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Can People in Sri Lanka's Estate Sector Break Away from Poor Nutrition:

What Causes Malnutrition and How It Can Be Tackled

PRIYANKA JAYAWARDENA

INSTITUTE OF POLICY STUDIES OF SRI LANKA

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INSTITUTE OF POLICY STUDIES OF SRI LANKA

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No. 01

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Abbreviations

ACC/SCN	Administrative Committee on Coordination – Sub Committee on Nutrition
BMI	Body Mass Index
CED	Chronic Energy Deficiency
CHR	Child Health Record
DCS	Department of Census and Statistics
DHS	Demographic and Health Surveys
FHB	Family Health Bureau
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MGRS	Multicentre Growth Reference Study
MHN	Ministry of Healthcare and Nutrition
MNBEID	Ministry of Nation Building and Estate Infrastructure Development
MoE	Ministry of Education
NCD	Non - Communicable Diseases
NCHS	National Centre for Health Statistics
NNP	National Nutrition Policy
PCA	Principal Component Analysis
PEM	Protein-Energy Malnutrition
PHM	Public Health Midwife
PHNS	Public Health Nursing Sister
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WHO	World Health Organisation

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Executive Summary

Despite that overall health indicators are on track to achieve the 2015 Millennium Development Goals, malnutrition continues to be a serious health concern in Sri Lanka. More than 20 per cent five under-five year olds are underweight, and 16 per cent of reproductive aged women were malnourished in the country. Apart from this overall picture, the country's Estate sector was worst affected in poor nutrition. For instance, about 30 per cent of children under the age of five are underweight, nearly 1 in 3 babies have low birth weight, and one-third of women of reproductive age are malnourished. It is recognised that, improved health care alone cannot improve all health outcomes. This is because there are deep rooted socio-economic factors affecting health. Thus, this study looks beyond health and explores the socio-economic determinants of child and maternal malnutrition in the Estate sector. Study findings contribute to policies on priority areas needing to be addressed in breaking the vicious cycle of malnutrition in the estate sector, in achieving overall goals of the country.

There are unique causes of child and maternal malnutrition in the Estate Sector.

Findings of this study revealed that unique causes such as, intake of imbalanced diet, household high alcohol and tobacco consumption, substantially contributes to child and maternal malnutrition in the Estate sector. These factors coupled with the women's lack of capacity in terms of education, household poor socio-economic status and also food insecurity, perpetuates the vicious cycle of malnutrition in the estate sector. Study findings can be summarised as follows.

The intergenerational cycle of malnutrition is deeply embedded in the estate sector.

Study revealed that low birth weight is a major cause of malnutrition in children under five years of age in the Estate sector. Further, mother's poor nutritional status is closely associated with child malnutrition. Growth retardation at birth, throughout childhood, and adulthood carry on the intergenerational cycle of malnutrition in the estate sector. Therefore, measures need to be taken at each stage of the life cycle to ensure that malnutrition does not perpetuate as an intergenerational problem.

A significant reason for child and maternal malnutrition in the estate sector was intake of the 'wrong' kind of food—consuming lack of protein rich food.

Mothers and under five year old children in the estate sector consumed fewer protein-rich foods (meat, fish and poultry eggs) and other nutritional food such as yellow vegetables, fruits and cereal when compared to their peers in the other two sectors. It was evident that a significant reason for child and maternal malnutrition in the Estate sector was the intake of imbalanced diet – lack of protein and vitamins but more starchy and fatty food. Therefore, sustainable nutritional interventions should be aimed at enhancing food security at the household and community levels as well as at schools in the estate sector.

Estate sector alcoholism and tobacco use significantly increased the prevalence of malnourished women.

Alcohol and tobacco consumption was extensively higher among estate sector people. For instance, 40 per cent of the estate sector families have been exposed to alcohol; whereas in the other two sectors, it was around 17 per cent. Spending on alcohol and tobacco badly affect the household's food security, especially in the Estate sector where the highest recorded poverty prevails. Counselling programmes should be initiated for youth that promote positive health practices and curb negative ones like alcoholism and tobacco use.

Education and knowledge of women have a strong impact on their nutritional status, as well as on the nutrition of their children.

In the estate sector, the level of women's education is much lower than in urban and rural areas. For instance, nearly half of the women were educated only up to primary level education whereas the national average of that is around 15 per cent. Poor education makes it difficult for women to take full advantage of the awareness raising campaigns on family health and hygiene practices offered in their localities, either by the government health service or by the estate management.

Special community driven programmes would have a major role to play in addressing the critical concern in the Estate sector.

Most of the causes of Estate sector malnutrition are unique to the Estate sector – intake of imbalanced diet, household alcohol and tobacco consumption etc. In this context, it has to be emphasized that policies relating to the improvement of nutritional levels of the Estate sector should be specially designed interventions with especial attention to community driven programmes. Nutrition education programmes should be strengthened to inculcate better consumption habits - what foods to select; how to prepare and feed children; and the hygienic and nutritional value of food. Also, there should be programmes to raise awareness on healthy behaviours. Further, household socio-economic status and safe environment in the deprived Estate sector would have a major role to play in the well-being of people in the Estate sector.

Keywords: malnutrition, estate sector, child health, maternal health

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ශ්‍රී ලංකාවේ සමස්ත සෞඛ්‍ය දර්ශක, 2015 සශ්‍රක සංවර්ධන ඉලක්ක සාක්ෂාත් කර ගැනීමට යොමු වෙමින් පවතින නමුත් මන්ද පෝෂණය තව දුරටත් බරපතළ සෞඛ්‍ය ගැටලුවකි. වයස අවුරුදු පහට වඩා අඩු ළමයින්ගෙන් සියයට 20 කට වඩා වැඩි ප්‍රමාණයක් නියමිත බරට වඩා අඩු වන අතර ප්‍රජනන වයසේ කාන්තාවන්ගෙන් සියයට 16 ක් මන්ද පෝෂණයෙන් පෙළේ. මෙම සමස්ත තත්වයට අමතරව රටේ වතු අංශයේ ළමුන් හා කාන්තාවන් අයහපත් පෝෂණ තත්වයෙන් වඩාත් පීඩාවට පත්වේ. නිදසුනක් වශයෙන් වතු අංශයේ වයස අවුරුදු පහට වඩා අඩු ළමයින්ගෙන් සියයට 30 ක් පමණ අඩුබර වන අතර සෑම දරුවන් 3 කින් 1 කට උපතේ දී බර අඩුය. තවද ප්‍රජනන වයසේ සිටින කාන්තාවන්ගෙන් තුනෙන් එකක් මන්ද පෝෂණයෙන් පෙළේ. වැඩි දියුණු කළ සෞඛ්‍ය රැකවරණයෙන් පමණක් සියලු සෞඛ්‍ය දර්ශකවල වර්ධනයක් පෙන්නුම් නොකරන බව පිළිගත් කරුණකි. එසේ වන්නේ සෞඛ්‍ය තත්වයට බලපාන්නාවූ මුල් බැසගත් සමාජ ආර්ථික සාධක පවතින නිසාය. සෞඛ්‍ය තත්වයෙන් ඔබ්බට යන මෙම අධ්‍යයනය වතු අංශයේ ළමා සහ මාතෘ මන්දපෝෂණයට හේතුවන සමාජ ආර්ථික හේතු අධ්‍යයනය කරයි. මෙම සොයා ගැනීම් රටේ සමස්ත ඉලක්ක සාක්ෂාත් කර ගැනීමේ දී වතු අංශයේ මන්දපෝෂණයේ විෂම චක්‍රය බිඳ දැමීම සඳහා යොමුවීමට අවශ්‍ය ප්‍රමුඛතා ක්ෂේත්‍ර පිළිබඳ ප්‍රතිපත්තිවලට දායක වේ.

වතු අංශයේ ළමා සහ මාතෘ මන්දපෝෂණයට සුවිශේෂ වූ සාධක පවතී. මෙම අධ්‍යයනයෙන් වතු අංශයේ ළමා සහ මාතෘ මන්දපෝෂණයට සැලකිය යුතු ප්‍රමාණයකින් දායක වන වතු අංශයේ අසමතුලිත ආහාර ගැනීමේ රටාව සහ ඉහළ මට්ටමක පවතින ගෘහස්ථ මත්පැන් සහ දුම්කොළ පරිභෝජනය වැනි සුවිශේෂී සාධක හෙළි කරයි. මෙම කරුණු හා බැඳුණු වතු අංශයේ මවුවරුන්ගේ අඩු අධ්‍යාපනය, ගෘහස්ථ අයහපත් සමාජ ආර්ථික තත්වය සහ ආහාර සුරක්ෂිත භාවයක් නොමැතිවීම වැනි සාධක නිසා වතු අංශයේ මන්දපෝෂණයේ විෂම චක්‍රය දිගටම පවතී. මෙම අධ්‍යයනයේ සොයා ගැනීම් පහත සඳහන් ආකාරයට සාරාංශ කළ හැකිය.

වතු අංශයේ මන්දපෝෂණය පරම්පරාගත විෂම චක්‍රයක් වී ඇත. මෙම අධ්‍යයනයේ ප්‍රතිඵල අනුව අඩු උපත් බර, වතු අංශයේ වයස අවුරුදු පහට වඩා ළමයින්ගේ මන්දපෝෂණයට ප්‍රධාන සාධකයක් බව හෙළි කරයි. තවද මවගේ ඌන පෝෂණ තත්වයද ළමා මන්දපෝෂණය හා සමීපව බැඳී පවතී. උපතේදී ඌන වර්ධනය, ඉන්පසුව ළමා කාලය පුරාත් වැඩිමහල් වයටත් පැතිර යාම, වතුකරයේ මන්ද පෝෂණ චක්‍රය අබන්ධව පැවතීමට හේතු සාධක වී ඇත. එමනිසා මන්දපෝෂණය අන්තර් පරම්පරා ප්‍රශ්නයක් නොවීම සහතික කිරීමට ජීවන චක්‍රයේ එක් එක් අවස්ථාවලදී ඌන පෝෂණය වැලැක්වීමට අවශ්‍ය පියවර ගත යුතුය.

තවද වතු අංශයේ ළමා සහ මාතෘ මන්දපෝෂණයට කැපී පෙනෙන හේතුවක් වන්නේ අසමතුලිත ආහාර රටාවයි. එනම් ප්‍රෝටීන් හා විටමින් අඩු එහෙත් පිෂ්ට සහ අධික තෙල් සහිත ආහාර ගැනීමයි. වතු අංශයේ මවුවරුන් සහ වයස පහට අඩු ළමයින්ගේ ආහාර රටා අනෙක් ප්‍රදේශවල සමාන කාණ්ඩ හා සසඳන විට ප්‍රෝටීන් බහුල ආහාර (මස්, මාළු සහ බිත්තර) සහ කහ පැහැ එළවලු, පලතුරු සහ ධාන්‍ය වර්ග ආහාරයට ගන්නේ මද වශයෙනි. එමනිසා වතු අංශයේ චිරස්ථායි පෝෂණ තත්වයන් පවත්වා ගැනීමට කෙරෙන ක්‍රියාදාමයන් අතරට ගෘහස්ථ සහ ප්‍රජා මට්ටමේ ආහාර සුරක්ෂිත භාවය නගා සිටුවීමට අවශ්‍ය පියවර ගත යුතුය.

මත්පැනට ඇබ්බැහිවීම සහ දුම්කොළ භාවිතය වතු අංශයේ මන්දපෝෂිත කාන්තාවන්ගේ සංඛ්‍යාව කැපී පෙනෙන ලෙස වැඩි කරයි. මත්පැන් සහ දුම්කොළ පරිභෝජනය වතු අංශයේ මිනිසුන් අතර ඉහළ මට්ටමකින් පවතී. නිදසුනක් වශයෙන් වතු අංශයේ පවුල්වලින් සියයට 40ක් මත්පැන් භාවිත කරන අතර අනිත් අංශ දෙකේ එම ප්‍රතිශතය සියයට 17 කි. මත්පැන් සහ දුම්කොළ සඳහා වියදම් කිරීම ඉහළම දරිද්‍රතා මට්ටමක් වාර්තා වන වතු අංශයේ පවුල්වල අහාර සුරක්ෂිත භාවය කෙරේ අයහපත්සේ බලපායි. මේනිසා තරුණයන් අතර සාධනීය සෞඛ්‍යමය පුරුදු ප්‍රවර්ධනය කෙරෙන හා මත්පැන් සහ දුම්කොළ භාවිතය වැනි අහිතකර දේ සීමා කෙරෙන උපදේශන වැඩ සටහන් ඇරඹිය යුතුය.

කාන්තාවන්ගේ අධ්‍යාපනය සහ දැනුම, තමන්ගේ මෙන්ම තම දරුවන්ගේත් පෝෂණ මට්ටම කෙරේ දැඩි බලපෑමක් ඇති කරවයි. වතු අංශයේ ස්ත්‍රීන්ගේ අධ්‍යාපන මට්ටම නාගරික සහ ග්‍රාමීය ප්‍රදේශ වලට වඩා අඩුය. නිදසුනක් වශයෙන් වතුකරයේ ස්ත්‍රීන්ගෙන් අඩකට ආසන්න සංඛ්‍යාවක් ප්‍රාථමික මට්ටම දක්වා පමණක් අධ්‍යාපනයක් ලබා ඇති අතර, රටේ ප්‍රාථමික මට්ටම දක්වා පමණක් අධ්‍යාපනය ලැබූ පුද්ගලයන් ප්‍රමාණය සියයට 15 ක් පමණ වේ. පහත් අධ්‍යාපන මට්ටම නිසා ස්ත්‍රීන්ට ප්‍රදේශයේ රජයේ සෞඛ්‍ය සේවාවන් හෝ වතු පරිපාලනයෙන් ලබා දෙන සෞඛ්‍ය සහ සනීපාරක්ෂක දැනුවත් කිරීමේ වැඩ සටහන්වලින් සම්පූර්ණ ප්‍රතිඵල ලබා ගත නොහැකිය.

වතු අංශයේ උගු වූ ගැටලු විසඳීමේදී විශේෂිත ප්‍රජා මට්ටමේ ක්‍රියාවට නංවන වැඩ සටහන්වලට ප්‍රධාන ස්ථානයක් හිමි වේ. වතු අංශයේ මන්දපෝෂණයට හේතු වන බොහෝ සාධක සමබල නොවූ ආහාර ගැනීම, ගෘහස්ථ මත්පැන් හා දුම්කොළ භාවිතය වැනි කරුණු වතුකරයටම සුවිශේෂී ඒවාය. මෙවන් සන්දර්භයකදී වතු අංශයේ පෝෂණ මට්ටම වැඩි දියුණු කිරීමව අදාල ප්‍රතිපත්ති ප්‍රජා මූලික වැඩ සටහන් කෙරේ විශේෂයෙන් යොමු වූ ඒ සඳහාම විශේෂයෙන් සැලසුම් කළ ක්‍රියාවලින් විය යුතු බව අවධාරණය කළ යුතුය. පෝෂණ වර්ධන වැඩ සටහන් මගින් තෝරා ගත යුත්තේ කුමන ආහාරද, ළමයින්ට කෑම සකස් කරන්නේ කෙසේද සහ ආහාරවල පෝෂණ ගුණය පිළිබඳව දැනුවත් කළ යුතුය. එමෙන්ම සෞඛ්‍යමත් හැසිරීම් පිළිබඳ දැනුවත් භාවය නංවාලන වැඩ සටහන්ද තිබිය යුතුය. වැඩි දුරටත් පහසුකම් අඩු වතු අංශයේ ජනතාවගේ සුභ සාධනය සඳහා ගෘහස්ථ සමාජ ආර්ථික තත්වය නංවාලන හා සුරක්ෂිත පරිසරයකට අවශ්‍ය ක්‍රියා මාර්ග ගත යුතුය.

நிறைவேற்றுச் சுருக்கம்

சுகாதாரம் பற்றிய சுட்டிகள் அனைத்தும் 2015 இன் மில்லேனியம் அபிவிருத்தி இலக்குகளை அடைவதற்கான வழிமுறைக்கு சாதகமாக காணப்படுகின்ற போதிலும், போஷாக்கின்மையானது இலங்கையில் பாரியதொரு அக்கறைமிக்க சுகாதார அம்சமாகவே தொடர்ந்தும் இடம்பெறவுள்ளது. ஐந்து வயதுக்குக் குறைவான சிறுவர்களில் 20 சதவீதத்திற்கும் அதிகமானோர் எடை குறைந்தவர்களாகவுள்ளதோடு, இனப்பெருக்க வயதுடைய பெண்களில் 16 சதவீதமானோர் போஷாக்கின்மையுடனும் நாட்டிலுள்ளனர். இவை அனைத்தும் தவிர, நாட்டின் தோட்டத்துறை சார்ந்த மக்கள் போஷாக்குக் குறைவினால் மிகவும் கடுமையாக பாதிக்கப்பட்டனர். ஐந்து வயதுக்கும் குறைவான 30 சதவீதமான சிறுவர்கள் எடை குறைவாகவுள்ளமை, பிறப்பின் போது கிட்டத்தட்ட மூன்றில் ஒரு குழந்தை என்ற வீதத்தில் குறைந்த எடையுடன் காணப்படுகின்றமை மற்றும் இனப்பெருக்க வயதுடைய பெண்களில் மூன்றில் ஒரு பகுதியினர் போஷாக்கின்றிக் காணப்படுகின்றமை போன்றவற்றை இங்கு எடுத்துக் காட்டாகக் கூறமுடியும். மேம்பாட்டுடனான சுகாதார பராமரிப்பை மாத்திரம் கொண்டு அனைத்து ஆரோக்கிய வெளியீடுகளையும் மேம்படுத்த முடியாது என்பது ஏற்றுக்கொள்ளப்பட்ட விடயமாகும். சுகாதார அம்சங்களைப் பாதிக்கும் வகையிலான சமூக-பொருளாதார காரணிகள் ஆழமாக வேரூன்றிக் காணப்படுகின்றமையே இதற்குக் காரணமாகும். எனவே, இவ் ஆய்வானது சுகாதார அம்சங்களுக்கும் அப்பால் சென்று தோட்டத்துறையினரின் பிள்ளைகள் மற்றும் தாய்மார்களின் போஷாக்கின்மை தொடர்பில் அவற்றைத் தீர்மானிக்கும் சமூக-பொருளாதார காரணிகளையும் கண்டறிகிறது. ஆய்வின் கண்டறிதல்கள் நாட்டின் ஒட்டுமொத்த இலக்குகளையும் அடைந்துகொள்ளும் வகையில், தோட்டத்துறையினரின் இத்தகைய மோசமான நிலைமையினைப் போக்குவதில் பங்களிப்புச்செய்யும் முன்னுரிமை விடயங்கள் குறித்தான கொள்கைகளுக்கும் பங்களிப்புச் செய்கிறது.

தோட்டத்துறையில் சிறுவர்கள் மற்றும் தாய்மார்களின் போஷாக்கின்மைக்கு தனித்துவமான காரணிகள் காணப்படுகின்றன. சமநிலையற்ற உணவுப்பழக்க முறை, மதுபானம் அருந்தல் மற்றும் புகையிலை சுவைத்தல் போன்ற தனித்துவ விடயங்களே தோட்டத்துறைச் சிறுவர்கள் மற்றும் தாய்மார்களின் போஷாக்கின்மை தொடர்பில் கணிசமான பங்களிப்பு செலுத்துவதாக இவ் ஆய்வின் கண்டறிதல்கள் வெளிக்காட்டியது. இத்தகைய காரணிகள் பெண்களின் போதிய கல்வி அறிவின்மை, வீடு சார்ந்த சமூக-பொருளாதார அம்சங்களில் தரக்குறைவு மற்றும் உணவுப் பாதுகாப்பின்மை போன்ற விடயங்களோடும் தொடர்பினைக் கொண்டமைந்து, தோட்டத்துறையினரின் போஷாக்கின்மை எனும் கொடுமையை தொடர்ந்தும் நிலைக்க வைத்துள்ளது. இவ் ஆய்வின் கண்டறிதல்கள் பின்வருமாறு சுருக்கமாக வழங்கப்படுகிறது.

போஷாக்கின்மையானது தலைமுறையாக கடத்தப்படுவதும் தோட்டத்துறை மக்களோடு ஆழமாக இணைக்கப்பட்ட விடயமாகக் காணப்படுகிறது. தோட்டத்துறையில் ஐந்து வயதுக்கும் குறைவான சிறுவர்களின் போஷாக்கின்மைக்கு அவர்கள் பிறக்கும் போதான எடைக் குறைவே பிரதான காரணம் என்பதையும் இவ் ஆய்வு சுட்டிக்காட்டுகிறது. மேலும், தாய்மார்களின் போஷாக்கு குறைவானது பிள்ளையின் போஷாக்கின்மைக்கு மிகவும் நெருங்கிய காரணியாகவும் உள்ளது. தோட்டத்துறைக் குழந்தைகளின் பிறப்பின் போதான வளர்ச்சிக் குறைபாடானது பிள்ளைப் பருமன் மற்றும் வாலிபப் பருவம் முழுவதும் போஷாக்கின்றிய தலைமுறையினருக்கிடையில் கடத்தப்படுகிறது. எனவே, போஷாக்கின்றமையானது தொடர்ச்சியாக தலைமுறையினருக்கிடையில் கடத்தப்படுகின்றதொரு பிரச்சினையாக மாறாதிருப்பதனை உறுதிப்படுத்தும் வகையிலான நடவடிக்கைகளை வாழ்க்கை வட்டத்தின் ஒவ்வொரு கட்டத்திலும் மேற்கொள்ள வேண்டியுள்ளது.

தோட்டத்துறையின் சிறுவர்கள் மற்றும் தாய்மார்களின் போஷாக்கின்மைக்கானதொரு குறிப்பிடத்தக்க காரணியாக 'தவறான' உணவு வகையை – புரதம் நிறைந்த உணவை குறைவாக உட்கொள்ளும் பழக்கமாகவிருந்தது. ஏனைய இரண்டு துறைகளைச் சார்ந்த சக மக்களுடன் ஒப்பிடுகையில், தோட்டத்துறையிலுள்ள தாய்மார்களும் மற்றும் ஐந்து வயதுக்குக் கீழான சிறுவர்களும் புரதம் நிறைந்த உணவு (இறைச்சி, மீன் மற்றும் கோழி

முட்டைகள்) மற்றும் மஞ்சல் நிற காய்கறிகள், பழங்கள், தானியங்கள் போன்ற ஏனைய ஊட்டச்சத்து மிக்க உணவுகளையும் குறைவாகவே உண்டுள்ளனர். தோட்ட துறையினரின் பிள்ளைகள் மற்றும் தாய்மார்களின் போஷாக்கின்மைக்கு, புரதம் மற்றும் உயிர்ச்சத்துக்களை குறைவாகவும், மாப்பொருள் மற்றும் கொழும்பு போன்ற உணவுகளை அதிகமும் கொண்டதானதொரு சமநிலையற்ற உணவுப் பழக்கமே பிரதான காரணமென நிரூபிக்கப்பட்டது. எனவே, தோட்டத்துறையினரின் குடும்ப மற்றும் சமுதாய வாழ்விலும் அதேபோல் பாடசாலை மட்டத்திலும் உணவு பாதுகாப்பினை மேம்படுத்துவதில் நிலைபேறான ஊட்டச்சத்துக்களைக் கொண்ட உணவுப் பழக்கம் இலக்குப்படுத்தப்படுதல் வேண்டும்.

தோட்ட மக்களின் மதுப்பழக்கம் மற்றும் புகையிலை சுவைத்தல் ஆகியன போஷாக்கின்றிய பெண்களின் எண்ணிக்கையை கணிசமானளவு அதிகரித்தது.

பெருத்தோட்டத்துறை மக்கள் மத்தியில் மதுபானம் மற்றும் புகையிலை ஆகியவற்றின் நுகர்வு மிகவும் அதிகமாகக் காணப்பட்டது. எடுத்துக்காட்டாக, தோட்டத் துறையின் 40 சதவீதமான குடும்பங்கள் மதுபான பழக்கமுடையதாகக் காணப்பட்ட அதேவேளை, ஏனைய இரண்டு துறைகளில் இது முறையே 17 மற்றும் 26 சதவீதமாக காணப்பட்டது. மதுபானம் மற்றும் புகையிலைப் பழக்கமானது, குறிப்பாக வறுமை கடுமையாக நிலவுகின்ற தோட்டப் பிரதேச மக்களது வீட்டு உணவுப் பேணுகையினை கடுமையாகப் பாதிக்கிறது. நேர்மறையான சுகாதார நடைமுறைகளை ஊக்குவிக்கும் வகையிலும் மற்றும் மதுபானம், புகையிலை பாவனை போன்ற எதிர்மறையான விடயங்களை தடுக்கும் வகையிலுமான உளவளத்துணை நிகழ்ச்சித் திட்டங்கள் முன்னெடுக்கப்படுதல் வேண்டும்.

பெண்களதும் அவர்களது பிள்ளைகளதும் போஷாக்கு நிலைமையுடன் தொடர்புடைய உறுதியான பாதிப்பொன்று பெண்களின் கல்வி மற்றும் அறிவில் தாக்கம் செலுத்திக் காணப்படுகின்றமை.

தோட்டத்துறையில் பெண்களின் கல்வி நிலைமையானது நகர மற்றும் கிராமிய பிரதேசங்களை விடவும் மிகவும் குறைவான மட்டத்திலேயே உள்ளது. கிட்டத்தட்ட பெண்களில் அரைவாசிப் பேர் ஆரம்பநிலைக் கல்வி வரை மாத்திரமே பயின்றுள்ள அதேவேளை, தேசிய மட்டத்தில் இதன் சதவீதம் 15மூ ஆகும். உள்நாட்டு மட்டத்தில் அரசாங்க சுகாதார சேவையினாலோ அல்லது தோட்ட முகாமைத்துத்தினாலோ வழங்கப்படுகின்ற குடும்ப சுகாதாரம் மற்றும் ஆரோக்கிய நடைமுறைகள் தொடர்பிலான விழிப்பூட்டல்களின் முழு அனுகூலத்தையும் இத்தகைய பெண்களால் பெற முடியாமைக்கு அவர்களது கல்வி மட்டம் குறைவாகவுள்ளமையே காரணமாகவுள்ளது.

தோட்டத் துறையினரிடம் காணப்படுகின்ற பாரிய அக்கறைமிகு இவ்விடயத்தைத் தீர்த்துவைப்பதில் விசேட சமுதாய இயக்க நிகழ்ச்சித்திட்டங்கள் ஒரு பாரிய வகிபாகத்தை வழங்கக்கூடும்.

தோட்டத் துறையினரின் போஷாக்கின்மைக்கான அனேகமான காரணிகள் தோட்டத்துறைக்கு தனித்துவம் உடையதாக விளங்குகிறது - அவை சமநிலையற்ற உணவுப் பழக்கம், குடும்ப மதுபானப் பழக்கம் மற்றும் புகையிலைப் பழக்கம் போன்றனவாகவுள்ளன. இத்தகைய சூழமைவில், தோட்ட மக்களின் ஆரோக்கிய மட்டத்தை மேம்படுத்தும் வகையில் சமுதாய இயக்க நிகழ்ச்சித்திட்டங்களுக்கான விசேட அவதானிப்புகளை உட்படுத்திய விசேட கொள்கைகள் வடிவமைக்கப்படுவதை வலியுறுத்தல் வேண்டும். எத்தகைய உணவுகளை தெரிவுசெய்தல், எவ்வாறு உணவு தயாரித்தல், எவ்வாறு பிள்ளைகளுக்கு உணவு ஊட்டுதல், சிறந்த உணவுப் பழக்கங்கள் மற்றும் உணவின் போஷாக்குப் பெறுமானம் போன்றவற்றை மக்களுக்கு வழங்கும் வகையில் போஷாக்கு பற்றிய கல்வி நிகழ்ச்சித்திட்டங்கள் வலுப்படுத்தப்படல் வேண்டுமென்பதோடு, ஆரோக்கிய நடத்தைகள் குறித்தான விழிப்புணர்வினை அதிகரிப்பதற்கான நிகழ்ச்சித்திட்டங்களும் காணப்படல் வேண்டும். மேலும் பிந்தங்கிய தோட்டப் பிரதேசங்களில் குடும்பம் சார்ந்த சமூக-பொருளாதார நிலைமைகள் மற்றும் பாதுகாப்பான சுற்றாடல் நிலைமைகள் ஆகியன தோட்டத்துறை மக்கள் மத்தியில் ஆரோக்கியமான சுக வாழ்வை ஏற்படுத்துவதில் பாரியதொரு வகதிபாகத்தை கொண்டிருக்கக்கூடும்.

பிரதான சொற்கள் : போஷாக்கின்மை, தோட்டத்துறை, சிறுவர் ஆரோக்கியம், தாய்மார்களின் ஆரோக்கியம்

1. Introduction

Sri Lanka has long been recognized for decent health care outcomes such as reduced infant (per 1000 live births, 16.5 in 1995 to 9.2 in 2012) and maternal mortality rates (per 100,000 live births, 61 in 1995 to 37.7 in 2012) (FHB, 2012). While most of the health indicators are on track to achieve the 2015 Millennium Development Goals (MDGs), malnutrition continues to be a serious health concern in Sri Lanka. Data reveals that more than 20 per cent of children under five years are underweight, nearly 16 per cent babies born have low birth weight, and 16 per cent women of reproductive age (15- 49) are malnourished. Furthermore, certain population groups fare worse than others. For instance, the estate sector shows a higher prevalence of child and maternal malnutrition compared to the country's average figures. In the estate sector, about 30 per cent of children under five years are underweight, nearly one in three babies born have low birth weight, and one third of women in reproductive age are malnourished.[1]

According to the findings of previous research on the determinants of nutritional status in the country, being a resident of the estate sector is an important determinant of child and maternal nutritional status (Priyanka Jayawardena, 2012; World Bank, 2007). Inequalities in health arise in part, because of socio-economic inequalities in society. Improved health care alone cannot improve all health outcomes as there are deep rooted socio-economic factors affecting health. For example, a child's nutritional status as well as birth weight of babies is determined by a number of factors, such as genetics, mother's nutritional status, the environment in which a child lives, and also social circumstances where cultural habits amongst some population groups can prevent children from getting vital nutrition even when resources are available.

People in the Estate sector are one of the most marginalized groups in the country, in part because the majority of its population is descended from indentured labour brought from India in the early 1900s, they were not granted citizenship status, and they lived for decades without state provision of social services. During that period estate workers were completely dependent on the estate's management for their basic needs – housing, health, and education facilities. These have resulted in large inequalities in access to and the utilization of, health services between the estate sector and the rest of the country. World Bank (2007) explains that the root cause for the persistence of poverty in this instance is the unique organizational structure of the estates. Further, plantation workers differ culturally and linguistically from the Sinhalese population, and are geographically isolated from the rest of the country. This forms a barrier when attempting to create awareness of health best practices.

"In the estate sector, about 30 per cent of children under five years are underweight, nearly one in three babies born have low birth weight, and one third of women in reproductive age are malnourished"

children under five years are underweight

[1] Estimates are based on DHS 2006/07 data.

To combat malnutrition in the country with an appropriate set of interventions, policy makers need to have a better understanding of the causes of malnutrition in severely affected populations, such as those in the estate sector. As recommended in the National Malnutrition Study conducted by the World Bank in 2007, interventions to improve the nutritional outcomes in the estate sector need to be designed separately, in consideration of its unique socio-cultural and economic conditions. There is an urgent need to identify the factors influencing poor nutritional status in the estate sector, in order to design and implement strategies and policies to promote nutritional status in the region.

There have been a few studies done in the Estate sector to investigate the malnutrition issue, but these have tended to be small area studies, descriptive in nature. In contrast, this research study uses national representative Demographic and Health Survey (DHS) micro data for analysis, and also adopts econometric techniques to examine the socio-economic determinants of child and maternal malnutrition in the Estate sector. Rather than investigating only general determinants such as household socio-economic status, or women's less education, this study has especially focused on investigating more direct and specific variables to the estate sector. For instance, nutrient food intake of child and mother and alcohol consumption and smoking habits of the estate sector households are incorporated in the probit analysis with the aim of directly addressing the critical concern. Thus, this study attempts to contribute to policies on priority areas needing to be addressed in breaking the vicious cycle of malnutrition in the estate sector.

With the aim of breaking the intergenerational cycle of malnutrition in the estate sector, this study examines the determinants of two main stages of the intergenerational cycle of malnutrition[2] — child malnutrition and maternal malnutrition. Under this main theme there are three sub-objectives, as follows:

- Examine the factors which influence the nutritional status of under five year old children in the estate sector,
- Examine the factors which influence mothers' poor nutritional status in the estate sector, and
- Based on the above analysis, identify interventions for reducing malnutrition in the estate sector.

This study builds on previous research and analyzes the socio-economic determinants of nutritional status. The study focuses on malnutrition in the context of protein-energy malnutrition (PEM), which signifies an imbalance between the supply of protein and energy and the body's demand for them to ensure optimal growth and function.

The report is organized as follows. Chapter 1 gives an introduction to the study through discussing rationale and objectives of the study. To set the stage, Chapter 2 presents the importance of nutrition in achieving overall goals of the country and background on deprived Estate sector. Chapter 3 lays out the underlying theoretical background and conceptual framework of the study while Chapter 4 describes the data, measures, and methodologies employed in this study. Chapter 5 examines the probable causes of malnutrition in the Estate sector as identified under the conceptual framework of the study. Chapter 6 presents the main empirical results on the determinants of child and maternal malnutrition in the Estate sector while Chapter 7 is devoted to discuss the effectiveness of existing nutritional policies and interventions which have been introduced to improve the nutritional status and mismatches between causes and interventions. Finally, Chapter 8 concludes with policy implications.

[2] According to the Administrative Committee on Coordination – Sub Committee on Nutrition (ACC/SCN), (1992),intergenerational vicious cycle of malnutrition has four main stages: low birth weight infants; child growth failure; malnourished stunted adolescents; and small statured, malnourished, reproductive aged women.

2. Background

2.1 Why Invest in Nutrition

Improving nutrition is essential to reduce extreme poverty and achieve sustainable development in a country. Under-nutrition remains a fundamental challenge in enhancing human welfare and achieving economic growth in the country. Good nutrition is essential for sustained economic growth to achieve equity and improve the quality of life. By improving efficiency, maximum social and economic potential can be met, to expand individual as well as the nation's economic well-being. Improving nutrition contributes to productivity growth and economic development, as well as reducing health care expenditure for the state and for households, allowing the funding of alternative welfare measures.

Malnutrition raises the life time risk of poor physical health, constrains intellectual growth, and leads to more chronic illness and disability in adulthood. Growth-retarded adult women are likely to carry on the vicious cycle of malnutrition by giving birth to low birth-weight babies. For instance, in Sri Lanka almost one of four babies born to undernourished mothers was of low birth weight, compared to only 14 per cent of those born to normal weight women.

Apart from such problems, the economic cost of malnutrition is very high; it has adverse implications for the economy, through its effects on education, productivity, growth and healthcare expenditure. Therefore, in the long run, poor nutrition and health can result in a poorly educated and unhealthy population, which will affect the economic growth and development of the country. According to the World Bank, (2006) report, GDP lost to malnutrition is as high as 2 to 3 per cent per year.

2.2 Achieving the MDG Target to "Eradicate Hunger"

Improving nutrition is essential for sustainable development. This requirement has been recognised in the Millennium Development Goals (MDG) since the first goal of the MDG is to eradicate extreme poverty and hunger. The two targets are to halve poverty and starvation, between 1990 and 2015. The key indicator used for measuring progress on the non-income poverty goal is the prevalence of underweight children (under age five). Therefore, improving nutrition is one of the MDG targets.

Sri Lanka's overall health indicators are on track to achieve the MDG targets in 2015. However, nutrition levels need to be improved considerably for Sri Lanka to achieve the MDG target of halving the proportion of people who suffer from malnutrition by 2015 (see Table 1). As shown in the above referred table, the gap in achieving the 2015 target is still large.

As described at the outset of this report, combating malnutrition has become a serious concern as there are certain population groups where prevalence of malnutrition is very high. For instance, families working on estates are among the country's poorest in terms of nutrition (see Figure 1).

Table 1: MDG Target to Eradicate Hunger

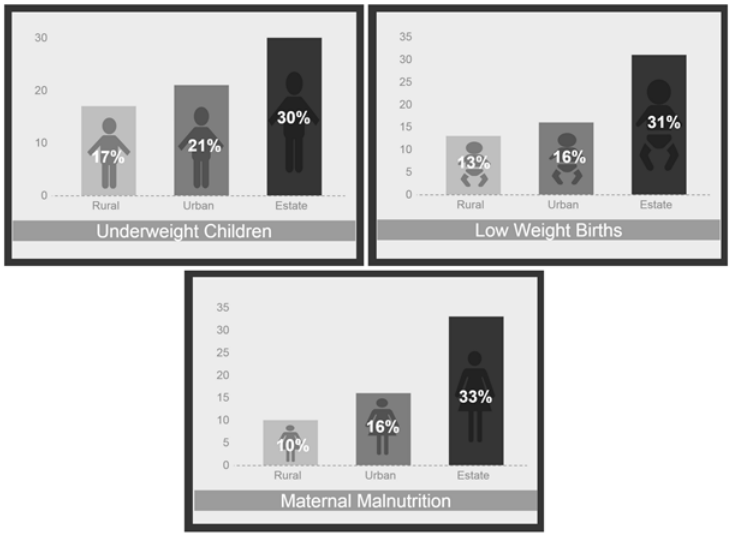
MDG Indicator	*Year*			
	1993	*2000*	*2006/07*[1]	*2015 Target*
Prevalence of underweight children under 5 years of age	37.7	29.4	26.9	19

Note: These indices are based on the previously used NCHS/CDC/WHO standards, which are comparable for the 1993 and 2000 figures.

Source: MDG progress report, 2008.

[3] The figure for year 2006/2007 based on WHO Child Growth Standards adopted in 2006, is 21.9%.

Figure 1: Nutritional Status of Mother and Child by Sector



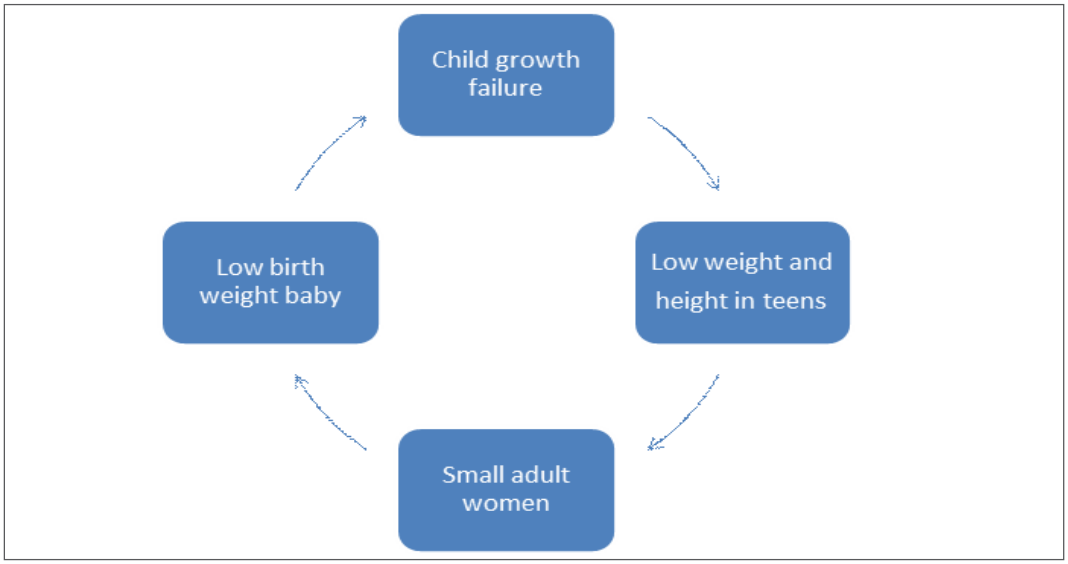
Source: Author's calculations using DHS 2006/07 data.

2.3 Estate Sector is Worst Affected in Malnutrition

In the Estate sector, higher prevalence of malnutrition in each stage of the cycle is a serious issue in combating malnutrition as it leads to a possible intergenerational cycle of malnutrition (see Figure 2).

Unless the cycle is broken at some stage, not only does it continue the vicious cycle of malnutrition; but also contributes to an enormous waste of human potential, a waste which no society can afford. Therefore, action needs to be taken at each stage of the life cycle to ensure that malnutrition does not perpetuate an intergenerational problem in the Estate sector. Rest of this report discusses the determinants of child and maternal malnutrition in the Estate sector.

Figure 2: Intergenerational Cycle of Malnutrition



Source: *Second Report on the World Nutrition Situation. Volume I: Global and Regional Results.* ACC/SCN (1992).

[4] The Department of Census and Statistics defines the estate sector as plantation areas having more than 20 acres (8 hectares) and more than 10 residential labourers under a single administration.

2.4 Deprived Region: Background on Estate Sector

Plantation workers and their families who reside in the estates[4] are called the plantation community. Most of these plantation workers descended from indentured labour brought from South India during the British colonial times. Plantation community is socially, economically and politically isolated from the rest of the society due to historical, cultural, geographical and other reasons. As of 2010, there are more than 1 million people[5] residing in the estates, with the majority concentrated in a geographically contiguous area in the Central Province of Sri Lanka.

In the estate sector, employment opportunities are available for less educated youths of this community. Further, in contrast to other parts of the country, female labour force participation (LFP) is high in the estate sector (Female LFP in 2012, Estate sector 50%, national 33%).[6] The availability of employment opportunities for less educated youth of this sector, keeps this community within the estates without any upward social mobility.

Plantation community was confined socially and economically to the plantation economic unit where basic needs are provided by the Estate sector management at a minimum level. For instance, the plantation community are housed in line rooms provided by the management which are in poor living condition such as limited space (single room), lack of privacy, no safe drinking water, shared toilets etc. Also there are gaps in service delivery in government health services in the Estate sector. According to the client relationship developed in the colonial period, the plantation community was inclined to be dependent on services provided by Estate sector management for their primary needs and services such as housing, healthcare, education etc. Therefore, the plantation community suffered from unhygienic housing, poor health facilities, low level of education, and lack of cultural and recreation facilities. With the aim of improving the lagging regions, Government has taken measures to integrate the estate sector primary services into the national system.

2.5 Estate Sector Poverty

During the last decade, Sri Lanka has made commendable progress in reducing poverty. This is not only at national level, but also sector level poverty levels have been reduced considerably. Especially in recent years, Estate sector poverty levels have gone down from 32 per cent in 2006/07 to 11.4 per cent in 2009/10 (see Table 2). However, still the estate sector is lagging behind when compared to the other parts of the country. For instance, as reported in HIES 2009/10 report, 58.5 per cent of the estate sector households are among the poorest 40 per cent households of the country (DCS, 2011). Furthermore, the survey results revealed that the mean monthly household income for the estate sector is remarkably less (about Rs. 12,000) than the national figure, Rs. 36,451 in 2009/10.

As recognised in the literature, the general underdevelopment and poor economic situation that prevailed in this sector, badly affected the household welfare and in turn, forms a vicious cycle of malnutrition among the plantation community.

Table 2 : Poverty Headcount Index (percentage) by Sector

	1990/91	1995/96	2002	2006/07	2009/10
Sri Lanka	26.1	28.8	22.7	15.2	8.9
Urban	16.3	14	7.9	6.7	5.3
Rural	29.5	30.9	24.7	15.7	9.4
Estate	20.5	38.4	30	32	11.4

Source : DCS, 2008; DCS, 2011.

[5] DCS, 2011.
[6] Estimates are based on LFS, 2012 data.

3. Underlying Theoretical Background and Research Design

3.1 Literature Review

Improving nutrition contributes to productivity increase, economic development, and poverty reduction by improving physical work capacity, cognitive development, school performance, and by reducing health care cost of ill health (World Bank, 2006). Nutrition is an input as well as foundation for health and development. Better nutrition results in stronger immune system, less illness and better health. Healthy children learn better, healthy people are more productive and more able to create opportunities to gradually break the cycles of both poverty and hunger in a sustainable way. According to World Bank report - Repositioning Nutrition as Central to Development (2006), malnutrition's economic costs are substantial. It costs poor countries up to 3 per cent of their annual GDP, while malnourished children are at risk of losing more than 10 per cent of their lifetime earnings potential.

A study carried out in Sri Lanka, to understand the relative importance of health and related variables in the levels of educational achievements of primary school children, revealed that poor nutritional status as indicated by stunting of growth, anaemia, and frequent illness are all associated with poor learning outcome (NEC, 2005). In relation to the country's planned economic growth with improved living standards, malnutrition is no doubt a cause for concern as it impacts the quality of the country's workforce.

Malnutrition is not a disease; rather it is a process, with consequences that may extend not only throughout life, but also into future generations (Gillespie and Flores, 2000). The causes of malnutrition are complex, multi-dimensional, and interrelated. They range from broad factors such as political instability and slow economic growth, to immediate determinants of child nutritional status — dietary intake (energy, protein, fat, and micro nutrients) and health status. These factors are interdependent on each other (Smith and Haddad, 2000). In turn, these conditions are closely linked to the overall standard of living of people, and whether a population can meet its basic needs such as access to food, housing, and health care. Thus, assessment of malnutrition rates, not only serve as a means for evaluating the health and nutritional status of children, but also provide an indirect measurement of the quality of life of an entire population (de Onis and Blossner, 1997).

There is recognition that malnutrition is frequently part of a vicious cycle that includes poverty and disease, and these three factors are interlinked. Socio-economic and political changes that improve health and nutrition can break the cycle (de Onis and Blossner, 1997). Increased income usually enables poor families to get better access to the things that enhance the nutrition: sufficient quantity and quality of food, better child feeding and hygiene practices, adequate supplies of clean water, and access to good quality preventive and curative health care. However, if families do not spend their increased income on the factors which determine good nutrition; then malnutrition rates are unlikely to decrease (Haddad and Alderman, 2000).

In this context, women are the key actors in utilising available resources for good nutrition and household food security. Women with more control over resources are also in a better position to provide care to children and achieve better birth weights. Six practices of child care are crucial for their nutritional well-being: (i) care for women, such as required rest and food intake during pregnancy; (ii) breastfeeding and feeding of young children; (iii) psycho-social stimulation of children and support for their development; (iv) food preparation and food storage practices; (v) hygiene practices; and (vi) care for children during illness — diagnosis of illness, health seeking, and home treatment (Engle, Menon, and Haddad, 1999).

Haddad, 1999 has described women's status on household food security as follows. Women have the greatest potential to make decisions that positively affect child survival. However, women's position and status strongly influence their ability to make decisions to realize that potential. Women's position and status is formed around a series of cultural and economic factors. The status and position of women is reflected by their ability to take decisions in the spending of household income, the quantity and quality of child care they are able to provide, and in health-seeking behaviours.

As explained in Smith et al. (2003), women's status affects the quality of care for children in a direct manner, but also indirectly through the

quality of the care women themselves receive. Finally, through the women's own health and nutritional status, the care women receive influences both the quality of care for children and their birth weights. Poor women are likely to be poorly nourished, which has serious implications for the nutrition status of their yet-to-be born children, and the birth weight of newly born children.

Research have been identified that the foundations of adult health are laid in early childhood and even before birth. The process of becoming malnourished often starts in utero and may last, throughout the life cycle and also spans generations particularly for girls and women (Gillespie and Flores, 2000). Poor circumstances during pregnancy such as, deficiencies in nutrition during pregnancy, maternal stress, maternal smoking and misuse of drugs and alcohol, insufficient exercise and inadequate pre-natal care can lead to poor foetal development (WHO, 2003).

Biological and social factors affect women's health throughout their lives and have cumulative effects. Therefore, it is important to consider the entire life cycle when examining the causes and consequences of women's poor health. The cultural and socio-economic environment can adversely affect women's life style, and in particular result in inadequate diet. From infancy, in many parts of the world, women receive less and lower quality food and are treated less often when sick and then only at a more advanced stage of disease. Also, when women are less educated, they receive less information than men, have less control over decision making and family resources, and they are also less apt to admit to health problems or to seek care. A life cycle approach to women's health takes into account both the specific and cumulative effects of poor health and nutrition. Many of the health problems that affect women of reproductive age, their new borns and older women begin in childhood and adolescence (World Bank, 1994).

The general level of underdevelopment may also pose additional health risks for women. For example, poor roads and lack of transport as well as inadequate obstetric facilities hinder women from receiving timely medical treatment for pregnancy related complications. Inadequate water supply and poor sanitation impose extra burdens on women's health status. Women's disproportionate poverty further curtails their access to health services (World Bank, 1994).

Samarasinghe *et al.*, (1990) carried out a study on female plantation workers in Sri Lanka to examine the determinants of maternal nutrition and health status of the selected population group, in comparison with other parts of the country. This study suggests that the maternal nutrition and health status of female plantation workers is a result of the interaction of specific home related, work related, historical, social, and structural factors. Furthermore, lesser education, social, and cultural beliefs affect the nutrition of pregnant women. For example, pregnant women consume less food at the household level than any other female group in the plantation sector. This may be linked to the belief, prevalent among lesser educated women, that if they eat less during pregnancy, they will have smaller babies which will make it easier at child delivery.

According to the findings of the World Bank 2007, patterns of exclusive breastfeeding have a negative correlation with the prevalence of child malnutrition across sectors of the country. A study of plantation workers showed that most women do not exclusively breastfeed for longer than one month (World Bank, 2007; Sorenson *et al.*, 1998). Relative isolation of the estate sector, low levels of education, and limited access to mass media, have limited the impact of national level awareness-raising campaigns, such as on the importance of breastfeeding.

3.2 Conceptual Framework

The conceptual framework underlying this study was adapted from UNICEF (1998) and Smith *et al*, (2003). The framework is comprehensive, incorporating individual characteristics and socio-economic determinants of child malnutrition (see Figure 3). The study recognized three levels of causality corresponding to immediate, intermediate, and basic determinants of child nutritional status. Figure 1 shows the major elements of the framework.

The two immediate causes of child nutritional status are inadequate dietary intake and health status. Children can become malnourished either because they do not eat nutrient food in quantity or quality; or because they are often sick. These factors themselves are interdependent. Illness reduces a child's appetite and reduces the absorption of nutrients. It also distracts nutrients away from contributing to a child's growth and towards fighting the illness.

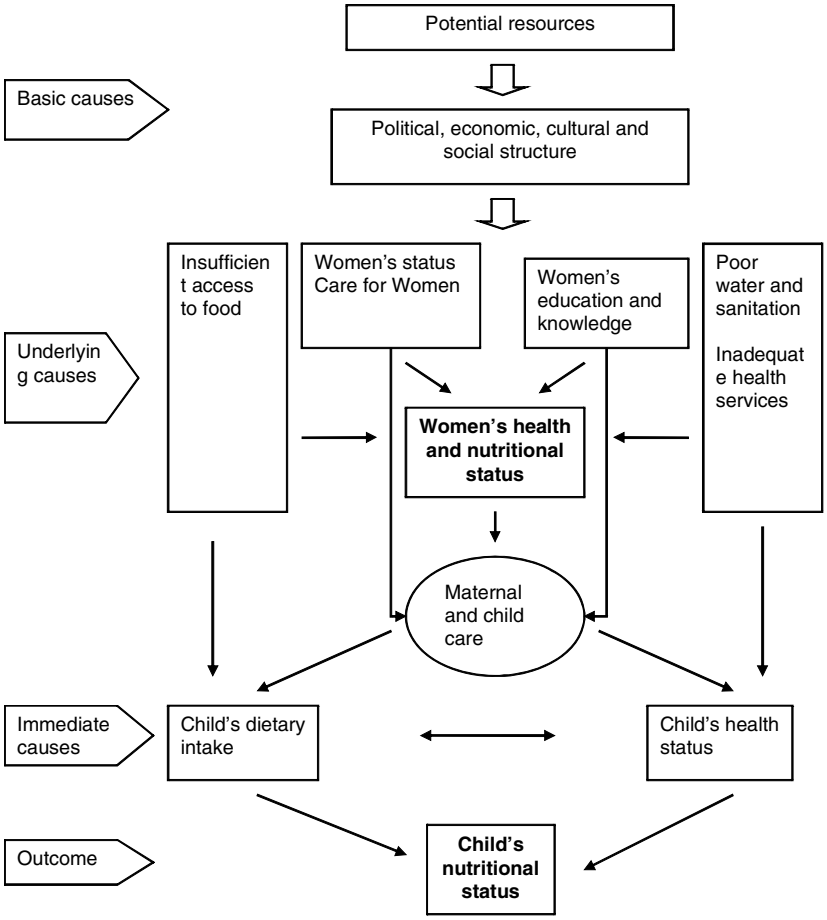
The immediate determinants of child malnutrition in turn are influenced by the three intermediate determinants, which take place themselves at the household level: food insecurity, inadequate maternal and child care practices, and poor health environment and services. Food security refers to access to sufficient food which leads to an active and healthy life. The second

underlying determinant of child nutritional status is health environment and services and it rests on sanitary facilities, access to safe drinking water, and access to health services — preventive and curative health care, pre-natal care, and birthing care. Although the actual amount of food taken by a child is directly related to food security, it is critically dependent on the maternal and child care practices such as breastfeeding, complementary feeding, and also food preparation. Similarly, a child's health is linked to the health environment in which the child lives, but ultimately it is dependent on the caregiver's ability to use of facilities, hygiene practices and health services – safe drinking water, sanitary facilities to optimize the child's health. Maternal and child care practices can be considered a major underlying cause of child malnutrition. Its effects influence children's nutritional status via food security, and health environment and services.

Even where there is a limited resource such as, household's economic resources, food insecurity, and limited access to health care, greater care giving within the household can optimize existing resources to produce good health and nutrition in children. As explained in Engle, Menon, and Haddad 1999, major categories of human resources for care include: caregiver's education, knowledge, and beliefs; caregiver's autonomy and control of resources; and caregiver's health and nutritional status. Determinants of women's own health and nutritional status are similar to those of child's nutrition. Women's status within the family has a great impact on their nutritional status. Therefore ultimately, the ability of mothers to provide care to children rests upon the quality of the care they themselves receive.

Then, the household's economic resources, cultural, and social structure influence the set of underlying causes observed within the household. Finally, the basic causes of child malnutrition manifest themselves at a societal level. They are the potential and actual resources available.

Figure 3 : Conceptual Framework



Source: Adapted from UNICEF, 1998; and Smith et al., 2003.

4. Data and Methodology

4.1 Sources of Data

The study used micro data from the Demographic and Health Survey (DHS) - 2006/07 conducted by the Department of Census and Statistics of Sri Lanka. The DHS collected demographic, socio-economic, and health data from married women aged 15-49 and their children under five years. Survey has covered representative samples of 3 sectors: urban, rural, and estate sector.

DHS household survey collects information about a large number of health, nutrition and health service utilization measures, as well as data on respondents' demographic, social, and economic characteristics. This data set is especially useful for the proposed study as it provides rich information on child health and the mother's background information (education, employment, prenatal care, health habits, as well as socio-economic background of the household – food consumption, sanitary facility, drinking water, etc). DHS 2006/07 survey has covered 1,791 households and 1,297 married women aged between 15-49 years, in the estate sector.

4.2 Measuring Malnutrition

The designation of a child as having impaired growth implies some means of comparison with a "reference" child of the same age and sex. Thus, in practical terms, anthropometric values need to be compared across individuals or populations in relation to an acceptable set of reference values.

WHO - Multicentre Growth Reference Study (MGRS) has undertaken systematic collection and standardization of information on the nutritional status of the world's under-5 population. Data has been collected from pooled sample of six countries of widely different ethnic backgrounds and cultural settings — Brazil, Ghana, India, Norway, Oman and the USA. For the analysis of nutritional surveys, WHO Child Growth Standards were published by WHO in 2006 (WHO, 2007).

Three anthropometric measures were standardized according to the international standards and z-scores[7] were created using WHO growth standards. A child was classified as "stunted" if the child's height-for-age z-score is below more than two standard deviations from the median of the reference population; "wasted" if the child's weight for height z-score is below more than two standard deviations from the international reference population; and a child was considered as "underweight" if child's weight for age z-score is less than two standard deviations from the international reference population, WHO (2006). A low birth weight child was defined as being of a birth weight of less than 2500g. The study considered the birth weight as recorded in the Child Health Record (CHR).

Indicator BMI< 18.5 was used to assess Chronic Energy Deficiency (CED) malnutrition in women. This indicator is the most frequently used standardized indicator of thinness (wasting) to assess the progressive loss of body energy (WHO, 1995). Height is a measure of past nutritional status, and reflects in part the cumulative effect of social and economic outcomes on access to nutritional foods during childhood and adolescence. Women, who are less than 145cm in height, were considered too short or stunted (ACC/SCN, 1992). According to the classification developed by WHO, anaemia was classified as mild, moderate, or severe, based on the haemoglobin concentration in the blood (WHO, 1968).

4.3 Measure of Socio-economic Status

The DHS surveys do not provide consumption or income data but has detailed information on household ownership and access to a variety of consumer goods and services. The questionnaire includes questions concerning the household's ownership of a number of consumer items, ranging from a fan to a television and car; dwelling characteristics such as flooring material; type of sanitary facilities, drinking water source and toilet facilities used; and other characteristics that are related to household socio-economic status. Recent research suggests that the asset approach is a reasonably satisfactory proxy for consumption (Filmer and Pritchett, 1998; Wagstaff et al., 1991). Thus, an asset approach was used throughout this study as a proxy for the standard of living of a household.

[7] Z-score (or SD-score) = $\frac{\text{observed value - median value of the reference population}}{\text{standard deviation value of reference population}}$

To construct the asset index, each household asset was assigned a weight or factor score generated through a principal components analysis. Typically, the asset index was assumed to be the first principal component; that is, the first linear combination (Gwatkin et al., 2000). These scores were summed up for each household and the asset index, A_i, for household *i* was defined as follows:

$$A_i = \sum_k f_k \frac{(a_{ik} - \overline{a_k})}{s_k}$$

Where a_{ik} is the value of asset *k* for household *i*, $\overline{a_k}$ is the sample mean and s_k is the sample standard deviation. f_k is the weights associated with the first principal component.

Individuals were ranked according to the total score of the household in which they resided. The sample was then divided into population quintiles.

4.4 Identifying Influential Factors for Malnutrition

Probit regression analysis was carried out separately for child and maternal malnutrition to examine the influential factors. The probit model was defined as

$$Pr(y=1|x)=\Phi(xb)$$

Where Φ is the standard cumulative normal probability distribution, xb is called the probit score or index.

Explanatory variables were employed to identify the role of all three underlying determinants (food insecurity, inadequate maternal and child care practices, and poor health environment and services) described in the conceptual framework, as well as the variables representing some of the basic causes, such as economic and social factors. The selection of the variables was based on the relevance to the study's research question as well as data availability.

Food security

Child and mother's food consumption as recorded in the survey with a 24 hour dietary recall was used as a measure of the quality of food intake. The proximal determinants are closely associated with household food security: number of people in the household and number of children between 0 and 5 were also used as proxy measures.

Health environment and services

To represent health environment, access to safe water and sanitary facilities were chosen as explanatory variables. Number of family health worker visits during pregnancy was used to capture available health services in the estate sector.

Mothers' education and knowledge

As explained in the conceptual framework of the study, women's education and knowledge also play a key role in household food security. The household decisions made in this area are influenced by women's knowledge regarding the nutritional benefits of different foods, and their ability to direct household resources toward food for home consumption. Thus, the effect of women's education and the relative status of child malnutrition will partially reflect the influences of food security as well as mother and child care. To measure mothers' education and knowledge, the variables of a mother's level of education and whether the mother reads newspapers regularly, were used in this study.

Women's status in the family

Women's status was used to capture a mother's relative power within the household. That is, women's decision making power relative to their male partners, which is measured at the household level. The measure was based on decision making regarding expenditure.

Mothers' nutritional and health status

Mother's education and knowledge as well as her status in the family, both influence mother's health and nutritional status. A mother's nutritional status was measured using her height (in cm) and whether or not she is underweight (BMI).

Maternal and child care practices

Women's impact on child nutritional status was indeed mediated through a wide variety of care giving practices for children, such as whether the baby was given colostrum, and whether the child was exclusively breastfed from 0–4 months. Furthermore, household health care and hygiene practices were measured through the use of iodized salt.

Economic status – Wealth quintiles based on asset index

Economic resource availabilities need to be employed as an explanatory variable. However, household income/expenditure information is not available in the DHS data set therefore, a wealth index using asset indices was used as a proxy measure throughout this study. This variable is expected to play a facilitating role for all the underlying determinant factors laid out above. It may, in particular, enhance health environment and services, as well as food availability, by improving resources available to households.

Other determinants

To distinguish the broader determinants of child's nutritional status, characteristics such as, the child's age, sex, whether the child is of low birth weight, and the child's health status were employed as independent variables in the explanatory analyses.

5. What Causes Malnutrition in the Estate Sector

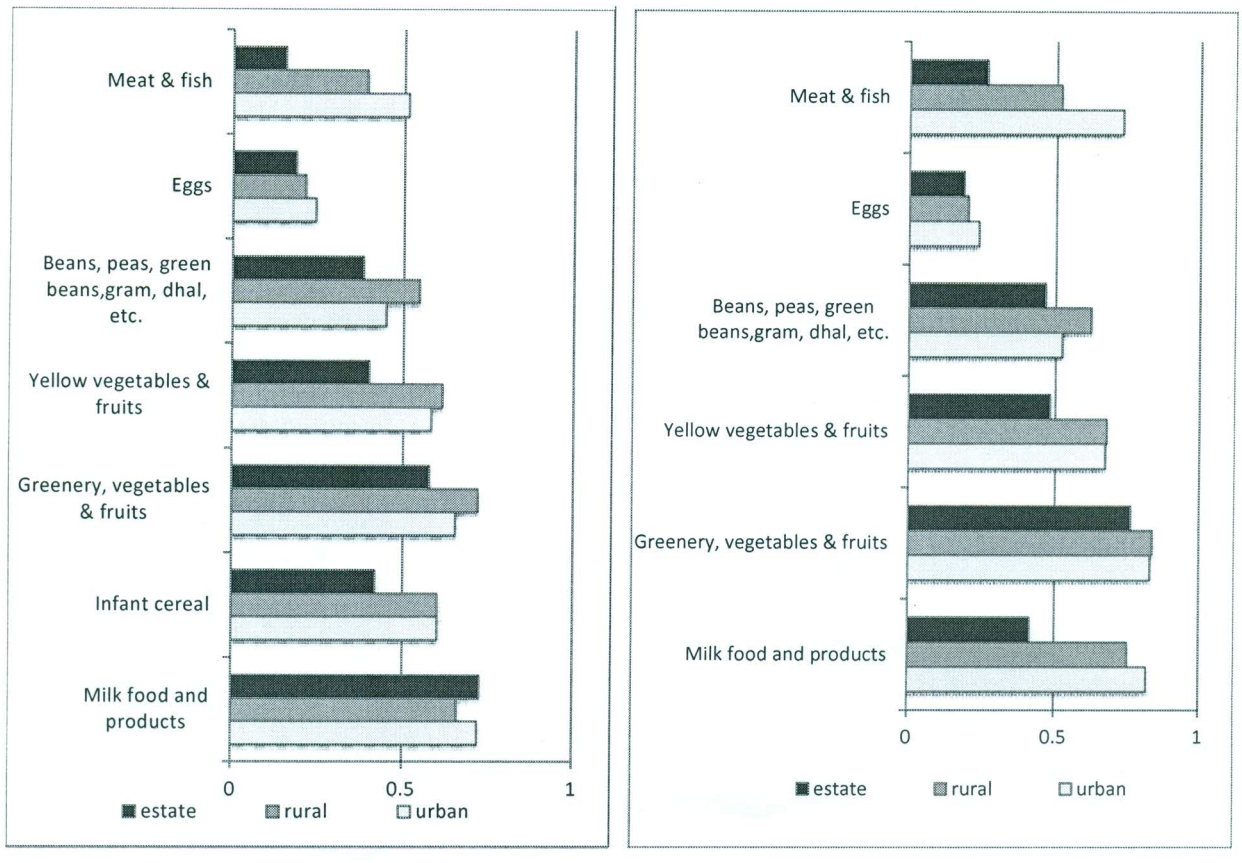
As described in the conceptual framework of this study, other than the basic causes there are immediate and underlying causes which badly affect poor nutritional levels of the Estate sector. To gain insights into the interactions between socio-economic status in determining child and maternal nutritional status of the region, causes of malnutrition among Estate sector people are discussed in this section in line with the conceptual framework of this study (i.e., in relation to three major pathways: food insecurity, inadequate maternal and child care practices, and poor health environment and services).

5.1 Food Security

In many developing countries, especially in the urban populations, there is an increase in the consumption of energy-dense nutrient poor food (high in fats and sugar but with insufficient nutrients) and a decrease in physical activity. Social and economic progress has led to the greater consumption of oil and sugar as cheap processed foods. At the same time, the consumption of fruits, vegetables and grains has also decreased. Ironically, even for low-income families these foods may be more affordable and accessible than more nutritious food such as fruits and vegetables. Health problems associated with inadequate calorie consumption and insufficient micronutrients now coexist with the growing presence of diet related chronic diseases.

As explained under the conceptual framework of this study, a child's dietary intake is an immediate determinant of his or her nutritional status. Food security is achieved when a person has access to enough food to lead an active and healthy life (World Bank, 1986). Dietary intake (energy, protein, fat, and micro nutrients) must be

Figure 4 : Food Consumed by Child and Mother



Source : Author's calculations using DHS 2006/07 data.

adequate in quantity and in quality, and nutrients must be consumed in appropriate combinations for the human body to be able to absorb them. Therefore, in this section children aged between 1-3 years and their mother's food intake patterns were investigated, using dietary recall data of the type of foods consumed during the past 24 hours, as reported in DHS survey.

Nutritional food consumption was much lower among estate sector children and mothers. If we look at the food consumed by children aged 1-3 years, we can see that the least consumption of protein rich food (meat, fish, poultry eggs and cereals) is in the estate sector, when compared to urban and rural areas (see Figure 4). Further, consumption of other essential nutritional food items such as yellow vegetables and fruits that are rich in vitamin A, were much lower among the estate sector children than the country average. If we look at the women's food intake we can see that women's food consumption patterns were similar to children's food consumption. Similar to Estate sector children, protein rich foods were consumed less by mothers in the estate sector when compared to peers in the other two sectors.

Food choices vary by individual; depending on their decision on taste, nutrition, convenience, and price. These food selection choices are most intriguing in the context of childhood food consumption. Parents often contemplate food choices for their young children, and parents are generally intolerant of health risk to their children. Indeed, parents place a higher premium on nutrition than taste in the decision making model. In this context, women's education and knowledge have a strong impact on decision making. Further, it stands to reason that nutritional information may prove uniquely elucidative.

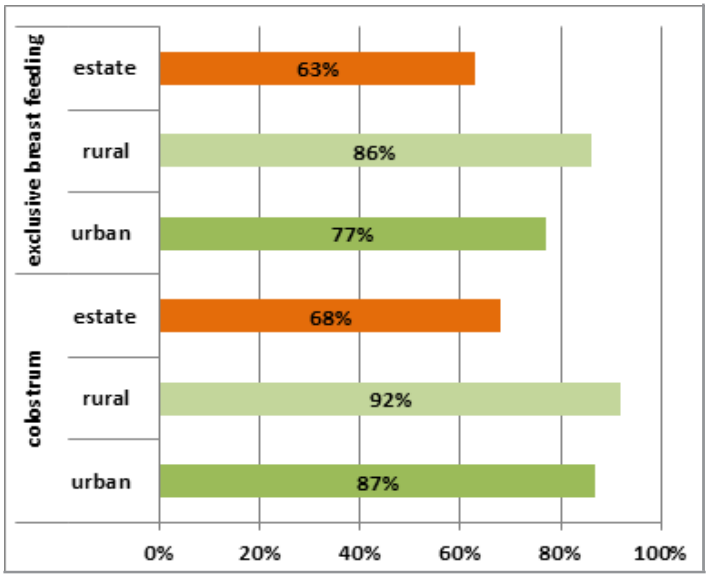
5.2 Child Care Practices

Appropriate food must be offered to the child with correct timing and frequency. Therefore, child care is crucial for the nutritional well-being of a child. As established in Engle 1999, critical areas of care for women include adequate quality and quantity of food; care to prevent and treat illness; support for sufficient fertility regulation and birth spacing; care during pregnancy and lactation; and safe prenatal and birthing care. It is well recognised that breast milk is the best for infants and nothing can duplicate its' value. Breast milk contains natural nutritional profile with perfect proportion and also it protects infants against infection. In this study, child care practices were mediated through a variety of child care giving practices, such as giving the baby colostrum, and whether he/she was exclusively breastfed from 0–4 months.

"Nutritional food consumption was much lower among estate sector children and mothers"

Estate sector mothers were less successful in child care practices. There were wide differences in the child care routine practised by the estate sector women. Giving the first milk (colostrum) to the newborns is promoted, as it is rich in proteins and antibodies that protect children from several infectious diseases. However, in the estate sector only 68 per cent of babies were given colostrum, whereas on average, in the rest of the country, 90 per cent of newborns were given the first milk (see Figure 5). Further, in the estate sector only 63 per cent of babies were given 4 months of exclusive breast feeding, whereas on average, in the rest of the country,

Figure 5: Child Care Practices



Source : Author's calculations using DHS 2006/07 data.

around 83 per cent of the babies were exclusively breast fed for the first 4 months.

Reasons for lower levels of exclusive breast feeding in the estate sector when compared to the other regions of the country could be due to the flexibility in legal provisions on maternity benefits in the Estate sector. According to the Maternity Benefits Ordinance, employer in the estate sector is allowed arranging the provision of "alternative maternity benefits" to their female workers (Ministry of Labour Relations and Productivity Promotion, 2010). With this legal flexibility, women in the plantation sector are encouraged to return to work earlier on. Thus, most of the plantation companies provide alternative maternity benefits such as crèches and day care centres on the estates for new-borns and children less than five years old. With this provision, estate sector mothers return to work earlier on while their infants are fed with other alternatives instead of breast milk. Thus, the high risk of malnutrition among infants in the Estate sector may also be due to the effect of poor performance of breastfeeding in the Estate sector.

5.3 Nutrition of Estate Sector Women

Nutrition and physical activity are the key components of healthy and productive lives. Women's health is central not only due to their productivity in employment, but also more importantly, due to specific reproductive outcomes and the performance of their many household tasks. To a large extent, the well-being of children depends on the health of their mothers. According to research findings on the determinants of child malnutrition in Sri Lanka, children of malnourished mothers are more likely to have a low birth weight, and also suffer from childhood malnutrition (Jayawardena, 2012). Also, when mothers are malnourished and sickly, their children face a higher risk of succumbing to diseases. Family members' repeated submission to infectious diseases will in turn increase the health care cost and impact on household economy, as family budgets will need to be diverted towards health care.

As explained under the methodology section, this study used three indicators of the nutritional status of women: Body Mass Index (BMI), height, and the haemoglobin (hb) concentration in the blood. Indicator BMI<18.5 was used to assess chronic energy deficiency malnutrition of women. This indicator is the most frequently used standardized indicator of thinness (wasting), to assess the progressive loss of body energy. Height is a measure of past nutritional status. As a third indicator, according to the classification developed by WHO, anaemia was classified as mild, moderate, or severe, based on the haemoglobin concentration in the blood.

Prevalence of malnutrition is highest among estate sector women. According to the Demographic and Health Survey (DHS) carried out in 2006-2007, one in six women of reproductive age (15-49 years) was malnourished in Sri Lanka. Further, there are regional differences in women's nutritional status, with an alarming rate of malnutrition prevalent in the estate sector. According to the results, around 33 per cent of estate sector women were undernourished, whereas this rate was about twice as high as that of the rural sector, and three times higher than in the urban sector (see Table 3).

"Living in the estate sector poses a significantly higher risk in terms of long-term nutritional status."

Further, living in the estate sector poses a significantly higher risk in terms of long-term nutritional status. Although the prevalence of stunted women was 10 per cent on average, in the estate sector 17 per cent of reproductive age women were short in stature. This indicates that there is a prevalence of long-term undernourished women in the estate sector, in part due to the cumulative effect of social and economic outcomes on access to nutritional foods, during childhood and adolescence.

Table 3 : Nutritional Status of Women

	BMI < 18.5	Stunted (height<145cm)
Urban	9.7	8.6
Rural	16.3	10.6
Estate	33.3	17.3
Total	**16.2**	**10.7**

Source : Author's calculations using DHS 2006/07 data.

Prevalence of moderate and severe anaemia was highest among estate sector women. On average, 39 per cent of reproductive aged women (15-49) were identified as being anaemic (hb < 11.0 g/dl). Although, the prevalence of severe or moderate anaemia was rare among reproductive aged women, the highest percentages of moderate and severe anaemia, 10.4 and 2.3 per cent respectively, were reported from the estate sector (see Table 4).

The observed regional difference in women's nutritional status could be an indication of low access to and use of health services in the estate sector, compared to other regions. For instance, people in the estate sector are isolated from the rest of the society, and this fact has kept this community within the estates without any social mobility due to poor infrastructure – poor roads, no transport facilities, etc. For instance, they have to travel great distances to access government hospitals. Although, Sri Lanka has good primary health care service, in the estate sector only 61 per cent of the mothers have reported that the public health midwife visited them during their pregnancy; whereas the country average was over 83 per cent.

Further, cultural and social factors in the estate areas are less favourable for women. For example, a high percentage of plantation sector women are addicted to alcohol and go through teenage pregnancies. A combination of these factors, and others, may lead to a higher risk of poor nutritional status among women in the estate sector.

5.4 Teenage Pregnancy

Past studies, ACC/SCN (1992), show that adolescent girls are not physically prepared for childbirth, since linear growth is not complete until age 18, and the birth canal does not reach its mature size until two to three years later. As a result of this, and other factors, teenage mothers face a high risk of serious pregnancy related complications. Further, teenage mothers are more likely to have a low birth weight babies.

According to the DHS survey 2006-2007, 6.4 per cent of adolescent women (age 15-19 years) have begun child bearing – either they were already mothers, or were pregnant with their first child (DCS,2009).

Looking across sectors, nearly 10 per cent of adolescent girls in the estate sector have begun child bearing. According to an estate sector youth, female girls live in unsafe conditions, and often suffer sexual abuse at the hands of their own family members.[8] Further, they explained that poor living conditions – line rooms, alcoholism, lower level of education, etc. are the main reasons for the perpetuation of this pathetic situation.

"Nearly 10 per cent of adolescent girls in the estate sector have begun child bearing."

Table 4 : Women's Anaemic Status

	Mild anaemia (hb, 10.0 10.9 g/dl)	Moderate anaemia (hb, 7.0 9.9 g/dl)	Severe anaemia (hb < 7.0 g/dl)	Any anaemia (hb < 11.0 g/dl)
Sector				
Urban	37.1	6.5	0.3	43.9
Rural	34.1	4.1	0.2	38.4
Estate	28.9	10.4	2.3	41.6
Total	**34.1**	**4.7**	**0.3**	**39.1**

Source :DCS, 2009. Prevalence of Anaemia among Children and Women Demographic and Health Survey 2006-2007, Department of Census and Statistics, Colombo, Sri Lanka.

[8] The information is collected through an FGD done with youth form the estate sector. The FGD was conducted by the Institute of Policy Studies, as a part of the project: Commitment of Sri Lanka in Effective and Meaningful Participation of Youth in Realizing the MDGs.

5.5 Utilization of Resources

As explained under the conceptual framework, economic, cultural, and social factors affect the utilization of available resources and how they are translated into resources for food security, child and maternal care, and health environments and services. Even where there is poverty, food insecurity, and limited access to health care, enhanced care given within the household can optimize existing resources to produce good health and nutrition in children.

Women are the key actors in generating good nutrition and household food security. Women have the greatest potential to make decisions that positively affect child health, spending of household income, the quantity and quality of food, and in health-seeking behaviours (Haddad, 1999). However, women's position and status is formed around a series of cultural and economic factors, such as mother's education level, knowledge, and whether mother engages in an economic activity, etc. Therefore, women's status and household's socio-economic status are discussed in detail in the following sections.

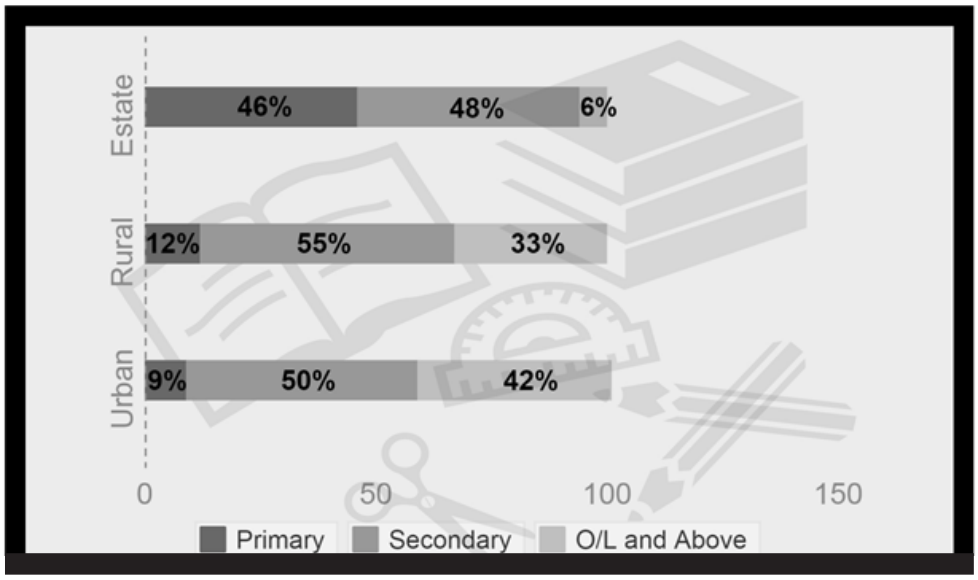
5.6 Estate Sector Women's Education

Almost half of the women in the estate sector have not had education beyond the primary level.

In the estate sector, women's level of education was much lower when compared to the education levels of mothers in the urban and rural areas (see Figure 6). Estate sector students get primary education in the estate schools. A majority of schools located in the estates are primary schools, and therefore, after primary education many students stop schooling due to a variety of reasons contributing to poor access to secondary schools. These include bad roads, lack of transport facilities, and poverty etc.

"Almost half of the women in the estate sector have not had education beyond the primary level."

Figure 6 : Women's Level of Education



Source : Author's calculations using DHS 2006/07 data.

"We have to walk around 7 kilometres to get a bus." Estate sector youth.

These students then enter into the labour force straight after completing primary education, as there are employment opportunities for lesser educated youth in the plantation sector. According to the findings of Samarsinghe et al. (1990), motivation to stay on in education is minimal among estate sector children, as they can start on wage employment at a young age. This perpetuates a vicious cycle, which keeps this community within the estates, without any upward social mobility.

Further, women's low literacy level could be a major cause of the problems associated with poor nutritional status in the estate sector. Poor educational conditions affect women's ability to utilize available resources, because it makes it difficult for these women to take advantage of the awareness raising campaigns conducted by the health service on family health and hygiene practices.

5.7 Women Engaged in Economic Activity

Women's employment status is also another important socio-economic variable explaining her own and household members' nutritional status. Although women's employment could provide an additional source of income that can improve the food security of the household, a heavy work load encroaches on women's energy, time, and health.

A majority of estate sector women were engaged in an economic activity.

The rate of estate sector women engaged in an economic activity (65%) was almost double that of the urban sector (30%). Among these estate sector working women, 85 per cent were agriculture related labourers. Further, according to the findings of this study, estate sector employed women were more likely to be malnourished as compared to estate sector women, who were not engaged in an economic activity.

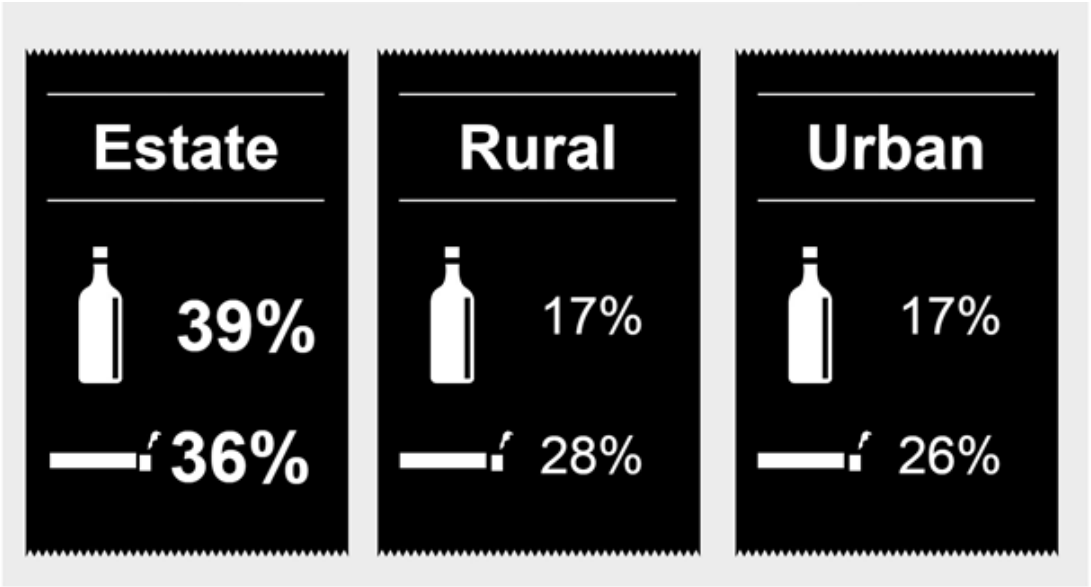
5.8 Alcoholism and Smoking

Each member of the family may be affected by alcohol differently. An alcoholic can disrupt family life and cause domestic violence, child abuse, and poverty, etc. Parental alcoholism may affect the child even before a child is born. In pregnant women, alcohol is carried to all of the mother's organs and tissues, including the placenta.

Alcohol consumption was extensively higher among the estate sector people.

According to DHS 2006/07 data, 40 per cent of the estate sector families have been exposed to alcohol; whereas in the other two sectors it was around 17 per cent (see Figure 7). Further, estate sector women are also addicted to alcohol, which may have an adverse effect on their health as well as the health of future generations. Estate sector people are addicted to alcohol due to many reasons such as, being engaged in labour intensive work, habit, cooler climate, etc. Also, there are many

Figure 7 : Household Alcohol Users and Smokers



Source : Author's calculations using DHS 2006/07 data.

liquor shops available in close proximity, which also acts as a motivator for people to consume alcohol.

Spending on alcohol and tobacco badly affect the household's food security.

Although, The estate sector has recorded the highest poverty levels (11.4 per cent), these people spend roughly two times more than the expenditures for alcohol and tobacco incurred by the average Sri Lankan.[9] According to the Household Income and Expenditure Survey 2009/10, the estate sector average monthly expenditure for liquor, tobacco, etc., was Rs.1216 and it made up around 9 per cent of their monthly food expenditure.[10]

5.9 Health Environment and Services

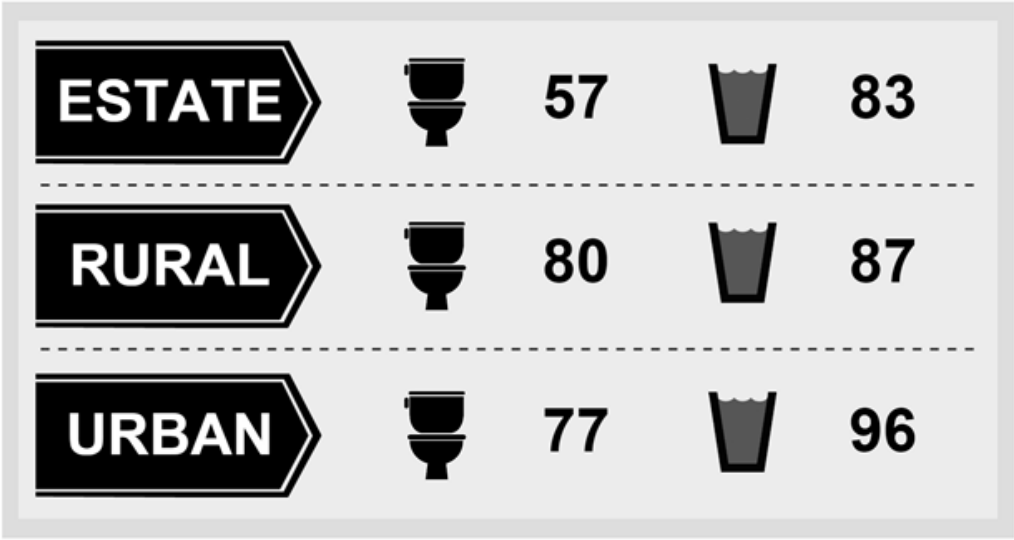
As explained in the conceptual framework of this study, health environment and services are underlying causes of child's and maternal nutritional status. The living environment must be cleaned to protect children from a variety of diseases. However, the availability of adequate sanitation facilities, such as safe drinking water and unshared sanitary toilet facilities, varies across the residence sectors.

Estate sector housing conditions were poor.

Socially, the estate sector people are inhibited, because they confined themselves to the estates where lodging facilities were provided by the estate management. As a result, these people suffer from poor housing, and unhygienic sanitary facilities, etc. As of the 2009 household survey, 64 per cent of the estate sector houses consisted of line rooms houses.[11] Further, out of those line houses, 66 per cent had one bed room. These poor living conditions are contributing factors to frequent illnesses, domestic violence, and sexual abuse among estate sector people.

"Estate sector people spend almost doubled for alcohol and tobacco compared to the average Sri Lankan".

Figure 8 : Household Sanitation and Drinking Water Facilities



Source : Author's calculations using DHS 2006/07 data.

[9] According to the HIES 2009/10 data, poverty head count ratio was 8.9% and the average monthly expenditure of alcohol etc. of the country was Rs.665.
[10] Estimated using HIES 2009/10 data.
[11] Estimated using HIES 2009/10 data.

Household sanitation facilities were poor in the estate sector.

In the estate sector, 17 per cent of the households did not have access to a safe drinking water facility, while 43 per cent did not have access to a sanitary toilet or have a separate toilet facility per household; for the rest of the country, these rates were at about 9 and 20 per cent respectively (see Figure 8). Alarmingly, 9 per cent of the households in the estate sector did not have a toilet at all.

"Alarmingly, 9 per cent of the households in the estate sector did not have a toilet at all."

5.10 Household Socio-economic Status

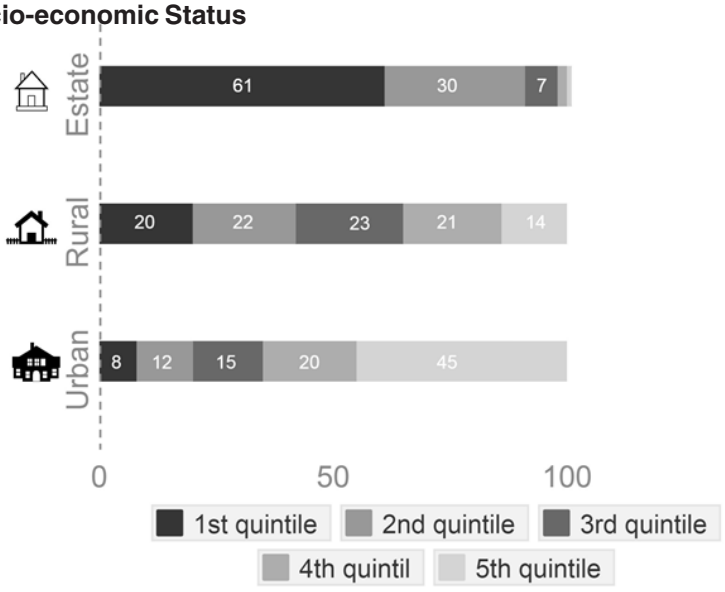
A household's socio-economic[12] conditions influence the nutrition of household members in many ways, including through the ability to satisfy the basic needs, and access to facilities which affect the health and welfare, etc. For example, a child belonging to the "poorest" socio-economic quintile is three times more likely to be underweight, than a child in the richest quintile.

In the estate sector 90 per cent of households were in the 1st and 2nd socio-economic quintile groups.

Households' socio-economic status was considerably lower in the estate sector than in the other two regions. In the estate sector almost 91 per cent of households fall into the poor socio-economic group (i.e., 1st and 2nd socio-economic quintile group), while in the urban and rural sectors this was at 20 per cent and 42 per cent, respectively (see Figure 9). The poor socio-economic status of households adversely affected the health and welfare of the estate sector people.

"In the estate sector 90 per cent of households were in the 1st and 2nd socio-economic quintile groups."

Figure 9 : Household Socio-economic Status



Source : Author's calculations using DHS 2006/07 data.

[12] As explained in the section 4.3, household socio-economic condition was defined based on the dwelling characteristics, ownership of assets, sanitation facilities and other characteristics which were related to household socio-economic status.

6. Determinants of Child and Maternal Malnutrition in the Estate Sector

According to the descriptive analysis provided in the last section, improvements in all of the hypothesized explanatory variables would lead to reductions in child malnutrition in the estate sector. However, the bi-variate relationships identified may mask the variables' confounding influences. The goal of this section is to single out the independent effect of each variable, while controlling for the others. More directly, it can be compared to the partial effects of the regressors on the probability that a child was malnourished.

6.1 Key Underlying Determinants of the Prevalence of Child Malnutrition in the Estate Sector

In this section, the statistical significance of the parameter estimates of child nutritional status (underweight) was investigated. Data for children younger than 5 years of age are taken from the DHS 2006/07. As described in the methodology section, underweight child is defined as more than two standard deviations below the average weight-for-age anthropometric measure with respect to the reference population.

As explained in the conceptual framework of this study, women's characteristics as well as most of the household characteristics affect her own health status, which is ultimately a determinant of child's nutrition. Therefore, probable endogenity was adjusted using two stage probit model as explained in the methodology section.[13] The results give a number of important insights into prevalence of child malnutrition among Estate sector under five year old children (see Table 5).

According to the findings of this study immediate determinants of child malnutrition, child's food intake and health status strongly associated with poor nutrition of Estate sector children. For instance, according to survey records of the 24 hour dietary recall, a child's food intake in terms of quality, showed a significant association with child nutritional status. Children, who consumed protein rich food such as meat, fish, poultry eggs, milk and other milk products, were less likely to be underweight. However, as discussed in the section 5.1, the consumption of protein rich food especially animal protein was much lower in the estate sector, compared to food consumption of urban and rural sectors. On the other hand, the consumption of more energy rich starchy and fatty foods significantly increases child malnutrition. This gives an indication that in the estate sector, a significant reason for child malnutrition was the intake of the 'wrong' kind of food. In other words, they didn't consume adequate amounts of food rich in nutrients, particularly, proteins.

As expected, child's birth weight is strongly associated with him/her

"A significant reason for child malnutrition was the intake of the 'wrong' kind of food. In other words, they didn't consume adequate amounts of food rich in nutrients, particularly, proteins."

[13] Variables categorized under mother's status; mother's education; food security; water and sanitation; and also variables, iodized salt for cooking, midwife visits were considered as causal factors of mother's nutritional status.

Table 5 : Determinants of the Prevalence of Child Malnutrition in the Estate Sector

Variables	Coef.	P>z
Child's characteristics and health status		
Child's age (in months)	0.002	
Male child	0.329	**
Low birth weight child	0.672	***
Whether child had diarrhoea, fever, or cough in the past two weeks	-0.055	
Child's food intake		
Child is currently breast feeding	0.039	
Infant cereal	-0.103	
Food made from grain – bread, rice, noodles	1.018	***
Yellow vegetables & fruits	-0.103	
Greenery and green vegetables	0.011	
Food made from roots – potatoes, manioc	0.278	*
Meat, fish, eggs, milk and milk products	-0.597	**
Beans, peas, green beans, gram, dhal, etc.	0.088	
Food made from oil	0.507	**
sugary food	-0.114	
Maternal and child care		
Family health worker visited during pregnancy	0.061	
Iron supplements during pregnancy	-0.081	
Vitamin A supplements during pregnancy	0.024	
Child was given worm treatment	-0.135	
Use iodized salt for cooking	0.258	
Mother's health and nutritional status		
Mother's height (in cm)	-0.031	**
Mother underweight (BMI)	-0.142	
Mother's status		
Mother engaged in an economic activity	0.062	
Mother's age at first child's birth		
15-19	0.106	
20-24 (base)		
25-30	0.428	
Mother's education		
Mother's education below primary	0.339	**
Mother reads newspaper regularly	-0.034	
Food security		
Number of people in the household	0.050	
Number of children between 0 and 5	0.338	**
Poor (belongs to two poorest quintiles)	0.358	
Household member use alcohol or cigarettes regularly	-0.107	
Water and sanitation		
Safe drinking water	0.114	
Water sealed separate toilet	0.161	
Shared toilet	0.349	**
constant	1.542	
N		
Pseudo R2		

Statistical significance at 1%, 5% and 10% levels are indicated by ***, **, * respectively.
Source : Author's calculations using DHS 2006/07 data.

eventually becoming a malnourished child. The higher prevalence of malnutrition among boys as compared to their female peers is also signified.

Apart from the above discussed immediate determinants, underlying causes in turn affect the child malnutrition. For instance, mother's height – which represents the mother's long term nutritional status – was closely associated with the child's nutrition. As established in Smith et al., (2003), women's nutritional status influences children's nutritional status in early childhood because of poor breastfeeding practices, a care that is vitally important for a child's health and proper growth. Further, as in the case of a mother's nutritional status, her education and knowledge also have a stronger impact on the child's nutrition, through child care practices. A child with a mother with an education below primary level is more likely to be underweight, than a child with a mother who has had secondary level education.

"Mother's long term nutritional status – was closely associated with the child's nutrition."

When considering child malnutrition by household food security and in terms of the care they receive, a significantly higher risk of child growth failures can be seen in the households that have a larger number of children aged under five years. Households with poor sanitary facilities — shared toilet facility, significantly increase the risk of childhood growth failures.

These findings indicate the association of estate sector child growth failures with immediate determinants such as wrong kind of food intake, existing life cycle of malnutrition in the estate sector— low birth weight babies, malnourished mothers. These factors coupled with the other underlying causes such as mother's lack of knowledge, poor household socio-economic status, and household food insecurity badly affect the nutrition of estate sector children.

6.2 Maternal Nutrition

As established in Jayawardena (2012), poorly nourished mothers give birth to babies with low birth weight. As shown in the previous section, those who were born underweight are more likely to be growth retarded in childhood. Further, children of malnourished mothers were more likely to be malnourished in their childhood. Hence, finding determinants of maternal malnutrition is of vital importance to ensure that malnutrition does not become an intergenerational problem.

As established in previous research, many inter-related factors influence a mother's nutritional status, ranging from her physiological utilization of food and nutrients during pregnancy and lactation, through to the socio-economic influences on food availability (World Bank, 1994). Bearing in mind the vital importance of a woman's nutritional status to a child's nutritional status, this section's purpose is to determine factors that influence an estate sector woman's own nutritional status.

"Households with poor sanitary facilities — shared toilet facility, significantly increase the risk of childhood growth failures."

6.3 Explanatory Analysis of the Prevalence of Maternal Malnutrition

Multivariate analysis of probit regression was performed to examine the net effect of each independent variable in the model, on maternal malnutrition among estate sector women, while controlling for other independent variables. Taking into consideration the data availability, the considered sample for above analysis, consists of reproductive aged women (15-49 years) with a child below three years of age.

As can be seen in Table 6, multivariate analysis identified the most important explanatory variables of estate sector maternal malnutrition. In this model, women's background characteristics, food in terms of nutrition value, health services, and household economic status were considered as determinants of women's nutritional status. Impacts of these variables on maternal malnutrition are discussed in detail in the remainder of this section.

Table 6 : Determinants of the Prevalence of Maternal Malnutrition in the Estates

Variables	Coef.	P>z
Women's food intake		
Food made from grain – bread, rice, noodles	0.580	
Yellow vegetables & fruits	0.024	
Greenery, vegetables and fruits	-0.340	**
Food made from roots – potatoes, manioc	-0.158	
Meat, fish, eggs, milk and milk products	0.004	
Beans, peas, green beans, gram, dhal, etc.	-0.103	
Food made from oil	0.335	*
sugary food	0.082	
Women's characteristics and status		
Woman's age	0.003	
Married age	-0.007	
Woman's education below primary	-0.016	
Woman reads newspaper regularly	-0.441	**
Woman engaged in an economic activity	-0.020	
Live with partner	-0.793	**
Maternal reproductive care		
Family health worker visited during pregnancy	0.190	
Iron supplements during pregnancy	-0.197	
Use iodized salt for cooking	-0.155	
Food security		
Number of people in the household	0.000	
Number of children between 0 and 5	0.070	
Poor (belongs to two poorest quintiles)	0.134	
Long-term resident in the Estate sector	0.079	
Household member use alcohol or cigarettes regularly	0.251	*
Water and sanitation		
Safe drinking water	0.058	
Shared toilet	0.150	
Constant	-0.235	
N		487
Pseudo R2		0.0625

Statistical significance at 1%, 5% and 10% levels are indicated by ***, **, * respectively.
Source : Author's calculations using DHS 2006/07 data.

"Higher the level of knowledge, lower the chances of a woman being malnourished".

Similar to the child's nutritional status, household nutritional food intake was one of the most important determinants of the nutritional status of women. The risk of being undernourished significantly decreased among women who consumed greenery vegetables and fruits. Further, consumption of oily foods increased the chances of being malnourished. Further, this study revealed that regular alcohol and cigarette consumption in a household significantly increased the household's food insecurity which led to the prevalence of malnourished women.

Women's nutritional status varies substantially depending on differences in their level of knowledge. The mother's knowledge was measured using a proxy variable – those reading newspapers at least once a week. Women who read newspapers at least once a week were generally more aware of utilizing available resources for the improvement of themselves and their families, than those who did not read newspapers regularly. Therefore, higher the level of knowledge, lower the chances of a woman being malnourished.

A married woman with an absent partner, is more likely to be undernourished as compared to women living with their partners. With her spouse living elsewhere, or in instances of widowhood or divorce, women are more likely to face economic insecurity, and would have to seek employment, which would in turn have both health and nutritional implications.

These results indicate that household resource allocation is associated with household food security, which is a prerequisite for access to adequate dietary intakes and improved nutritional status for all members of the household.

"Regular alcohol and cigarette consumption in a household significantly increased the household's food insecurity which led to the prevalence of malnourished women".

7. Policies and Interventions to Address the Problem of Malnutrition

Investment in health and nutrition is fundamental for improving human welfare and economic growth as well as for reducing poverty. Direct and indirect social and economic costs can be reduced significantly by eliminating malnutrition. Therefore, the policies and actions of national governments are a critical component in reducing under-nutrition and enabling households to achieve nutrition security. Successive governments have placed the achievement of nutrition security among their key development priorities and allocated significant state resources to combat under-nutrition in the country.

Antenatal care, growth monitoring, supplementary feeding programmes such as the Thriposha programme and nutrition education have been the established strategies implemented throughout the country in the last few decades. Several new strategies are also implemented involving interventions such as the food basket for pregnant and lactating mothers and the glass of milk for pre-school children for better targeting. Furthermore, the presence of a good health infrastructure and the implementation of grass root level health activities, free education, free health services and food supplementation programmes have created a favourable platform to improve the health status of the country as a whole.

Despite the success of many other social development programmes, there are many mismatches between policy needs and policy responses to malnutrition that have undermined to their ineffectiveness. This section first reviews the existing food and nutrition policies, strategies and programmes in the country as a whole, with special focus on programmes which target the enhancing nutritional levels of the Estate sector people. Then the adequacy and efficacy of interventions and programmes to address the critical concern will be discussed.

7.1 National Nutrition Policy

Optimum results of the efforts of the government and other agencies, to eliminate malnutrition cannot be achieved unless all interventions are carried out according to a well-designed work plan in a coordinated manner. Therefore, a National Nutrition Policy is a prerequisite and it has to be based on the ground situation and the scope and responsibility of all relevant agencies. The first nutrition policy for Sri Lanka was developed in 1986 and its effectiveness has diminished over the years for several reasons: limited inter-sectoral coordination, change of the government priorities, and the policies not being updated in line with socio-economic changes.

Identifying this necessity, the Ministry of Healthcare and Nutrition has developed a National Nutrition Policy (NNP) in 2010 and based on that document, a strategic plan has been developed. The Nutritional policy has been designed in order to implement future strategies and action plans in accordance with it, while building up on the related policies already in existence. This policy has been prepared to obtain inter-sectoral cooperation to improve the nutritional status; including areas of work such as planning, agriculture, fisheries, livestock, health, education, social services, poverty alleviation and all the other relevant sectors. The Nutrition policy has focused its attention on optimum nutrition throughout the lifecycle by reducing the intergenerational impact of malnutrition.

7.2 Interventions to Enhance the Nutrition

The Government is committed to provide a comprehensive system of health services to its people. Mainly there are two types of interventions to enhance the health and nutritional status of the people; direct interventions (integrated package of maternal and child health and nutrition, nutrition of school children etc.) and indirect interventions (food subsidies and income supplementation programme, safe water and sanitation etc.).

Health care interventions and programmes are provided through the well-developed infrastructure of the Ministry of Health, involving a wide network of medical institutions and health units. Such a network has resulted in a more concerted effort to strengthen the infrastructure to provide an efficient health service throughout the country.

Integrated maternal and child health programme

The Maternal and Child Health (MCH) integrated package universal programme, is conducted by the

Family Health Bureau (FHB) of the Ministry of Health. This programme has scope for interventions in maternal care during pregnancy and lactation to growth monitoring of under five year olds and immunization coverage. This broad package includes growth monitoring and promotion (during antenatal care visits, child's growth monitoring), provision of mineral supplements (iron, folic acid, calcium and vitamin C) during pregnancy, provision of supplement food Thriposha (throughout pregnancy, six months of lactation as well as children under 5 who show growth faltering).

Many services of the integrated package are offered through MCH clinics from the time expectant mothers are registered at the clinic to the monitoring of the child up to 5 years of age. Nutrition education is presently implemented mainly at MCH clinics by the Public Health Midwife (PHM) and the Public Health Nursing Sister (PHNS) during their home visits. Further, health and nutrition education is provided at the MCH clinics and during home visits to pregnant and lactating mothers by the PHM. This health and nutrition education covers breast feeding promotion, complementary feeding and health promotion among under five year old children.

Maternal and Child Health integrated programme could be considered as a well-structured programme to provide primary health care services in the country. However, some of these programmes are not able to function to the expected level due to the various service delivery issues. According to the report of the Task Force for the Formulation of a Food and Nutrition Policy (2004), some of the identified limitations of the integrated maternal and child health programme are as follows. Growth monitoring is weak due to inadequate staff, non-functional scales and lack of growth monitoring charts. In particular, growth monitoring is poor after the child's first year due to child's attendance of clinics gradually decreasing. Further, inadequate supply of nutritional supplements due to various reasons such as non-compliance, inadequate supplies etc. also affect nutrition outcomes. Likewise, inadequacies in the Thriposha programme are insufficient provision for nutritional requirements, irregularities in distribution, etc. Furthermore, nutrition education is not successful as many of the clinics are highly over-crowded. Further, at village level coverage is inadequate due to excessive workload of the mid-wife and rare home visits to households in deprived areas. A PHM has to cover at least 3000 persons (or 600 households); a number that cannot be adequately covered by one PHM regularly. There are barriers to health care provision in specific localities due to various issues such as the post-conflict situations in the North and East, geographic conditions, urban – rural differences, communication barriers etc. For instance, the Estate sector lags behind in health service delivery when compared to other regions of the country.

As identified in Human Resources for Health situation analysis report, barriers and obstacles to carry out health programmes in the Estate sector include dearth of health care workers who can reach the Tamil-speaking population (Ministry of Healthcare and Nutrition, 2009). Also, Estate sector geographic conditions affect health care provision to a large extent. For instance, health care workers employed by provincial health authorities have difficulties to reach these people as well as find places to reside and work, due to poor roads, weak public transport system, lack of other resources such as suitable housing, education facilities, and other facilities for professional staff to reside in these areas. In this context, government health services and nutritional programmes are far difficult to reach the Estate sector people. Therefore, availability of health care workers in the Estate areas needs special consideration when addressing the problem of malnutrition in the Estate sector.

Issues of health service delivery in the Estate sector

Health services have a major role to play in achieving the optimum benefits of the targeted health and nutritional programmes of the deprived region. However, there are barriers and obstacles in health service delivery in the Estate sector. Major reason for these health service gaps is the institutional structure which was practised since the colonial period.

According to the planter health scheme which was introduced during the British colonial era, estate sector hospitals and dispensaries were provided by the estate sector management. Even after independence, the estate services were not considered as part of the national health system. There had been a progressive run down of estate sector health services due to poor maintenance, lack of qualified medical personnel, and unqualified persons were deployed by the management. Since late 1970's, with the political representation of estate sector people through the Ceylon Workers Congress (CWC), the government made efforts to improve health services in the estates. In 1990, a policy decision was taken by the government to integrate estate sector health services into the national health system under the provincial health authorities. During 1996-2008, 24 health institutions have been taken over under the provincial health

administration (Ministry of Healthcare and Nutrition, 2009). However, some of these institutions are not able to function to the expected level as basic facilities are not upgraded yet (Ministry of Healthcare and Nutrition, 2009). Also, there were issues related to the procedures in handing over and taking over and funds were not provided to the Ministry of Health for upgrading the health institutions. Although the government had taken measures to integrate the estate health services into the national health system, still these people rely on health services provided by their management due access difficulties, transportation issues etc. Poor health care services in the estate sector obstructs the health and hygiene programmes conducted by the health service. Therefore, to improve the accessibility, availability and quality of the public health services, reconstraints should be rectified and optimum benefits of the services should be given to the target population.

Initiatives to enhance the nutrition among adolescents and youth

As discussed in previous chapters, nutritional status of individuals passes through the different stages of the life cycle. Therefore, actions need to be taken at each stage of the life cycle to eradicate the malnutrition in the country. As discussed above, there are interventions to improve the pregnant and lactating mothers and child nutrition. However, according to the national figures, the highest proportion of malnourished reproductive aged women was observed in the youngest age group of 15-19 years (40%), followed by the second lowest age group of 20-29 (22%) (DCS, 2009). These figures clearly indicate that adolescent malnutrition is a major problem in the country.

Further, the issue of malnutrition among adolescent girls is more critical in the Estate sector, as there is a higher prevalence of teenage pregnancies in the Estate sector. As recognised in previous research, incidence of nutritional deficiencies among young girls has an adverse effect on reproductive outcomes and continues the vicious cycle. Therefore, adolescent girls of the Estate sector are in high risk of becoming malnourished mothers and giving birth to low birth weight babies.

With the current initiatives, enhancing the nutrition among adolescents and youth has been recognised. For instance, under optimum nutrition throughout the lifecycle concept, present Nutrition policy has recognized the necessity of improving youth nutrition, to reduce the intergenerational impact of malnutrition. According to National Nutritional Policy recommendations, a new intervention “pre-conception care” has been introduced to the Family Health Programme in 2012, to cover pre-pregnant women. The main objective of provision of this package is to create awareness, provide health promotion, screening, and interventions for women of reproductive age to reduce risk factors that might affect future pregnancies and continue the intergenerational cycle of malnutrition.

This programme is delivered through the Maternal and Child Health (MCH) clinics. However, there could be service delivery issues especially targeting working adolescents, who might not be interested in going for these MCH clinics. Especially, in the Estate sector, female labour force participation is high, around 65 per cent of reproductive aged women in the Estate sector are engaged in economic activity and they might not attend these clinics due to their tight work schedule, access difficulties as the government health services are far and difficult to reach. Therefore, for better targeting it would be better to conduct in-house pre-conception programmes at their work places by government health staff.

“The highest proportion of malnourished reproductive aged women was observed in the youngest age group of 15-19 years (40%).”

Health of school children

Health of school age children can play a major role in determining the successful development of a nation. Schools serve as an ideal setting to positively affect children's health because they reach young people at a critical stage of development. In order to activate a school to achieve its potential to improve health, it is essential for the community to understand the importance and feasibility of improving health through schools. There are many direct as well as indirect interventions implemented in schools to enhance health and nutritional status of school children.

School meal programme

At present there are two school feeding programmes, the Ministry of Education (MoE) administers the schools meal national programme while the World Food Programme (WFP) assists the "Food for Education" initiative in collaboration with the Ministry of Nation Building and Estate Infrastructure Development. Presently the school meal programme has been implemented in almost 80 per cent of schools 1 Million of the school children studying in grades 1-5 are benefited by the programme.

School health programme

School health programmes are implemented under the purview of both the Ministry of Healthcare and Nutrition (MHN) and the Ministry of Education (MoE). The Family Health Bureau (FHB) is the focal point for the school health programme. The FHB is responsible for planning, providing guidance, monitoring and evaluation while the provincial education and health authorities are responsible for implementing the programme. This programme includes school medical services, sanitary survey, and health education. School medical services include medical inspection of children, detection and correction of health problems, providing immunization, worm treatment, provision of micronutrients to needy children and providing necessary advice on health related issues.

Limitations of school health and nutritional programmes

The government school meal programme covers only grade 1-5 students in schools. Further, there is no specific nutritional programme targeting the non-school going children. These create a gap in addressing the nutritional needs of the adolescent children and non-school children. Especially in the estate sector, only school centred health and nutritional programmes are not sufficient to address the health and nutritional needs of the school aged children as their school enrolment is considerably low. For instance, in the Estate sector senior secondary (grade 10-11) and collegiate level (grade 12-13) net enrolments were around 54 per cent and 13 per cent, whereas national average for their counterparts were around 82 per cent and 39 per cent, respectively (Jayawardena, 2014). These limitations should be addressed when targeting the nutritional advancement of school aged children. Furthermore, there are newly emerging problems such as development of life skill needs; prevention of the use of tobacco, alcohol, drugs and substance-abuse; reproductive health etc. Therefore, for better targeting of school aged children in the Estate sector, where social issues are high — higher prevalence of alcohol and cigarette consumers, teenage pregnancies etc., special awareness programmes should be carried at the school level as well as at the youth group level.

7.3 Indirect Interventions

Other than the direct interventions there are many indirect interventions (food subsidy programme, safe water and sanitation facilities, health education etc.) which enhance the nutritional status of individuals. Some of the most important indirect interventions are discussed in this section.

Food subsidies and income supplementation programmes

Successive governments have taken positive measures in relation to food subsidization and income supplementation programmes. In 1978, the Food Stamp scheme was introduced to low income groups: a cash subsidy in the form of food stamps to procure a basket of nutrition-oriented food commodities (rice, flour/cereal, sugar, milk foods, dry fish, and pulses). In 1989, the food stamp scheme was replaced by the national poverty alleviation programme "Jansaviya". In 1995, after the political change of the government, the Janasaviya program was changed to "Samurdhi" program. These government poverty alleviation approaches constitute the government's major strategy to offset missing income with a view to enable better food consumption and enhance the well-being of the poor.

Among the current programs, the Samurdhi transfer program is the most extensive social welfare programme which operates in three approaches to alleviate poverty, providing microfinance facilities and developing physical and social infrastructure to uplift the living standards and develop livelihoods of people. Further, according to the "Mahinda Chinthana", the "Nutrition Food Package" was implemented with the objective of enhancing the nutrition level of pregnant and

lactating mothers of low income families. Under this programme, the beneficiary can obtain a "Nutrition Food package" worth Rs.500/- for 20 months.

A total of 1.5 million families benefitted from the Samurdhi subsidy programme in 2013 at a total cost of Rs. 15 billion which accounts for 0.2 per cent of the country's gross domestic product (Central Bank of Sri Lanka, 2013). However, a number of studies point to large-scale mistargeting and the exclusion of poor households in the Samurdhi program (Nanayakkara, A.G.W, 2006). The program apparently misses more than 40 per cent of the households in the poorest 10 per cent of the population. On the other hand, some of the richest 10 per cent of the population (4 per cent) also received the Samurdhi benefits.[14] Such large errors in targeting dilute the positive impact of the program on the poor and are evidence of serious distortions in the welfare budget. Therefore, the existing food subsidy programme needs to be reviewed to determine better geographic and poverty targeting to improve the cost-effectiveness of the programme and its potential impact on nutrition in the deprived regions such as the Estate sector.

"The existing food subsidy programme needs to be reviewed to determine better geographic and poverty targeting to improve the cost-effectiveness of the programme and its potential impact on nutrition in the deprived regions such as the Estate sector."

[14] http://www.ips.lk/talkingeconomics/2010/07/12/better-targeting-of-transfers-samurdhi-programme/

8. Conclusion and Policy Recommendations

The estate sector lagged behind other regions of the country on various means — socio-economic inequity, disparity in service provisions, poor infrastructure etc., which badly affect the health and nutrition of estate sector people. Findings of this study revealed that unique causes such as, intake of imbalanced diet, household high alcohol and tobacco consumption substantially contribute to child and maternal malnutrition in the Estate sector. These factors coupled with the women's lack of capacity in terms of education and knowledge, household poor socio-economic status and also food insecurity, perpetuates the vicious cycle of malnutrition in the estate sector. For sustainable development in the region, the individual causes of malnutrition within the community must be recognized and removed. Therefore, special interventions should be aimed at enhancing food security, access to health care services, and enhancing living conditions of the estate sector people. Based on the findings of this study, some policy recommendations to address the identified issues are discussed in the rest of this section.

"Nutrition education programmes should be strengthened on the importance of appropriate foods – what foods to select; how to prepare and feed children in relation to frequency, density, utilization; and the hygienic and nutrition value of food".

"Actions need to be taken at each stage of the life cycle to combat the intergenerational cycle of malnutrition in the estate sector".

Food security in the deprived estate sector should be strengthened.

A significant reason for child and maternal malnutrition in the estate sector was intake of the 'wrong' kind of foods, specifically those lacking in protein. The growth of children might be hampered by a shortage of food or the wrong kind of foods, such as those lacking in protein. For better targeting, it is important to identify food shortages, inappropriate feeding practices, and diversities in diet that exist among this community. Also, nutrition education programmes should be strengthened on the importance of appropriate foods – what foods to select; how to prepare and feed children in relation to frequency, density, utilization; and the hygienic and nutrition value of food. This health and nutrition education programme should also cover breast feeding promotion, complementary feeding and health promotion among children and adolescents. Especially, community driven programmes would have a major role to play in improving the food security in the deprived estate sector.

WHO recommended, exclusive breast feeding should be promoted in the Estate sector.

It was revealed that estate sector mothers are less successful at breastfeeding that is vitally important for a child's health and proper growth. As discussed before, due to special legal provisions that apply to the plantation sector, most of the women in the plantation sector are encouraged to return to work earlier on without taking their full maternity leave (at least 3 months). Therefore, special measures need to be taken to

"Campaigns against behaviours and changing harmful attitudes and practices such as alcoholism should be carried out amongst the young people in the estates".

introduce a compulsory maternity leave period while making special arrangements to promote breastfeeding at the crèches and day care centres in the estates.

Actions need to be taken at each stage of the life cycle to combat the intergenerational cycle of malnutrition in the estate sector. Growth retardation at birth, throughout childhood, and adulthood carry on the intergenerational cycle of malnutrition in the estate sector. To enhance the maternal nutrition, regular (at least monthly) nutritional check-ups, and specially designed nutritional education awareness programmes are recommended for estate sector female workers. Further, these health programmes should target women at each stage of the reproductive age – adolescents, pregnant and lactating mothers and mothers with under five year old kids. For better targeting, these programmes should be conducted by the government through specially trained health workers at the Estates, with the support of estate sector management.

"Higher prevalence of teenage pregnancies is also a serious issue that needs to be tackled in the estate region."

Special measures need to be taken to address the nutrition and health issues of youth.

At present, measures taken to address the needs of the adolescent age group are minimal. Therefore, separate group for adolescents may be more appropriate as they are not likely to share their ideas in a group with matured women and may prefer programmes that are specially designed to offer young people sympathetic counselling. Also, campaigns against behaviours and changing harmful attitudes and practices such as alcoholism should be carried out amongst the young people in the estates, and intervene to change the levels of alcoholism in the estates.

Higher prevalence of teenage pregnancies is also a serious issue that needs to be tackled in the estate region.

One of the main reasons for that is the lack of awareness on reproductive health among adolescents. Special education programmes can promote positive health and improve knowledge on reproductive physiology, sex education, disease prevention etc. Further, as teenage and young adult pregnancies are likely to result in small statured women giving birth to low weight babies, family planning measures must also focus on reducing pregnancies in this age group.

Special nutrition counselling programmes are necessary to improve awareness among less educated women.

Education and knowledge of women have a great impact on their nutritional status, as well as on the nutrition of her children. Culture and social factors, in the estate areas are less favourable for women and most of the women in the estate sector are less educated and hence, these factors adversely affect their ability to make the right nutritional choices, as well as the empowerment to adopt such decisions. Therefore, special nutrition counselling programmes are necessary to improve awareness among less educated women. This could be done at the community level by forming women's groups.

A successful fight against hunger must involve a community-centred approach to malnutrition.

A community approach to nutrition demands that the community answer these questions, with the help of trained individuals, and develop long-term solutions to their malnutrition problems. Formation of women's groups through the intervention of the women in their circles with back-up by referral

"Living conditions in estate areas should be enhanced by providing better housing and increasing access to safe drinking water, and sanitation facilities."

facilities is important to empower women to make the right nutritional choices and to adopt decisions.

Living conditions in estate areas should be enhanced by providing better housing and increasing access to safe drinking water, and sanitation facilities.

A safe living environment must be encouraged by providing basic

facilities, including safe drinking water, sanitary facilities, drainage and waste management. Public health inspection is recommended to maintain the living conditions of the estate sector community. Inspectors are responsible for annual sanitary survey in estate sector homes and also crèches and day care centres in the estates of their designated areas.

Health care services in estate areas should be strengthened with specially trained health care providers to tackle the vicious cycle of malnutrition.

Government should rectify the constraints experienced when taking over the estate sector hospitals under the national system to provide optimum benefits of the target population and also set up new health centres where hospital services are not available. Further, special monthly medical clinics at work places are recommended while providing facilities for outreached services through qualified health workers. Health care personnel must speak Tamil. Therefore, suitable deployment, training and recruitment of health care workers who can reach the Tamil speaking population should be adopted. In-service training should be given to health staff serving the plantation population to work in the language of the population. In that case, recruiting health workers within the community will be more effective.

Going beyond health and eliminating the deep-rooted socio-economic factors which are transmitted from generation to generation in the Estate sector community could break the vicious cycle of malnutrition in the Estate sector of Sri Lanka.

"Going beyond health and eliminating the deep-rooted socio-economic factors which are transmitted from generation to generation in the Estate sector community could break the vicious cycle of malnutrition in the Estate sector of Sri Lanka."

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