and sequentially applied will consolidate and increase the political gains of implementing fiscal decentralization in Rwanda.

³⁴ I will interview some of the districts to find out what problems they face in processing the funding application and suggest remedy measures.

Appendix 1
CDF Allocation Criterion

Projects will be awarded points based on the previous years' implementation performance looking on the following criteria. Maximum points will add up to 10 with the lowest scale being 1.

1. Project appreciation criteria (2 Points)

Proposed project will give rise to the following questions:

- The proposed agency for the execution of the project has a required experience and does not cause any hindrance that can affect the realization of proposed activities;
- The project document gives all required information;
- The project costs are within limits of the budget;
- The project costs and communities contributions are appropriate;
- The project is in the local government annual plan framework;
- The project contributes to the poverty reduction and takes into consideration environment and gender.

2. Institutional criteria (1 Points)

- The proposed agency has got qualified staff to facilitate the project realization;
- The agency has got an adequate infrastructure (office, equipment...) to facilitate the project execution;
- The agency benefits from an adequate account and administrative system to manage and protect the project resources;
- The agency has got an evaluation and control system;
- The agency is experienced in the project domain.

3. Project coherence (1 Points)

- The project shows clearly the problems and causes;
- The proposed solution are adequate to resolve raised problems;
- The final results are susceptible to be attained;
- The budget is reasonable for that kind of projects (reference to standard costs of certain infrastructure: school, health center...);

4. Financial criteria (1 Points)

- The budget articles have a clear relation with proposed activities;
- The costs are well shared to all project components;
- The unit costs are well indicated in the project budget and are related to market prices;
- The quantity of articles is reasonable.

5. Economic criteria (1 Points)

- The costs are reflected in a realistic way (as far as salaries, rent, transport ...are concerned)

6. Durability criteria (1 Points)

- Project beneficiaries are actively implicated in the project conception;
- The proposed technology is familiar to the local community;
- The work and/or the materials are adapted to the work;
- The local government and the local community will be charged of exploitation and maintenance of the project (by their implication in the whole project cycle and the follow up system, evaluation and sampling).

7. Social criteria (1 Points)

- The beneficiaries community characteristics (cultural, socio-economical, sanitary state...) are clearly defined;
- Gender problems are clearly defined;
- Vulnerable groups benefit from the project.

8. Environmental criteria (1 Points)

- The project has an impact on forestation, natural regeneration in order to avoid natural resources exhaustion and degradation;
- The project anticipates anti-erosive measures;
- The project will use non-toxic substances to preserve the environment;
- The project does not pollute water and air;
- The project favors the farming or exploitation of natural resources (trees, woods, renewable resources....)

9. Technical feasibility (1 Points)

- The proposed solutions are possible and appropriated technically;
- The solutions are adapted to solve identified problems;
- The project is in accordance with standard technical procedures in comparison with other projects of the same nature and extend;

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