

# Developing Community-Based Intervention Strategies and Package to Save Newborns in Nepal

KC A,<sup>1</sup> Thapa K,<sup>2</sup> Pradhan YV,<sup>3</sup> KC NP,<sup>3</sup> Upreti SR,<sup>3</sup> Adhikari RK,<sup>4</sup> Khadka N,<sup>1</sup> Acharya B,<sup>3</sup> Dhakwa JR,<sup>5</sup> Aryal DR,<sup>6</sup> Aryal S,<sup>3</sup> Starbuck E,<sup>7</sup> Paudel D,<sup>8</sup> Khanal S,<sup>9</sup> Devkota MD<sup>4</sup>

<sup>1</sup>Save the Children Nepal, <sup>2</sup>Paropakar Maternity and Women's Hospital, Ministry of Health and Population, <sup>3</sup>Department of Health Services, Ministry of Health and Population, Government of Nepal, <sup>4</sup>Institute of Medicine, <sup>5</sup>Perinatal Society of Nepal, <sup>6</sup>Nepal Pediatric Society, <sup>7</sup>Save the Children US, <sup>8</sup>United States Agency for International Development, Nepal, <sup>9</sup>United Nations Children's Fund, Nepal.

## ABSTRACT

In Nepal, the proportion of under 5 deaths that are neonatal (0-28 days) has been increasing in the last decade, due to faster declines in infant and child mortality than in neonatal mortality. This trend is likely due to a focus on maternal and child survival programs that did not adequately address newborn health needs. Policy and actions to save newborn lives resulted from increased attention to newborn deaths in 2001, culminating in the endorsement of the National Neonatal Health Strategy in 2004, a milestone that established newborn health and survival as a national priority. Operationalization of the National Neonatal Health Strategy took place in 2007 with the development of the Community-Based Newborn Care Package (CB-NCP). This paper describes how national stakeholders used global, regional and in-country research and policies to develop the CB-NCP, thus outlining key ingredients to make newborn health programming a reality in Nepal. A technical working group was constituted to review existing evidence on interventions to improve newborn survival, develop a tool to prioritize neonatal interventions, and conduct program learning visits to identify key components appropriate to the Nepal context that should be included in the Community Based Integrated Newborn Care Package. The group identified interventions based on the evidence of impact on newborn survival, potential mechanisms within the existing health system to deliver the interventions, and linkages with existing programs and different tiers of the health system. Not only was Nepal one of the first countries in south-east Asia where government adopted a national strategy to reduce neonatal deaths, but it was also one of the first to endorse a package of neonatal interventions for pilot testing and scaling up through existing community-based health systems that provide basic health services throughout the country. CB-NCP was designed to be gradually scaled up throughout the country by integration with Safe Motherhood and Child survival programs that are currently operating at scale. Under Ministry of health and Population leadership, a network of academia, professional bodies and partners developed a common vision for improving newborn health and survival, and launched district-level pilot programs to demonstrate and learn how newborn health interventions could be effectively and efficiently delivered and scaled up in Nepal.

**Keywords:** Nepal, community based newborn care package, health system, integration.

## INTRODUCTION

The proportion of under 5 deaths in the first 28 days of life has been increasing since 1990s, such that substantial reduction in neonatal deaths has now become a major focus for many countries to achieve the Millennium Development Goal for child survival.<sup>1,2</sup> Until 2000 the burden of newborn deaths was largely overlooked with the major focus being on selective interventions to

improve child survival and safe motherhood program.<sup>3</sup> Until the breakthrough evidence from Gadchiroli (India), most public health programmers considered neonatal mortality reduction to be beyond grasp.<sup>21</sup> In Nepal too, the focus was to reduce deaths attributed to diarrhea, pneumonia<sup>4</sup> and vaccine preventable disease<sup>5</sup> and to improve maternal health and survival through safe

**Correspondence:** Dr. Ashish KC, Save the Children, Kathmandu, Nepal.  
Email: aaashis7@yahoo.com.

motherhood policy<sup>6,7</sup> and programme.<sup>3</sup> The health and survival of newborn babies was virtually neglected in policy and strategy documents, public health programs, and research. Based on data from the Nepal Demographic Health Survey 2001,<sup>8</sup> State of World for Newborn in Nepal 2002<sup>9</sup> provided the first systematic report summarizing the country situation of newborn health and survival. The emerging awareness of the newborn health gaps and opportunities led to development of National Neonatal Health Strategy (NNHS) 2004<sup>10</sup> as the first step in Nepal to improve newborn health and survival.

Shortly after the endorsement of NNHS, the Nepal Demographic Health Survey-2006,<sup>11</sup> showed convincingly that that newborn mortality had declined by substantially less than infant and child mortality over the decade from 1996 to 2005. The proportion of children dying between 12 to 59 months decreased by 71% and the proportion of infants dying between 1 month to 11 months decreased by 48 %; while there was only a 34% decline in babies dying within the first 4 weeks of life (Figure 1).

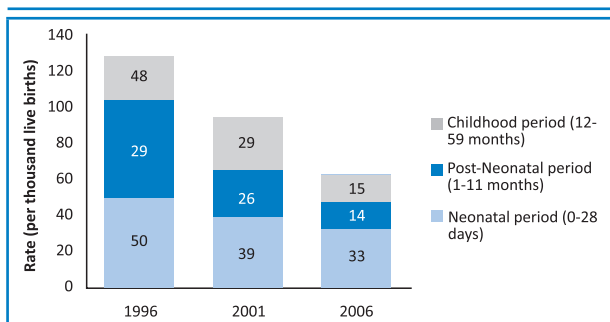


Figure 1. Proportion of Under-five death during different age interval (Nepal Demographic and Health Survey 1996, 2001 and 2006).<sup>8, 11, 80</sup>

Verbal autopsy data from 2006 Nepal Demographic Health Survey<sup>11</sup> revealed that majority of newborn die due to sepsis/pneumonia (34%), birth asphyxia (26%) and prematurity (23%). Equity analysis further revealed the risk of newborn death was twice fold higher in poorest families or in rural areas than in better off or urban areas.

With the low national coverage<sup>11</sup> for antenatal care (44%), skilled personnel to assist delivery (18%) and postnatal care to mother (31%) there was a huge urban-rural disparity in access to services, with urban women and newborns having two- fold greater access to services across the continuum of care (ie, ANC, SBA, and PNC) compared to rural women (Figure 2).

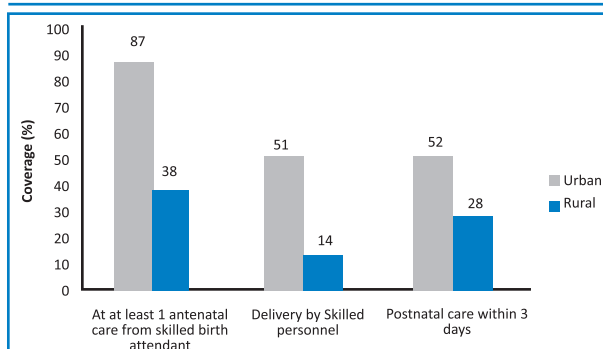


Figure 2. Variation across urban to rural population for antenatal, delivery and postnatal care (NDHS-2006).<sup>11</sup>

Also equity gap between well off and poorest exist across the continuum of care interventions. (Figure 3)

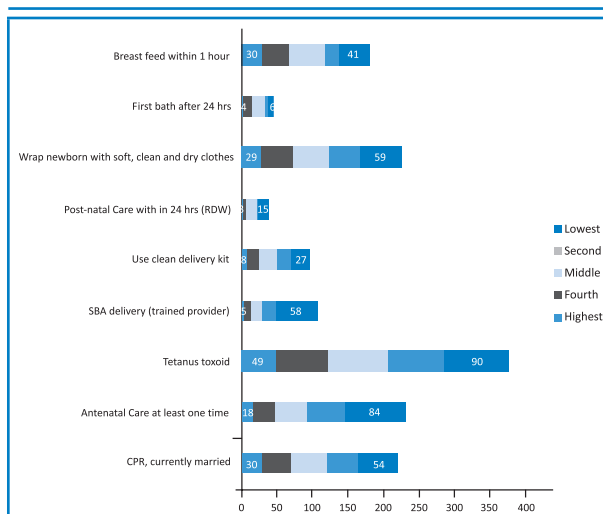


Figure 3. Variation across wealth quintile across continuum of care (NDHS-2006).<sup>11</sup>

Given the low coverage and equity gaps of maternal and neonatal survival interventions and with the National Neonatal Health Strategy in place., Department of Health Services, Family Health Division and Child Health Division jointly carried out a assessment of Newborn Health Programs in Nepal<sup>11</sup> in early 2007 to identify the newborn health programs and projects being implemented across the country, and to assess synchronicity newborn health programs with National Neonatal Health Strategy and alignment with safe motherhood and child survival programs. The assessment recommended developing a package of evidence-based interventions to reduce neonatal mortality to be integrated into safe motherhood

and child survival programs and delivered through the existing health system platforms

This third paper in this series describes how global, regional and in-country research and policies led to development of Community-Based Newborn Care Package and outlines the ingredients that made newborn health programming a priority in Nepal.

While preparing this article, review of all the draft papers such as the Newborn Health and Programs in Nepal<sup>12</sup> Community Based Newborn Care Package,<sup>13</sup> consultative meeting notes, program learning visit notes, review of national documents, and all the newborn related publications used for development of package have been undertaken.

In May 2007, the Department of Health Services, Family Health Division and Child Health Division under took a joint initiative to develop a Community-based Integrated Newborn Care Package, following recommendation of the rapid assessment of Newborn Health and Programs in Nepal,<sup>12</sup> forming a Technical Working Group. The group comprised of representatives from professional bodies of pediatric, obstetric and perinatal groups, academicians, researchers, representatives from United Nations, United States Agency for International Development, International and National Non-Governmental Organizations working in the field of maternal and child survival programs. The TWG had a mandate to review evidence on neonatal survival interventions, develop

a tool for prioritization of interventions considering implementation feasibility and cost-effectiveness, and conduct program Learning Visits (PLV) to identify the components of the Community Based Integrated Newborn Care Package appropriate to the country's context. In order to facilitate the process further, a core group was selected among the members from the TWG to draft the package.

The core group reviewed a list of published articles in international peer-reviewed journals<sup>14-77</sup> and focused primarily on three review publications from Bhutta, Z. A., G. L. Darmstadt, et al. 2005,<sup>19</sup> Haws, Thomas et al. 2007<sup>29</sup> and Darmstadt, Bhutta et al. 2005.<sup>78</sup> Based on the review, the core group selected 20 interventions which met the criteria of evidence of efficacy (IV) and evidence of efficacy and effectiveness (V)<sup>78</sup> as laid out in the lancet Neonatal Series, and reduce all causes of neonatal mortality or morbidity or risk factors, that would be helpful in implementing a large scale program. The group recommended those interventions which had evidence to be implemented as large scale programs which are already being tested in the country's health systems, and community and outreach based interventions and low national coverage.

In the table 1, new interventions which met the criteria are marked Dark Blue, existing interventions which met the criteria are marked Gray and those which did not met the criteria are marked Light Blue.

Table 1. Interventions to Reduce Neonatal Mortality and Recommendations for the Nepal Community-Based Integrated Newborn Care Package.

Interventions	Amount of evidence †	% Reduction in all-cause neonatal mortality or morbidity/major risk factor if specified (effect range)	Suitability for Nepal (at scale)	Cost	Current status in Nepal	Recommendation for inclusion in CB-INCP	Comments
<b>Antenatal</b>							
Tetanus toxoid immunization, <sup>56,49</sup>	V	33-58% Incidence of neonatal tetanus: 88-100%	Already being delivered as large scale program	NA	NDHS-2006: 63% TT2 during pregnancy	Recommended to maintain efforts to increase coverage	
Syphilis screening and treatment <sup>57,58,59,60</sup>	IV	Prevalence-dependent	Not tested at community settings	NA	NA	Not recommended as a community-based intervention	
Pre-eclampsia and eclampsia prevention- calcium supplementation. <sup>61,62</sup>	IV	Incidence of pre-maturity: 34% (-1 to 57%) Low birth weight: 31% (-1 to 53%)	Can be Delivered at community through Community Health Worker and Female Community Health Volunteer	Low	Feasibility of delivery not tested within health system	Not recommended as an intervention in the package, review will be done once tested on delivery feasibility	
Intermittent presumptive treatment for malaria <sup>63,64</sup>	IV	32% (-1 to 54%) PMR: 27% (1-47%) (first/second births)	Health Facility and primary Outreach clinics already exists	NA	Malaria Control Program provides treatment to pregnant women in endemic areas	Treatment of pregnant women with fever (not IPT) in endemic districts through existing HF by creating awareness (BCC)	
Detection and treatment of asymptomatic bacteriuria <sup>65,66, 67</sup>	IV	Incidence of pre-maturity/low birth weight: 40% (20-55%)	Feasibility of delivery not tested	NA	NA	Not recommended as it is not tested community-based intervention.	
Iodine fortification of common salt <sup>68,69,70</sup>	V	65% reduction in Neonatal mortality (DeLong et al 1997)	Currently being rolled out at large scale program	NA	Ongoing MOHP program	Can be included in BCC package	
Antenatal de-worming <sup>71</sup>	IV	No effect in perinatal or neonatal mortality	Currently being rolled out at large scale program	NA	Ongoing MOHP program	Can be included in BCC package	
<b>Intrapartum</b>							
Antibiotics for preterm premature rupture of membranes <sup>53</sup>	IV	Incidence of infections: 32% (13-47%)	Evidence on community based delivery not available	NA	Comparatively few cases expected at ward level.	Not recommended	
Corticosteroids for preterm labor <sup>77</sup>	IV	Reduction in Acute Respiratory Distress Syndrome by 36%, Cerebral hemorrhage by 70% and Neonatal mortality by 37%	NA	NA	Feasibility of delivery not tested	Not recommended	

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Detection and management of breech-caesarian section <sup>54</sup>	IV	71% reduction in perinatal or neonatal death, excluding fatal malformations	Evidence on community-based delivery not available	NA	Not community-based intervention	Not recommended	
Labor surveillance for early diagnosis of complications <sup>55</sup>	IV	(early neonatal deaths): 40%	Evidence on community-based delivery not available	NA	Not community-based intervention	Not recommended	
Clean delivery practices <sup>46</sup>	IV	58-78% Incidence of neonatal tetanus: 55-99%	Currently being rolled out at large scale program-Birth Preparedness Program	NA	Ongoing MOHP program	Recommended in the package	
<b>Postnatal</b>							
Resuscitation of newborn baby <sup>41,42,43,39,40,18</sup>	IV	6-42%	Evidence on community-based delivery	NA	Consider for including in the package	Recommended in the package	
Breastfeeding <sup>44,45,38,81</sup>	V	55-87%	Currently being rolled out at large scale program-Birth Preparedness Program	NA	Ongoing MOHP program	Recommended in the package	
Prevention and management of hypothermia <sup>72,73,39,40,38, 81</sup>	IV	18-42%	Evidence on community-based delivery	Depends on delivery strategy	Consider for including in the package	Recommended in the package	
Care of low birth weight newborns with Kangaroo mother care <sup>30,33,32,34,35,31,36,37, 38</sup>	IV	Incidence of infections: 51% (7-75%)	Use of Community Health Worker and Female Volunteer to identify LBW babies and promote KMC	Low	Successful feasibility study of community based Kangaroo Mother Care in Kanchanpur	Recommended in the package	
Community-based pneumonia/sepsis case management <sup>21, 81, 22)</sup>	V	27% (18-35%)	Use of Community Health Worker and Female Volunteer to identify and management infection	NA	Successful feasibility study in Morang, Nepal	Recommended in the package	

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Behavioral change Communication for newborn health <sup>47, 44, 51, 21, 49, 21, 50</sup>	IV	There was a 63% decrease in PMR <sup>45</sup> A 30% reduction in NMR <sup>18</sup>	Use of Community Health Worker, Female Community Health Volunteer and mother's group	NA	Successful feasibility study in Kailali (Save the Children, 2004)	Recommended in the package	
Neonatal vitamin A supplementation <sup>74, 75, 76</sup>	NA	15%+ mortality impact in first 6 months of life	Concrete evidence on neonatal mortality and morbidity reduction not available	Low	Not systematic review and recommendation needed	Not recommended	
Umbilical cord cleansing with 4% chlorhexidine <sup>82</sup>	IV	24% - 34% neonatal mortality reduction	Evidence on community based delivery within the health system not available	NA	Review based on operational feasibility within the health system	Not recommended	

Following the recommendation of interventions for the package, the core group conducted onsite learning visits to newborn trial sites in India, Bangladesh, and Indonesia and in country pilot study sites -Kanchanpur, Banke and Morang between August-December, 2007 (table 2).

**Table 2. Program Learning Visit to newborn study sites and key lessons learnt.**

Sites	Design	Interventions	Lesson Learned by the program learning group
SEARCH, Gadchiroli district, India	Controlled trial Baseline phase (1993-1995), observational phase (1995-1996), and the 7 years of intervention (1996-2003)	Home-based newborn care consisting of sepsis management, supportive care of low birth weight newborn babies, asphyxia management, primary prevention, health education and training of traditional birth Attendants. Built upon a preexisting community mobilisation programme	Community case management of sepsis, low birth weight and birth asphyxia is successful in a intensive support setting from the health system.  As the CHW in Gadchiroli, CHW or FCHV in Nepal can be made better performing if provided performance based incentive
Kabupate, Cirebon, Indonesia	Prospective study (2003-2005) to performance of Community Mid-wives in managing birth asphyxia	Management of birth asphyxia by Community Based Mid-wives	Skilled assistance at birth can be provided at birth huts or smallest health facility units for emergency management of obstructive labor and neonatal complications
Projahnmo Project, Shylet district, Bangladesh	Cluster Randomized Control Trial (2001-2005)	Intervention 1: Home-care model with training of CHWs in BCC and ENC; CHWs visited pregnant women in antenatal and postnatal period to promote preparedness for birth or newborn care, to provide iron folate supplements, and to counsel on breastfeeding issues; also included home screening, management, or referral of sick newborns;  Intervention 2: community-care model with community meetings with pregnant women and family members and advocacy meetings with local leaders; TBA training on cleanliness during delivery, maternal danger signs, and newborn care; specific recruitment of volunteer community resource people to improve attendance at community meetings, and care-seeking for maternal and neonatal complications	CHW can deliver a complex package of interventions successful with intensive support
MINI, Morang district, Nepal	Baseline and end line study with observational study in between (2004-2009)	To test a replicable model for the community management of neonatal infections within the existing government health system.	Community based management of neonatal sepsis can be implemented within the health system with strong support from the district health office and peripheral health facilities
CB-MNC, Banke district, Nepal	Baseline and end line study with observational study in between (2004-2008)	To test the Birth preparedness package within the health systems settings	Behavioral change for preparation for birth, essential newborn care and care seeking can be improved through counseling from FCHV
CB-KMC Access, Kanchanpur district, Nepal	Baseline and end line study with observational study in between (2006-2007)	To test the feasibility of implementing Kangaroo Mother Care at Community Settings	Community based management of low birth weight with KMC is feasible with extra-visit, the community based interventions needs to be linked with health facility interventions

After desk review and program learning visits interventions deemed to be cost effective and potentially feasible were categorized into two groups (Table 3) i.e

Group A : Interventions which can be piloted in more than one district based on its global evidence of efficacy

and effectiveness, experience in Nepal and existing delivery strategy in the health system.

Group B: Interventions which need further experience in Nepal and can be piloted at limited scale based on the limited experience to date in Nepal or uncertainty in the delivery mechanism.

**Table 3. Delivery strategies of interventions and recommendations for the newborn care package.**

Intervention	Strategy
<b>Group A</b>	
Behavioral change strategy for newborn health (including complication readiness, including recognition of and stimulation for asphyxia, breastfeeding, hypothermia prevention, clean delivery practices, cord care, and postnatal care)	Awareness creation through social mobilization tool-birth preparedness package focusing on mothers' groups and community resources / influential and one-on-one health education by female community health volunteers (FCHVs). Mass media nationwide, Social Mobilization Campaign in pilot districts
Postnatal care to mother and newborn (Cord care, thermal care, examination baby/mother)	Female Community Health Volunteer (FCHVs) to provide 3 postnatal care visits to both mothers and their newborns at home. Establish functional linkages with the health workers and health facilities for effective referral
Community case management of pneumonia/sepsis	FCHVs to use algorithm to identify neonatal infection, initiate oral Cotrimoxazole, provide the course to the mother and refer to provide Inj. Gentamicin by health facility staff as per protocol
Prevention and management of hypothermia	Awareness creation through social mobilization tool-birth preparedness package (BPP) focusing on mothers' groups and community resources / influential, and one-on-one health education by FCHVs.  HF staff to be trained to prevent, recognize and manage hypothermia
<b>Group B</b>	
Promotion of institutional delivery and clean delivery practices in case of home deliveries	Awareness creation through social mobilization tool, birth preparedness package (BPP) focusing on mothers' groups and community resources / influential, and one-on-one health education by FCHVs.  Free distribution of clean delivery kit (CDK), Encourage social marketing CDK
Care of low birth weight newborns	FCHVs to identify low birth weight (LBW) by weighing  Provide home based care including Kangaroo Mother Care (KMC) (Maya koangaalo), feeding support  Establish functional linkages with health workers and health facilities for effective referral of very low birth weight (VLBW) and low birth weight (LBW) with danger signs
Recognition of asphyxia, initial stimulation and resuscitation of newborn baby	The FCHV must be present at every home birth in her ward to assess, identify birth asphyxia and resuscitate as per guideline



The main objective of the CB-NCP was to substantially reduce all-cause neonatal mortality in Nepal. The CB-NCP was intended to be a dynamic package, with new interventions being added reflecting evolving evidence and experience, both globally and in Nepal. For the effective coverage of selected neonatal interventions

of the package, the five building blocks of the health system (governance, human resource, health financing, information, logistic and supplies) need to be strengthened.<sup>79</sup>The core group outlined systems that were needed to be in place for their effective coverage (Table 4).

**Table 4. Setting up of the package within the health systems building blocks.**

Health Systems building block	Interventions/Actions
Governance, Stewardship and Planning	Ministry of Health and Population to approve policy to delegate additional responsibility to Female community Health Volunteer, allow health facility and community based health workers to manage newborn's possible severe infection with Gentamicin injection and provide incentive scheme for FCHVs to provide specified care for newborns (antenatal, natal (including referral and accompanying the mother for institutional delivery), and postnatal periods)  District health office will lead the implementation of the package with planning incorporated within its system and Mother's group and Village Development committee will be mobilized by the District health office and health facility to mobilize the communities and families for newborn care
Human Resource	Competency based Protocols and guidelines for health worker and FCHVs will be developed on ENC at delivery, postnatal period, including birth asphyxia, sepsis and LBW management. To ensure the referral management system and information systems are in place cascading of the training will be done from Health facility based staff to Female Community Health workers with competency based approach to enhance the skills. Follow up after training, regular refresher training and supervision to all health workers and volunteer to ensure logistic supplies, updated knowledge and skills to deliver newborn services
Health Financing	A system of pay for performance to Female Community Health Volunteer to improve the quality and coverage of newborn services. The cadre will be paid after completion of set of activities-counseling during pregnancy, institutional delivery, postnatal home visit and assessment of weight. Monitoring of performance will be done by peripheral health workers and health facilities and audit payment by district health office on a random basis.
Information	A system of pregnancy registration, birth and death registration of newborn will be established with a monitoring system to assess the program performance at input, process and output level. An evaluation system to evaluate the intervention's performance will done developed
Medical supplies, vaccine, technology	A logistic management system for the package will be mainstreamed into the regular district logistic management system so as to ensure regular supply and procurement of supplies.

The overall recommendation on the interventions and the required health system strengthening for the package was presented to the broader TWG. The recommendations were discussed, analyzed and finally endorsed on October 16, 2007 by the TWG. Following final submission by Family Health Division and Child Health Division to Ministry of Health and Population Secretary, the Community Based Newborn Care Package was officially endorsed on December 21, 2007.

### WAY FORWARDS

Nepal is one of the first countries in South Asia to adopt a comprehensive strategy to reduce neonatal death and also the first to endorse a package of neonatal interventions to be tested in the community settings and gradually scaled up throughout the country along with the package's integration with safe motherhood and child survival programs. Nepal becomes a pioneer to adopt the package developed and owned jointly by of the government, academia, professional bodies and development partners. This helps to have a common

vision for improving newborn health and survival among all stakeholders. Strong ownership and support among the policy makers and program managers who are well versed on the health system efficiency to deliver neonatal interventions is a key to success. Additionally, liaison with international community and researchers provides a good interface between the researchers and academia with policy makers for informing evidence based policy making. A participatory environment and culture supported by the government and donor communities for the development of the package is a good example for success for other countries.

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