University of Toronto
Department of Economics

Working Paper 461

Evaluating the impact of a targeted land distribution program: Evidence from Vietnam

By Dwaye Benjam, Loren Brandt, Brian McCaig and Nguyen Le Hoa

July 16, 2012

Evaluating the impact of a targeted land distribution program: Evidence from Vietnam

Dwayne Benjamin, University of Toronto
Loren Brandt, University of Toronto
Brian McCaig, Wilfred Laurier University
Nguyen Le Hoa, Center for Agricultural Policy (Hanoi)

July 12, 2012

Funding: This research was funded by The World Bank. An earlier version of this paper appeared as, "Assessing the Impact of Land Redistribution in the Central Highlands," an unpublished report submitted to the World Bank in December 2010. Benjamin and Brandt are also grateful for financial support from the Social Sciences and Humanities Research Council of Canada (SSHRC).

Acknowledgements: We would like to acknowledge helpful comments from Nguyen Do Anh Tuan, Nguyen Thi Thuy, and Nguyen Quynh Huy, and Nguyen Thi Thinh of the Center for Agricultural Policy in Hanoi; Valerie Kozel, Martin Rama, and Carrie Turk of the World Bank; and participants at a workshops at the World Bank in Hanoi and Washington, Dalhousie University, The Paris School of Economics, Toulouse, McGill, Guelph, Illinois, and The Rimini Centre for Economic Analysis.

ABSTRACT

In this paper we estimate the impact of a land reform program in the Central Highlands of Vietnam. In 2002, Program 132 directed the transfer of farm land to ethnic minority households that had less than one hectare of land. Using the 2002 Vietnam Living Standards Survey as a baseline, in 2007 we resurveyed over one thousand households to provide a retrospective evaluation of the impact of their participation in Program 132. We supplemented the household-level panel with commune and district-level surveys as well as local interviews in order to better understand the details of program implementation. Contrary to official reports that the program was implemented as intended, our findings show that there was considerable deviation from the planned program parameters: Many eligible households did not receive land, while ineligible households often did. We estimate that beneficiaries of the program in the province of Kontum experienced increases of household income largely in line with what one would expect from a small plot of poor farm land. Outside Kontum, where participation rates were substantially lower, household incomes did not improve with program participation, though this could be explained by lags in the maturation of perennial crops. Overall, our results underscore the limitations of simple transfers of land as a mechanism for improving the living standards of ethnic minorities. Our results also show the significant gap that can exist between simple program design and decentralized implementation, the potential implications of which we discuss for program evaluation.

JEL Codes: Q15, I3, O12, O13

1.0 INTRODUCTION AND OVERVIEW

In 2002, the government of Vietnam announced a plan to redistribute land to land-poor ethnic minority households in the Central Highlands (CH) region. This was prompted by long simmering ethnic conflict that had boiled over between indigenous minorities, and the more recently settled Kinh, Vietnam's largest ethnic group. Policy-makers hoped that by granting secure access to agricultural land, minority households could better participate in the rapidly expanding commercial agriculture sector, improving their otherwise poor economic status. Program 132 as drafted in Hanoi covered three single-spaced pages, and defined precise eligibility criteria and objectives: Ethnic households with less than one hectare of farm land would be topped up, subject to local land availability.

In 2006 we began our evaluation of the impact of Program 132, guided by two questions: First, did household participation in this program lead to higher incomes, and second, how effective is land as a "treatment" for low living standards? An *ex ante* randomized controlled trial (RCT) was impossible, but the prospects for a textbook retrospective evaluation were excellent. First, the 2002 Vietnam Living Standards Survey (VLSS) provided a rich baseline survey of the "before" period, with 3,000 households surveyed in 120 communes across the Central Highlands, including 1,295 minority households. Second, official reports and our own pre-survey interviews with local officials suggested that the policy was executed in line with the original pronouncement. One-sixth of ethnic households, and over half of those households deemed "eligible," were reported to have received land, with an average transfer of about half a hectare. Program participation rates were especially high in the more sparsely populated province of Kontum, where almost forty percent of ethnic households received land.

Early in 2008 we conducted a follow-up survey of households in fifty of the VLSS communes, yielding a panel of 1,128 households, 837 of whom were minorities. With detailed information on land holdings and economic outcomes before (2002) and after (2007) the introduction of Program 132, and questions tailored to measure participation in the program, we had several identification strategies at our disposal. We elaborate upon their pros and cons later on, but our strategies included:

1. Among minority households, comparing outcomes of the *ex post* treated and *ex post* untreated households. The longitudinal nature of the sample permits some control for pre-program household heterogeneity;

2. Instead of *ex post* treatment status, comparing outcomes based on *ex ante* program eligibility, especially comparing those ethnic households who were just above and just below the one hectare eligibility threshold (A fuzzy regression discontinuity design).
3. In a similar vein, because Kinh households were ineligible, an evaluation strategy could exploit the Minority versus Kinh program eligibility difference;
4. Communes varied in the extent to which they had land at their disposal, and thus *ex post* treatment rates varied across communes. Comparisons of outcomes could then be made between households in "lucky" and "unlucky" communes.
5. Finally, Program 132 was confined to the Central Highlands. We surveyed a small number of communes in neighboring provinces, where minorities outside the CH could serve as a potential control group for those inside the CH.

At the outset, if we could have traveled back in time to carry out an experiment (pilot project), we would have selected samples of minority households in several communes, and within each commune extended long-term access to a half-hectare of land to a random sample of landless households. Over time, we could estimate the additional income generated from this land – the "value of land" – that would be the foundation for learning how and whether land re-distribution was an effective treatment. A supporting retrospective evaluation of the new program would audit how well the distribution of land was carried out, and corroborate whether land was as valuable to households as predicted by the experiment.

As it turns out, even with the benefit of time-travel, we would have found the retrospective survey more useful than our hypothetical experiment. Hanoi's three-page policy announcement and the experiment we imagined were poor predictors of policy implementation at the commune and household level. In hindsight, the slippage between the idealized and actual implementation of the policy is neither surprising, nor unexceptional, especially in a developing country context. It did, however, undermine our "fail-safe" portfolio of identification strategies. Most seriously, among minority households we find only a weak relationship between *ex ante* potential eligibility, and *ex post* treatment status. While the slippage invalidated our most elegant sources of identifying the causal effect of a half-hectare of land on household income, it highlights the challenges of generalizing RCT-based evaluations of pilot-projects to real programs. External validity is predicated on the assumption that the implemented policy will mimic the experiment. Unfortunately, programs like 132 deviate from idealized ones in ways that

simultaneously undermine the external validity of the *ex ante* RCT, and the internal validity of the *ex post* evaluation.

Despite challenges to clean identification, we are able to paint a rich picture of the before and after economic outcomes of minority households in the CH, and to draw plausible conclusions about the causal impact of Program 132 on the living standards of these households. For the program itself, the news is mixed. First, treatment through the program may not have been as high as officially reported. Second, land was frequently given to apparently ineligible households instead of eligible ones. So while land was transferred to minority households—there appears to have been no leakage to Kinh households--it was not targeted to those in most need. Third, in Kontum province, we find that households granted access to "annual land" used for growing annual crops like cassava saw their crop income increase in line with the returns to this type of land. Outside Kontum the effects were negligible, reflecting lower treatment rates and lags in the maturity of the perennial crops like coffee and cashews. Conditional on treatment, it thus appears that the program improved the living standards of minority households, at least in Kontum. Overall however, the program did little to improve the *relative* position of minority households: The gap between minorities and the Kinh widened significantly between 2002 and 2007. This speaks more to the limitations of a program like this than any problems with implementation: There is only so much that a half-hectare of land can accomplish.

Indeed, it is on the question of the value of additional land that our fantasy RCT would have been informative: A well designed experiment can isolate the causal impact of a transfer of land to a minority household, absent the supporting human and financial capital, and other resources needed to be successful farmers. The results of such an experiment would probably have kept program expectations in check. Without the experiment, we must rely on the panel structure of the data to control for household heterogeneity and "farming potential" that might be correlated with treatment within communes. We believe that the combination of good data and conventional econometric procedures yields credible estimates of the value of land to these households.

Based on our findings, however, we would now revise our dream experiment. The impact of the policy was determined more by variation in its implementation than the value of land itself. Moreover, program implementation and the value of land were probably interconnected: Communes where land was scarce (and more valuable) could transfer less land than those where land was plentiful (and less valuable). The challenges to impact evaluation thus arise at least as

much from endogenous variation of treatment across communes as deviations from random assignment within communes. Accordingly, a better RCT would be based primarily on random assignment of treatment across communes. Such an experiment would also better capture the heterogeneity of implementation that inevitably arises from such a decentralized policy: Three pages in Hanoi, transmitted to provincial, then district, then commune governments facing different incentives and constraints.

Our research in no way detracts from the value of well-designed experiments, but it does reinforce criticisms offered by Deaton (2009), Ravallion (2008, 2009), and others, concerning over-reliance on RCT's for the evaluation of policy: Experiments may suggest the effect an exogenous increase in land can have on household income, but cannot answer the "what actually happened" question. "Pre-Post" comparisons like ours can be informative in answering the "what happened" question, and also provide plausible, though qualified, answers to the "why." And baseline surveys, which are typically the product of regular data collection efforts, are absolutely essential here.

The remainder of our paper is outlined as follows. In the next section we provide a more detailed overview of Program 132, as well as a description of the economic conditions of minority households in the Central Highlands in 2002. After describing our sampling strategy and data set, we then describe patterns of treatment: who received land from Program 132, and how did this relate to eligibility as predicted in 2002? We then explore the potential impact of treatment, first on household land holdings, and second on household income, including a detailed discussion of the evolution of minority household incomes between 2002 and 2007. In our final section, we draw together our conclusions, and potential lessons from this exercise.

2.0 POLICY BACKGROUND

In 2001, and then again in 2004, Vietnam's Central Highlands' provinces were disrupted by protests by ethnic minorities.[1] There have been numerous assessments in the press, by NGOs as well as by academics of the complex economic, political and social forces underlying the unrest.[2] Issues of religious freedom often come up, but at the core appear to be economic factors,

[1] The Central Highlands provinces include: Kontum, Gia Lai, Lam Dong, and Dak Lak, which split into Dak Lak and Dak Nong provinces in 2004.

[2] Several excellent sources exist. World Bank (2009) provides a broad overview of minority outcomes, history, and policies directed towards improving minority welfare. Writenet (2006) and USAID (2008) provide rich detail on the sources and potential consequences of ethnic conflict. As noted by World Bank

especially those related to land, that have been playing out for several decades. Disruption of ethnic minorities' customary land rights and traditional forms of agriculture following the end of the Vietnam War in 1975; waves of migration into the region by Kinh and other ethnic minority households, accompanied by resettlement of ethnic minority within the region; and commodity boom-bust cycles beginning in the mid-1990s, have all contributed to perceptions of the growing economic marginalization of ethnic minority households in the region, and a widening gap with the Kinh in the region.[3]

To help address these concerns, in late 2002 the central Government of Vietnam implemented Program 132, which was designed to redistribute farmland to land-scarce ethnic minority households in the Central Highlands, "to improve their lives, enhance the development and ensure the security in Central Highland regions." (Article 1 of Decision 132).[4] For a variety of historical reasons, many minority households had only tenuous claims on fixed plots of agricultural land, and the government hoped that by providing secure long-term access to land, households would invest in the land, and be better able to earn a livelihood farming. The policy objective was clearly stated: Farm households should have a minimum of 1.0 hectares of agricultural land, with some adjustments made for paddy land: "The minimum distribution of agriculture land and residential land for each household is 1 hectare of terrace land or 0.5 hectare of paddy land (single crop) or 0.3 hectare of paddy land (double crop) and 400 m^2 for residential land." (Article 2 of Decision 132). As paddy land is almost non-existent in our sample, we set aside these distinctions for the remainder of the paper. Households were granted full use rights to the land, with the restriction that they could not sell or mortgage the land for ten years: They were expected to farm the land.

Implementation of Program 132 was delegated to lower levels of government, with responsibility spread across several ministries. The provincial Ministries of Agriculture and Rural Development (MARD) had primary responsibility, shared with Provincial People's Committees, Provincial Ministries of Finance (to oversee budgetary issues), Provincial Ministries of Natural Resources and the Environment (to oversee compliance with environmental regulations, especially pertaining to forests), and local Committees for Ethnic Minorities. From the provincial

---

(2009) and Dang (2012), while the government has instituted a variety of programs (like 132) to address the needs of ethnic minorities, the programs have not been formally evaluated.

[3] On the economic welfare of the ethnic minority in Vietnam more generally, see Baulch *et. al*. (2007, 2012), Dang (2012), van de Walle and Gunewadena (2001), and World Bank (2009).

[4] The full text of Decision 132 is available in an online appendix.

level, implementation was further delegated to the District, and ultimately, the Commune level. Clearly, land redistribution was subject to local land availability, and local needs (unlike money, land cannot be shifted from one place to another). Whatever elements of common program design existed would be subject to local constraints in implementation. Commune governments were typically responsible for assessing eligibility, and the actual distribution of land. In some communes, the new land was assigned by commune officials, while in others, households drew lots to choose new plots. We have no reason to believe that the assignment of land was "random," and even less reason to believe that land assignment was conducted in the same way across communes.

The sources of available land also varied. In some communes, land was available from adjacent agro-forest plantations, typically operated by state-owned forestry companies. Some communes also had publicly-managed land that could be made available to households. Land could also be purchased from other households by the government for redistribution. If in compliance with environmental regulations, forest land could also be transferred to households. Finally, land reclaimed from "free land," "treeless hills," and "non-used" land, in other words, land with nebulous status, could also be transferred to households. The transferred land need not be "plough-ready," and households were given up to 4 million VND (about US$235) to cover the costs of land reclamation.

Shortly after Program 132 was announced, in 2004 the closely-related Program 134 was implemented. Program 134 essentially extended Program 132 to ethnic minority households outside the Central Highlands. One key difference was that the land thresholds and redistribution targets were half as high as in Program 132 (i.e., 0.5 hectare instead of 1.0 hectare). In addition, Program 134 added housing and drinking water to the existing Program 132 infrastructure, even within the Central Highlands. While we do not evaluate the housing and water dimensions of Program 134, because of the overlap in program administration, we treat Programs 132 and 134 as a "package," though referring primarily to Program 132, as its parameters were most relevant for farm land in the Central Highlands.

There have been a number of "official" assessments of Programs 132 and 134 that draw on a combination of commune, district and provincial-level reports. The main objective of these assessments was to account for the extent of land redistribution, and tally how many households benefited from the program. Of these, MARD (2006) is probably the most comprehensive. These reports paint a mixed picture of the extent and intensity of "treatment" (program participation).

We summarize the provincially-reported "treatment rates" in Table 1. The bottom row shows the number of households, and corresponding treatment rates for the entire Central Highlands. Of almost 250,000 ethnic minority households, almost one third (28.3%) were deemed "eligible" for the program. Unfortunately, "eligibility" is not explicitly defined, so it is unclear what this means. More clear is the reported number of treated households who received land, over 43,000 households. This represents sixty percent of eligible households, and 17 percent of all minority households in the region. Setting aside the potential problems in defining eligibility, these numbers indicate widespread program participation. The total amount of land transferred was almost 21,000 hectares, which implies an average redistribution of almost a half-hectare of land per household.

The other rows of the table report comparable numbers for each province. There is significant heterogeneity across provinces in program implementation, with the highest percentage of eligible in Kontum, followed by Lam Dong. Concerning overall treatment rates (a more precisely defined statistic) Kontum reported the highest percentage of minorities (37.2%) and also a higher percentage of "eligible" that were treated (81.9%). Neighboring Gia Lai province had the next highest rate of treatment (15.7% of all minority households). In contrast, less than half of eligible households in Dak Lak or Lam Dong received land. The main reason for the variation of treatment rates of eligible households appears to have been a shortage of available land. Irrespective of province, those households that were treated received on average slightly less than half a hectare of land.

In summary, Table 1 suggests that Program 132 succeeded in distributing a considerable amount of land to minority households. Underlying the treatment rates is an important assumption: While some eligible households did not receive land, no ineligible households received land. The provincial, aggregate data do not permit this sort of evaluation. Nor is there any evidence in these numbers that the program actually helped minority household living standards: The land need not have yielded dividends to household income. In order to more fully evaluate those questions, we needed to design a household survey to better assess linkages between program participation and household outcomes.

3.0 DATA AND INITIAL CONDITIONS

The 2002 VHLSS provides an excellent baseline survey of households just prior to the implementation of Program 132. For our purposes, the VHLSS has detailed rich information on

household land holdings and ethnicity – the key determinants of program eligibility – as well as a rich array of "pre" outcomes like household income. For the "post" survey, our budget permitted a re-survey of 1250 households, drawn from 50 communes out of the original 120 communes in the 2002 VHLSS. Our objective was to pick a subset of these communes, 50 in total, yielding 1250 households (25 per commune), for resurvey in 2008. Our selection of communes was skewed towards maximizing the number of potentially "treated" ethnic minority households, based on observed land holdings in 2002. For administrative reasons, we also excluded all communes that in 2002 were in Dak Lak, but became part of Dak Nak province after 2003. Relative to their share of the rural population in the Central Highlands, we over-sampled in Kon Tum and Gia Lai, and under-sampled in Dak Lak and Lam Dong, as our objective was to maximize the number of households that would have been eligible for treatment.[5] For households, we adapted the full VHLSS questionnaire, with additional modules on Program 132 and 134 program participation. Surveys were also conducted at both the commune and district level, with modules added relating to 132 and 134 implementation. The resulting household survey, the *Central Highlands Vietnam Living Standards Survey* (CHVLSS) included 1126 panel households (i.e., households surveyed in both 2002 and 2007) with complete information. [6]

The objective of Program 132, and to a slightly less extent 134, was to redress differences in land endowments between ethnic minority and Kinh households in the Central Highlands through allocation of land to the former. Thus, it is useful to examine differences in landholdings between the two types of households before the policies were implemented, which we report in Table 2. The four Central Highland provinces we examine are not identical in this regard. Indeed, for reasons that will soon become clear, we separate results for the Central Highlands into

[5] In addition, we also surveyed 400 households in 16 communes in two neighboring provinces, Ninh Thuan and Quang Ngai, but in this paper, we do not utilize these data. Following our strategy in the Central Highlands, we selected communes with high minority population concentrations. These tended to be communes located near the borders with the Central Highlands's provinces. While we hoped that households in these communes would serve as a potential control group (minorities in these provinces were not eligible for program 132), the level of heterogeneity *within* the CH was sufficiently high that adding more provinces would do little to aid identification.

[6] In the course of our resurvey, we were not able to track down all of the households that were originally surveyed in 2002, and thus not able to construct a "perfect" panel. The attrition was 122 households, or 10 percent of the original sample. We compared the 2002 attributes of our panel households (1128) with those of the households that we lose to attrition (122). Not conditioning on commune, we lose slightly more non-minorities, households with less annual land, and smaller households with slightly higher incomes. Conditioning on commune, there are no significant differences between the panel households, and the attrited ones (within the sample communes). This suggests that our panel households provide an unbiased picture of the changes between 2002 and 2007 (conditional on the commune being re-sampled).

(1) Kontum; and (2) CH Outside Kontum. Altogether, in the CHVLSS we have data on 230 households in Kontum, of which 208 are minority, and 896 outside Kontum, of which 629 are minority.

We report summary measures relating to both the mean and distribution of landholdings for annual, perennial, and annual *plus* perennial land for minority and non-minority households. The land indicators in the surveys do not perfectly line up with the categories in the policy documents (annual and perennial land in the survey; terrace versus paddy land in the policy documents). The policy was directed primarily at annual land, though as land is clearly fungible, and perennials are important in the Central Highlands, it makes sense to explore the sensitivity of conclusions to various definitions of land holdings. It is also unlikely that households with significant holdings of perennial, but not annual land, were the intended beneficiaries of the program.

In the case of Kontum, ethnic minority landholdings were significantly smaller than those of their Kinh counterparts. Average total ethnic minority landholdings were 1.12 hectares per households compared to 1.97 for Kinh, or a difference of nearly 75 percent.[7] Minority households owned less of both types of land, with their holdings of perennial land only 0.06 hectares compared to 0.55 hectares for non-ethnic minority. We also observe 12 percent of ethnic minority households having annual landholdings less than 0.5 hectares, and an additional 41 percent with landholdings between 0.5 and 1.0 hectares. In total, 53 percent of all ethnic minority households have less than a hectare of annual land. Including perennial land only marginally lowers the percentage, reflecting the small amount of perennial land held. We therefore predict that about half of minority households were eligible for Program 132. By comparison, only 13 percent of non-ethnic minority households have annual plus perennial land less than a hectare. One striking difference between minority and Kinh households is the role played by forest land: Minority households claim access to almost three-quarters of a hectare of forest land, while it is essentially zero for Kinh households.

A slightly different picture emerges outside Kontum. Ethnic minority households on average have ***more*** land than the Kinh, a product of larger holdings of annual land. Holdings of perennial land are nearly identical. There remains a significant percentage of ethnic minorities with annual or total agricultural land holdings less than either 0.5 or 1.0 hectare, but the

[7] It is important to keep in mind the relatively small number of Kinh households in Kontum in our sample (23 in total).

percentage is typically no higher, and usually lower than we observe for the Kinh. Overall, 69 percent of Kinh households report landholdings less than a hectare, compared to 44 percent for ethnic households. As in Kontum, about half of the ethnic minority households appear eligible for program participation. Unlike Kontum, forest land is relatively unimportant in the rest of the CH.

In the next panel of Table 2, we make similar comparisons with respect to household incomes. The differences between Kontum and the three remaining Central Highland provinces are relatively small, with non-ethnic (Kinh) minority households enjoying higher total incomes of roughly 45 percent in both cases.[8] Note however the differences in the sources of this gap. Outside Kontum, income from cropping is nearly identical for the two groups, with higher wage and business income for non-ethnic minority generating much of the gap. In Kontum, on the other hand, differences in cropping income between the two groups are the source of slightly less than half of the difference, with income from wages and family businesses making up the rest. In all likelihood, differences in access to land underlie the differences in cropping income. Comparing minorities across provinces, income levels are similar, so the distinction between Kontum and the other provinces (in 2002) is not income-based. Nonetheless, the composition of income is different, with minorities in Kontum earning less from cropping, and more from agricultural sidelines, likely connected to their greater access to forest land.

Comparing other key variables, minority households are significantly larger than their Kinh neighbors, with almost six members per household, versus five for the Kinh. There are striking differences in levels of education across households. First, households in Kontum have about 1.5 years less education per person (measured by the most educated adult in the household), irrespective of ethnicity. The gap between ethnic groups is staggering: Almost 3 to 4 full years of education, with Kinh having almost double the years of schooling. To the extent that human capital is an important determinant of income—on and off the farm—it would seem at the outset that improving education for ethnic minorities might yield a bigger bang than changing the land distribution.[9] We also explore time-use patterns across households in order gauge how improved access to land might affect employment of potentially underutilized minority family members. Overall, minority and Kinh households spend a similar total number of days working, but the Kinh spend significantly more time than minorities in non-farm activities. There are only minor

[8] In per capita terms, the differences are even larger, reflecting differences in average household size.
[9] As previous researchers have noted (i.e., van de Walle and Gunewardena (2001), and Baulch *et al* (2007, 2012), observed differences in access to land explain very little of the gap between ethnic and Kinh incomes. Education, on the other hand, is a major contributor.

differences between Kontum and elsewhere in the CH, and men and women have similar employment patterns.

Finally, we report the three largest minority groups in each "region." Throughout our paper we discuss minorities as a homogeneous group, when in fact there are many different ethnic groups. Of particular note, the ethnic groups in Kontum are different than those in the rest of the Central Highlands, adding another reason why we separate our discussion for these sub-regions.

4.0 WHO RECEIVED LAND?

In order to evaluate the impact of the program on household incomes, as a preliminary step we need to know how program land was allocated to households. Did household eligibility line up with actual program participation? Were there deviations from program design that undermine our use of "predicted eligibility" as the foundation for an identification strategy? Is there evidence that the program was implemented differently than intended?

We begin with a summary in Table 3 of commune-level data, where we asked commune officials to report how Programs 132 and 134 were implemented at the local level. It important to keep in mind that our strategy for selecting the 50 communes implies that these estimates may not perfectly line up with the provincial estimates. Since we selected communes on the basis of potential eligibility, the sign and magnitude of the bias will depend on how treatment rates are correlated with potential eligibility. In principle, the bias could be either positive or negative, but our hope was to select communes with the greatest extent of treatment.

The first three columns of Table 3 provide basic counts for the communes in our sample, showing the distribution of the sample across provinces, as well as the number of households represented by our sample. Ethnic minority households comprise a significant majority in the Kontum and Gia Lai communes, about one-third of households in Dak Lak, and about half of households in the Lam Dong communes. Out of our 50 communes, 35 report implementing Program 132.[10] In the next four columns we summarize the criteria used by communes for establishing household program eligibility. First, what type of land was considered? Eligibility was typically defined in terms of one type of land, e.g., annual, perennial, or "unused," but there were a few communes that based it on a combination of types. Most used household annual land

[10] All communes in Kontum resurveyed reported implementing Program 132. This was followed by 12 out of 15 in Gia Lai, 12 out of 17 in Dak Lak, and only 1 out of 8 in Lam Dong. The total number of participating communes rises to 39 once we include those that implemented either or both of programs 132 and 134.

to establish eligibility, presumably in line with local standards of land use. In Kontum, all communes used annual land. In Dak Lak, by contrast, eligibility was frequently based on having too little perennial land. We also find significant differences in the thresholds that were used. Kontum appears to have followed the national directives most carefully, with mean eligibility just slightly less than a hectare of annual land. In both Gia Lai and Lam Dong, households typically with land less than 0.3 hectare were deemed eligible, while in Dak Lak it was two times that. Moreover, in Dak Lak, eligibility was sometimes based on perennial land.

These thresholds varied for several reasons, the most important of which was local land availability. In land abundant areas like Kontum, it was easier to find land to top up a household to 1.0 hectare, while in land scarce areas, this was too expensive. Moreover, the implied value of a land transfer would have been higher in these communes. In short, the amount of land transferred and the targeting of land to households is correlated with the value of land itself. As a result, the returns to program participation may be correlated with household eligibility, at least across communes. In land abundant areas, a hectare of land may not have amounted to much benefit, especially if it needed significant reclamation.

In Appendix Table 1, we draw on the commune level data to calculate the type and source of land redistributed to households. In Kontum, it is primarily annual land that has been transferred from state farms or plantation, or been reclaimed. The average amount of land redistributed per household is 0.45 hectares, which is identical to the provincial-based estimate. Outside Kontum, annual and perennial land transferred from state farms and plantations is slightly less important, while land obtained by the state from other households (with compensation) makes up nearly a third. The commune level data also imply that on average 0.30 hectares per household were redistributed, which is slightly lower than the provincial level data suggest outside Kontum.

In the final three columns we summarize the commune-reported "treatment rates," based on commune-level responses. The reported participation, or treatment rates should be compared to the final column of Table 1 (based on province-level reports). In Kontum, 37% of ethnic households received land from Program 132, very close to the provincially-reported 37.2%. As the line between Program 132 and 134 may be blurry, we also calculate the "treatment rate" for Program 134, and combined Program 132/134. In Kontum, this bumps the treatment rate marginally, to 38.1%. The percentage of ethnic households receiving program land was much smaller in the other provinces, even combining the two programs. The combined treatment rates

in Gia Lai (12.5%) and Dak Lak (11.7%) are still reasonably close to the provincial reports of 15.7% and 10.3%. For Lam Dong, we only had one out of eight communes participating in program 132, and a few more in Program 134. The resulting treatment rate is very low, at 5.7%, which is significantly below the provincially-reported rate of 19.4%. This may be the result of some combination of poor luck of the draw with our sample of communes and over-reporting. Regardless, it implies a sample for which it will be difficult to estimate reliably the impact of program participation. Even with treatment rates of 10 percent in Gia Lai and Dak Lak, the number of treated households is very small.

In summary, the province and commune level data reveal significant heterogeneity in treatment rates. This heterogeneity likely comes from a number of sources including: 1) variation in the cut-offs used for determining eligibility; 2) variation in the number of eligible households; and 3) most importantly, variation in available land, and budget for project implementation.

Household-level Measures of Program Participation

We do not actually know whether a particular household was deemed eligible for the program. However, as discussed in the context of Table 2, we do observe land holdings in 2002, which should be strongly correlated with eligibility. Strictly speaking, our estimates of "eligibility" are for "potential eligibility." For expositional ease, we will mostly dispense with the "potential" qualifier. Recall also that the VHLSS land data do not map perfectly into the eligibility criteria spelled out in the Program 132 and 134 documents (which were based on "Terrace Land."). In Table 4, we cross-tabulate the proportion of households falling into four basic landholdings groups: 0 land, 0 to 0.5 hectare, 0.5 to 1.0 hectare and more than 1.0 hectare (the same categories as Table 2, using combined annual and perennial land). The overall proportion of households in each category suggests that 50.7% of households in Kontum have less than a hectare of land, while slightly fewer (43.7%) have less than a hectare elsewhere in the CH. How many of these households received land from the program?

In our household survey, we directly asked households whether they received land from Programs 132 or 134. While program eligibility status is fuzzy for reasons described above, unfortunately, even treatment status is potentially ambiguous, as households may not be fully aware of their own treatment status (given the number of programs, and strong links between the commune and land allocation). We therefore provide information on "treatment" by initial landholdings using several alternative definitions of treatment:

- "**Treat 1**" A pure estimate of land that households attribute to receiving from the main Program 132;
- "**Treat 2**" Allowing for some confusion between the two main land programs (132 or 134), this measure includes whether households report land from either program; and
- "**Treat 3**" A broader measure that also includes new land that households report they reclaimed since 2002. They may not know the exact reason that they were granted legal access to the land, but they know they got it. A significant amount of program land required reclamation, and households may have reported their program land in this category.

"Treat 3" is the most liberal estimate of treatment, and allows for the possibility that households may not have known the channel by which they received the additional land. Recall that reclaimed land represented the source of a quarter of all land redistributed to households.[11] But it may also include land that has nothing to do with the program.

Turning to the cross-tabs, we begin with the overall treatment rates, irrespective of eligibility (the "All" column in Table 4). In the case of Kontum, 16.4 percent of all ethnic minority households received land through Program 132, and marginally higher, 17.4 percent, if Program 134 land is included. Under our broadest measure of potential treatment, nearly a third of ethnic minority households in Kontum received land, which is similar to treatment rates reported at the commune and provincial level. Household-reported treatment rates outside of Kontum are ***significantly*** lower. Only 2.1 percent of all ethnic minority households received land from 132, with an additional 1.6 percent, or 3.7 percent in total, receiving land from Programs 132 or 134. If we include newly reclaimed land since 2002 that may have also come from the state, 9.9 percent of all households received land since 2002, which does line up better with the commune and provincial reports. The household data thus confirm the much higher rates of program participation in Kontum, and the absolutely low rates of participation outside Kontum using the narrowest definition of treatment.

But the implied participation rates are still lower than the official sources, especially if we use the measures of treatment that most directly refer to program land. Why might this be the case? There are two possible explanations aside from over-reporting by local governments. First,

[11] The household level data on land received through 132 and 134, and results in Appendix Table 1 also reveals the important role of reclaimed land.

imperfect recall by households over the legal sources of their land over the past five years may be a factor. While households might be familiar with the programs, attributing an individual plot of land to the program may be difficult. This will be especially true for land that they may have been informally working prior to Program 132, and where the program effectively secured property rights to existing land. It is less likely that program land has already been disposed of, given the restrictions placed on selling this land. Of course, less formal transfers (i.e., to children) could lead to leakage at the household level.

Second, new household formation and our sample design may also be a contributing factor to the gap. An examination of the 2001 and 2006 Agricultural Censuses reveals a significant increase in the number of ethnic minority households and a decline in average household size over a period that spanned the implementation of Program132. We do not believe that Program 132 alone *caused* a significant increase in household formation – the value of the relevant land is not high enough for that – but other factors could coincide with ethnic household splitting and formation. The housing component of Program 134, for example, may have facilitated the movement of younger generations into their own households. Formation of new households has implications for the estimation of official, aggregate participation rates: If land was given to new households, then the appropriate denominator includes the new households, not just the "original" households. *Ex post* household treatment rates will be exaggerated. Certainly, it makes reconciling results using a panel with the aggregate sample more difficult. The panel nature of our data limits our ability to measure treatment of new, younger households. Especially if the new households are more likely eligible than the panel households, our sample will understate the extent of treatment, while giving an accurate estimate of treatment in the "base" households from 2002. This highlights an inevitable limitation of retrospective, panel-based surveys.[12]

Turning now to the linkages with eligibility, the easiest comparison is between those households with less than or greater than one hectare of land (i.e., potentially eligible to those who should not in principle receive any land). In Kontum, as well as in the remaining Central

[12] This discussion highlights the potential difficulty of comparing treatment rates using the different data sources. Note, however, that our panel does not show much of a decline in ethnic minority household size between 2002 and 2007. In Kontum, average household size from 5.72 to 5.69, well within sampling error. Outside Kontum, the decline is slightly larger, from 5.86 to 5.73. This is much smaller than the decline calculated from the Agricultural Censuses (5.57 to 5.22 outside Kontum between 2001 and 2006). We therefore do not have any evidence in our data to suggest that the programs led to changes in household structure.

Highland provinces, there appears to be significant leakage in the treatment, with the ineligible almost equally likely to treated. In Kontum, using "Treat 2" as the measure, 20 percent of households with land (in 2002) under one hectare received program land, while 14.7 percent of (in principle) ineligible households also received program land. While it is true that eligible households had a higher probability of treatment, the relationship between eligibility and treatment seems very weak. In the final two columns of Table 4, we formally test for a relationship between land holdings ("eligibility") and reported treatment status, regressing treatment status on indicators of a household's landholding category and reporting the F-statistic for the land category dummies. We do this with, and without commune dummies, allowing for some heterogeneity of average farm sizes and land availability across communes. For Kontum, neither Treat 1 nor Treat 2 is correlated with 2002 landholding status. If we include reclaimed land in the measure of treatment (Treat 3), there is a stronger link, but this disappears once we account for commune-level heterogeneity. Outside Kontum, the leakage appears to have been just as severe. Using the broadest measure of treatment ("Treat 3"), slightly more ineligible households received land (11.0 percent versus 8.4 percent). Stated differently, between one-half to two-thirds of treated households were "ineligible," depending on the treatment measure used. There is no significant link between predicted eligibility and treatment status.[13]

How Progressive were the land transfers?

An underlying premise of Programs 132 and 134 and the allocation of land to ethnic minorities is the view that landholdings are positively correlated with household incomes. Thus, targeting land for land-poor households will help improve the welfare of the neediest rural ethnic minority households. Land transferred through 132/134 may not have been directed to the land poor, but it may still have been directed to poor households. In Table 5, we provide a breakdown of landholdings and treatment by per-capita income quartiles (in 2002) for Kontum, and then do the same thing for the Central Highlands excluding Kontum. In Kontum, there is only a very weak relationship between average landholdings and income quartile. Average landholdings fall

[13] While not reported in these tables, we also explored linkages between the amount of land that households said that they received from the programs, and predicted eligibility. Conditional on treatment ("Treat 2"), eligible households in Kontum received 0.34 hectares of land, compared to 0.49 for the ineligible. Outside Kontum, eligible households received 0.29 hectares, compared to 0.23 for those with more than a hectare of land to begin with. As with treatment status itself, there was no evidence that the amount of land received was related to predicted eligibility.

marginally between the first and second quartiles, and then rise slightly through the fourth. Outside Kontum, the link is much stronger, especially with respect to perennial land, which rises from 0.25 hectares in the first quartile to 0.71 in the fourth. In total, households in the richest quartile have 75 percent more annual plus perennial land than households in the poorest quartile. Annual land is thus only weakly related to household income, and is a poor marker of low income. Perennial holdings, on the other hand, are more concentrated among richer households. It takes money to invest in this type of land, from the preparation of the land itself, the cost of the planting and maintaining the perennials, and the foregone income while waiting for the plants to mature.

In Table 5, we also report potential eligibility rates by income quartile, based on whether a household had less than one hectare of land in 2002. Eligibility typically falls through the quartiles, but the drop is much less than might be expected. In Kontum, the first quartile (Q1) has 56% of households with agricultural land under one hectare. This is actually lower than the next richest quartile (Q2), where 73% are potentially eligible. Eligibility rates then fall through the next two quartiles. Outside Kontum, the link between potential eligibility and income quartile is stronger. This reflects the greater importance of more lucrative perennial land where there is a stronger link between acreage and income (as opposed to some of the larger more marginal farms of annual land in Kontum).

Of most interest from an equity perspective, household-reported treatment rates are fairly similar across quartiles, though higher in the middle. In Kontum, treatment rates peak in the third quartile. The same pattern holds outside Kontum, though the treatment rates are much lower in magnitude. In summary, land transfers were not disproportionately directed to low-land households. Nor were transfers directed towards poorer households. If anything, transfers went to the middle and upper income households. Whatever the actual mechanism used to assign households to the program, it does not seem consistent with the stated objectives from Hanoi.

So who got the land? As we ultimately wish to relate treatment to outcomes, is there evidence that the land was targeted to certain types of households? Certainly, we would have preferred that it went to the low-land households, but that is not the case. To explore the issue further, we estimate richer versions of the treatment regressions reported in Table 4. In Table 6 we show the results of regressions relating Treat 2, our preferred measure of program participation, to a more detailed set of land holding indicators (i.e., separate indicators for the amount of annual, perennial, and forest land), as well as household characteristics (per capita

income, education, and family size). The bottom line from Table 6 is that we find very little that is correlated with treatment status, except what commune a household resides. On the basis of 2002 observables, it is difficult to predict who would receive program land.

In Kontum, we find that households with less perennial land were slightly more likely to receive land, but this is not robust to the inclusion of commune effects. This means that the treatment rates are lower in communes with more perennial land. Outside Kontum, we find weak evidence again that households with less perennial land were more likely to be treated, but the effects are quite small. On the other hand, while forest land holdings are rare at the household-level outside Kontum, there is some correlation between having forest land, and treatment status. None of the household characteristics – notably income and education – were correlated with treatment. The most significant variables, by far, are the commune dummies.

There are several implications of this exercise. First, there is very little predictable variation of treatment within communes. The program was not implemented the way that it was designed, at least on the basis of the three-page sketch from Hanoi. The variation of treatment across communes means that it is not likely to be valid to exclude commune dummies from any analysis. The most reliable analysis will have to be conducted within communes. This also limits the value of adding more communes to serve as "controls" given the evident heterogeneity of implementation across communes. The nature of the implementation of the program also underscores the value of separating Kontum from the rest of the analysis. The absence of a link between observable household characteristics in 2002 – especially predictors of program eligibility -- and subsequent treatment, undermines any identification strategy that relies on these serving as instruments, either for conventional Instrumental Variables, or for Fuzzy Regression Discontinuity. On the "half-full" side, there is no evidence of departures from "random assignment," at least to the extent that program participation excluded those with the highest income or education. We still need to be concerned that households were granted land based on the perceived value of land to them: Which households could put the land to its best use? But at least for Kontum, our evidence is also consistent with broad participation of minority households in the program, with land assigned essentially randomly to households. We now turn to an analysis of what happened to the observable outcomes of these households after the implementation of Program 132.

5.0 ASSESSING THE IMPACT OF PROGRAMS 132 AND 134

We are interested in assessing the impact that the distribution of land through 132 and 134 had on rural household incomes in the Central Highlands between 2002 and 2007. Given that our identification strategy will be driven by before-and-after comparisons between treated and untreated households, it is useful to look at the broader changes that occurred in both land and incomes over this five-year period.

Changes in Land

Households were specifically asked in 2007 whether they received land from the programs. Independent of these reports, we have detailed information in the 2002 and 2007 surveys to compare household land holdings irrespective of treatment status. In particular, we wish to know whether minority households, as a group, experienced improvements in their land holdings. We can compare changes in the land distribution between minorities and Kinh who would not have been treated, and between minority households that report being treated or not.

In Table 7 we report land outcomes for ethnic minority and Kinh households in the Central Highlands. For ethnic minority households, the data suggest an increase in average agricultural land of slightly more than 20 percent, from 1.20 to 1.47 hectares per household. This was offset by the loss of almost all of the forest land households reported having in 2002.[14] By comparison, agricultural landholdings increased from 0.89 to 0.97 hectares for the Kinh. Overall, the data suggest that there was a relative increase in land holdings for minorities, consistent with the existence of the programs. Separate breakdowns for Kontum and non-Kontum are once again helpful. Ethnic minority households in both parts of the Central Highlands experienced an increase in landholdings of agricultural land, with households outside Kontum reporting a slightly larger increase, from 1.23 to 1.52 hectares. All of the reduction in forestry land occurs in Kontum.

The CDFs (cumulative distribution functions) reveal that the increase in mean landholdings was accompanied by similar reductions in the percentage of households with less

[14] We have not been able to identify conclusively the reason for the decline in forestry land, though several alternative possible interpretations exist. First, forestry land was recorded differently in the 2002 and 2007 surveys, raising the possibility of measurement error. Second, in Kontum, forestry land has been under the ownership of state forests since the 1980s, with households often hired as "caretakers". Most of the decline in access to forest land, and the commensurate forestry sideline income, could be due to the fact that there was a temporary suspension in this program (which has since been re-implemented). This accords with interviews we conducted with commune officials in 2010. Third, there may also have been a genuine reduction in forest land. But working against the last interpretation are the census data for 2001 and 2006, which actually show a slight increase in forestry holdings for ethnic minority.

than a hectare of agricultural land. In Kontum, the percentage of households with land under one hectare declines from 50.5 percent to 43.3 percent. Outside Kontum, there is a similar sized drop in the percentage of households with less than a hectare of farmland, from 43.7 percent to 37.4 percent. Note for the Kinh, that the percentage of households with "zero" land doubles, from 9.0 to 18.6 percent. Even while some Kinh households were expanding their plantings of perennials, other Kinh households were exiting agriculture altogether.[15] This highlights the challenge of using "more" or "less" land as a measure of household "improvement."

These simple summaries of the aggregate land distribution hide important subtleties. First, in moving from annual to perennial land, farm sizes generally shrink (so overall land is a poor summary of "farm capacity."). Second, there is a great deal of shuffling between annual and perennial land that may have an even greater impact on income changes than the simple total acreage. And finally, the averages hide the significant amount of churning that is occurring with land holdings. In Figure 1 we plot histograms of changes in land holdings for the Kinh and minority households. The change in land holdings is simply the difference between 2007 and 2002 household operated land, calculated separately for annual and perennial land. To allow for some round-off error, we allow small changes to count as "zero change." We then calculate the fraction of households with increases or decreases of land of varying amounts. In addition to showing the underlying heterogeneity of changes, and movements into annual or perennial land, we may also be able to detect program participation indirectly: Do we observe significant numbers of minority households receiving land between zero and one hectare?

Starting with Kontum, we see that the vast majority of households had changes in annual land holdings of at least 0.25 hectares. Minority households had increases in annual land upwards from 0.25 hectares, consistent with having participated in Program 132. Some households also experienced declines in their land holdings. Kinh households, especially, divested themselves of annual land. There is a clear shift then of minority households into annual land, and Kinh households away. For perennial land, most changes (in both directions) applied to the Kinh, with increases outweighing decreases. Outside Kontum, we also witness a majority of minority households experiencing changes in their annual land holdings, mostly with increases of at least 0.25 hectares. Compared to the Kontum, minority households elsewhere in the Central Highlands shifted into perennial land. Except for perennial land in Kontum, the panels of Figure 1 show a

[15] This also corroborates the point raised in Ravallion and van de Walle (2008) that "landlessness" is a poor proxy for risk of poverty, and is frequently a sign that households are moving out of agriculture into more lucrative pursuits.

significant share of minority households improved their land holdings relative to their Kinh neighbours.

What does this imply about potential linkages between Program 132 and the land distribution? One possibility is that these changes are largely a consequence of the policy. In our survey, we asked whether households had acquired new land since 2002.[16] Overall, more than a quarter of all ethnic households report "new" land that they had acquired since 2002, with the percentage in Kontum 44.2 percent. In Kontum, the three primary sources of this land are that identified as coming through Programs 132 or 134, newly reclaimed land, and land that they were allocated long-term use rights to (presumably by the state). Outside Kontum, 24.0 percent of all households report acquiring new land, but land which might be linked to the state is significantly less than in Kontum. More important is land that is either inherited, or bought. Clearly, while important, program land is not the only way for minorities to have increased their land holdings between 2002 and 2007. This complicates the estimation of treatment effects, as the "control" households can obtain extra land through other means than the program. The existence of other channels to acquire land likely makes it more difficult to distinguish differential outcomes for treated and untreated households, especially outside Kontum.[17]

Changes in Income

In Table 8, we report a breakdown of real household incomes and expenditures for 2002 and 2007, all expressed in constant 2007 VND, and data on household labor supply. We present results for Kinh and Minority households over the entire Central Highlands, as well as a separate breakdown for minority households inside and outside Kontum. We will focus our discussion on minority households, but it is worth reviewing the dramatic change in outcomes for Kinh households. Household incomes more than doubled in real terms, from 23.2 million VND to 48.8 million VND. While incomes rose significantly from all sources, by far the overall increase was driven by the dramatic increase in crop income. This reflected the combined effect of higher output from perennial land, and higher prices for perennial crops. Also worth noting, despite the

[16] Note that the responses to these questions need not be the same as that which we can measure from the land questionnaires in the VLSS: Household respondents may not have perfect recall over what was reported in the 2002 survey.

[17] This is consistent with the general observations by Ravallion and van de Walle (2008) concerning the efficiency and high level of activity of land markets in Vietnam in the post-reform era.

role of agriculture in the growth of income, Kinh households devoted less labour time to farming, and more time to non-agricultural pursuits in 2007 compared to 2002.

Turning to minority households, in 2002 real household incomes in Kontum were 17.1 million VND. Per capita incomes were 3.1 million, while per capita expenditures were slightly lower at 2.5, implying that these households were saving in upwards of twenty percent of their incomes. Nearly three-quarters of income came from cropping and agriculture-related sidelines, e.g. forestry and animal husbandry, with income from wages making up most of the rest. Incomes outside Kontum were modestly lower, with income from wages (sidelines) playing a more (less) important role. We observe a *sharp divergence* in the trends in incomes between provinces. In Kontum, total household as well as household per capita real incomes *fell* between 2002 and 2007. Similar behavior is seen in our estimates of per capita expenditure, confirming that this is not an artifact of problems in measuring income. Cropping income rose by nearly 30 percent, and wages by 43 percent, but these increases are more than offset by the collapse in sideline income, primarily forestry and livestock, of 79 percent. There a number of alternative explanations for this decline.[18]

Contrast this behavior with the growth in the Central Highlands outside Kontum, where per capita incomes almost doubled from 2.8 million to 5.6 million VND. Largely driving this growth is the sky-rocketing growth of income from the cropping sector, which can be linked to land in perennials in 2002. This increase is complemented by growth in wage income, which is slightly larger in percentage terms than we observe in Kontum. The Central Highland provinces outside Kontum also experience a reduction in incomes from sidelines, but of much smaller magnitude.[19]

The differing experiences of Kontum and the other CH provinces further undermine our original evaluation strategy. Most obviously, untreated (or any) minority households outside Kontum are a poor control group for treated households inside Kontum. Compounding this problem, the treated households are concentrated in Kontum. Ignoring this problem would lead to negative "treatment effects": The treated households in Kontum fell far behind the untreated minority households outside Kontum. But this had nothing to do with their treatment status, and

[18] See footnote 13 in this regard. The fact that the reduction in sideline incomes included significant losses in earnings from forestry, livestock, and hunting and trapping suggests changing rules on access and use in Kontum.

[19] Baulch *et al* (2012) and Dang (2012) use the VLSS (through 2004 and 2006, respectively) to report rising incomes overall for minority households, combined with a widening gap with the Kinh. They do not show results separately for Kontum.

instead reflected differences in outcomes between provinces. In particular, minority households outside Kontum had greater holdings of perennial land, which saw extraordinary returns over this period. We can also see in Table 8 that the Kinh would be an inappropriate control group, as their incomes grew even faster than the minorities; however well the minorities fared outside Kontum, they fell even further behind the Kinh.

More Formal Program Evaluation

The aggregate "evidence" suggests that the changes in the distribution of farm land were consistent with the implementation of Programs 132 and 134. It is not clear however whether this is a consequence of the program, or part of the clearly dynamic changes in landholdings that we described. Even less clear is whether program participation did anything to improve ethnic minority living standards: Minorities outside Kontum experienced increases of income far beyond anything a half-hectare of land could generate, while households in Kontum saw their incomes decline. In order to better identify the potentially causal links between the Program 132 and household outcomes, we now turn to household-level treatment status and outcomes.

Ultimately, we estimate a program evaluation regression of the form:

$$y_{h,07} - y_{h,02} = \alpha + \beta Treat_{h,07} + \gamma' X_{h,02} + u_h$$

where $y_{h,07} - y_{h,02}$ represents the change between 2002 and 2007 for a particular outcome y_h for household, h; $Treat_{h,07}$ is household reported treatment status from the 2007 survey; and $X_{h,02}$ is a vector of household controls, all dated 2002. We focus on the key outcomes that were the objective of the policy: land and income. To better understand the potential impact of the program, we examine annual and perennial land separately, and also the various sub-components of income. Crop income is of most obvious importance, but given the sharp decline in sideline income, we also examine income from sidelines. One concern is that crop income increased at the expense of sideline income. This could happen if minority households were diverted (or forced) from activities in the forest, in favor of more sedentary agriculture. We also explore labour supply to agriculture to see if access to land affected household time allocation. Given the time elapsed since the policy was in place, we might observe greater agricultural activity in terms of labour input, while not yet finding an effect of the program on income. As for measuring treatment

status, we tried a variety of measures. We report our *ex ante* preferred indicator: Self-reported household participation in Programs 132 or 134 ("Treat 2"). Results are generally not sensitive to this choice.[20]

The standard problem in program evaluation is that the effect of treatment is confounded with unobservable determinants of the outcomes, in this case, changes in land holdings or growth of incomes. The most feasible way (in principle) to deal with this is to include a rich set of covariates, and assume (hope) that treatment status is conditionally independent of the potential outcomes. To accomplish this, we include a vector of land holding indicators for the amount of annual, perennial, and forest land controlled in 2002. These variables will control for program eligibility, and given the importance of land holdings for income growth, will also control for linkages between household land investments prior to 2002 and subsequent income growth. The "treatment" variable will then identify the effect of "new" land that potentially came through the program. We exploit the panel structure of the data and also include controls for household predictors of income growth, specifically household education and size in 2002, as well as a vector of household outcomes in 2002, most notably total income (and log per capita income), and income from various sources (crop income, sideline income). To the extent that these variables are correlated with both program participation and potential outcomes, this should control for some types of endogenous assignment to the program. Finally, in all specifications, we include commune fixed effects. This allows for the fact that programs were implemented differently across communes, and that these differences are possibly correlated with the potential changes in outcomes across communes. This means that our specification is identifying the effect of program participation by comparing treated and untreated households within the same commune, holding constant (in a linear regression sense) a household's land endowments and income in 2002.

The identification strategy rests on the assumption that within communes, otherwise identical households were not given program land for reasons correlated with unobserved determinants of future income growth, or their ability to access land. What could undermine this? On one side, commune officials might want to give land to those households that could put it to

[20] The most obvious refinement is to use the intensity of treatment as our measure, i.e., the amount if land received in the program (including zero). This measure tends to better correlate with household changes in land, but is less correlated with changes in income. We attribute this to measurement error: Measures of land treatment are more correlated with self-reported household allocations of land, while the additional "noise" introduced by household recall of the level of treatment yields an even poorer measure of treatment than the binary indicator of program participation.

the most productive use. In this case, we would expect an upward bias in the returns to program participation. We cannot rule this out, but the fact that we find no correlation between treatment status and other predictors of potential income growth such education or income in 2002 leads us to believe that this source of bias is exaggerated. In the other direction, officials may favor households that most need the land, in which case there would be a downward (negative) bias in the estimated coefficients. Again, as we find no evidence that program participation was higher for low-income households of those with less land, we do not view this as being a large bias. Of course, there is no way to rule out definitely a bias in either direction.

Our original plan was to employ a variety of estimators to evaluate the robustness of the estimated impact of treatment. The most promising was to use landholdings from 2002 – in principle the sole determinant of program eligibility – to construct instruments, either conventionally or in a regression discontinuity framework. As we saw previously, however, land-holdings in 2002 are uncorrelated with reported treatment status, eliminating this as a useful source of instruments. It also turns out that land holdings in 2002 fail to satisfy exclusion restrictions: Incomes rose fastest for those households with greater land holdings of perennial land in 2002, and changes in land between 2007 and 2002 were also correlated with land holdings in 2002 for reasons that have nothing to do with program participation. The creative use of other ineligible households to construct control a group was also unfruitful. The Kinh, for example, are not a plausible control group. While not eligible or treated, their income growth is a poor counterfactual for what would happen to minorities in the absence of treatment. In the same vein, minorities outside the Central Highlands are a poor control group, given the heterogeneity of income growth across locations. Moreover, as we cannot reliably disentangle the impact of land received from Program 132 or 134, these minority households cannot serve as a control group as they were treated in Program 134. In summary, and acknowledging its limitations, the best counterfactual for treated households in the Central Highlands are untreated households in the same commune with similar covariates.

The Value of land: What is the potential impact of treatment?

Before estimating the impact of program participation, it is worth estimating the potential impact that an additional plot of land can have on household income in the first place: How much income can be derived from a small tract of land? In Table 9 we report the results of "value of land" regressions. These regressions enable us to look at three important questions: (1) Are

returns to land different for minorities and Kinh? (2) Are the returns the same in Kontum and elsewhere? (3) How much more lucrative is land under cultivation with perennials? We do this several different ways. First, we estimate cross-section regressions separately for 2002 and 2007, relating crop income from a given year to the land used that year. In columns 1 and 2 therefore, the dependent variable is the total net income earned by the household from cropping, regressed on household holdings of annual and perennial land. Other controls include household size, male and female education, and commune fixed effects. We also include a minority status dummy to allow returns to the two kinds of land to differ between the ethnic minority and Kinh, and a Kontum dummy to allow the returns to differ inside and outside of Kontum. In general, we expect the returns to perennial land to exceed that to annual, but recall that land types may only imperfectly capture land use. Moreover, at any given point in time, households may be in the process of shifting some of their annual land into perennial crops. If reclassification occurs only with a lag, this could bias the comparison of returns. In addition, it typically takes three to four years before newly planted land in perennials begins to generate income.

In 2002, the returns to perennial land are only marginally higher than those to annual land. For the base group (Kinh outside Kontum) the average return is 6.076 million VND compared to 5.549 for annual land. To help put these numbers in perspective, average per capita incomes in 2002 were in the vicinity of 3 million VND. The return to annual land in Kontum is slightly higher than that outside Kontum, but the returns to perennial land are significantly lower. The gap in returns between ethnic minority and Kinh only shows up in the returns to annual land. Moreover, amongst the ethnic minority, returns to perennial land are two and half times that to annual land (6.124 versus 2.428 million VND).

For 2007, the returns to both annual and perennial land are significantly larger, but the increase is much more pronounced in the case of perennials. This is especially so outside Kontum, though even in Kontum the returns to perennial land exploded. Amongst the ethnic minority, the returns to both types of land are higher in 2007, but the increase lags what we observe amongst the Kinh. Note again that the returns to perennial land could increase for a variety of reasons: The trees (e.g., cashews or coffee) may be more mature and yielding more output, or the prices of these crops may have increased. In fact, it was likely both factors.

These regressions are complemented by two specifications based on changes in crop income between 2002 and 2007. The first (in column 3) is slightly unconventional as a production function: We estimate the change in income as a function of the levels of variables in 2002. This

however mimics our main program evaluation regressions, where we estimate the effect of program participation conditional on a similar vector of 2002 characteristics. In column 3 we see that those households that had perennial holdings in 2002 had the greatest increases in crop income. Indeed, holding one hectare of annual land (all else equal) did not yield any increase in crop income (though it of course yielded the same level of income per hectare). In this specification, it is clear that access to perennial land in 2002 was critical to increased crop income over this period as being in the annual business yielded no income growth. It also illustrates that perennial holdings in 2002 would be a poor instrument for program participation, as they had a direct effect on crop income growth.

In the last column (4), we estimate a more conventional "first difference" specification: Were changes in land associated with changes in crop income? If a household received 0.5 hectares of land from Program 132 or 134, or some other means, were they able to turn this into more crop income? This gives us the best possible estimate for the potential impact of program land. In the bottom panel we see that an extra hectare of annual land for a minority household yielded an average of 2.097 million VND, while an extra hectare of perennial land yielded 8.339 million VND (for minority households). The return to annual land was actually higher in Kontum than outside. As we move to our more formal estimates of the effect of treatment, it is clear, however, that land is a valuable asset for all households in the Central Highlands. Receiving "free" annual land (i.e. Treatment) should increase crop income.

Program Evaluation: Results

Regression results for the program evaluation equations are presented in Table 10. Statistically significant results are highlighted, and what is most remarkable is how small the estimated effects are: It is difficult to declare that the program had a significant effect on household outcomes, even in Kontum where the program was most widespread. That said, the results are certainly suggestive that the program had a modest impact, and it must also be acknowledged that given the variation and magnitude of changes that occurred between 2002 and 2007, finding any effect is difficult.

For Kontum, we estimate that program households received 0.28 hectare of annual land, which is not far from the official reports. Treated households did not increase holdings of perennial land, again consistent with the official reports. Treated households saw their crop income rise by 2.69 million VND, which is remarkably in line (given sampling error) with what

0.28 hectares of additional annual land would generate (from Table 9). Sideline income was unaffected by program participation, at least in Kontum. This reflects the fact that both treated and untreated households saw their sideline income collapse: Households that participated in the program were not disproportionately diverted out of the forests. In terms of labor supply, we see that both men and women in treated households increased their time farming, quite substantially but not statistically significantly. Taken together, we take this as evidence that in Kontum, Program 132 provided slightly more annual land to minority households than they would otherwise have been able to obtain, and that they earned income from this land commensurate with the returns to annual land.

In the second row of the table, we report the results for the Central Highlands outside Kontum. If anything, we see a *negative* effect of participation on land accumulation and income: Treated households experienced reductions of annual land, modest increases of perennial land, and reductions of total income, especially sideline income. Very few of the coefficients are statistically significant. The slight tilt towards perennials may account for the "negative treatment effect" for crop income. Since much of the land received from Programs 132 and 134 was only allocated at the earliest by 2004, by the end of 2007 the impact of expanded acreage in perennials on cropping (and total) income would have been marginal. Net incomes might have been lower because households continued to incur production costs on this land in the interim. While it is possible that these households were "losers," (i.e., negatively selected) the land data suggest that part of the explanation is due the relative shift of treated households into perennials that may not have yet borne fruit.[21] The only significant coefficient is for sideline income: Outside Kontum, it could well be the case that treated households were diverted from their traditional livelihoods. However, to the extent that perennials will generate future income, they may well come out ahead in the future. Taken together, however, our main conclusion from outside Kontum is that it is almost impossible to detect an impact of the program on household outcomes. This could stem from the low estimated treatment rate and potential measurement error, lags in seeing the benefits of perennial land, or the fact that all households – treated and untreated – were able to acquire land over this time period.

[21] This was found to be the case in two communes visited in Lam Dong in August, 2010, where all of the Program 132/134 land went into coffee.

6.0 DISCUSSION AND CONCLUSIONS

At the outset of our project, we expected a relatively clean evaluation of Program 132: We surveyed over 800 minority households yielding a panel of households observed just before, and shortly after the implementation of the program. Official reports suggested that the program was implemented in line with its objectives, transferring land to eligible minority households with small landholdings. Given the levels of participation – 60% of eligible households – our main problem would be fine tuning estimates to address potentially endogenous assignment of land to households. This could readily be accomplished by comparing outcomes by program eligibility status: Did eligible households obtain more land, and experience higher income growth than comparable ineligible households? As our household survey revealed, however, there is little evidence that the program was implemented in line with official reports. Participation rates were lower than expected, especially outside Kontum. Furthermore, there was almost no link between observed eligibility variables and subsequent treatment.

Our results highlight the value of retrospective surveys in evaluating and auditing the implementation of government programs, and by implication, the value of continuously conducting household surveys that can serve as baselines. Especially with decentralized programs like 132 and 134, it should come as no surprise that local implementation may deviate from the original plan. This is especially the case with a land program that hinged on the availability of local land: That explains why treatment rates were so much higher in Kontum. To predict the impact of this program, it would have been useful to pilot the program in a sample of randomly selected communes in order to study how local officials interpreted, and complied with program parameters. The lessons from such an exercise could be applied to the design of the policy to take better account of local incentives and constraints for program implementation.

Of course, a more intensive RCT would still be useful in order to evaluate how valuable a plot of land could be to a household. On that front, we believe that our more conventional panel-data based estimates are still informative. We estimate that households receiving program land experienced increases of income in line with the returns from the amount and type of land distributed through the program. And those returns, while non-negligible, are not large enough to make much difference to the lives of minority households. These results underscore the limitations of land re-distribution as a means of increasing farm incomes in a dynamic,

increasingly complicated agricultural economy. Households may be able to generate basic staples for household consumption, but serious income growth requires households being able to grow perennials and other crops that require human capital and credit, as well as integration with outside markets. Programs 132 and 134 seem to have succeeded in distributing land to a significant number of households, and provided the government with an opportunity to demonstrate its concern over land and ethnic minority issues. But the benefits of the program appear to have been diffuse, and far greater investments (and probably a lot more elapsed time) will be required for ethnic minorities to appreciably close the gap in living standards with their Kinh neighbours.

7.0 REFERENCES

Baulch, Bob, Truong Thi Kim Chuyen, Dominique Haughton and Jonathan Haughton (2007): "Ethnic Minority Development in Vietnam." *Journal of Development Studies*, October, pages 1151-1176.

Baulch, Bob, Hung T. Pham, and Barry Reilly (2012): "Decomposing the ethnic gap in rural Vietnam, 1993–2004," *Oxford Development Studies* 40:1, pages 87-117.

Dang, Hai-Anh: (2012): "A Widening Poverty Gap for Ethnic Minorities," Chapter 8 in *Indigenous Peoples, Poverty and Development*, edited by Gillette H. Hall and Harry Anthony Patrinos, Cambridge University Press.

Deaton, Angus (2010): "Instruments, Randomization, and Learning about Development." *Journal of Economic Literature*, 48(2): pages 424–55.

Ministry of Agriculture and Rural Development (MARD) (2006): Summary Report on the Implementation of Prime Minister Program 132 on Resolving Land Issues for Local Ethnic People in the Central Highlands.

Ravallion, Martin (2008): "Evaluating Anti-Poverty Programs," in *Handbook of Development Economics Volume 4*, edited by Paul Schultz and John Strauss, Amsterdam: North-Holland.

Ravallion, Martin (2009): "Evaluation in the Practice of Development," *World Bank Research Observer*, Vol. 24, No. 1, February 2009, pages 29-54.

Ravallion, Martin and Dominique van de Walle (2008): *Land in Transition: Reform and Poverty in Rural Vietnam*. World Bank: Houndmills, U.K. and New York: Palgrave Macmillan.

USAID (2008): *Vietnam Central Highlands Needs Assessment: Final Report*.

Van de Walle, Dominique and Dileni Gunewardena (2001): "Sources of ethnic inequality in Vietnam." *Journal of Development Economics*, 65:1, pages 177-207.

World Bank (2009): *Country social analysis: ethnicity and development in Vietnam*. The World Bank, Washington, D.C.

Writenet (2006): *Vietnam: Situation of Indiginous Minority Groups in the Central Highlands.* Report Commissioned by the United Nations High Commissioner for Refugees, Status Determination and Production Information Section (DIPS).

TABLE 1

Provincial Reports of "Treatment" Rates for Households (HH), Program 132

Province	Number of Minority HH	Number of "Eligible" HH	Number of HH Received Land	% of Minority Eligible	% of Minority "Treated"	% of "Eligible" "Treated"	Land Transfered (Ha.)	Land Received (Ha. per HH)
Kon Tum	34,488	15,678	12,836	45.5	37.2%	81.9%	5,793	0.45
Gia Lai	80,208	16,170	12,596	20.2	15.7%	77.9%	4,083	0.32
Dak Lak	100,353	20,981	8,202	26.3	10.3%	39.1%	4,556	0.56
Dak Nong		2,120	2,120			100.0%	1,283	0.61
Lam Dong	38,700	16,856	7,519	43.6	19.4%	44.6%	5,026	0.67
Total	253,749	71,805	43,273	28.3	17.1%	60.3%	20,741	0.48

Source: Authors' tabulations based on official Provincial Reports of Program 132

1) "Eligibility" is taken as defined in the official reports.

TABLE 2

Comparisons of Households in 2002: Minority versus Non-Minorty; Kontum versus non-Kontum

	Kontum		CH (Non-Kontum)	
	Non-Minority	**Minority**	**Non-Minority**	**Minority**
Average Household Land				
Annual Land (Ha.)	1.43	1.06	0.31	0.77
Perennial Land (Ha.)	0.55	0.06	0.49	0.47
Agricultural Land (Annual+Perennial, Ha.)	1.97	1.12	0.80	1.23
Forestry Land (Ha.)	0.03	0.76	0.02	0.03
Land Distribution				
Proportion of Households with:				
Annual Land = 0 (Ha.)	0.00	0.00	0.44	0.15
Annual Land > 0 & < 0.5 (Ha.)	0.04	0.12	0.35	0.27
Annual Land >0 & < 1.0 (Ha.)	0.30	0.41	0.10	0.25
Annual Land >= 1.0 (Ha.)	0.65	0.47	0.11	0.33
Agricutural Land = 0 (Ha.)	0.00	0.00	0.10	0.01
Agricultural Land > 0 & < 0.5 (Ha.)	0.04	0.11	0.31	0.17
Agricultural Land >0 & < 1.0 (Ha.)	0.09	0.40	0.28	0.26
Agricultural Land >= 1.0 (Ha.)	0.87	0.49	0.31	0.56
Household Income and Composition				
Household Income	24,571	17,140	23,088	15,604
Crop Income	10,655	7,584	8,618	8,684
Sidelines	6,536	6,100	2,285	2,512
Wages	4,720	2,221	5,907	3,178
Family Business	2,488	207	4,534	328
Other Income	-531	593	472	471
Remittances	703	436	1,272	431
Per Capita Income	5,166	3,140	5,239	2,808
Simple Demographics				
Household Size	5.13	5.72	4.67	5.86
Maximum Male Education (>= 15)	6.70	3.68	8.24	4.47
Maximum Female Education (>= 15)	5.09	2.52	7.82	3.37
Household Labour (Days per year)				
Male, Days in Farming	204	203	161	212
Male, Days in Non-Farm work	42	3	46	9
Female, Days in Farming	142	243	135	216
Female, Days in Non-Farm work	46	1	70	10
Main Ethnic Groups (%)				
Xơ Đăng (Sedang)		50%		
Ba Na (Bahnar)		25%		
Giẻ Triêng		23%		
Ngái				32%
Ê Đê (Rhade)				22%
Cờ Ho				16%
N	23	207	267	629

Source: VHLSS 2002

1) Household education is summarized by "maximum male or female education" and measures the years of education of the highest educated (male or female) adult in the household. This is calculated for household members 15 and older. If there is no male or female older than 15, the maximum is calculated as "zero."

2) Income variables are expressed in '000 VND (2007 Prices)

3) Land Distribution based on households with land by size (in Hectares)

TABLE 3

Commune Reports of Implementation (Programs 132 and 134)

	Basic Counts			Implementation of Program 132							
	Number of:				Land for Eligibility (Communes)				"Treatment Rates"		
					Type of Land			Threshold	Percentage of Ethnic Households Receiving Land		
Province	Communes	Total Households	Ethnic Households	Participating Communes	Annual	Perennial	Unused	(Average, in Ha.)	Program 132	Program 134	Program 132 or 134
Kon Tum	10	9,724	6,492	10	10	0	0	0.86	37.0%	1.1%	38.1%
Gia Lai	15	16,488	9,880	12	7	1	4	0.28	10.4%	2.0%	12.5%
Dak Lak	17	42,374	14,412	12	6	5	5	0.61	7.6%	3.7%	11.3%
Lam Dong	8	11,760	6,194	1	0	0	1	0.30	0.9%	4.8%	5.7%
Total	50	80,346	36,978	35	23	6	10	0.56	12.4%	3.0%	15.4%

Source: CHVLSS 2007 (Commune Surveys)

1) This table reports results from the commune-level CHVLSS surveys

2) Land for eligibility refers to the land type used by communes to establish household eligibility for Program 132.

3) The threshold is the reported level of land below which households were deemed eligible for program participation.

4) "Treatment Rates" is the percentage of ethnic minority households receiving land from the relevant program.

TABLE 4

"Treatment" Rates by 2002 Land Holdings ("Potential Eligibility")

Household-Level Reports of Program Participation

	Potentially Eligible (under 1.0 Ha.)				"Ineligible"		F-Tests (p-values)	
Kontum	0	0 to 0.5	0.5 to 1.0	< 1.0	>= 1.0	All	OLS	FE
Treat 1: 132 Indicator	0.0%	8.7%	23.2%	20.0%	12.7%	16.4%	2.29 (0.16)	1.78 (0.17)
Treat 2: 132 or 134 Indicator	0.0%	8.7%	23.2%	20.0%	14.7%	17.4%	1.77 (0.23)	1.32 (0.27)
Treat 3: 132, 134, or Reclaimed	0.0%	21.7%	40.2%	36.2%	27.5%	31.9%	***4.98 (0.04)***	2.31 (0.10)
Sample Size	0	23	82	105	102	207	207	207
Proportion of Households	0.0%	11.1%	39.6%	50.7%	49.3%	100.0%		

	Potentially Eligible (under 1.0 Ha.)				"Ineligible"		F-Tests (p-values)	
Non-Kontum Central Highlands	0	0 to 0.5	0.5 to 1.0	< 1.0	>= 1.0	All	OLS	FE
Treat 1: 132 Indicator	0.0%	0.0%	1.2%	0.7%	3.1%	2.1%	1.18 (0.32)	1.74 (0.16)
Treat 2: 132 or 134 Indicator	0.0%	3.8%	4.3%	4.0%	3.4%	3.7%	2.16 (0.11)	0.55 (0.65)
Treat 3: 132, 134, or Reclaimed	16.7%	7.6%	8.5%	8.4%	11.0%	9.9%	0.41 (075)	0.65 (0.58)
Sample Size	6	105	164	275	354	629	629	629
Proportion of Households	1.0%	16.7%	26.1%	43.7%	56.3%	100.0%		

Source: VHLSS 2002 and CHVLSS 2007 (Household Survey)

1) Treatment status is based on household reports from the CHVLSS 2007

2) Potential Eligibility is based on reported land holdings in 2002 (combined annual plus perennial land)

3) All calculations based on sample of minority households only.

4) F-Tests are for whether there is a correlation between treatment status and being in a "potential eligibility" category (i.e., land holding category). Tests rejected at the 5% level are highlighted in bold italics.

5) The F-tests are computed without commune dummies ("OLS"), and with commune dummies ("FE")

TABLE 5

2002 Land Status and 2007 Reported Treatment Rates by 2002 PCY Quartile

	Means by PCY Quartile				F-Tests (p-values)	
	Q1	Q2	Q3	Q4	OLS	FE
Kontum:						
Per Capita Household Income (2002)	1,712	2,148	3,112	4,307	***213 (0.00)***	***125 (0.00)***
Annual Land in 2002 (Ha.)	1.01	0.89	1.07	1.17	3.07 (0.09)	2.33 (0.08)
Perennial Land in 2002 (Ha.)	0.05	0.09	0.06	0.05	0.29 (0.83)	1.00 (0.39)
Total Agricultural Land in 2002 (Ha.)	1.06	0.99	1.14	1.22	1.47 (0.29)	1.16 (0.33)
Potentially Eligible (Total land < 1.0 Ha.)	0.56	0.73	0.45	0.40	5.48 (0.02)	2.24 (0.08)
Treat 1: 132 Indicator	11.1%	20.5%	25.0%	8.3%	***6.17 (0.02)***	1.94 (0.12)
Treat 2: 132 or 134 Indicator	11.1%	20.5%	26.6%	9.7%	***6.50 (0.02)***	1.77 (0.15)
Treat 3: 132, 134, or Reclaimed	18.5%	34.1%	46.9%	22.2%	2.62 (0.12)	***3.76 (0.01)***
Non-Kontum Central Highlands:						
Per Capita Household Income (2002)	1,400	2,278	2,938	5,178	***506 (0.00)***	***406 (0.00)***
Annual Land in 2002 (Ha.)	0.70	0.77	0.66	0.97	1.87 (0.15)	***6.47 (0.00)***
Perennial Land in 2002 (Ha.)	0.25	0.32	0.67	0.71	***6.88 (0.00)***	***11.53 (0.00)***
Total Agricultural Land in 2002 (Ha.)	0.95	1.09	1.33	1.68	***8.70 (0.00)***	***16.68 (0.00)***
Potentially Eligible (Total land < 1.0 Ha.)	0.54	0.47	0.40	0.30	***5.72 (0.00)***	***10.12 (0.00)***
Treat 1: 132 Indicator	2.2%	0.0%	4.8%	1.5%	1.05 (0.38)	2.30 (0.08)
Treat 2: 132 or 134 Indicator	3.8%	3.0%	6.2%	1.5%	0.89 (0.46)	0.13 (0.94)
Treat 3: 132, 134, or Reclaimed	10.4%	10.9%	11.0%	6.6%	***3.10 (0.04)***	1.26 (0.29)

Source: VHLSS 2002 and CHVLSS 2007

1) This table reports means for 2002, and 2007 reported treatment status, outcomes by per capita income quartiles (calculated on the basis of 2002 PCY)

2) The PCY Quartiles are calculated over the entire CH (Minority households only)

3) All statistics calculated over minority households only

4) F-Tests test are for whether there is a correlation between a given variable (e.g., income, land, or treatment status) and being in an income quartile. Tests rejected at the 5% level are highlighted in bold italics.

5) The F-tests are computed without commune dummies ("OLS"), and with commune dummies ("FE")

TABLE 6

Exploring Linkages Between Potential Eligibility, Other Household Characteristics, and Treatment Status

Can We Predict Treatment Status?

(Based on "Treat 2", Standard Errors in Parentheses)

	Kontum		Non-Kontum Central Highlands	
	OLS	FE	OLS	FE
F-Annual Land Categories	2.423	1.231	0.187	0.260
	(0.150)	(0.294)	(0.905)	(0.854)
F Perennial Land Categories	***5.254***	0.486	0.971	***3.055***
	(0.027)	(0.692)	(0.418)	***(0.028)***
F Forestry Land Categories	0.058	0.692	***8.130***	***9.843***
	(0.944)	(0.502)	***(0.001)***	***(0.000)***
F ALL Land Categories	***8.015***	0.779	***4.151***	***3.633***
	(0.004)	(0.606)	***(0.002)***	***(0.000)***
F Household Characteristcs	0.212	1.886	1.700	1.515
	(0.925)	(0.115)	(0.173)	(0.196)
F Commune Dummies		***3.251***		***6.834***
		(0.002)		***(0.000)***

Notes:

1) This table reports F-statistics ofor the joint significance of household variables of a given type, in a regression explaining household reported treatment status.

2) Regressions are estimated without Commune Dummies (OLS), and with Commune Dummies (FE)

3) Household characteristics include: log per capita household income in 2002, household size in 2002, and maximum male and female education in 2002

4) Coefficients statistically significant at the 5% level are highlighted in bold italics.

TABLE 7

Land Outcomes: 2002 versus 2007 (VHLSS and CHVLSS)

	All Central Highlands				Minority Only			
	Kinh		Minority		Kontum		Non-Kontum	
	2002	2007	2002	2007	2002	2007	2002	2007
Average HH Land:								
Average Annual Land	0.40	0.30	0.84	1.02	1.06	1.14	0.77	0.98
Average Perennial Land	0.49	0.67	0.37	0.45	0.06	0.17	0.47	0.54
Average Agricultural Land	0.89	0.97	1.20	1.47	1.12	1.31	1.23	1.52
Average Forestry Land	0.02	0.01	0.21	0.03	0.76	0.00	0.03	0.03
CDF of Households with Land:								
Total = 0	9.0%	18.6%	0.7%	2.3%	0.0%	0.5%	1.0%	2.9%
Total < 0.5 Ha.	38.3%	37.2%	16.0%	15.6%	11.1%	15.0%	17.6%	15.7%
Total < 1.0 Ha.	64.5%	60.3%	45.5%	38.9%	50.7%	43.5%	43.7%	37.4%

Source: VHLSS 2002 and CHVLSS 2007

1) HH Land variables are expressed as average hectares per household, for each type (Annual and Perennial)

2) The CDF is the "Cumulative Distribution Function", i.e., the cumulative percentage of households with total land (Annual + Perennial) below the stated cutoff

TABLE 8

Changes to Income and Work, 2002-2007 (Panel Households)

	All Central Highlands				Minority Only			
	Kinh		Minority		Kontum		Non-Kontum	
	2002	2007	2002	2007	2002	2007	2002	2007
Income:								
Per Capita Income	5,233	11,666	2,890	4,906	3,140	2,921	2,808	5,559
Per Capita Expenditure	4,370	7,574	2,227	3,250	2,517	2,304	2,165	3,562
Log PCY	8.40	9.13	7.85	8.24	7.99	7.86	7.81	8.36
Log PCX	8.27	8.81	7.62	7.96	7.78	7.67	7.59	8.05
Household Income	23,206	48,805	15,984	26,175	17,140	15,837	15,604	29,577
Crop Income	8,780	27,791	8,412	17,270	7,584	9,686	8,684	19,766
Sidelines	2,623	2,072	3,400	2,108	6,100	1,287	2,512	2,378
Wages	5,812	8,640	2,941	4,548	2,221	3,169	3,178	5,002
Family Business	4,371	7,225	298	314	207	185	328	356
Other Income	392	1,283	501	1,030	593	1,144	471	992
Remittances	1,227	1,794	432	905	436	366	431	1,083
Labour (Days worked):								
Male, Days in Farming	164	140	210	226	203	245	212	219
Male, Days in Non-Farm work	46	65	7	13	3	8	9	15
Female, Days in Farming	135	116	223	219	243	258	216	206
Female, Days in Non-Farm work	68	62	8	10	1	3	10	12

Source: VHLSS 2002 and CHVLSS 2007 (Panel Households)

1) All values are expressed in constant '000 VND (2007 prices)

TABLE 9

How much crop income can be derived from a hectare of land?

OLS Regressions: Various Specifications

	(1)	(2)	(3)	(4)
Output Measure:	**2002 Level**	**2007 Level**	**Change**	**Change**
Land Measure:	**2002 Level**	**2007 Level**	**2002 Level**	**Change**
Minority Indicator	-996	1,137	-1,511	***-7,669***
	(1017)	(2857)	(3593)	***(2905)***
Base Land:				
Annual Land (Ha.)	***5,549***	***9,243***	829	***8,825***
	(822)	***(1304)***	(2905)	***(1534)***
Perennial Land (Ha.)	***6,076***	***31,059***	***18,877***	***15,779***
	(662)	***(1886)***	***(2340)***	***(2412)***
Interactions with Land:				
Minority X Annual Land	***-3,121***	***-5,041***	376	***-6,728***
	(843)	***(1555)***	(2981)	***(1768)***
Minority X Perennial Land	48	***-16,758***	***-17,266***	***-7,439***
	(779)	***(2172)***	***(2755)***	***(2648)***
Kontum X Annual Land	1,270	-465	-4,687	3,012
	(828)	(2104)	(2927)	(2303)
Kontum X Perennial Land	***-3,996***	***-11,293***	2,304	-4,553
	(1979)	***(2985)***	(6994)	(3135)
Combined Effects:				
Minority Annual	***2,428***	***4,202***	1,205	***2,097***
	(379)	***(1000)***	(1340)	***(944)***
Minority Perennial	***6,124***	***14,301***	1,611	***8,339***
	(482)	***(1411)***	(1704)	***(1415)***
Kontum Annual	***6,819***	***8,778***	-3,858	***11,837***
	(1022)	***(2350)***	(3611)	***(2662)***
Kontum Perennial	2,080	***19,767***	***21,181***	***11,225***
	(1977)	***(2999)***	***(6988)***	***(3265)***

Source: VHLSS 2002 and CHVLSS 2007 (Panel)

1) Each column represents a regression of crop income on land holdings (annual and perennial).

2) For crop income: specifications include the 2002 level, 2007 level, and the change between 2007 amd 2002

3) Land holdings are measured as either: the 2002 level, the 2007 level, or the change between 2002 and 2007

4) All specifications include controls for commune fixed effects, household size, and education

5) Standard errors in parentheses, and statistically significant coefficients (5%) in bold italics.

6) The Combined effects are the sum of the base land coefficient, plus the relevant interaction term.

TABLE 10

Estimated Treatment Effects: The Impact of Participation in Program 132 or 134 ("Treat 2") on Various Outcomes

	Annual Land	Perennial Land	Total Land	Household Income	Crop Income	Sideline Income	Male Days Farming	Female Days Farming	Total Days Farming
Effect for Kontum:	0.28	-0.04	0.24	***2,954***	***2,690***	-72	21.1	49.6	70.7
	(0.18)	(0.14)	(0.18)	***(894)***	***(941)***	(177)	(20.3)	(31.4)	(39.9)
Effect for CH Outside Kontum:	-0.30	0.07	-0.23	-4,615	-1,873	***-970***	16.3	-27.3	-11.0
	(0.16)	(0.18)	(0.21)	(2,424)	(2,148)	***(432)***	(43.2)	(37.0)	(76.7)

Source: VHLSS 2002 and CHVLSS 2007 (Panel), Minority Households Only

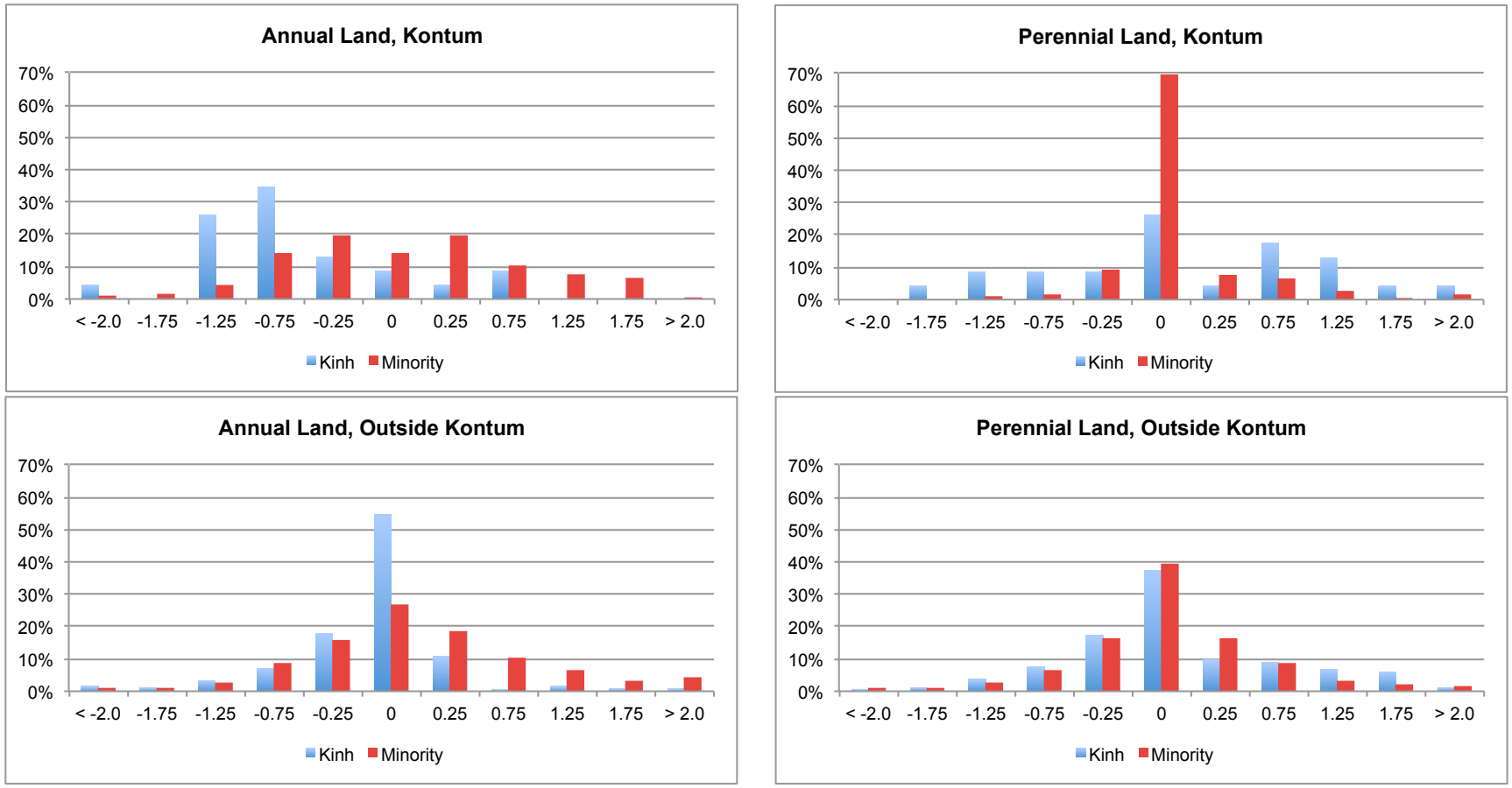
1) Each reported coefficient is the regression coefficient on a measure of treatment status from a regression of a change in household outcomes on treatment status, and covariates.

2) All specifications include commune fixed effects, flexible controls for household land endowments in 2002, household size and education in 2002, log pcy in 2002, and a complete set of initial measures of the 2002 dependent variables in this table.

3) Standard Errors in parentheses, and statistically significant coefficients (5%) in bold italic.

FIGURE 1

Changes of Household Land Holdings Between 2002 and 2007: What Percentage of Households had Changes of "X" Hectares?



APPENDIX TABLE 1

Land Redistributed by Communes Through 132: By Type and Source

		Land Source: 1	2	3	4	Total	
	Type of Land:	**Amount (ha.)**	**Amount (ha.)**	**Amount (ha.)**	**Amount (ha.)**	**Amount (ha.)**	**% of Total**
Kontum:	Annual	644.0	141.5	191.7	0.0	977.3	90.2%
	Perennial	0.0	0.0	0.0	0.0	0.0	0.0%
	Forest	0.0	0.0	0.0	0.0	0.0	0.0%
	Unused	0.0	0.0	106.1	0.0	106.1	9.8%
	Other	0.0	0.0	0.0	0.0	0.0	0.0%
	ALL	644.0	141.5	297.8	0.0	1083.4	100.0%
	% of Total	59.4%	13.1%	27.5%	0.0%	100.0%	
Non-Kontum	Annual	64.3	196.5	74.6	13.1	348.6	53.1%
	Perennial	193.7	5.5	0.0	45.3	244.4	37.2%
	Forest	0.0	0.0	0.0	0.0	0.0	0.0%
	Unused	0.0	6.6	38.7	16.5	61.8	9.4%
	Other	1.9	0.0	0.0	0.0	1.9	0.3%
	ALL	259.9	208.6	113.3	74.9	656.8	100.0%
	% of Total	39.6%	31.8%	17.3%	11.4%	100.0%	

Source: CHVLSS 2007 (Commune Survey)

1) Land Sources:

1 Land transferred from state owned farms and forestry plantations

2 Land from other households with compensation

3 Reclaimed land

4 Other

Appendix: Decisions 132 and 134 Documents

Decision 132/2002/QG-TTg dated 08 October 2002 of the Prime Minister on redistributing production and residential land for ethnic minority people in Central Highlands

Article 1. Resolving land for ethnic minority people in Central Highlands, to ensure that the ethnic minority households can have basic land for production activities as well as residential land. This is to improve their lives, enhance the development and ensure the security in Central Highland regions. Land should be basically redistributed to ethnic minority households who have not or lack of residential and production land at the end of 2003.

Article 2. The minimum distribution of agriculture land and residential land for each household is 1 hectare of terrace land or 0.5 hectare of paddy land (single crop) or 0.3 hectare of paddy land (double crop) and 400 m2 for residential land. As for perennial land, basing on production capability and the lack of land situation, there will be a suitable amount of land to be redistributed. The households who have not agriculture land will be provided forestry land, the distributed land amount will be followed the direction of the decree no 163/1999/NDD-CP dated 16 November 1999 of the Government on land redistribution, land lending to organization, households and individuals to use permanently for forestry purpose.

Article 3. Resolving principles

1. Ensure the equality and transparency of the redistribution to households, villages based on Government regulation and land policy. No consideration on resolving the issue of requesting old land.

2. To be suitable with custom of each ethnic group in close connection with the local socio-economic development plan towards the target of building a civilized and modern rural area, conserving traditional culture of each ethnic group.

3. Land redistributed households should directly managed and utilized their residential and production land. Within 10 years, they are not allowed to sell, mortgage in any form. If they are discovered to do that, they will be withdrawn and be not able to be redistributed again.

Article 4. Land fund for redistributing to ethnic minority households includes:

1. Land from state owned agriculture and forestry farm consists of: a. Excessive land after re-planning, land has not been used or ineffective production land; b. Land is near river wharf or villages where ethnic minority people are living in; c. Land from the households who have contract with state owned agriculture and forestry farm. If the average land holding of these households exceed local general average land holding, it will be adjusted to give the excessive land to the land fund. The land includes annual land, perennial land and forestry land.
2. Withdrawn land from state owned agriculture and forestry farm if necessary
3. Withdrawn land from ineffective production land, wrong purpose use of enterprises or from the enterprises which are closed down.
4. Land from farmers who have large land and would like to transfer a part of their land with compensation following the Government regulation.
5. Land for public use which has been managed by local authority

6. Reclaimed land, unexploited land
7. Forestry land with water source, poor or low economic effectiveness forestry land are allowed to change the using purpose into production land (the implementation of converting from forestry land to production land following government regulations on land and forestry development and protection is a must.)

Article 5. Implementation budget

1. Central budget:

Budget for reclaiming is on average of 4 million VND per hectare. As for households who reclaim themselves following local plan, they are allocated the same amount of money. The compensation for withdrawn land from households' reclaimed land is no more than 4 million VND/ha.

2. For withdrawn garden value

a. State owned enterprises' garden

If the enterprise's garden is invested by state budget, then the budget allocated to the enterprise will be noted as reduction correlatively to the practical value of the garden after reassessment and be debited against to household who is allocated the garden.
If the enterprise borrows from bank to invest in the garden, they are leaved the debt in a certain time with no interest rate, the state will support the bank in term of interest rate.

b. As for withdrawn garden which are from and invested by private enterprises and individuals, then local authority will resolve by their own budget.

3. Households are allocated perennial garden will be debited (with no interest rate) the garden value at the allocated time. Time for repaying debt will be appropriate to the economic cycle and production time left of the garden, but the maximum time is 10 years. Households repay debt before the regulated time will be reduced price. Specific reduction level will be regulated by the Ministry of Finance.
The President of People Committees in Central Highlands will preside the withdrawing of garden debts of households who are allocated land relating to garden.
Obtained debt, will be firstly paid for the owners of the gardens, and then the rest will be invested to local infrastructure, irrigation, electricity, clean water.

4. Ministry of Finance, Ministry of Planning and Investment will base on specific proposal of each province to approve and arrange enough budgets during two years (2002-2003) to implement. In 2002, state budget will be advanced for the implementation; the rest will be taken from proposed budget in 2003.

Article 6. Form of land redistribution and land use management

1. Production land: Ethnic minority households who depend on agriculture and forestry production have no land or are lack of production land will be distributed land directly from the local people committee with the standard amount following Article 2 in this Decision. In order to

help ethnic minority households to have enough land for production ensuring their lives, within 10 years, land distributed households of this program will be not allowed to transfer and mortgage in any form. Any organization or individual come to purchase ethnic minority households' land will be seized without compensation.
After redistributing land to ethnic minority households, local people committees have the responsibility to monitor carefully the use and management of redistributed land following this Decision in order to avoid the situation of selling or mortgaging land.

2. Residential land: The households who have no residential land will be provided land to construct their houses, the standard amount is indicated in Article 2 of this Decision and will be given land use certificate permanently following government regulations.

Article 7. Implementation organization

1. The President of the Provincial People Committees in Central Highlands will have the responsibility to review land demanding household list of their own provinces and coordinate with Ministry of Agriculture and Rural Development, Ministry of Military, State owned rubber corporation, State owned coffee corporation, Army Corps 15, Army Corps 16 to rearrange state owned agriculture and forestry farms, state owned agriculture enterprises in local area as in following direction: transfer all unexploited land, ineffective land and a part of currently used land (including land is near river wharf and village) of the state owned agriculture and forestry farms to local authority in order to distribute to ethnic minority households).
In 2002, the pilot should be completely implemented in some district, villages in order to get experiences and adjust the implementation plan so that in 2003, production and residential land redistribution is basically finished following this decision.
In parallel with land redistribution, the extension activities for agriculture, forestry, money lending, product sale, house construction, etc should be well organized to help ethnic minority people to improve their lives.
Inspection on the management, utilization of land in implemented provinces should be taken place in order to prevent and punish any activities on purchasing land, mortgaging land illegally.

2. Ministry of Agriculture and Rural Development will preside and coordinate with two other Ministries including Ministry of Finance, Ministry of Natural Resources and Environment to assess the land support proposals of Central Highlands provinces following this decision prior to the time President of People Committees in Central these provinces approve their own land support proposals.

3. Ministry of Natural Resources and Environment will preside and coordinate with Ministry of Agriculture and Rural Development to monitor the implementation in Central Highland provinces; Ministry of Finance will take the responsibility to guide and check the budget utilization during the implementation of this decision.

Article 8. This decision is in effect since its signed date.

Article 9. Ministers of the following Ministries: Ministry of Agriculture and Rural Development, Ministry of Finance, Ministry of Planning and Investment, Ministry of Natural Resources and Environment, Ministry of Labour, Invalids and Social Affairs and Minister of Central Ethnic Minority Committee, President of State Bank, President of People Committee in following

provinces: Lam Dong, Dak Lak, Gia Lai and Kon Tum have the responsibility to implement this decision./.

Prime Minister
Phan Van Khai

Decision No 134 of the Prime Minister on supporting production land, residential land, houses and daily use water for poor ethnic minority households.

Article1. Implement policies on supporting production land, residential land, housing and daily use water for poor ethnic minority households in associated with other socio-economic program of Government to support ethnic minority households to afford production activities, improve their lives and escape from poverty.

1. Target group

Local ethnic minority households who are permanent residents, poor ethnic minority households who are living based on agriculture and forestry activities. These target groups should be eligible for the program if they have not or are lack of production land or residential land and meet difficulties in terms of houses, daily use water.

2. Principles

a. Support production land, residential land and houses, daily use water directly to poor ethnic minority households

b. Ensure the transparency, equality in supporting to each household in every village following Government regulations and policies.

c. To be suitable with custom of each ethnic group, region, and conserve the culture character of all ethnic groups, be suitable with practical conditions and be in associated with local plan on socio-economic development.

d. Households who are distributed production land, residential land, houses and daily use water should manage and use the supported items directly. This is to ensure production development, living condition improvement and contribute in poverty reduction. In particular case, if supported households (production and residential land) want to move to another province, they should transfer their land use right to the local authority to redistribute to other poor ethnic minority households.

If they do not follow this regulation, Government will withdraw with no compensation to redistribute to ethnic minority households who have not land or are lack of land.

Article 2. About policies

1. Production land

The minimum amount of redistributed land for one household includes 0.5 ha of terrace land or 0.25 ha of single paddy crop or 0.15 ha of double paddy crop. Based on local land fund, labour capacity, and number of members in each household and local budget, the provincial people

committees may consider and decide to redistribute land to the ethnic minority households with higher amount.

2. Residential land

The minimum amount of redistributed land is 200m2 for each ethnic minority household in rural area. Based on local land fund and budget, the provincial people committee will consider to redistribute residential land to ethnic minority households with higher amount.

The State will have particular policies to support on production and residential land for poor Kho me ethnic group due to the characteristics of Mekong river delta.

3. Housing

Regarding poor ethnic minority households (including Kho me) have no houses or houses are damaged partly, the support will follow the direction "People should construct themselves, the State will support and the community will help".

a. Central budget will be delivered to support the amount of 5 million VND/household to construct houses. Based on situation and budget, the local authority will put an additional support and encourage the help of the community
b. As for the provinces that possess forest planned and annual wood exploiting plan approved, the provincial people committees are allowed to exploit wood under common regulation to support ethnic minority households to construct their houses. The amount of wood to be distributed will be decided by the provincial people committee. It is not allowed to take this advantage to destroy the forest.

4. Support on daily use water

a. The ethnic minority households are scattered living in upland, mountain, etc where are difficult to get daily use water, the State will provide an amount of 0.5 ton cement/household from central budget to construct water tank or support the amount of 300. 000 VND/household to sink well or find a daily use water source.

b. As for common daily use water building, the State will support 100% from central budget to villages which have above 50% of total households are ethnic minority households, support 50% to the village which have from 20% to below 50% of total households are ethnic minority households. The local daily use water construction must be ensured of the effectiveness and the sustainability.

Article 3. Land fund for redistributing land to ethnic minority households includes:

1. Public land which have been withdrawn by the State following the general planning. Land is allocated with contract to households from State owned agriculture and forestry farms.

2. Land is withdrawn from State owned agriculture and forestry farms due to ineffective use.
3. Land is reclaimed from bared and hilly land or abandoned land
4. Land is withdrawn from state enterprises that use land ineffectively and for wrong purposes or enterprises are closed down; land is withdrawn from individuals who appropriate illegally.
5. Land is being managed and used by State owned agriculture and forestry farms but is used by ethnic minority households long time ago should be adjusted to be reallocated with contract to ethnic households as production land (including the area of perennial crops or forest) to use following general regulation. The specific amount will be decided by provincial people committee.
6. Land is given or transferred from other households voluntarily
7. As for the case of having no land for agriculture production, forestry land will be used to redistribute. The redistributed amount will be followed the Decree no 163/1999/ND-CP dated 16 November 1999 of the Government in redistributing, lending forestry land over organizations, households and individuals for long term use; and regulations of Land Law.

Article 4. Support in creating production and residential land fund

1. Central budget will support to create production and residential land fund, consisting of reclaiming, compensation for withdrawn land, transferred land from other households who have large land with amount of 5 million VND per hectare. Based on local practical situation, the provinces will decide specific regulations.

2. If the state owned agriculture and forestry farms are assigned to organize production activities for ethnic minority households, they are also supported by central budget for reclaiming with amount of 5 million VN per hectare. Moreover, they are also supported capital for constructing roads, electricity network and small irrigation building.

Article 5. Implementing budget

1. Central budget should ensure the expense amounts following regulations of this decision

2. Local budget should contribute the amount of over 20% of total Central budget as well as encourage other legal budget sources in order to implement this policy.

3. The local take the initiative in providing budget for measuring land, issuing land use certificate for ethnic minority households

Article 6. Implementing organization

1. Provincial people committees have the responsibility to directly and comprehensively preside and organize the implementation of this policy

a. Announce publicly the criteria, target group and conduct a survey to obtain the list of poor ethnic households who have not or are lack of production and/or residential land and meet difficulties in terms of housing, or daily use water.

b. Design and approve proposals on redistributing production land, residential land, housing, daily use water for poor ethnic minority households in local area (including the promulgation of Decisions on adjusting contracted land and withdrawn land from state owned agriculture and forestry farms which are under the management of ministries and other local situated institutions) in order to send to Ministry of Planning and Investment, Ministry of Finance for reviewing and submitting to the Prime Minister so that annual plans can be approved.

The above mentioned activities should be completed during the third quarter of 2004. If there are any constraints, it is needed to report to the Prime Minister and Ministries as well as related institutions to resolve.

c. Direct the related institutions, local authorities and other socio-political organizations to implement effectively support policies to poor ethnic minority households, contribute in poverty reduction and improve the lives of ethnic minority households.

d. Monitor regularly the implementation process, ensure that the policy go to all ethnic minority households, the corruption is not allowed.

e. By the end of 2006, the implementation of policies in this Decision should be basically finished.

2. Ministry of Agriculture and Rural Development has the responsibility in leading, guiding and helping the provinces in constructing and upgrading small irrigation building, supporting on seeds, animals, resolving daily use water and rural environment hygiene towards the direction of production development and poverty reduction.

3. Ministry of Construction will guild and monitor the provinces in implementing the policies of supporting houses for ethnic minority households.

4. Based on the proposal on resolving production land, residential land, housing, daily use water approved by the provincial people committee, Ministry of Planning and Investment will preside and coordinate with Ministry of Finance to review the plan, allocate additional targeted budget to the provinces within proposed plan and central budget in 2005, 2006 and then submit to the Prime Minister for final decision.

5. Ministry of Finance will submit to the Prime Minister for approval specific policies in terms of withdrawing production land from state owned agriculture and forestry farms (including perennial crops and planted forest) in order to allocate with contract to poor ethnic minority households.

6. Central ethnic minority committee will preside and coordinate with other Ministries, related institutions to guide and monitor the implementation of this Decision, and report to the Prime Minister periodically.

7. Ministries, related institutions based on their own mandates will have the responsibility to monitor and support the provinces to implement effectively the policies regulated in this Decision.

Article 7. This Decision will be in effect after 15 days from the first day to be public in Government legal document. To declare off the Decision no 154/2002/QD-TTg dated 12 November 2002 of the Prime Minister on policies for ethnic minority households and other households in Central Highlands selected for the policies on purchasing houses with deferred payment.

Article 8. Ministers, Heads of the institutions are at the same level with the Ministries, Heads of Governmental institutions and the Presidents of City/Provincial people committees under central management will have the responsibility to implement this Decision./.

Prime Minister

Phan Van Khai. Signed.