

6

Policy Recommendations

6.1 The previous chapters have described the problem of indoor air pollution and its linkages with poverty reduction; provided a ballpark estimate of the extent of this problem in Guatemala; and discussed ways of mitigating the impact of indoor air pollution, principally through two interventions, LPG and improved stoves. This chapter attempts to draw together the different recommendations and policy options, as well as areas for further discussion, as an input to decision-makers in Guatemala to address the problem of indoor air pollution and its related health impacts.

Poverty and Indoor Air Pollution

6.2 The first chapter showed how indoor air pollution in Guatemala is closely linked with (i) the high incidence of poverty with over half of all Guatemalans – 56% or about 6.4 million people – living in poverty in 2000; (ii) the low levels of rural electrification, with less than 40% of the poorest households having electricity connections compared to 95% of the richest households; (iii) large rural populations with over 60% of the Guatemalan population living in rural areas, 81% of the poor and 93% of the extreme poor live in the countryside. Three quarters of all rural residents fall below the full poverty line and one quarter live in extreme poverty; and (iv) high levels of traditional fuel use. In Guatemala, fuelwood is the dominant cooking fuel in 97% of households in rural areas. Furthermore, 42% of rural households use fuelwood only while 55% practice multiple fuel use, whereby the household uses more than one type of fuel.

Linkage with Millennium Development Goals

6.3 There is a growing body of evidence, based on worldwide IAP health studies, that has detected alarmingly high levels of indoor air pollution in homes which use traditional solid fuels. Exposure monitoring studies in Guatemala have confirmed that women and children endure high exposure to toxic pollutants from fuelwood consumption. The worldwide literature also points to a strong association between indoor air pollution and health conditions, particularly among children in the first few years of life. Conclusive

links between health impacts and different levels of indoor air pollution are still lacking, and a recently initiated study currently underway in the Guatemalan Highlands, financed by the U.S. National Institutes of Health, is expected to be an important source of future information.

6.4 Back-of-the envelope type estimates, based on results of worldwide IAP health studies, indicate that the number of annual cases of ALRI could be as reduced by as many as 16,000, and annual deaths by about 700 as a result of eliminating indoor pollution in the Guatemalan Highlands. This represents a potential 50% reduction in the annual cases of ALRI in the 400,000 children between the age of 0-4 years living in households where open fires are used for cooking.

6.5 However, despite the current lack of conclusive evidence, the general consensus amongst the broad-range of Guatemalan stakeholders in the April 2003 workshop was that something had to be done about the problem of indoor air pollution in the short-term particularly because of its close linkage with the Millennium Development Goals number 4 related to reducing child mortality and number 5 related to improving maternal health. This is also consistent with the recommendations of the Guatemala Poverty Report that suggested that preventative health be targeted, particularly to the following vulnerable groups: poor and malnourished children, poor women and girls, poor indigenous households, and the rural poor. In Guatemala, these very same vulnerable groups are those most affected by indoor air pollution.

What can be done about indoor air pollution?

6.6 It was striking to note that at the start of this study, there was already a rich stock of papers in international academic journals on exposure monitoring experiments in Guatemala. The results of some of these is described in the first and third chapters. However, indoor air pollution was not a topic on the agenda of any government agency. As the study developed, and principally through the dissemination workshops, there was a gradual understanding built up of the importance of intersectoral collaboration to have an impact on this issue, and the importance and emotive nature of the issue itself, which is so closely linked with the well-being of children and women, mainly in poor, rural, indigenous households, and to the country's poverty reduction goals. Indeed, during the April 2003 workshop, participants identified a number of issues as barriers to successfully reducing indoor air pollution in rural homes. These included: (i) lack of a national policy; (ii) lack of leadership; (iii) apathy (as reflected by lack of willingness on the part of the government to act and lack of interest on the part of the population); (iv) lack of interinstitutional coordination; (v) resistance to change; (vi) lack of education; (vii) lack of training; (viii) poverty and lack of access to resources; and (ix) lack of state policies.

6.7 These barriers reflect the fact that there is considerable lack of information about this topic, and therefore as a result, lack of a constituency to do something about it. The interventions described below aim to (i) assure availability of information so that the

extent of the problem can be monitored; (ii) facilitate solutions through both better coordination and use of technical options; and finally, (iii) ensure sustainability in the implementation of options, through promoting behavioral change in the long term. At a broad level – four types of interventions are needed:

- **Monitoring the problem and understanding better the links between health and poverty reduction:** This is an important intervention since it helps to build a constituency through the provision of information about the subject itself. Clearly there is strong evidence that points to a problem closely linked with Guatemala's poverty reduction agenda, but there are still gaps in this that need to be filled in. The improved stove intervention trial (mentioned above), conducted by Smith and his co-workers, that attempts to estimate the reduction in ALRI associated with improved stove use in Guatemala will shed more light on the severity of the problem of IAP and ALRI in Guatemala, and the effectiveness of improved stoves as an intervention in reducing IAP and ALRI. The government needs to follow this study and other research in this area that tries to link ALRI and pneumonia to indoor air pollution, particularly since these are the number one health issues with respect to both morbidity and mortality for children respectively in Guatemala, and therefore a better understanding of linkages will provide important input for national health policies.
- **Greater Interinstitutional Coordination:** This is probably the most crucial. The topic itself is such that it falls between the different mandates of existing government institutions. The technical mitigation options lie within the mandate of the Ministry of Energy, but the link with health impacts and dissemination of these impacts lie in the Ministry of Health. In terms of financial resources, the FIS has a major role to play in financing technical options, such as improved stoves, for poor households. However, the technical innovation and health impact aspects is missing from their current program. This is a clear case where the sum of the parts clearly would have a greater impact than the cumulative impact of each part separately.

Coordination between various types of stakeholders is also crucial, namely the government (with whom the policy options lie and the broader mandate of poverty reduction), the private sector (who help develop the market for the technical options, namely improved stoves and LPG in rural areas), the NGOs (who often act as a partner to the government in implementation of programs, both on health service delivery in rural areas and improved stoves); the households themselves, particularly the women who use the stove, and the men who choose to buy it and often collect firewood for it; and academia, who are working on establishing a firm link between health and indoor air pollution.

A third layer of coordination should also be highlighted. This is with Guatemala's neighbor to the South, Mexico, where 28 million people use firewood for cooking, and where the same issues are under discussion at the moment. A collaboration across boundaries, clearly has great scope for both

countries, since there are planned and ongoing efforts in Chiapas which could be coordinated with Guatemala programs and vice versa, given that it is the same region and shares many cultural and socioeconomic factors. The advantages of this collaboration would be principally the creation of a larger market for technical mitigation options, and therefore one that would be more attractive to the private sector. Joint monitoring and sharing of research would also bring additional benefits for both countries.

- **Making people aware of the problem in order to promote behavioral change:** As mentioned above, lack of information and lack of an understanding of the link between smoke and poor health has meant that there was no constituency to champion this subject. In the course of the study, dissemination of study results has started to build a nascent constituency at the level of the government stakeholders, but much more needs to be done. In the stoves study, a striking finding was that women did not make the link between health and smoke. This clearly needs to be changed, to promote changes in behavior to achieve better health outcomes. In one sense, the problem is akin to provision of sanitation and the impact on diarrheal diseases. Only after there was recognition of the fact that washing hands was crucial to obtaining a better health outcome, that the technical option of providing a latrine was not a sufficient condition, and programs started including education for the mother on the importance of this, did health outcomes improve in sanitation programs.

Women's groups and NGOs can clearly play an important role in getting the message to the final users. Adjusting existing government training and health outreach programs, as well as existing media campaigns for improved stoves and LPG, to also discuss linkages between smoke and health will be equally key in promoting long-term changes in behavior.

- **Implementing technical options:** Technical options, principally improved stoves for the lower income quintiles with targeted subsidies through the FIS, and improved stoves and LPG stoves for the higher income quintiles, also need to be implemented. However, the majority of current improved stoves programs (of which there is a rich stock compared with other countries in Central America) focus on fuel efficiency, are highly-subsidized, offer limited choice to the user, and are implemented in a modular manner, with no interaction with the government and its policies, separate suppliers, and separate rules of the game with respect to program design and implementation. Clearly these need to be changed through the government playing a more proactive role in establishing policies related to improved stoves programs, that emphasize both fuel efficiency and health impact as key criteria for stove design, and promote a more market-based system with targeted subsidies for the poorest, and with choice and training for the user. Such policies clearly will require good coordination between different government entities and other non-governmental stakeholders. Coordination on better house design to improve ventilation is another area for possible government intervention through building codes and working with local

municipal heads. Finally, the government can play a key role in assuring that technical options for mitigating indoor air pollution are placed firmly in the context of broader rural development programs, that seek to reduce poverty more generally. Donors and NGOs need to ensure that their programs are in-step with such a program, and that they do not operate in a modular manner.

The role of each stakeholder in a solution

6.8 Indoor air pollution is a topic that involves many stakeholders, and requires that many people play a part to ensure a change in the status quo. Ironically, it is also an issue where the technical solutions are fairly straightforward, but the behavioral and cultural issues are much more important. So the importance of the role of different stakeholders to promote this change of behavior is crucial to ensure that solutions are sustainable over time. In order to illustrate this, we attempt to present our conclusions from the perspective of the different stakeholders and how they can work together to make a difference. A discussion on budgetary implications and changes in the incentive framework follow.

6.9 **President's Office or Ministry of Planning:** Clearly, without leadership, any activity requiring coordination across institutions is unlikely to move forward. Here, an institution at a different level to the Ministries involved, such as the President's office or the Ministry of Finance or Planning can play an important role in promoting interinstitutional coordination, and including the topic of mitigating the impacts of indoor air pollution in the context of the country's broader policies and strategies for poverty reduction. Such an institution could also take the lead in the short term by forming a working group, comprised of the principal stakeholders to define an appropriate plan of action to respond to such an issue at the start of the new administration.³⁷ Such a group could evolve into the Intersectorial Coordination Group on Rural Household Energy, as described below in paragraph 6.11 in greater detail.

6.10 **Ministry of Health (MSPAS):** While this study attempted to estimate the impact of indoor air pollution, clearly more consistent information gathering and monitoring will allow for more accurate monitoring of this issue in Guatemala. In that regard, an expansion of the MSPAS's outdoor pollution unit to include indoor air pollution would be a critical step. Given the potential impact of this problem on infant health and mortality, and its relation with the national poverty reduction program, the MSPAS could (i) start to gather better information on this issue, including through influencing the design of subsequent DHS and LSMS questionnaires to include appropriate questions to establish better understanding of the linkages between ALRI and pneumonia and indoor air pollution; (ii) liaise with ongoing academic initiatives, such as the US National Institutes of Health-financed intervention study, (iii) play a role in designing preventative programs with other Ministries and the FIS through playing an active role in an

³⁷ This suggestion was put forward by one of the Working Groups in a final dissemination workshop held in Guatemala in April 2003.

Intersectorial Coordination Group on Rural Household Energy (see para. 6.11), through provision of information of the impacts of indoor air pollution, promoting better housing design (such as use of chimneys and separating sleeping quarters from the kitchen) and the broader inclusion of the topic of mitigating indoor air pollution in poverty reduction programs; and (iv) take a more active part in disseminating information on IAP in Guatemala by making use of its existing clinic outreach program as a vehicle for dissemination of information on ALRI and other health impacts of IAP such as low birth weight of babies and, respiratory problems in women that are reported in the literature. By tackling IAP today, in the longer term, this should result in a reduction in healthcare costs.

6.11 Ministry of Energy and Mines (MEM): The technical solutions lie closely in the hands of the Ministry of Energy and Mines, but application of many of these technical options require that this Ministry work closely with others, including Planning, Health and the FIS. With respect to promoting cleaner household energy options in rural areas, the findings of this study suggest that this Ministry can play an important role in establishing an Intersectorial Coordination Group on Rural Household Energy, in which there is representation of key stakeholders, and which has as a mandate the championing and implementation of policies related to meeting the energy needs of rural families. It is particularly important that this mandate be closely linked with broader rural development programs, and that the Group's efforts focus on improving the current infrastructure and programs, so that they are more effective, rather than seeking to only create new programs. This is particularly true for the improved stoves programs, where, given the high use of fuel wood and its close linkage with poverty reduction, greater effort is needed to shift from current heavily subsidized improved stoves programs with limited user options and a greater focus on fuel efficiency to more market-based programs where the user can choose from a variety of options, and where both health impact and fuel efficiency are the cornerstones of stove design. Efforts also need to be made to promote dissemination on the need for stoves to be properly maintained, and complemented by adequate housing design.

6.12 As a complement to the activities of the Intersectorial Coordination Group, the MEM also needs to establish and lead a Technical Stoves Unit, which would act on behalf of the consumer to assure stove design quality and certify stove design. This could be run by a third party NGO or private sector entity. Such a Unit, by certifying various stove designs financed by the FIS, would result in giving the user greater choice in stoves as well as protect the user from faulty stove designs. Ideally if such a Unit were to gain broad acceptance amongst users, it is expected that new NGO programs would also approach the Unit for certification of their stove designs, and therefore play an important role in research into new designs, organizing demand from communities, and delivering services. Alternatively, the government could expand its scope to include non-FIS designs. Such a Unit would also play an important part in disseminating its findings to the public, so as to promote better understanding of the linkages between health and indoor air pollution and to protect the public from purchasing faulty products.

6.13 On LPG, it is recommended that MEM (i) closely monitor price movements to ensure that the current duopoly structure not lead to high end-user price levels in the future, particularly since both LPG prices and start-up costs are low by international standards in Guatemala today, and market power is concentrated in two dominant LPG firms. Price and other incentives to promote the use of LPG among the poor should be primarily market-based; and (ii) examine, a system of cylinder ownership whereby cylinders are owned by firms and not by individual consumers. In this way, LPG firms can be held responsible for maintaining cylinders and complying with safety regulations. This should also accelerate cylinder renewal, as the chances of new cylinders migrating to other firms are minimized.

6.14 **Ministry of Environment:** Improved stoves are closely linked to greater fuel efficiency and less deforestation. The Ministry of Environment can clearly play a role in an Intersectorial Coordination Group on this subject, as well as a member of the Board of the Technical Stove Unit.

6.15 **Ministry of Foreign Affairs:** Through the Ministry of Foreign Affairs, it is recommended that coordination on this issue is established with the Mexicans. The advantages of such a collaboration are described earlier. They include the creation of a larger market for technical mitigation options, and therefore one that would be more attractive to the private sector, and the related advantages of joint monitoring and sharing of research.

6.16 **Social Investment Fund (FIS):** The FIS today is the major supplier of improved stoves in Guatemala. Such a program clearly needs to continue since, as this study shows, improved stoves are the primary mechanism for reducing exposure to smoke and indoor air pollution, which is closely linked with maternal and child health in poor households. However, the current FIS program could potentially have a greater impact on reducing health impacts of indoor air pollution through (i) providing the user a choice of certified (in both fuel efficiency and reduced pollution) improved stoves, which will also help to encourage needed competition in the improved stoves market; (ii) improving existing training programs on use and maintenance of stoves by scheduling training sessions for users after they have gained sufficient experience using the stoves; and (iii) expand existing training to include the links between improved stoves, smoke and health. The FIS could also play an important part in an Intersectorial Coordination Group and a Technical Stoves Unit, by collecting and providing input on how well stoves function in the field, through use of its existing mechanisms to follow up on implementation of its programs.

6.17 **Womens' Groups:** Such groups could play a crucial role in assuring the participation and involvement of the households and the users (principally women) in the development of a policy on biomass use and in an Intersectorial Coordination Group. In addition, these groups could (i) provide training for women leaders on the hazards of smoke; and (ii) collect and provide input on how well stoves function in the field.

6.18 Private Sector Stove Manufacturers: It is important that such groups work closely with the government to assure that their products are certified and also help convey the message with respect to health impact to users. By doing so, in the longer term, they would be helping to improve their own sales. The opening up of the FIS to other certified designs would provide an incentive to this group to move forward along the lines suggested. Possible technical assistance from the government, financed by donors, through the Intersectorial Coordination Group and a Technical Stoves Unit, for market studies to clarify the relationship between the market for stoves and whether subsidies are necessary to promote them would also be useful from the perspective of the government's policy formulation, but also to help define strategies for retail distribution and marketing of stoves.

6.19 Private Sector LPG Companies: Such companies need to continue their focus on expanding access to rural populations, as well as appropriately pricing LPG and ensuring cylinder safety. The inclusion of an LPG certified stove with first cylinder on the list of FIS offered stoves would clearly provide a positive incentive to further market development.

6.20 NGOs (Stoves): It is important that the Government of Guatemala build upon and support the considerable base of experience and institutional capacity that has already been developed by existing stove programs implemented by NGOs in Guatemala. NGOs clearly need to work closely with the government if starting new programs, especially with a Technical Stoves Unit. It is also important that their programs fit in with a governmental policy on rural household energy, and are focused on the poorest income quintiles. If the FIS starts to offer other certified stove designs, clearly these NGOs could play a key role in stove development, organizing demand and delivering service. NGOs can also clearly play an important role in provide training to rural communities on the linkages between improved stove, indoor air pollution and health impacts; and to collect and provide input on how well stoves function in the field.

6.21 NGOs (Health Service Delivery): Guatemala is unusual in that NGOs play a primary role in providing health services to the rural areas. These NGOs, through their contract with the Ministry of Health, clearly can play an important role in disseminating information on ALRI and other health impacts of IAP such as low birth weight of babies and, respiratory problems in women that are reported in the literature.

6.22 Academia: The findings from the monitoring literature and field experience attest to the fact that interventions to improve stove efficiency do not necessarily translate to reduced levels of IAP, notably PM_{10} due to factors such as housing design and stove maintenance. Further complicating this is the dependence of measured exposure levels on the accuracy and method of measurement. There is a need to narrow the variations of PM_{10} levels associated with use of improved stoves or at least identify causes to which they may be attributed. It is clear that in-depth and well informed exposure monitoring in actual situations where improved stoves are being used is required and should be carried out. In particular, background concentration levels of PM_{10} in households should be monitored and assessments of the effects of background concentrations and cooking

patterns on exposure levels undertaken. Clearly further studies of the type proposed will not only provide better understanding of exposure levels associated with improved stove use, but will also provide better understanding of how improved stoves can be promoted from a health perspective. Academia, in moving forward on this type of research, needs to work closely with the government, NGOs and the households themselves to assure that their research findings are incorporated in policy. The role of the Intersectorial Coordination Group will be a key mechanism to assure this.

6.23 Foreign Donors: Donors clearly play an important role in poverty reduction and improved stoves programs. While they coordinate closely on the former issue with the government, coordination on the latter issue has been lax or non-existent. It is really important for donors to establish a link between indoor air pollution and poverty reduction; as well as to coordinate closely with the government and in-line with any new direction established by the Intersectorial Coordination Group to assure that their improved stoves programs are targeted to the most needy and that the program is designed in such a way as to be sustainable and to have an impact on both fuel use and health.

6.24 The budgetary implications of such a program are worth discussing, particularly given the many priorities faced by the Guatemalan government. In particular, it is worth noting that these suggested interventions, seek to utilize current arrangements to make them more efficient and effective in terms of combating indoor air pollution. In addition to a more targeted use of existing budgetary resources, they also suggest an increase in overall budgetary resources, particularly with respect to establishing a Technical Stove Unit (with start-up cost estimated at \$250,000 a year), as well as an increase in the number of staff in the Ministry of Health's Environment Unit to focus on IAP monitoring and dissemination. However, given the close linkage of this topic with maternal and child health, it is expected that these increased costs will be off-set in the longer term by improvements in health impacts.

6.25 The sequencing of some of these events, if these suggested recommendations are followed, is also important. For example, the government would need to first establish an Intersectorial Coordination Group and a Technical Stoves Unit, so that it can certify stoves, prior to making any changes in the FIS program.

6.26 It is also important to clarify that the changes above imply a change in the incentive framework under which all IAP stakeholders would operate. The opening up of the FIS program to more than one design would result in opening up the improved stoves market to several other market players (including regional players), and therefore help ensure that there is more choice for the user, and, in the long term, reduced costs of different improved stoves. It will also force the stove manufacturers to make more than one design; as well as provide an incentive to NGOs to organize demand and to deliver the service. This would be a significant change from the current situation of dedicated stove manufacturers for the different improved stoves and NGO-led distinct stove programs, typically supported by foreign donors. If the FIS was also to offer a fixed subsidy amount for an improved stove (the design of which had been certified), one could

include improved stoves of different costs (including an LPG stove with the first LPG cylinder) so that the user could make the choice between an expensive, large stove with a longer life (such as the current FIS *plancha*) and a cheaper, smaller stove with a shorter life (but where the FIS subsidy would cover virtually the full cost of the stove). This will allow greater user choice.

6.27 Finally, it is worth reiterating that the activities under this study were chosen to specifically complement existing activities underway in Guatemala at the time, and therefore are by no means comprehensive. The focus has been on providing policy-makers with information on the possible extent of the indoor air pollution problem in Guatemala. In addition, particular focus has been given to policy recommendations to enhance the impact of the existing improved stove and LPG programs, with respect to enhancing effectiveness in terms of health impact. Future areas of investigation include (i) a better understanding of the changes in exposure to PM 2.5 of different members of the household when using an improved stove under real conditions (with a focus on both operation and maintenance of the stove) and the corresponding impact on health; (ii) an analysis of the costs and benefits of different mitigation options; (iii) an analysis of LPG availability and corresponding issues in the rural areas; and (iv) assessing current and planned rural development programs and providing recommendations (based on worldwide experience) on how best to integrate technical options for mitigating indoor air pollution in the context of these programs.

6.28 In conclusion, indoor air pollution is a priority in Guatemala today. Despite the many knowledge gaps, there is a strong case that the government and other stakeholders act to address this issue, mainly because of its close linkages to child mortality and maternal health.