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Florence Mc Bain

Abstract

Recently, many emerging countries have established subsidized health insurance schemes to provide financial protection and support access to health care to poor households. The challenge to ensure the long term sustainability of such schemes is huge. In this paper, the impact of the health environment on the long term sustainability of a health insurance is explored, focusing on water and sanitation. India offers an interesting case to explore this question. Indeed, since 2008 India launched a fully subsidized health insurance Rashtriya Swasthya Bima Yojana (RSBY) in a context where 56% of its population does not have access to safe sanitation and 8% do not have access to safe water (JMP, 2012). A framework is proposed linking water supply and sanitation; health status of the insured population; health insurance and the productivity of households. Next, based on a literature review, the outcomes of investments in water and sanitation and health insurance are reviewed and the potential synergies and trade-offs of combing these investments are explored. In a last section, the case of India is analysed in detail, with international comparisons and further research lines are proposed.

Keywords: Health insurance, financial sustainability, water and sanitation, India

1 Introduction

Whether established universal health insurance systems in developed countries or newly launched health insurance for a targeted population in emerging countries, all face the challenge of offering sustainable and adequate health care and financial protection when seeking health care to its population. In many emerging countries, where the capacity to levy resources for health insurance is limited and where the epidemiologic transition poses a double threat of non-communicable and communicable diseases, this problem is particularly acute. The need to identify cost-effective policies that reduce or prevent the health burden and the health care costs is essential.

In such a context, this paper analyses the potential synergies and trade-offs which arise from investments in health insurance and water and sanitation services (WSS). The provision of safe drinking water and sanitation not only fulfills fundamental basic needs and offers convenience; but has huge health benefits by preventing many water-related diseases and is cost-effective. Thus, investments in WSS could be an effective policy to improve health outcomes and contribute to cost containment of health expenditures for health insurances in emerging countries.

The analysis focuses on India, which offers an interesting case of limited public resources; an ambitious health insurance program for the poor and poor environmental conditions. In 2008, India launched the Rashtryia Swasthya Bima Yojana (RSBY) a fully subsidized health insurance for its below poverty line (BPL) households. It aims to cover 69 million BPL households and offers a wide coverage for secondary and tertiary health care services. The WSS situation in India remains critical. In 2012, 8% of the population or 97 million people do not have access to safe drinking water and 56% of the population does not have access to improved sanitation (JMP, 2012). The health impact of these poor WSS conditions is significant. According to the National Commission on Macroeconomics and Health (2005), diarrhea accounts for 8% of the total disease burden in India, making it the most burdensome communicable disease and it is the second cause of child mortality1.

The paper is structured as follows: a first section presents the importance of the environmental context in which a health insurance is being rolled out for the financial sustainability of the insurance as well as health outcomes and productivity of the targeted population. In a second section, the literature on health insurance in low income and emerging countries is reviewed to understand to what extent health insurances deliver their aims in terms of financial protection and increasing access to health care in a sustainable manner. The third section reviews the literature on the benefits and the limits of WSS programs to improve health and welfare of their population. The last section focuses on India´s particular case and provides some international comparison to identify directions for further research to better understand the synergies or trade-offs of investments focusing on both the environment and health insurance.

[1] The estimates are based on figures from 1998, but no contemporary estimates are available at the WHO.

2 Importance of the environmental context for health insurances

Traditionally, public health insurance schemes are either tax-funded or financed via workers´ social contributions. In most emerging countries, both types of funding are often critical because of weak tax raising capacities and a low share of formal workers. India is no exception. Only 2,8% of the population were paying income taxes in 2011 (Ministry of Finance, 2012) and according to the latest ILO statistics, 83,6% of its workers were employed in the informal sector (ILO, 2012). With limited financial resources, identifying policies or investments that reduce health expenditures; improve health outcomes and the welfare of the population is a necessity. Investments in the WSS sector have the potential to do so. The intertwined relation between WSS, health and productivity, make WSS investments attractive to potentially contain health care costs, reduce insurance costs, and improve health status. In addition, the overwhelming burden of poor WSS falls on poor households, thus investments in WSS can enhance together with health insurance pro-poor development.

2.1 Water and sanitation, health, productivity and health insurance- a framework:

Socio-economic and environmental conditions have been recognized as determinants of health, independently of individual risk factors (Commission on Social determinants of health, 2008). In this context, as figure 1 illustrates, the role played by water and sanitation deserves particular attention because of its direct link to water-related diseases; health care costs and its short and long term impact on people´s labor productivity.

Inadequate WSS conditions such as poor water quality, insufficient domestic water supply, the absence of/ or unhygienic latrines and unhygienic behavior have well-established health consequences. Diarrhea, dysentery, gastroenteritis, typhus, trachoma, worm-diseases are amongst the most well-known and most burdensome of these water-related diseases. It is estimated that water-related diseases account for 9,1% of global DALYs (Prüss et al. 2008) and 6,3% of all deaths, while diarrhea alone is estimated to be responsible for 4,3% of the global DALYs (GHE, WHO 2013) in 2011. In India the situation is particularly acute. In 2010, diarrhea is the third major cause of premature death and responsible for 6,8% of all Years of Life Lost (GBD, 2010).

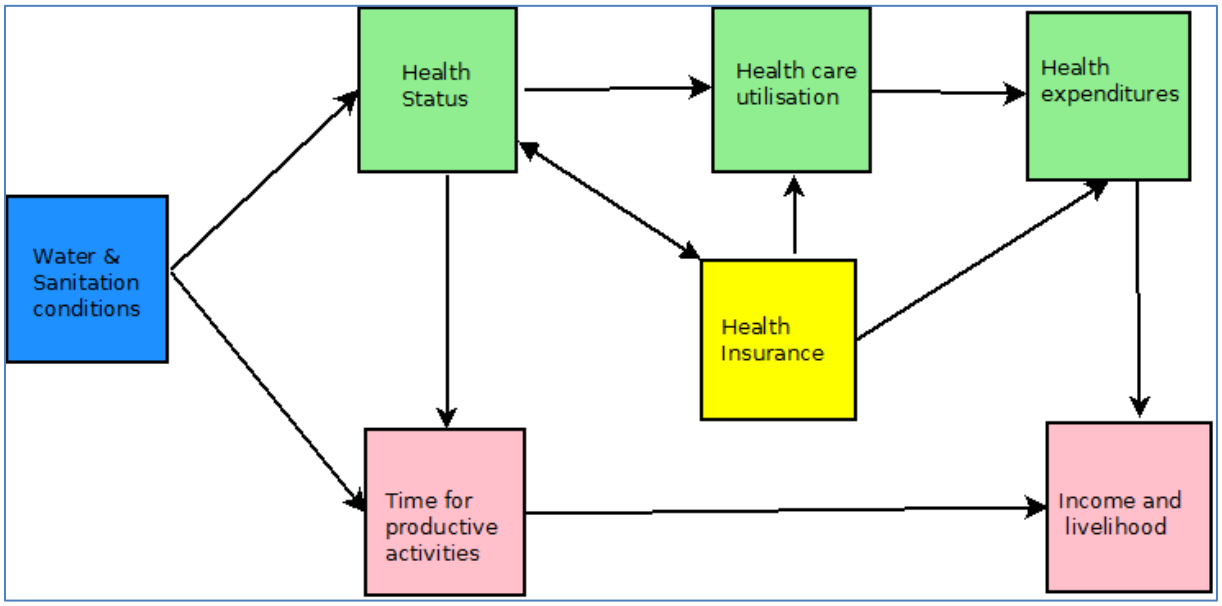
Such illnesses affect poor households´ income- by their frequency and their gravity. Like any other illness, water-related diseases affect household income by creating a disruption in earning activities and adding to the households´ expenditures when seeking health care or self-medication. Most water-related diseases when treated on time can be treated at the primary health care level. The costs of one diarrhea event is usually not catastrophic, but on the medium or long term- repeated bouts of diarrhea induce a sum of small expenditures which affect poor households´ income. Based on the 60th NSSO on morbidity and health care, Bandhari et al. (2010) find that 79% of the 11,8 million households pushed into poverty via health care expenditures are due to outpatient care, with small but frequent expenditures. Moreover, all authors agree that drugs constitute the bulk of health expenditures, accounting for between 49% and 77% of all health care expenditures in India (Dror et al. 2012). Thus, even when individuals practice self-medication in the case of diarrhea, household income is affected. In addition, untreated diarrhea in particular amongst children under five can lead to complications with dehydration and dysentery, which require expensive hospitalisation. According to Mahal et al. (2010), the NSSO data shows that diarrhea/dysentery is the most frequent single cause for hospitalisation in India in 2006. In sum, frequent diarrheal diseases which involve small but frequent expenditures and the costs linked to deterioration of untreated water-related diseases can lead to consequent health expenditures.

Besides, poor WSS conditions significantly reduce the time available for productive activities. When water is not available on the premises, the time spent to fetch water can be considerable. For example, in rural South Africa the general household survey finds that households spend on average eight hours fetching water per week in 2005 (Anderson et al. 2010). In India, several studies report that households with water sources away from the premises spend a few hours a week on water fetching (Motiram and Osberg, 2010). Treating water before consumption; finding a place to defecate when no latrines are available are all time consuming and time lost for productive activities or to look after the children to the benefit of the human capital development.

Further time losses arise from the negative health effects of poor WSS. Every water-related disease episode creates a direct interruption of productive activities when the disease affects an earning household member or indirectly when it affects a non-earning member, either by taking care of the affected person or accompanying them to seek health care.

Lastly, productivity is often reduced in the long term, because of health effects of some water-related diseases. Chronic diarrhea, probably through its association with malnutrition, is often associated with lower cognitive capacities, thus affecting future productive capacities (Fischer-Walker et al. 2012; Niehaus et al. 2002).

Figure 1: Links between water, sanitation and health insurance



Source: designed by author

Health insurance brings financial protection to households and supports their access to health care. Nevertheless, in a high risk environment, the financial protection of households and the long-term sustainability of the health insurance are challenged. Firstly, although health insurance provides financial protection against health expenditures, this protection will always be incomplete as health insurance cannot cover all expenditures and income reductions associated to ill-health. The higher the risks linked to the environment with poor WSS; the more frequent water-related diseases exacerbate the financial burden on poor households. Secondly, as the targeted population is more affected with water-related diseases, the higher the health expenditures linked to such preventable diseases are taken in charge by the health insurance, which raises the problem of cost containment and medium/long term sustainability of the insurance, in a context of limited financial resources.

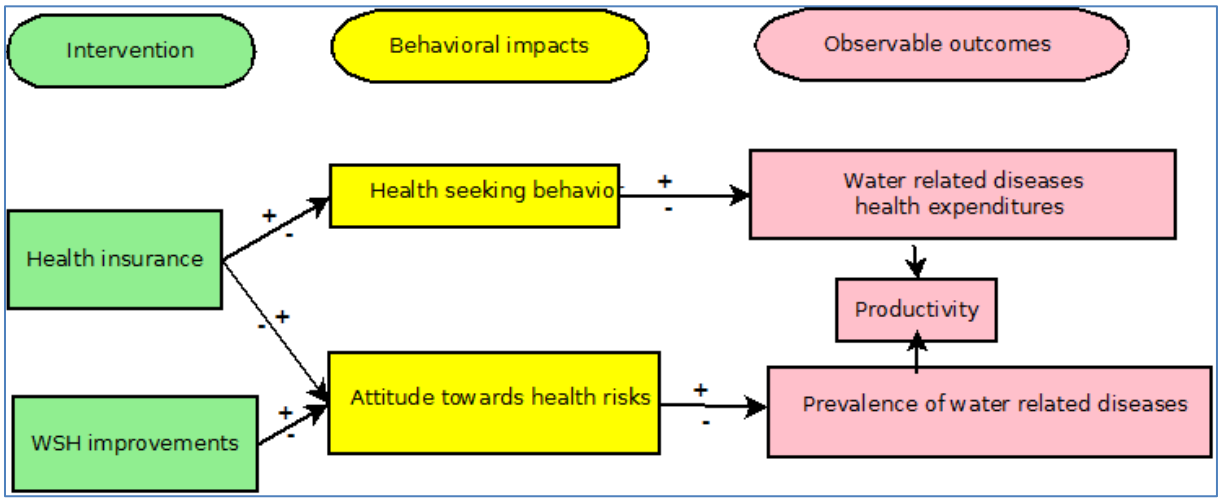
Thus, to improve the benefits of health insurance, investments that prevent and promote good health cost-efficiently (Cutler and Zeckhauser, 2000) are needed. Because of the effects of WSS on

health, health expenditures and productivity, we propose a framework that explicitly links health insurance with investments in WSS to explore potential synergies and trade-offs that could arise from such investments.

Synergies are expected in terms of health risks mitigations; support to households´ productivity and containment of health care costs. Investments in WSS improve health by preventing and decreasing the frequency of water-related diseases (Esrey et al. 1991; Fewtrell et al. 2005).An improved health in turn smoothens the households´ income and reduces their financial vulnerability against major health shocks. Households´ financial vulnerability is further reduced by the health insurance when seeking health care. In addition, by lowering the financial barrier to access health care, health insurance supports earlier and better access to health care, which has been shown to reduce the health burden and health expenditures (Kraft et al. 2009), while increasing the households´ productivity (Dizioli et al. 2012). Additional productivity gains are expected from WSS investments from time saved previously used for unproductive activities. Indeed, all cost benefit analyses of WSS investments estimate that the main benefit from WSS improvements comes from the time gains that enable households to dedicate more time to productive activities (Hutton et al., 2007; WSP, 2008) to increase their income and develop their human capital. Further positive health spillovers of WSS improvements are expected because of the strong association between diarrhea and malnutrition, which should also decrease (Fischer-Walker et al. 2012). As healthier individuals are more resistant to disease, their productivity is increased, further protecting their income from financial vulnerability and eventually helping them to lift themselves out of poverty, while contributing to cost-containment of health expenditures for the health insurance.

Nevertheless, this logic must be weighed against potential trade-offs which might occur in terms of the demand for health care and people´s attitudes towards health risks. Indeed, as figure 2 illustrates, key to both types of investments is the private behavior of households. On the one hand, health insurance has a positive impact on health seeking behavior as it lowers the costs of health care but it can also influence private attitudes towards health risks. On the other hand, WSS investments are expected to influence private attitudes towards hygiene and thus impact WSS health related risks. If trade-offs are at play, the outcomes in terms of water-related disease frequency, the productivity of households and the level of health expenditures for water-related diseases might not be as positive as expected.

Figure 2. The impacts of health insurance and WSS interventions on private behavior



Source: designed by author

To analyse the synergies and trade-offs which occur when investing jointly in WSS and health insurances, the following questions should be investigated: are people seeking more health care under health insurance or not? Does the provision of improved WSS infrastructure lead to the expected health outcomes in terms of diarrhea frequency and Body Mass Index (BMI)? Is there an increase in productivity of insured households with improved WSS reflected in household incomes? Is there a reduction of health expenditures for water-related diseases at the household level and at the health insurance level?

Beyond the potential synergies of investing in health insurance and WSS which benefit the insurance and the beneficiaries, the burden of poor WSS and water-related diseases on poor households are an additional argument to investigate the question of synergies and trade-offs between health insurance and WSS.

2.2 Water and sanitation, water-related diseases and poverty

Health and poverty are intertwined in different ways with the crude consequence that poorer people have poorer health (Marmot, 2005). This inverted relationship between good-health and poverty has been observed across and within countries (Marmot, 2005, Ruger et al. 2006, Whitehead, 2001) and is particularly true for water-related diseases. Indeed, poorer people living in riskier environments and with riskier life-styles (CSDH, 2005) have a higher burden of water-related diseases.

Poorer people have less access to safe drinking water and safe sanitation. Here again the gradient can be found across countries, as well as within countries. Thus 88% of the 884 million people living without access to improved sources of drinking water live in lower income countries. Within countries, disparities of access are high. In India for example, only 3% of the poorest quintile have access to improved sanitation facilities in 2008, compared to 94% of the richest quintile (JMP, 2010).

With poorer access to WSS, the health burden of water-related diseases is concentrated on the poorest. Worldwide, Prüss et al (2002) estimate that water and sanitation are responsible for 94% of all water related diseases and that of 4.3% of the global DALYs attributable to diarrhea alone, the disease burden is 240 times higher in developing regions compared to developed regions. Analysing diarrhea prevalence amongst children under five within countries using DHS data from 1990 until 2005, Forsberg et al (2009) systematically find that diarrhea prevalence is higher in the lowest quintile compared the highest one, whether in Europe, the Pacific or Sub-Saharan Africa. Globally they find that 16,3% of children in the lowest quintile recall a diarrhea episode in the two weeks preceding the survey, compared to 11,6% in the highest quintile.

Consequently, the economic burden of poor WSS and water-related diseases is higher on poorer countries and poorer households. As WSS as such is not a major concern in developed countries, most analyses on the costs of poor WSS exclude these countries. In fact, the only cost evaluations which can be found have been done by the World Bank and focus on the costs of sanitation. The WSP initiative evaluates that the costs of poor sanitation range from 1,6% in Ghana in 2010 to 7,2% of GDP in Cambodia in 2005, and costs 6,4% of GDP in India in 2006. Other studies estimate the cost-benefits or cost effectiveness of WSS interventions for different countries or different world regions, taking into account the costs of different interventions and the benefits linked to avoided premature deaths; productivity loss; health expenditures and time loss. In their study, Hutton et al. (2007) find that intervention costs to improve water and sanitation infrastructure are higher in more developed regions than in less developed ones when measured in per capita costs. Furthermore, because of a lower frequency of these illnesses in more developed regions, the benefits of WSS interventions in terms of health care costs saved is much smaller in more developed regions than in Africa or South-East Asia. The economic burden of poor WSS within countries has also not been studied very extensively. The only study that comes closer to such an analysis is from Rheingans et al (2012) where the authors examine the costs structure of child diarrhea across income quintiles across and within 3 African countries and 3 South-Asian countries. . The authors find that in all countries the

total household costs of diarrhea are lower in lower income quintiles than in higher ones, which can be interpreted by differed health seeking behavior and lower costs associated to productivity loss. Nevertheless, both studies are based on absolute terms analyses and do not refer to total disposable income, which could give a better estimate of the relative financial burden of such disease episode for different wealth quintiles. In addition, the frequency of the diarrhea episodes, is not captured in these two cross-sectional studies. As seen previously, children in poorer wealth quintile are more subject to water-related diseases, thus in sum it is expected that costs of diarrhea are higher for the poorest households.

Lastly, the gender inequality of poor WSS and its socio-economic impact must be underlined. Poor WSS access affects women and children most. Fetching water is mainly a task carried out by women and young girls, thus often leaving children on their own or shortening the time available for home work, to the detriment of their human capital formation (JMP, 2012). The lack of latrines also burdens women and girls more than men, leading to repeated school absence during menstruation and exposing women to violence as they practice open defecation. In the JMP´s most recent report of 2012, it reports an analysis based in 25 Sub-Saharan countries where 71% of women and girls are responsible for water collection. Furthermore, in their study on household costs for child diarrhea, Rheingans et al. (2012) find that in all countries, with the exception of Bangladesh, boys´ diarrhea episodes are associated to higher household costs compared to girls diarrhea episode, reflecting the gender inequality in terms of access to health care, which on the long run increases morbidity and mortality risks of girls and of women.

The clear association between poverty, poor WSS and its health and economic consequences highlight the need to take environmental conditions into consideration when developing policies that aim to protect the poor from ill-health hazards.

Having presented the reasons to look at the potential synergies of investing in water and sanitation interventions when rolling out a subsidized health insurance for the poor, the next section reviews the literature on the effects of health insurance and WSS investments for the poor and highlights some of the underlying considerations on private behavior which need to be taken into account.

3 Evidence from health insurance for the poor

Targeted subsidized health insurances aim to protect households from health care expenditures and support their access to health care. This section reviews the literature on these issues and explores how private behavior in terms of health seeking behavior and attitude towards environmental risks can be affected by the introduction of health insurance.

3.1 Health insurance and financial protection:

The main objective of health insurances is to reduce households´ direct health expenditures by providing them with adequate financial protection when seeking health care. Therefore, health insurance programs for the poor are traditionally evaluated according to their effectiveness to offer financial protection to its beneficiaries either by looking at the average health expenditures or the share of catastrophic health expenditures, as a share of total household expenditures.

Surprisingly, as a recent review on health insurance programs in low and middle-income countries for informal population highlights, the goal of financial protection is often not met (Acharya et al. 2013). While authors such as Jutting et al. (2001), Sepehri et al.(2006), Bauhoff et al.(2011), find clear positive evidence of household financial protection in Senegal, Vietnam and Georgia, others found more mixed evidence in China with an actual increase in OOP for members (Wagstaff et al. (2009); Lei and Lin (2009) and Liu (2011)) or an increased likelihood in catastrophic health expenditures in both Zambia and China (Ekman (2007) and Wagstaff (2008)). These latter results can be explained by either an increase in the utilization of health care services, in particular when co-payments are used or a rise in the use of expensive services induced by health care providers when health care providers are paid or reimbursed on a fee-for-service basis (demand induced by health care providers).

3.2 Health insurance and health care utilization:

By introducing health insurance, the lower costs of health care can lead to an increase in the utilization of health care services. This behavior, called ex-post moral hazard, leads to an over-utilization of health care services that usually contributes to the inefficiency of an insurance. Newhouse (1993) was the first to observe it in the Insurance experiment, whereby people enrolled in schemes with lower co-payments used health services more than in schemes with higher co-payment rates, ceteris paribus. This phenomenon is well-known to the insurance market and policy makers try to find ways to limit it. Nevertheless, in poorer countries, where access to health care is low, one of the secondary aims of a health insurance is to increase the access and the utilization of health care services. Indeed, in many developing countries delayed health care, self-treatment or alternative treatments are often observed with negative consequences both in terms of health burden and health expenditures (Kraft et al. 2009). Thus another important evaluation criterion is the utilization of health care services, which reflects health seeking behavior and access to health care.

In general, evidence from different types of health insurances show an increase in the utilization of health care services. Whether in CHIs (Baeza et al (2002), Devadasan et al. (2004), Jütting, (2004)), subsidized health insurance or social health insurances (Jowett et al. (2004); Trujillo et al. (2005); Wagstaff (2007); Liu et al. (2011)), all studies find an increase in the utilization of health care services amongst the insured. Most programs are voluntary and thus individuals and families that are more likely to need treatment are likely to enroll first in the insurance, increasing the utilization of health care services (adverse selection/self-selection). Most studies mentioned above rely on propensity score matching to deal with this problem. Nevertheless, self-selection cannot always fully be dealt with. Increases in the utilization of health care services have to be taken carefully and may not always reflect an actual change in health seeking behavior but the consequence of self-selection.

Some recent studies on the utilization pattern of insured and uninsured with subsidized health insurances schemes, point to less conclusive results though. Hassan et al. (2010) for example find opposite results to Trujillo et al. (2005) with no increase in health care service utilization between insured and uninsured from the Columbian subsidized social health insurance program for preventive or inpatient care. In China and Georgia, Lei and Lin (2009) and Bauhoff et al. (2011) respectively do not find an increase in the utilization of medical services under the NCMS and the Medical Insurance Program for the Poor. The reasons for a non-increase in health care utilization can often be attributed to either design mistakes in the insurance scheme (Robyn et al. 2012) which can induce negative attitudes from health care providers towards insured when seeking health care; or deterring high levels of copayments (Lei et al. 2009) as hypothesized in the case of China´s NCMS; or a lack of interest to seek care at the providers empanelled in the scheme, reason invoked by Bauhoff et al (2011) in the case of Georgia.

3.3 Health insurance and attitudes towards health risks: ex-ante moral hazard

As Trujillo et al (2005) emphasizes: "The potential distributional gains from […]subsidized health insurance schemes are, however, usually accompanied by efficiency losses, which occur because of distortions in both the participants' behavior and in the allocation of resources to the health care sector as a whole".. This section reviews what is known in terms of behavior change under health insurance and how this can affect households´ attitudes towards environmental health risks.

Insurance can affect private behavior at different levels. As seen previously, a lower price of health services can induce an over-utilization of health care services, called ex-post moral hazard. In addition, it can also influence the behavior of insured before they fall sick, via ex-ante moral hazard.

To better understand ex-ante moral hazard, one needs to consider the risks which the insurance covers. Erlhich and Boeck (1972) were the first to recognize that risks can be measured in terms of severity and probability. Traditionally, insurance decreases the severity of the losses as a risk materializes, but does not influence the probability of risks materializing. Ex- ante moral hazard refers to changes in behavior that can influence this probability, such as life-style choices; prevention or early detection of diseases (Bates et al. 2010).

Until recently, the evidence for ex-ante moral hazard has quite extensively been observed in certain insurance sectors, such as car insurance (Abbring et al. 2008) or work disability insurance. In the case of car insurance for example, it has been observed that taking up an insurance has led to, in certain cases, an increase in the number of claims, as insured take up more risks when driving and anticipate the insurance coverage in case of an accident (Abbring et al. 2008). Similarly for work disability insurance it has been observed that people take more risks at work and thus increase the number of accidents when they are insured (Dave et al., 2009). Insurances have learnt from these attitude changes and provide incentives to individuals to avoid risk taking behavior. In the case of car insurance, the level of the premium typically increases when the insured has had an accident, to encourage careful driving. In the case of health insurance, incentives to influence private behavior can be given by linking the level of the premium or of the co-payment to certain preventive practices.

In the case of health insurance, ex-ante moral hazard has drawn less attention as it is expected that, unlike with other material goods, people will always want to decrease the probability of falling sick (Cutler & Zeckhauser, 2000). Indeed, the utility loss due to illness is not only a financial matter and can never be completely compensated for (Dave et al., 2009). According to Ehrlich and Boeck (1972), when the marginal costs of self-protection are low, prevention and insurance should be complements. Nevertheless as Dave et al. (2009) have found in their review, when the price of curative care under health insurance is low, the incentives for self-protection and prevention are also lower. Individuals anticipate compensation from the insurance pay less attention to self-protection

or prevention, thus increasing the probability of falling sick. In the case of water-related diseases, the question is whether health insurance leads to an increase or a decrease in preventive attitudes such as hand washing after defecation and treating water before drinking it. So far, research on ex-ante moral hazard in the health sector reports mixed evidence. Some authors find no evidence of ex-ante moral hazard, while others find a positive effect of health insurance on individuals´ attitude towards prevention and health risks and yet others find evidence of an increase in health risks. Dave et al. (2009) explain this variety of outcomes by the fact that most health risk attitudes have a long time span to materialize into health hazards, thus quite independently to health insurance. In addition, the incentives (or disincentives) to change attitudes towards health risks are low and often difficult to influence. In addition, the authors argue that there are two dynamics at play: ex-ante moral hazard that increases people´s attitudes towards health risks, which can be partly offset by the contact with health staff which counsels and encourages lower health risk attitudes.

Newhouse (1993) drawing on the US RAND Health Insurance Experiment does not find that lifestyle habits are affected by varying degrees of health insurance generosity. Similarly, Courbage et al. (2004) find that life style habits such as smoking and exercise activities are not affected by private health insurance take-up amongst British households.

Mensah et al. (2010) find in Ghana that health insurance increased pre- and post-natal preventive visits, seeming to indicate that insurance enrollment is associated with an increased awareness of health risks and prevention. The insurance has a positive effect on private behavior to decrease the probability of health risks related to pregnancy. Similarly, Trujillo et al. (2010) find a positive effect of insurance on the use of preventive care amongst a cross-sectional survey of diabetic patients, even though these services are not covered for.

On the other hand, Klick et al. (2007) find that the inclusion of diabetes treatment in health insurance plans dissuades behavioral improvements in the US, resulting in an increase of the body mass index of diabetic patients after the adoption of such policies. Dave and Kaetner (2009) also find evidence that Medicare, a US health insurance for elderly, reduces prevention and increases unhealthy behaviors among men, although this is partly off-set by the positive effects of medical counseling. More recently, Yilma et al. (2012) explored the impact of enrolling in Ghana´s National Health Insurance Scheme (NHIS) on ownership and use of insecticide treated bed nets as preventive behaviors against malaria. The authors use a propensity-adjusted households fixed effects model and find clear evidence of ex-ante moral hazard, with a decrease in ownership and use of treated bed nets as people enroll in NHIS.

Water-related diseases can partially but significantly be prevented by hygiene measures such as washing hands after defecation and household treatment of water (through boiling, chlorine, filter etc…) before drinking it. When health insurance is introduced, will this influence households´ attitude towards environmental health risks, either by decreasing their attention and time given to prevention or by increasing their awareness for the need to have hygienic habits? If ex-ante moral hazard is observed, households pay less attention to hygiene habits related to water-related diseases, as they anticipate the health coverage and increase their probability of catching water-related diseases. If ex-ante moral hazard exists, the benefits of the health insurance will be limited as health expenditures increase and there is no health improvement amongst the insured. To observe ex-ante moral hazard requires a good understanding of how the insurance functions by the insured, which is not always the case amongst poor households (Platteau et al. 2013); an awareness of the health consequences of hygiene practices and/or high costs for households to engage in self-protection.

Having reviewed the evidence of health insurance, the next section presents evidence of water and sanitation improvements on health, health risks and income for the poor.

4 Evidence from water, sanitation and hygiene interventions on the poor:

As seen previously poor WSS have consequent effects both in terms of health burden (directly) and in terms of productivity loss (directly and indirectly), thus it is expected that WSS interventions bring about significant positive health benefits as well as productive ones. Nevertheless, as the review shows results are not always as strong as expected and this can be at least partly explained by some behavioral trade-off concerning WSS related health risks.

4.1 WSS interventions, health outcomes and economic impact:

While the link between poor water and sanitation conditions and water-related diseases is undeniably high; the WHO estimates that 94% of all water-related diseases can be attributed to poor WATSAN conditions, precise estimations of the positive impact of WSS interventions on health are still quite limited and with a large variance in their positive health outcomes (Pattanayak et al., 2007). As Pattanayak et al. (2007) underline: "*mechanisms to achieve [improved water and sanitation] are broad and varied in terms of the types of services (water supply, water quality, sanitation, sewerage, and hygiene); the setting (urban, peri-urban, rural); and the typology of delivery (public intervention, private interventions, decentralized delivery, expansion or rehabilitation*)". In addition, as Overbey (2008) underlines, some studies suffer from self-selection bias making it difficult to attribute the observed health benefits to the intervention itself and not to the motivation/ awareness in WSS of households. As a consequence, systematic reviews find a large span in terms of the effectiveness of WSS interventions to reduce the frequency of diarrhea or other water-related diseases. In their systematic review, Esrey et al. (1991) find that interventions reduce the frequency of diarrhea between 0% and 84%. More recently, Fewtrell et al. (2005) find effectiveness of WSS interventions to vary between 11% and 89% in terms of diarrhea morbidity reduction. Curtis et al. (2000) in their review find that hand washing with soap interventions can reduce diarrhea episodes between 27% and 89%.

Another possibility to measure the health benefits of WSS interventions is to estimate the avoided health care costs and averted DALYs. In an estimation by Haller et al. (2007) on 10 WHO sub-regions, the authors find that WSS interventions have a cost-effectiveness that varies from 20$ per DALY averted in the case of disinfection of water at point of use to 13.000$ for piped water and sewage connections, with the greatest health impact from piped water connections. Another study in small water supply communities of America, Europe and Western Pacific by Hunter et al. (2009) estimate that the total costs of diarrhea and post-infectious irritable bowel syndrome mounted to US$ 16 567 million and the costs of water supply intervention and maintenance to be US$ 14 507 million. Thus, the study concludes that water supply intervention, even in remote rural areas involving heavier infrastructure are cost- beneficial.

Surprisingly, although one important benefit of WSS interventions is expected to be the time gains for households´ productive activities, little evidence evaluate interventions in this dimension. Indeed, most studies concerned with the economic dimension of WSS are prospective and use valuation of time to estimate benefits or cost effectiveness ratios. No study could be found that tried to estimate the productivity of households and/or the income of households after WSS interventions.

Thus, although evaluations of the costs of poor WSS converge and all cost-effectiveness and cost-benefit analyses evaluate that WSS are highly profitable because of its impact on averted health care costs, averted mortality and time gains, little evidence exists beyond the pure health impact of WSS.

4.2 WSS interventions and behavior change:

Private behavior of households is essential to the success of WSS interventions and has been a concern for the field for the past decade. The presence of health insurance might complicate behavior changes by affecting the opportunity cost of self-protection via hygiene.

As past experience has shown, without ownership, willingness and acceptability from households WSS interventions fail[2] (Sugden et al., 2005). A first step to improve the outcomes of WSS intervention has been to ensure that projects are based on the willingness of households. While the demand for improved water supply is either existent or can easily be triggered because of the inconvenience felt by communities and households to have intermittent water and the burden of fetching water, creating demand for sanitation is more difficult. Indeed, as Banda e al. (2007) reveal in their study on knowledge and practices of water handling and sanitation, traditional defecation practices are often fully accepted and for some associated to positive values ("a social outing") and a clear lack of association with health outcomes. Social marketing approaches and community-led-total-sanitation (CLTS) campaigns have recently become common practice to create community norms and awareness of the health risks associated to unhygienic practices to support the demand for sanitation.

Beyond supporting demand for WSS improvements, WSS requires more complex behavior change amongst communities to fully benefit from WSS improvements. Indeed, without addressing household behavior, as a recent World Bank evaluation of demand-driven WSS projects in India showed (Pattanayak et al. 2010), the expected health benefits and the reduction in health expenditures do not materialize and the frequency of water-related diseases remains unchanged. Analyzing the effectiveness of different household water treatment (HWT); Enger et al. (2013) conclude that compliance to any HWT was more important and a pre-requisite to the efficacy of any treatment. Thus, to lead to behavioral changes it is necessary to raise awareness and offer communities medium or long-term support to manage the infrastructures and make sure that the communities understand the risks associated to certain practices and how to change them. In a project in 400 sample villages in Peru, Bolivia and Ghana with community water supply interventions and external expertise to maintain the water supply systems, Whittingon et al. (2009) find much higher rates of success with 95-90% of functional hand pumps in the 3 countries, compared to previous studies where ownership and expertise were neglected. More interestingly though, the authors also find that up to 38% of the households were still using unsafe water supply sources even when communal hand pumps are available, revealing the importance of convenience in usage and awareness of the health benefits of using safe water.

Not only are behavioral changes towards WSS difficult to trigger, but other phenomena at play increase the complexity of behavioral change in WSS interventions. In an ex-post evaluation 6 months after a 3 year intervention on HWT and hand washing practices in Guatemala, Arnold et al. (2009) find that when compared to control villages, the intervention led to modest but significant gains in water treatment behavior but no difference in self-reported hand washing behavior, spot-check hygiene conditions, or the prevalence of child diarrhea. Similarly, systematic reviews by Esrey et al. (1991), Fewtrell et al. (2005) and Luby et al. (2006) all report that combined interventions have a similar health impact to single interventions. Thus, it indicates that multiple interventions act as substitutes rather than complements. If so, there is either a loss in the efficiency of multiple interventions in their implementation; a difficulty for households to adopt to multiple changes with a general loss of compliance to different changes or a trade-off in behavior taking more risks than previously, assuming a safer environment. Supporting the latter hypothesis, Bennett et al. (2008) find that improvements in water supply have in the Philippines led to a decrease in sanitation hygienic behavior, indicating a negative trade-off being operated in terms of health behavior. Nevertheless, even though behavioral trade-offs might be at play, other authors argue that independent

[2]

interventions cannot always be successful and that not only behavior should be looked at but also infection paths of water-related pathogens. Eisenberg et al. (2007) for example simulate the impact of interdependent transmission paths and find that with poor sanitation; water quality improvement will always have minimal health impact.

As this section highlights private attitudes towards WSS is complex and crucial. Can health insurance support demand for WSS and the adoption of hygienic practices via an increased contact with health care services that raises the awareness of risks linked to a poor WSS environment? Or does it negatively affect the motivation to engage in self-protection in the presence of ex-ante moral hazard? Research in this field benefit both WSS interventions, to better understand the importance of external motivation factors to environmental risks and for the sustainability of the health insurance, as previously discussed.

Having reviewed the literature on the benefits and limits of health insurance programs for the poor and WSS interventions, the next section focuses on the case in India, where the recent implementation of RSBY offers an interesting example of health insurance in a high health risk environment to explore the synergies and trade-offs of investing in health insurance and WSS.

5 India´s RSBY and WSS situation: an international comparison and specific challenges

Since 2008, India launched an ambitious health insurance programs for below poverty line households, which has largely been acclaimed by the international community for its boldness, its quick implementation and some innovations that will be highlighted below. Nevertheless, the medium and long term development of this scheme will depend on its sustainability. As the water and sanitation sector has persistently been critical in India, it offers an interesting case to analyse the risks of implementing health insurance in a high risk environment and detect synergies or trade-offs of coupling health insurance with WSS investments to tackle the persistently burdensome level of water-related diseases.

5.1 Rashtriya Swasthya Bima Yojna:

The aim to have a universal health care system in India was set as early as 1946 by the Bhore Committee, but limited financial resources, a lack of human resources and polices have made this aim a distant mirage. Instead as Patel (2011) notes India developed into "one of the most fragmented and commercialized health-care systems in the world". Supply of health care is overwhelmingly done by private health care providers, accounting for 82% of outpatient visits and 65% for inpatient visits in 2004 (Dilip, 2012)[3]. Similarly, the financing of the health sector is characterized by a high fragmentation, whereby public health expenditures account for 26,5% of total health expenditures, while private expenditure represented 73,5% in 2007 (WHO, 2008). 90% of these private expenditures are household out-of-pocket (OOP) expenditures, producing high inequality. In an attempt to correct the flaws of such a system, the Central Government and several State governments have launched ambitious health insurance programs for the poor, RSBY in 2008.

Rashtriya Swasthya Bima Yojna (RSBY)-the Central government´s scheme is the largest insurance plan in India, but at least three other successful state funded hospital health insurances targeted to the poor are also contributing to the recent upsurge in health insurance membership: Rajiv Aarogyasri in Andhra Pradesh (2007), the Tamil Nadu Insurance Scheme for Life Saving Treatment (2009), and the Vajpayee Aarogyasri (2009) in Karnataka. All schemes are quite similar in design, but vary slightly in their target population and their benefit package[4].

Estimates show that prior to these schemes 10% of the population was enrolled in some health insurance arrangements (Selvaraj, 2012) and mostly through state sponsored schemes for civil servants, private insurance and community health insurances. Beginning of 2012, four years after being launched, RSBY alone covers 20% of the population (Dror, 2012) and as of latest approximately 35 million BPL households. Nevertheless, these figures have to be taken carefully as RSBY only records total cumulated membership and it is not possible to know how many households have renewed their membership or not. Thus, it is likely that the coverage rate is over-estimated. Taking into account the three other State insurances, latest figures estimate that 50,2% of the BPL population[5] have benefited from an insurance coverage.

[3] This figure is for Kerala only, but similar figures of 60% have been found at the national level

[4] While RSBY's package covers mainly secondary care hospitalizations, Vajpayee Aarogyasri covers both secondary and tertiary health care and Rajiv Aarogyasri and the Tamil Nadu Life Saving scheme cover only tertiary surgical interventions. The amounts covered by the schemes vary as well: RSBY has the most modest coverage of Rs. 30. 000 per family per annum, while Vajpayye Aarogyasri and Rajiv Aarogyasri cover up to Rs 2 lakh per annum. The Tamil Nadu scheme covers 1 lakh for a family on a 4 year basis (Selvaraj, 2012). The extent of RSBY, which covers 31 million BPL families and is planned to cover up to 302 million people.

[5] This figure was calculated adding all members of the 4 schemes and compared to the Ladakweep estimate of the total number of BPL households.

As Das (2011) writes RSBY "combines cutting edge technology with an unusual reliance on incentives to provide inpatient insurance coverage". Salient features of RSBY are:

Cashless transactions: members receive a smart card that gives them access to health care in the empanelled facilities without paying anything, all transactions going through the card.

Health insurance: private or government-run health insurers are selected at the district level[6] through competitive bidding and are attracted by the guarantee that full premium will be paid by the central government (75%) and the state government (25%) and up to Rs. 750/household. Health insurances can decide whether they rely on TPA to administer claims.

Health care providers: both private and public health care providers can be empanelled by the health insurance into the scheme. Transactions are cashless and are directly addressed to the insurance. This increases the prospect for the providers of being paid compared to previous models.

Household enrollment: all BPL individuals or households are eligible. They are identified by each state. Up to five members of a household can be enrolled. The annual registration fee is Rs. 30, to avoid any financial barriers to enroll and thus encourage wider membership and not only of households who know they will need health care (lower adverse selection)

Coverage: RSBY provides coverage up to Rs. 30 000 per annum and per family for some 700 secondary surgical and medical interventions. It also covers indirect costs such as transportation to health care facilities on a reimbursement basis.

As shown in the table 1 in annex, RSBY is currently implemented in 26 states[7] with 17 States having implemented the scheme in all districts. States with a high coverage of its population are Himachal Pradesh where 79,5% of the BPL households enrolled and Nagaland where 77,1% of the target population is enrolled. The national average of the coverage of the targeted population is almost 50%. According to current enrollment rates, how long RSBY has been running in a State seems unrelated to the percentage of the BPL population covered.

Early evaluations have pointed to some weaknesses of RSBY in terms of the benefit package and the problem of long term cost containment. The Public Health Foundation of India underlined the mismatch between the benefit package that focuses on secondary and tertiary health care and evidence that points to the importance of primary health care and in particular of drugs in households´ health expenditures (PHFI, 2011) and their subsequent impoverishing effects. This has led RSBY to launch a pilot experience since 2013 whereby out-patient and drugs are included in the benefit package. In addition as Dror (2012) had already pointed and PHFI note the long-term financial sustainability of RSBY is uncertain. In 2010, certain states report a high utilization rate amongst RSBY ensured with insurances making losses. The loss by insurances is bound to push the price of future premiums higher, increasing the financial costs of the insurance.

5.2 Water supply and sanitation in India and its health burden:

Unlike health, which is a responsibility of the Central government, WSS is constitutionally the responsibility of the States. Nevertheless, because of the persistently critical WSS situation and low funding, the Central government has become increasingly involved in the sector both politically and financially. Since 2011, a Ministry of Drinking Water and Sanitation has been created to coordinate activities and programs for rural areas nationally. Besides, the financing from the Central government

[6] Depending on how big the state is, it is divided by RSBY into different regions, regrouping districts with similar levels of health care demand and prices. Each region then offers a biding.
[7] www.rsby.gov.in last consulted on 15.10. 2012

has increased over the five-year plans and reached 55% of total investments in the sector in the 11th Plan, compared to 24% a decade earlier (Planning Commission, 2011).

A major shift in WSS policies was observed a decade ago, when WSS policies evolved from a supply-driven approach to a more demand-responsive one, involving lower levels of governmental structures (Sijbema, 2009). In rural India, Village Water Supply and Sanitation Committees (VWSCs) and in urban areas Urban Local Bodies have been encouraged since then to deal with the day-to-day management of water supply and sanitation and the planning of new schemes (Jha, 2010). These committees are voluntary and as Jha (2010) and the Planning Commission (2010) underline, the financial means frequently do not reach these lower levels, limiting the tasks of these committees.

As a result, progress in the WSS coverage has been improving over the last decade, although slowly. In terms of safe domestic water supply, the latest Census reveals that in 2011 43,5% of the households have access to tap water, 11% rely on well (protected and unprotected) and 42% on tube-well water and hand-pumps[8]. Disparities between rural and urban areas and between states are persistently high. In rural areas, only 30,8% of the households have access to tap water compared to 70,6% in urban areas. Furthermore, while some states such as Tamil Nadu, Goa and Himachal Pradesh rely for more than 75% on tap water (from treated and untreated sources), other states such as Bihar only have 4% of their population relying on tap water.

Concerning sanitation coverage, the 2011 Census estimates that for that year 36,4% of the population uses water closet as a latrine, another 9,4% uses pit (ventilated and unventilated) and that 53,1% have no latrines[9]. Compared to 2001, the percentage of households that have gained access to some type of latrine has increased by almost 10%, but this still leaves an estimated 800 million people without access to latrines. Figures in terms of coverage vary again across States and rural and urban areas. In Sikkim 75% of the population has access to water closet, while in Orissa it is less than 20% of the population. The States with the highest access to all types of latrines are in Kerala, where more than 95% of the population has access to some type of latrine, followed by Tripura and Mirozam, with almost 90% of coverage. The lowest sanitation coverage is found in Bihar, Orissa, Chattisgahr and Madhya Pradesh, where more than 75% of the population still practices open defecation. The urban-rural divide is also striking: 69,3% of the rural population has no access to any types of latrines compared to 18,6% of the urban population. According to the JMP definition of safe latrines, 44% of the population uses improved sanitation facilities (water closet with piped sewer system, septic tank, other system, ventilated improved pit), with 27,6% in rural areas and 79% in urban areas. Nevertheless, as the JMP underlines these figures might be overestimations as crucial operating and maintenance (O&M) are not estimated.

In terms of socio-economic gradient in the access to WSS, India is no exception and WSS is highly unequal across wealth quintiles. Although progress on safe water access has encouragingly been "equity neutral" according to the JMP (2012), the inequalities in terms of access both to safe drinking water and toilets remains. Taped water is provided to 64% of the top income quintile, compared to only 2% in the lowest one (JMP, 2012). In terms of sanitation coverage, the inequalities are even more striking (Bonu and Kim, 2009), with 97% of the top income quintile with safe latrines, compared to only 4-5% in the lowest income quintile in 2005-2006.

It is therefore not surprising that India bears a particularly high share of water-related diseases. Diarrhea alone constitutes more than half of all death rates due to infectious and parasitic diseases and is estimated to cause still 8% of all deaths in India between 2001 and 2003 (Office of the Registrar General, 2004). Hughes and Delauvey (2001) estimated that environmental risks account for nearly 20% of the total burden of disease in India, with water and sanitation being the first risk.

[8] These figures differ from the JMP estimates, which seems to overestimate safe water supply. Indeed, according to the latest JMP figures safe water supply had an overall coverage estimation of 92% in 2010, with 97% coverage in urban areas and 90% in rural areas.

[9] The estimation in terms of sanitation coverage match those of the JMP, with 34% of the population having access to safe latrines

No data enables to estimate the specific burden of water-related diseases or diarrhea in the lowest income quintiles but total child mortality rates across income quintiles and total child mortality rates indicate that the burden of water-related disease is higher amongst poorer households. Subravaniam et al. (2008), based on NHFS-2 data, find that individuals from lowest quintile of standard of living are 86% more likely to die compared to those in the highest quintile. Child mortality, a very sensitive health outcome to household income and material deprivation in the first years of life (Marmot, 2005), also reveals deep inequalities. According to NFHS-3 data for 2005-2006, wealthier households experience only a third of the under-five mortality of poorer households (NHFS-3, 2005-2006).

Diarrhea is one of the two diseases that account for 50% of all deaths amongst children in India, along with pneumonia (Bassani et al. 2010). According to Bassani et al. (2010) in 2005 diarrhea caused 300 000 deaths among children under five, from a total of 1,34 million fatalities for this age group . These figures and the under-five mortality rates according to income, show a clear burden of diarrhea amongst lower income quintiles.

Table 1. Childhood mortality rates according to wealth quintiles

Early childhood mortality rates 2005-2006 (in 1000)					
Wealth quintiles	**Neonatal mortality**	**Postneonatal mortality**	**Infant mortality**	**Child mortality**	**Under-five mortality**
Lowest	48,8	21,9	70,7	32,5	100,9
Second	44,9	24,2	69,2	22,8	90,4
Middle	41,2	19,4	60,6	13,8	73,6
Fourth	32,4	9,9	42,3	7,1	49,1
Highest	24,3	9,2	33,6	2,7	36,2
Source: NHFS-3 final report, GoI					

In addition, similarly to other countries, poor WSS mostly affects the most vulnerable. Water fetching in India is essentially a task for women and children, with according to some estimates three times as many women as men fetching water (James et al. (2002)). In terms of health burden, diarrhea claims 10% of all deaths amongst women, compared to 7% of men in 2001-2003 in India (Office of Registrar General, 2004). Lastly, Rheingans et al (2012) find that child diarrhea episodes for girls in India are slightly less expensive than for a boy, suggesting less expenditure for the latter.

5.3 Challenges for India:

India´s ambitious RSBY program fits into a recent trend amongst middle and low income countries to try and provide social protection nets to their poor population. In this section, comparing India to other countries, several specific challenges to ensure the sustainability of RSBY and improve WSS are raised.

As the table 2 below illustrates, several countries have also recently developed tax based schemes to provide health insurance coverage to vulnerable sections of their population. Countries, such as in Philippines, Indonesia and Columbia (Wagstaff et al. (2009) and Obermann et al. (2006)) choose to cross-subsidize the scheme from their existing social health insurance program to enroll poor households; while Mexico and China developed separate subsidized public health insurance programs for the most vulnerable; an option that India has also taken. Ghana, on the other hand, has designed an entirely new universal health insurance scheme to cover its entire population.

Contrarily to India, most other countries have developed schemes which are not entirely free and households have to pay either a flat-based contribution, or an income-based one, with full subsidization for only a portion of the targeted population. India in contrast aims to fully-subsidize 33% of its total population. On the other hand, it must be underlined that India is also the only country that has opted to fully exclude outpatient care and drugs from the benefit package, although it is currently trying to extend the coverage in certain States (Out-Patient experiment).

These characteristics raise two concerns for India´s scheme. One links to the nature of the benefit package and the second to cost containment. As Desai (2009) and PHFI (2011) underline it is still unclear if the nature of the benefit package of RSBY is best adopted to financially protect poor households when seeking health care. Indeed, there is an ongoing debate in India about the nature of health care expenditures that push households into poverty or aggravate their poverty. For Mahal (2010) inpatient health care expenditures have the most impoverishing effects, while for others out-patient care expenditures, less expensive but more frequent, have a greater impoverishing effect (PHFI, 2011). All authors agree that drugs constitute the highest source of health expenditures, which are fully excluded from the benefit package. In the specific case of diarrhea, Rheingans et al (2012) find that in India medication accounted for 75% of the direct medical cost linked a child diarrhea episode. By excluding primary health care, which is justified on the grounds of avoiding moral hazard and prioritizing public resources to prevent catastrophic hospitalisation expenditures; this can give incentives for households to delay seeking health care when hospitalisation is not necessary, which could have perverse effects.

Water-related diseases are not foreseen in the benefit package unless hospitalisation is required. This means that the high Indian burden of water-related will continue to be either carried by private households or at an excessively high price by the health insurance. Both could be avoided by appropriate public investments and incentives to reduce health risks linked to WSS. Second, by opting for a fully-subsidized scheme with no cross- subsidization (although this is now under consideration by extending the program to above poverty line households) RSBY faces the challenge in terms of cost containment and long-term sustainability. In the current set-up, health insurance companies can exert a control on the price of health care services when empanelling hospitals in the scheme and health insurances are themselves selected on the basis of public bidding with capped premiums of Rs. 750. Nevertheless some authors expect the premium to rapidly rise (Dror, 2012) and costs are expected to rise as membership increases and demand for health care is supported.

Table 2. Selected health insurance programs in middle-income and low income countries						
Country	**Scheme**	**Financed**	**Began in**	**Target**	**Population**	**Services included**
China	New Cooperative Medical Scheme	Flat-rate contribution, subsidised by gov. for the poor	2003	Rural population	96% of targeted population = 832 million by 2011	Inpatient services and defined at county level according to needs of the popuation. Most counties include outpatient care. Cost-sharing.
Indonesia	Jamkesmas- National Health Insurance for the Poor and near poor	fully susbidised	2005	30-40% poorest of the total population, exact figure not given	76,4 million individuals in 2010	Outpatient and inpatient; drugs are coevred if prescribed within rules, no cost-sharing
Philippines	PhilHealth	Slided according to income	2003	informal workers	43,5 million individuals or 90% of targeted population by 2010	Inpatient care with limits on payments by health insurance in private hospitals and free in public hospitals. Special packages for TB, DOTS, Maternal and neonatal care- fixed rate with no balance billing. Outpatient for consultation with general physicians, lab test are sponsored by the insurance.
Mexico	Seguro popular	contribution according to income	2003	informal workers	52,6 million individuals, almost 50% of total population and almost 100% of target population	primary and secondary care for 284 interventions and covers 522 pharmaceutical producst. Interentions were chosen on cost-effectiveness basis.
Columbia	Regimen subsidiado	subsidised to purchase insurance amongst private and public insurers	1993	poor households	80% of the population in 2007 or approx. 36,8 million individuals	primary health care and selected high-cost catastrophic services. In addition municipalities offer additional services
Ghana	National Health Insurance scheme	slided contribution with exceptions for informal workers	2005	All	Almost 17 million individuals by end of 2010 or almost 70% of total population	Basic health care services, including outpatient consultation, essential drugs, inpatient care and hospitalisation, maternity care, eye care, dental care and emergency care. Approx. 95% of the diseases in Ghana are covered
Georgia	Medical insurance program for the poor	fully subsidised	2006	poor households	0,75 million individuals by 2009 or 20% of the total population	(a) urgent outpatient and inpatient treatment; (b) planned inpatient services; (c) chemotherapy and radiation therapy; (d) outpatient care and limited diagnostic and lab; (e) child delivery costs (f) a small benefit for outpatient pharmaceuticals
Source: World Bank reports 2013 (Aguilera etal.; Chakraborky et al.; Liang et aal. ; Pigazzini et al. ; Smith et al.)						

The option to avoid escalating health care costs via prevention is particularly relevant for India. Despite the launch of the National Rural Health Mission in 2005, India, like many other low and middle-income countries, is characterized by poor service availability and quality at the primary health care system. Hsiao (2001) in such a context challengingly questions: "does a nation have the capacity to transform [public resources] into effective services for rural and poor population?" Investments in WSS that can reduce the primary health care burden are therefore particularly relevant. In addition, further comparison with other countries reveals to what extent the WSS is an important burden in India.

Table. 3: Safe drinking water and sanitation in selected countries

	Population with access to improved	
Country	**Drinking water source**	**Sanitation facilities**
China	89	61
Indonesia	81	52
Philippines	92	72
Mexico	94	83
Columbia	92	77
Ghana	82	13
Georgia	98	95
India	90	32
Source: World Bank development indicators, 2008		

Comparing WSS infrastructure in table 3 shows that India lags behind. Although with 90% of safe drinking water, India reports levels similar to China or the Philippines, the sanitation coverage is strikingly low at 32% in 2008, compared to 61% in China for the same year, or 72% in the Philippines. Looking at the level of infectious diseases and the level of under-five child mortality- which is strongly correlated to the levels of diarrhea mortality for this age group, India stands out by its exceptionally high levels. While in China, only 7,2% of all deaths are attributable to communicable diseases, maternal, prenatal and nutrition it causes 37,2% of all deaths in India in 2008.

6 Conclusion

India has launched an ambitious health insurance program for its poor, to enable a better access to health care, without facing the risks of health-related impoverishment. First evaluations of the scheme have shown encouraging results in terms of utilization but mitigated results in terms of financial protection. As emphasized in this paper, India´s insurance program is rolled out in high environmental risks, with below average WSS coverage, resulting in a high burden of water-related diseases. Evidence shows that these diseases linked to the access of WSS facilities and the knowledge of hygiene practices, which are highly correlated with poverty. This implies that the targeted population of RSBY carries a heavy burden of water related diseases, which could be avoided by promoting investment in WSS together with RSBY, as a potentially highly effective accompanying measure.

The interest to analyse the synergies and trade-offs of investing in WSS and health insurance can be placed at two levels. Firstly, it is necessary to find strategies that can, beyond protecting the poor from catastrophic health expenditures, reduce their health burden, improve the financial protection of these households and increase their productivity, to contribute to real welfare gains. Secondly, it is necessary to find innovative approaches to ensure the sustainability of health safety nets which are currently being implemented in India by coordinating health insurance with preventive policies.

While the potential for synergies from coordinating a preventive and service supply investment- WSS- with a protective and responsive investment one – health insurance- seems promising; more research is needed to understand how private behavior is influenced when such investments are done in terms of attitudes towards health risks and their health seeking behavior.

A first step to further investigate this question would be to evaluate the effects of poor WSS and improved WSS on insured and uninsured households in their utilization of health care services; the frequency of water-related diseases, their health expenditures and their capacity to work and their income. This would enable to identify synergies or trade-offs of such investments. A second step would need to focus on the evolution of health seeking behavior and hygienic behavior of households when health insurance and WSS interventions are implemented, to deepen the understanding of how private behavior is influenced by external incentives.

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Annex

Table 1. RSBY coverage rates of BPL population per state in 2012:

State or UT	Year of implementation start (for at least 3 districts)	% of districts covered	% of BPL population covered
Andhra Pradesh*	2007	100%	28,5%
Arunachal Pradesh	2011	63%	43,9%
Assam	2010	19%	41,3%
Bihar	2011	100%	49,6%
Chandigarh (UT)	2011	100%	50,8%
Chhattisgarh	2009	100%	67,6%
Delhi	2008[10]	11%	9,7%
Goa	N.A.	0%	0,0%
Gujarat	2009	100%	49,7%
Haryana	2009	100%	42,5%
Himachal Pradesh	2010	100%	79,5%
Jammu and Kashmir	2011	13%	53,8%
Jharkhand	2010	100%	52,9%
Karnataka	2010	100%	45,8%
Kerala	2009	100%	67,0%
Madhya Pradesh	N.A.	0%	0,0%
Maharashtra	2009	91%	46,5%
Manipur	2011	44%	60,4%
Meghalaya	2010	71%	44,3%
Mizoram	2010	100%	62,4%
Nagaland	2009	100%	77,1%
Orissa	2010	100%	62,9%
Puducherry (UT)	2012	25%	62,6%
Punjab	2009	100%	45,8%
Rajasthan	2011	21%	53,7%
Sikkim	N.A.	0%	0,0%
Tamil Nadu *	2010	100%	67,2%
Tripura	2010	100%	71,3%
Uttar Pradesh	2009	100%	31,4%
Uttarakhand	2010	100%	55,3%
West Bengal	2009	100%	64,9%
Total		**77%**	**50,2%**

Source: Own compilation based on data from RSBY website[11], Aarogyasri website for Andhra Pradesh (last consulted on 15.10,2012) and Tamil Nadu Kalaignar Insurance Scheme. * Both states are not covered by RSBY but their respective state health insurance.

[10] The scheme has not been extended or renewed since then.

[11] RSBY: http://www.rsby.gov.in/overview.aspx last consulted on 15.10.2012 , https://www.aarogyasri.org/ASRI/FrontServlet?requestType=CommonRH&actionVal=RightFrame&page=%3CB%3EDR_RWP%3C/B%3E&pageName=DR_RWP&mainMenu=Documents-and-Reports&subMenu=Reports-and-Working-Papers# last consulted on 15.10 2012

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