Acknowledgment

The trial testing report of the first round (SEA-PLM 2019) of the Southeast Asian Primary Learning Metrics (SEA-PLM), was made possible through the valuable contributions and collaboration of SEAMEO, UNICEF and the national teams of participating countries of SEA-PLM 2019, namely: Cambodia, Lao PDR, Malaysia, Myanmar, Philippines and Vietnam. This publication lays the foundation for the first regional assessment of SEA-PLM, as well as paves the way for the main survey of SEA-PLM 2019.

Without the financial partnership between UNICEF and Ministries of Education of participant and honorary members of SEA-PLM, the institutional commitment of SEAMEO, the technical expertise of ACER and other international experts from international agencies and universities, this experimentation of the new tests, questionnaires and procedures in a small sample of schools could not have been carried out in 2018.

SEA-PLM Regional Steering Committee members played a significant role in the design, validation and implementation of the new protocol and instrument through the field trials conducted in their countries in 2018 and contributions to reporting processes. SEA-PLM extends its sincere gratitude to its members.

SEAMEO and UNICEF also wish to particularly acknowledge and thank experts from ACER for their ongoing technical support, expertise and coordination assistance throughout the conception phase and during the implementation of the assessment.

Finally, SEA-PLM Secretariat is thanked for their technical and administrative support.

A full list of experts is included at Annex I.

The Australian Council for Educational Research Ltd (ACER) has been contracted to design and implement the first round of SEA-PLM assessment, SEA-PLM 2019. This report has been prepared by experts from ACER in 2018.
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Introduction

The Southeast Asia Primary Learning Metrics (SEA-PLM) is a regional assessment which aims to set a common approach to assessing learning outcomes at primary Grade 5 students. SEA-PLM is a set of assessment and survey instruments for the Southeast Asian region. Designed to be a system level monitoring tool of educational quality and equity, SEA-PLM covers four domains including mathematics, reading and writing and global citizenship.

The assessment also includes background questionnaires that gather key data from students, parents, teachers and school principals. A key feature of the SEA-PLM assessment is that it has been developed on the basis of an Assessment Framework that is specially developed to suit the context of ASEAN and SEAMEO Member Countries.

SEA-PLM focuses on supporting ASEAN and SEAMEO member countries to better understand the status of student learning achievement and thereby improve the quality of their education systems. The following report is a consolidation of the first and second phase of the field trial reports on SEA-PLM. In the interests of completeness, this report includes some material already presented in previous SEA-PLM reports as well as materials described in the associated technical reports of SEA-PLM.

The report begins by outlining the purpose and features of SEA-PLM and then describes the work already undertaken as part of the SEA-PLM field trials including some of the lessons learnt throughout this process. The second part of the report outlines the key findings from the field trial phase and next steps. The final section of the report provides a set of recommendations for SEA-PLM as it moves into the main survey phase. The report is intentionally brief so that it can act as a key summary of program activities and next step plans for the SEA-PLM initiative.
1. General overview of SEA-PLM

In 2012, the Southeast Asian Ministers of Education Association (SEAMEO) and UNICEF initiated the Southeast Asia Primary Learning Metrics (SEA-PLM) in an effort to assess and monitor students’ acquisition of knowledge and skills, to further improve the quality of education in Southeast Asia.

The SEA-PLM program targets grade 5 students in the domains of mathematics, reading and writing and global citizenship, emphasising across these domains the quality and depth of the learning taking place. SEA-PLM expects to achieve three key outcomes including:

1. Enhanced capacity to generate and analyse assessment data at regional, national and sub-national levels.
2. Enhanced capacity to utilise assessment data for education improvement and more equitable learning outcomes at regional, national and sub-national levels
3. Enhanced ASEAN integration in terms of approaches to assessment, with an initial focus on primary Grade 5 in the domains of numeracy (mathematics), literacy (reading & writing), and global citizenship.

At the heart of SEA-PLM is the priority given to working hand in hand with government counterparts. SEA-PLM is entirely embedded into national systems and structures. Government budgetary allocations to SEA-PLM further reflects the level of national commitment. During the four years of operation all seven participating SEA-PLM countries have committed national budgets to the program and are continuing to do so as the program moves into the main survey stage of work. The program is working to build government capacity and provide support to their existing assessment programs through a long term capacity development strategy of system level support.

The SEA-PLM program provides opportunities for national experts who are responsible for implementing learning assessment reforms to benefit from intense training and capacity development through their participation in SEA-PLM. The program aims to build a regional cadre of experts in areas such as test development, sampling, scaling, test administration standards and procedures, and data management and reporting.

SEA-PLM is working towards a comprehensive quality improvement strategy for education systems in the region. With a greater focus of integrating SEA-PLM into countries National Education Sector Plans (NESPs) the program will in time help governments identify how they can improve their education system, including teacher training, curriculum implementation and school management. The common means of reporting on student performance will enable ASEAN member governments to report on student performance within countries and across the region over time.

SEA-PLM whilst regionally focused, has been designed to meet international assessment technical standards. International best practices have been adopted in areas related to framework construction, item development, translation and verification, test administration standards, data management practices, technical analysis, and scaling and reporting of results. This means that the SEA-PLM Assessment Framework and tools, as well as the resulting numerical scale of student achievement can be easily aligned to other international assessments or metrics.
2   SEA-PLM Conception phase and first experimentation (2005-2018)

The year 2018 marks a significant milestone in the evolution of SEA-PLM. Over the past four years from the time of the first SEA-PLM test administration in 2015, 4 high level regional workshops have been undertaken and 26 in-country trainings have been implemented across 7 different countries.

Almost 700 new test and questionnaire items have been developed and administered in 26 different test booklets, covering 4 domains, in 9 different languages. Data has been collected from 15,392 grade 5 students, 14,479 parents and 2,558 teachers, across 277 different primary schools in 8 different test administration cycles.

The following section of this report is a summary of activities which have taken place for implementation of the field trials for SEA-PLM from 2015 to 2018.

2.1 Curriculum audit and framework development

An early step in developing an Assessment Framework for SEA-PLM was determining how to design and construct a single assessment program across all ASEAN member countries. This step needed to take account of the similarities and differences in the curriculum frameworks in each country for the four domains to be assessed through SEA-PLM (mathematics, reading, writing and global citizenship).

This account was achieved through an audit of the curriculum materials from 11 ASEAN countries comprising those countries already participating in the SEA-PLM field trial, and others who might be likely to join SEA-PLM in the future. The audit examined statements concerning the overarching orientation of education in each country and then focused on the details of the curriculum for Grade 5. The audit found that whilst there was considerable variation and diversity across the ASEAN countries in the way they define their curriculum requirements there was also significant overlap and similarity across the curriculum statements.

SEA-PLM was designed so that it respected the differences and at the same time built on the commonalities. SEA-PLM therefore adopted an approach termed ‘curriculum referenced assessment’. In other words, SEA-PLM is not designed to test student knowledge as defined in national curriculum statements, but rather responds to overall objectives of educational outcomes related to how education should produce citizens who are able to deal with challenges and to solve the kinds of problems they are likely to confront both now and in the future. SEA-PLM therefore focuses on the practical application of students’ skills, knowledge and understanding in everyday contexts and has adopted a ‘literacy orientation’ to the development of its Assessment Framework.

The SEA-PLM Framework is designed to support the development of assessment instruments that focus on students’ applying their skills. This approach builds upon a global and growing regional focus of embedding national education objectives within a set of 21st Century Skills. Also, the SEA-PLM Framework has been designed so that younger and older children in early primary and lower secondary grades can be included, providing the means for governments in the ASEAN region to effectively report against their Sustainable Development Goal (SDG) commitments.
2.2 Test development

The test development phase of SEA-PLM focused much of its efforts on developing a well targeted and culturally appropriate set of test materials. This process commenced with a rigorous process of item development. Ensuring the items were regionally appropriate, whilst also suitable to cover all elements of the Framework constructs was critical to the success of SEA-PLM. This was achieved by establishing Domain Technical Review Panels (DTRPs) for mathematics, reading and writing and global citizenship. A separate Reference Group was established to review the questionnaire items. ACER’s domain experts worked alongside the DTRPs to develop twice the number of test items which were anticipated for use during the main survey. The scope of the development task was determined by the test design, as outlined in the Assessment Framework, that the SEA-PLM steering committee adopted in early 2015.

The test booklets used a rotated booklet design which comprised a total of 90 minutes of test time for each domain. Domains were broken down into 15 minute clusters of test items and the item clusters were then placed in test booklets according to a rotated test design. This meant that no clusters of items were always at the start or at the end of the booklets which could positively or negatively influence the difficulty of these items due to student fatigue. Test booklets included a set of questionnaire and global citizenship items. The total test time for each booklet was one hour.

As a first step in booklet development, a set of English source booklets were developed and these were used to support country level adaptations and translations. A critical element of a regional assessment is to ensure comparability and consistency of the meaning of items across contexts. The translation process for SEA-PLM was rigorous and included a series of steps and quality assurance stages which is in line with international practice. Despite this, the translation work for SEA-PLM during the field trial was complex, time consuming and far more costly (for both ACER and the in-country teams) than originally anticipated.

During the field trial several translation approaches were used. In the outset, countries undertook their own translations, for the second phase of the field trials, an external translation company (SDL) was contracted. Issues of accuracy and relevance of the translation process remained and during the final stage of translation work for the maths mini trial, Transperfect, were contracted by ACER to undertake the translation work. The translation process is still not without fault and further refinements are required for any remaining translation work required for the main survey. However the bulk of the translation work is now complete and test items are now available in nine different languages, which will significantly reduce the burden of test booklet development in preparation for the main survey.

2.3 Manual development

The second key purpose of the field is to test the field operations in preparation for the implementation of the main survey. Standardised operations related to translation, test administration and data management have been developed and these are outlined in five separate SEA-PLM manuals including:

a. Test administrator’s Manual
b. School Coordinator’s Manual
c. Technical Team Manager’s Manual
d. Data Management Manual
e. Translation, Adaption Manual.

A draft set of manuals were developed in readiness for the first test administration in Brunei Darussalam in November 2015. Since their first use, the manuals have continually evolved and have been updated to incorporate country specific feedback related to issues of implementation and clarity.
These changes have been possible largely through the on-the-ground support provided to countries by ACER, UNICEF and SEAMEO during their test administration by means of the ‘test administration observation reports’.

In each of the seven cycles of test administration key lessons have been identified including the need to ensure a clear understanding of who should have copies of the operational manuals, how they should be circulated and which manuals need to be translated prior to test administration activities. A final set of operational manuals are now available as result of the completion of the field trial. The operational manuals form the basis for the development of a consolidated set of technical standards for SEA-PLM. The development of a set of technical standards for SEA-PLM forms part of the preparation work for the start of the main survey.

2.4 Trial testing data collection

SEA-PLM test administrations have taken place in seven countries across the ASEAN region with an additional mini-field trial for the new mathematics items. The first phase of test administration took place between 2015 and 2017 in Brunei Darussalam, Cambodia, Lao PDR and Myanmar. The second phase of field trials took place over a three months period between the end of 2017 and start of 2018. The maths mini-trial was conducted in Cambodia in June 2018.

Exhibit 1 below outlines the countries that participated in the SEA-PLM Field Trial, as well as the numbers of schools and students that participated in the survey within each country. A minimum of 35 schools were recommended to ensure adequate coverage across country-defined sampling strata of interest, with a target number of 1,800 students per country.

The larger number of schools sampled in Malaysia, and the associated larger number of students, was a function of the delivery of the SEA-PLM field trial test administration in three languages across the three recognised school types: Malay-medium, National Type – Chinese, and National Type – Tamil.

Exhibit 1: Country codes as used in this report and numbers of participating students and schools in SEA-PLM field trial

<table>
<thead>
<tr>
<th>Country</th>
<th>Schools in survey</th>
<th>Students with valid test data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei Darussalam</td>
<td>38</td>
<td>1,796</td>
</tr>
<tr>
<td>Kingdom of Cambodia</td>
<td>35</td>
<td>1,722</td>
</tr>
<tr>
<td>Lao People’s Democratic Republic</td>
<td>35</td>
<td>1,787</td>
</tr>
<tr>
<td>Malaysia</td>
<td>63*</td>
<td>3,849</td>
</tr>
<tr>
<td>Republic of the Philippines</td>
<td>36</td>
<td>1,889</td>
</tr>
<tr>
<td>Republic of the Union of Myanmar</td>
<td>35</td>
<td>2,089</td>
</tr>
<tr>
<td>Socialist Republic of Vietnam</td>
<td>35</td>
<td>2,260</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>277</strong></td>
<td><strong>15,392</strong></td>
</tr>
</tbody>
</table>

*Due to the division of schools in Malaysia into National Primary School, Chinese Vernacular Primary School, Tamil Vernacular School, a larger number of schools participated in the field trial than in other countries participating in the SEA-PLM field trial.

In addition to the original set of items, an additional 40 items were delivered to a sub set of students in Cambodia to more appropriately accommodate variation in the levels of student ability at the regional level. A comprehensive outline of item information from the maths mini-trial is presented in a separate report, the Mini-trial of Mathematics items for SEA-PLM in Cambodia.
One of the key objectives of implementing a field trial in each one of these participating countries is to assess all aspects of the test administration systems which will be used for the SEA-PLM main survey. Field trial observation missions to each of the seven participating countries were conducted jointly by SEAMEO and ACER. The SEAMEO-ACER team were supported in-country where possible by the UNICEF country office and the participating Ministry of Education representatives from the SEA-PLM Technical Teams.

The purpose was to document the implementation process and collect feedback from project stakeholders with the aim of identifying lessons learned and areas for improvement, and to formulate recommendations for a capacity support strategy needed to assist the preparations for the SEA-PLM main survey.

Each country had its own unique characteristics and contexts, yet there were a number of similarities across the countries where support was needed at the individual, institutional and organisational levels. In each country it was highlighted that there was a need to articulate a comprehensive assessment strategy which brings together the various assessment initiatives taking place in-country, as well as the need to appoint a National Steering Committee in each country. In many countries, during the field trial, resourcing was a challenge as SEA-PLM appointed staff often had other full-time responsibilities.

This challenge has mostly been addressed by countries including SEA-PLM into their national work plans and securing internal budgets to support activities. Other common points which were identified by countries as needing improvement in advance of implementing the main survey included: the need for an in-country communication strategy around SEA-PLM; ensuring standardised test administration procedures were followed; maintaining confidentiality and security of test materials; capacity to undertake translation and booklet development; and the challenges of including different population sub-groups, such as children with special needs into the survey sample. Another important consideration for the future rounds of SEA PLM will be to develop processes to strengthen countries capacities to more effectively integrate the SEA PLM initiative into their National Education Sector Plans and national planning processes.

During the first phase of the field trial a significant challenge was related to the slippage of work schedules. SEA-PLM is designed to work alongside partner Ministries and program delays were often due to staff availability or a misunderstanding of the requirements and sequencing of tasks required to implement SEA-PLM. Challenges relating to the translation process were also identified during the first phase of work. Both of these challenges were addressed during the second phase of SEA-PLM, where detailed country level work plans were negotiated and agreed in partnership with each of the countries, SEAMEO and UNICEF. Country commitment to the schedules were agreed during the orientation workshops which took place in 2017 in each of the three remaining countries. A separate work plan was developed for the mathematics mini-trial. Additionally a new translation company was contracted which helped in part to address some of the translation issues identified during the first phase of work.

Lessons learnt from the first phase of field trials were consolidated into the second phase of countries and the program witnessed a much closer adherence to agreed time frames and work schedules and the translation process has been of a higher quality once the contractor was changed from SDL to Transperfect. Furthermore, during the second phase of field trial countries, ACER was better equipped to know which tasks countries would require more support and arrangements were made to ensure adequate, timely and targeted support was provided. Capacity building plans have been developed for Cambodia, Lao PDR, Myanmar, Malaysia, Philippines and Vietnam. Using the 14 key areas needed to implement an effective assessment program (as shown in Annex B) as a reference point, the capacity development plans were categorised into three levels including institutional, organisational and individual. Within each plan, a variety of capacity-building elements are considered, ranging from communication engagement, and information sharing with development partners, high-level government departments, reviewing training modules, and ensuring the security of human and financial resources. Whilst each plan is unique to the needs of each country commonalities across these plans are observed which are outlined in Exhibit 2.
Exhibit 2: Summary of Capacity Development Needs for participating SEA-PLM Countries

<table>
<thead>
<tr>
<th>Institutional</th>
<th>Organisational</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Link Education Assessment Activities to national policy priorities and develop a National Assessment Strategy.</td>
<td>• Strengthen engagement between SEA-PLM National Steering Committee and Technical Team</td>
<td>• Build staff capacities in item development, standardised test administration procedures, adaptation, translation and development of cognitive booklets; coding; data entry and cleaning; applying results of student assessment to national policy frameworks</td>
</tr>
<tr>
<td>• Institutional agreement on location of the SEA-PLM program within existing national structures which support student assessment.</td>
<td>• Develop a communication strategy about the purpose of SEA-PLM to raise awareness with participating schools, teachers and parents.</td>
<td></td>
</tr>
<tr>
<td>• Agreement on budget allocations for the implementation of SEA-PLM and staff/capacity requirements within relevant Ministries.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These detailed capacity development reports form the basis for the schedule of work at the regional and country level for the implementation of the main survey.

2.5 Coder training and data management

Coding is a term used for a specific type of marking that is used in large-scale assessments because of its high reliability. In this approach to marking, there is a carefully prepared coding guide that describes qualities of possible student responses to the constructed-response items in the test. Using this coding guide, markers match each student response to one of the described categories in the coding guide. The categories are numbered and these numbers for the categories are referred to as ‘codes’.

The first coder training workshop, held in Bangkok (August 2016), provided the opportunity for representatives of three of the field trial countries to draft the coding guides and be trained to undertake coding activities. In preparation for the workshop, participants selected a range of student responses in mathematics, reading and writing tasks so that raters could develop a coding matrix for a broad spectrum of student abilities. Following the regional coder training workshop, country level coder workshops were held in the remaining four field trial countries including Myanmar, the Philippines, Malaysia and Vietnam.

The development of the coding rubrics for writing was particularly challenging as no previous international assessment had successfully developed a single assessment for use in multiple countries with diverse languages, using common tasks and common scoring criteria, to report student achievement on a single scale across the multiple countries and languages. At the end of the field trial, a fully developed code book has been finalised for use across all three cognitive domains.

Data management workshops were held in each of the participating SEA-PLM countries following the finalisation of the coding activities. These five day workshops provided an overview of the KeyQuest Data Management Software, to facilitate data entry activities for both the test and questionnaire data and to collaborate on processes for undertaking quality control and data validation procedures. These in-country training sessions significantly improved the quality of data entered and the timeframe for the completion of data entry processes. A series of adaptation and modifications of KeyQuest software was needed to ensure the compatibility of platforms across different countries.
3. Results from the trial testing

Data from all of the 7 field trials plus the mini trial were analysed in August 2018 by ACER’s team of psychometricians and domain experts.

Detailed results from this analysis is outlined in several internal reports: the *SEA-PLM Cognitive Domains Psychometric Report (August 2018)*, the *SEA-PLM Phase II Field Trial Report: Cognitive Domains (Mathematics, Reading, Writing)*, the *SEA-PLM Questionnaire Psychometric Report (August, 2018)*, the *SEA-PLM Phase II Field Trial Report: Questionnaire Domain* and the *SEA-PLM Global Citizenship Domain Report (August, 2018)*.

The paragraphs below present the main conclusions extracted from those internal reports.

3.1 Reading

Approximately 100 reading items were developed for the field trial of which 48 items will be needed for the main survey. A key challenge of the reading item development process was to present a range of reading material, covering the expected wide range of reading abilities within and across countries in the region.

Some items were specifically designed to measure what is referred to in the Assessment Framework as ‘precursor skills’ which required the development of word-recognition (labelling) items. In order to do this it was necessary to identify words and associated images which would be accessible and immediately recognisable to students across the region. It proved impossible for some of the reading items to prepare a single image that would suit all countries in the region. In order to resolve this problem, for some images, two forms of the same images were developed, especially where people were portrayed.
Exhibit 3 shows the results from the reading assessment from the field trial. The ‘X’s’ on the left represent students and where they sit on the reading scale. The number on the right hand side of the table show the difficulty level of students. The majority of items sit within the average ability of student performance. Some items at the very bottom of the scale were too easy for the SEA-PLM assessment and will be removed for used in the main survey.

The results show that on the whole the reading items were well targeted to the populations in the seven countries participating in the field trial and a relatively small number of the reading items have been identified as having undesirable measurement properties. The field trial data analysis provides evidence of substantial variation in the reading ability of students from the different participating countries. Yet these early results suggest that pre-reading skills have been effectively attained by the participating grade 5 students during their earlier foundational school years. The results also show that on the whole girls outperform boys in reading ability.
3.2 Writing

The tasks and items developed for writing were found to measure the entire range of student abilities from weakest to strongest relatively well (see Exhibit 4). A total of 101 writing items were developed and after removing those items with undesirable properties a sufficient number of items remain for use in the main survey. The field trial shows that on the whole girls outperform boys in writing ability.

Exhibit 4: Writing Item Difficulties and Achievement Distribution.

The writing assessment for SEA-PLM is the first of its kind to assess student writing abilities across multiple scripts and languages. Whilst this is challenging, results from the field trial show that there is little in the way of differential item functioning by country which indicates it is possible to measure students’ writing ability across languages and countries using a common set of instruments and against a common scale. This is an exciting and novel finding, and there is considerable degree of promise that the main study will further strengthen the evidence that assessing writing across languages can be achieved successfully.

Whilst it now seems possible to assess writing across languages, there is evidence in the field trial data that points to some of the criteria such as Grammar and Punctuation which cannot be applied across countries. During the main survey these criteria will still be included in the assessment but only reported on by country.

In order to gather more evidence to determine which writing process apply across languages and which ones are language-specific, particular attention needs to be paid to limiting other factors within the control of the testing program that may contribute to country level variation. In particular, it requires a continued focus on providing high quality coder training and carefully monitoring of the coding process to ensure reliability across the various participating countries.
3.3 Mathematics

The development of the maths items for SEA-PLM was based on the parameters identified in the SEA-PLM Assessment Framework, which is aligned to the intentions and objectives of the 11 ASEAN curricula frameworks for mathematics. Exhibit 5: Mathematics Item Difficulties and Achievement Distribution including results from the mini-trial, shows the item difficulties and student achievement distribution from the first phase of the SEA-PLM Field Trial. The first stage of the field trial showed that the curricula intentions in mathematics do not match student abilities, especially as this relates to students abilities to interpret and apply mathematical knowledge and skills. This in itself is an important finding from the field trial and could have implications with regards to the teaching of mathematical concepts for students in primary schools across the ASEAN region. However, the intention of SEA-PLM is to understand what students can do and in order to do so it was important that new items were developed and trialled for use in the main SEA-PLM survey in order to measure the foundational skills of student mathematical abilities.

Exhibit 5: Distribution of item difficulty and student performance for Phase I maths

During the first half of 2018, 40 new maths items were developed in collaboration with the SEA-PLM Technical Team in Cambodia. Cambodia was chosen as the country of implementation for the mini-trial based on their excellent engagement, resourcefulness and management of the field trial conducted in 2016. Specific attention was given to reducing the reading load for the new maths items. The intention of the maths assessment is to assess student mathematical abilities. If items have a high reading load, this confounds the measurement of student abilities in mathematics.

The items were translated using the services of a translation company which was contracted by ACER to oversee the translation process (Transperfect). Some challenges remain with the translation process and one key lesson learnt is that it is important to allow sufficient time for translation review and cluster review stages, ensuring that the items are presented in their final visual form (i.e. booklet form) so that the association between translation and items is more easily recognisable by reviewers.
The new items were administered to approximately 300 grade 5 students. These results are outlined in more detail in the SEA-PLM Phase 2 Mini-trial Development Report. The new items were found to target well the student abilities. Whilst some items were still considered to be too difficult, the mini-trial of maths items provided sufficient number of well performing items at the lower end of the mathematical scale.

The results from all 7 field trial countries and the additional mini-trial show that the items developed for mathematics were found to measure the entire range of student abilities from weakest to strongest relatively well (Exhibit 6). The field trial results show that student abilities in mathematics varies widely across the participating countries and that on the whole girls outperform boys in mathematical reasoning ability. Importantly, the field trial results has important implications for the conduct of mathematics teaching and learning to improve students’ skills in their ability to use of their mathematical knowledge in every-day lives.

*Exhibit 6: Mathematics Item Difficulties and Achievement Distribution including results from the mini-trial.*

The results from all 7 field trial countries and the additional mini-trial show that the items developed for mathematics were found to measure the entire range of student abilities from weakest to strongest relatively well (Exhibit 6). The field trial results show that student abilities in mathematics varies widely across the participating countries and that on the whole girls outperform boys in mathematical reasoning ability. Importantly, the field trial results has important implications for the conduct of mathematics teaching and learning to improve students’ skills in their ability to use of their mathematical knowledge in every-day lives.

*Exhibit 6: Mathematics Item Difficulties and Achievement Distribution including results from the mini-trial.*

<table>
<thead>
<tr>
<th>Students</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>x 65 110.2</td>
<td>x 120.1</td>
</tr>
<tr>
<td>x 130</td>
<td>x 110</td>
</tr>
<tr>
<td>x 150</td>
<td>x 110</td>
</tr>
<tr>
<td>x 150</td>
<td>x 110</td>
</tr>
<tr>
<td>x 100</td>
<td>x 110</td>
</tr>
<tr>
<td>x 70</td>
<td>x 110</td>
</tr>
<tr>
<td>x 50</td>
<td>x 110</td>
</tr>
<tr>
<td>x 20</td>
<td>x 110</td>
</tr>
</tbody>
</table>

The new items were administered to approximately 300 grade 5 students. These results are outlined in more detail in the SEA-PLM Phase 2 Mini-trial Development Report. The new items were found to target well the student abilities. Whilst some items were still considered to be too difficult, the mini-trial of maths items provided sufficient number of well performing items at the lower end of the mathematical scale.
3.4 Global Citizenship

The inclusion of the global citizenship domain in SEA-PLM means it is the first cross national assessment to investigate primary students’ level of awareness and understanding of their world, and their place in it. The global citizenship (GC) domain sought to understand children’s attitudes towards taking an active role in their community and their views of working with others to promote equality, fairness and sustainability through an ASEAN lens. Considerable consultation took place during the early stages of the development of the GC domain which eventuated in an agreed common definition for GC within the ASEAN context as follows:

*Global citizens appreciate and understand the interconnectedness of all life on the planet. They act and relate to others with this understanding to make the world a more peaceful, just, safe and sustainable place.*

The endorsed definition of GC (above) informed the development of the GC Assessment Framework including content and measurement sub-domains. The GC Assessment Framework includes three measurement domains (cognitive; attitudes and values; and behaviours and skills), and three content sub-domains (GC systems, issues and dynamics; GC awareness and identities; and GC engagement). Due to the experiential nature of the GC domain the GC Domain Technical Review Panel agreed to measure only attitudes and values and to some extend behavioural intentions during the field trial stage of SEA-PLM, with the view of adding a cognitive assessment in subsequent years.

The GC domain is comprised of a set of 10 student questions (71 items) and a set of five teacher questions (50 items). The student GC questions were incorporated into the student questionnaire which was administered after students had completed the cognitive test and the teacher GC questions were incorporated into the teacher questionnaire.

A total of 15,673 students from the seven field trial countries completed the student questionnaire and a total of 2,558 teachers across the same field trial countries completed the teachers’ questionnaire. A more comprehensive analysis of the results from the GC domain are available in the SEA-PLM Psychometric Questionnaire Report and the SEA-PLM Global Citizenship Domain Report, but some key findings from the implementation of the field trial shows that it is possible to reliably measure students attitudes towards local and global issues that are common across a range of culturally diverse countries such as those in the ASEAN region.

Whilst there was wide variation in students’ understanding of some of the key GC terms, a common aspect across all countries was that students identified more easily with issues that were locally oriented. ‘Global’ activities seemed to be less relevant. On the other hand, while students had less experience learning about globally oriented GC topics, there is evidence that the students placed importance on it and are interested in extending their understanding and knowledge beyond their own local community. On the whole, the results from the field trial show that students are more interested in being a ‘good local citizen’ rather than and ‘active global citizen’.

Findings from the teacher questionnaire revealed some important if not contradictory results in relation to the student questionnaires. Many teachers indicated they were teaching activities related to environmental sustainability, whilst in some cases, less than half of the students reported being involved in any activity related to this same topic. Teachers demonstrated a much higher awareness and interest in all aspects related to the ‘global’. This suggests there is significant scope for global awareness activities to be more systematically integrated into teaching activities in the classroom. This is important, as almost a quarter of students responded that they had learned ‘nothing’ about ‘what is happening in the world’. Some teachers provided feedback during the test administration observations that they found the questions in the GC domain to be of great interest as they had provided ideas for teachers to incorporate some of these concepts into their everyday teaching. This is particularly encouraging given that many of the teachers who participated in the SEA-PLM field trial indicated little or no formal training in GC concepts, especially in relation to globalisation, social inequity or injustice.
The GC domain is still very new and whilst a great deal of information has been collected and lessons learnt over the past four years of testing the GC concept, there is very good evidence from the SEA-PLM program that this is a domain which warrants further investigation and development. As stated in the Global Citizenship Domain Report (February 2017), concerns regarding the lack of instruments for all three measurement subdomains (cognitive, attitudes and values, and behaviours and skills) remain. A cognitive assessment, which could be field tested using the same operational systems as during the main survey, is recommended which will help inform understanding about the basis upon which student’s values and attitudes regarding GC are formed.

To take forward the GC Domain, it is recommended that a short multiple choice cognitive assessment be developed to ascertain students’ knowledge and understanding of key terms pertaining to GC such as ‘global’, ‘climate change’, ‘natural resources’, ‘pollution’, ‘peace’, etc., as per their given translation into the language of the test. This would not be a test of GC, but rather a test of GC vocabulary and concepts. The curricula of participating countries would be broadly referenced in the test. Correlations between the test and questionnaire would offer a greater confidence level in describing the results for the main survey.

### 3.5 Questionnaires

The field trial results related to the student questionnaire are outlined in detail in the SEA-PLM Questionnaires Domain Report. The results showed that the majority of the content had acceptable psychometric properties and are able to measure those aspects outlined in the contextual framework for the study. As stated earlier the missing data rates indicate that students were generally able to complete the questionnaires, both in terms of understanding what was required of them (albeit with some exceptions) and in terms of the number of questions assessed. This was a concern at the start of the field trial, especially given the relatively young age of the students.

Guided by the SEA-PLM Contextual Framework, the student questionnaires include content designed to measure contextual factors (or constructs) that are believed to influence student learning outcomes. In most instances, as evidenced in the SEA-PLM Psychometric report for the Questionnaires, these questions appear largely successful in measuring such constructs. This includes questions that were adapted from other large-scale educational surveys, such as those measuring attitudes to, and engagement with reading and mathematics (adapted from TIMSS and PIRLS).

New content designed specifically for SEA-PLM has shown to have value in profiling contexts for student learning. An example of this is the question related to student work activities when not at school. Students who spent larger amounts of time undertaking activities such as working on farms or in physical work (e.g. in a mine, in a workshop, in a factory), presumably often at the expense of schooling, had lower levels of achievement.

The field trial data cannot be interpreted with confidence as it is not a representative sample, however, some preliminary trends have emerged as they relate to student learning. For example a strong correlation was found between a student’s home possessions and learning outcomes. There was a strong positive association found between whether a child had attended pre-schooling and students’ later performance, even after the resourcing of the family was taken into account. The degree in which students report that their parents interact with them about their schooling had a significant impact on students’ learning.

Approximately 15,000 parents from across the region completed a parent questionnaire (see Table 3).
### Exhibit 7: Number of participating parents, by country

<table>
<thead>
<tr>
<th>Country acronym</th>
<th>Country name</th>
<th>Number of parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRN</td>
<td>Brunei</td>
<td>1,703</td>
</tr>
<tr>
<td>KHM</td>
<td>Cambodia</td>
<td>1,680</td>
</tr>
<tr>
<td>LAO</td>
<td>Laos</td>
<td>1,572</td>
</tr>
<tr>
<td>MMR</td>
<td>Myanmar</td>
<td>2,089</td>
</tr>
<tr>
<td>MYS</td>
<td>Malaysia</td>
<td>3,835</td>
</tr>
<tr>
<td>PHL</td>
<td>Philippines</td>
<td>1,794</td>
</tr>
<tr>
<td>VNM</td>
<td>Vietnam</td>
<td>1,806</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>14,479</strong></td>
</tr>
</tbody>
</table>

For the parent questionnaire, valuable information was collected with regards to student home background and their early development. Particularly important was the information parents provided about students’ school readiness in relation to literacy and numeracy ability, as this is an interesting predictor of students’ later achievement. The number of books parents reported in the home shows a strong positive correlation of student performance. The question on parental occupation on the other hand provided weaker than expected associations and this will be omitted for the main survey.

A total of 2,558 teachers from 277 schools completed the teacher questionnaire (see Table 4).

### Exhibit 8: Number of participating teachers and schools, by country

<table>
<thead>
<tr>
<th>Country acronym</th>
<th>Country name</th>
<th>Number of Schools</th>
<th>Number of teachers</th>
<th>Average teachers per school</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRN</td>
<td>Brunei</td>
<td>38</td>
<td>314</td>
<td>15</td>
</tr>
<tr>
<td>KHM</td>
<td>Cambodia</td>
<td>35</td>
<td>131</td>
<td>15</td>
</tr>
<tr>
<td>LAO</td>
<td>Laos</td>
<td>35</td>
<td>66</td>
<td>11</td>
</tr>
<tr>
<td>MMR</td>
<td>Myanmar</td>
<td>36</td>
<td>117</td>
<td>17</td>
</tr>
<tr>
<td>MYS</td>
<td>Malaysia</td>
<td>63</td>
<td>1,502</td>
<td>83</td>
</tr>
<tr>
<td>PHL</td>
<td>Philippines</td>
<td>35</td>
<td>111</td>
<td>19</td>
</tr>
<tr>
<td>VNM</td>
<td>Vietnam</td>
<td>35</td>
<td>317</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>277</strong></td>
<td><strong>2,558</strong></td>
<td></td>
</tr>
</tbody>
</table>

There was wide variation in the gender balance of grade 5 teachers across the region. Cambodia and Lao PDR for example showed near gender parity of its teachers, whereas Brunei Darussalam recorded approximately a third of their teachers being female and Myanmar reported that more than 92% of their teachers were female. Most teachers reported receiving training in classroom management and pedagogy, but less teachers reported receiving direct instruction on how to teach mathematics, reading or writing. Most teachers had not received any training related to inclusive education or special needs education. Teachers reported that they were least confident in conducting research or laboratory work in their class or in multi-grade teaching and teachers reported that at least 60% of their students were affected at least to some extent by being hungry in class. School and community resources also show a statistical association with student outcomes, as does teacher absenteeism and teaching time in each of the domain areas. In preparation for the main survey some minor revisions will be made to the teacher and school questionnaire. The implementation of the parent questionnaire requires substantial logistical and financial resources. Nevertheless, given the significance of the results and the implications for education improvement strategies, country participation in such a questionnaire is strongly encouraged.

In the case of the student questionnaire, there will be a reduction in the number of booklets from six in the Field trial to one, as per the study design. Accordingly, a large reduction in content will be required and priority will be given to those questions that are strongly underpinned in the Contextual Framework and contribute strongly to the research direction of the project, those that show sound psychometric properties and those that would likely to be used in any reporting and dissemination of the project, either regionally, or by countries.
4. Next Steps

The first phase of preparations for the implementation of the main survey have already commenced. Comprehensive work plans have been developed for each country by ACER in consultation with the national Technical Teams. These work plans outline the scope of activities for the following 12-24 months (time frames vary by country) and cover activities related to school sample design, field operations standards, item adaptation, translation, booklet development, test administration, coding, data entry and cleaning, data analysis and dissemination.

A major focus of the preparations for the main survey is the development of a detailed sampling strategy for each country and the finalisation of a set of technical standards for the implementation of the main survey. A regional meeting was held in Bangkok (August, 2018) which was attended by all 7 participating SEA-PLM countries, UNICEF, SEAMEO and ACER to help build regional consensus around quality standards, agree on the next steps for SEA-PLM and to confirm country commitment to the main survey.

At the time of preparing this report six of the seven SEA-PLM countries had committed to participating in the main survey (Brunei to confirm). A tentative time frame for sampling and orientation workshops, and test administration dates is show below in Exhibit 9.

Exhibit 9: Dates of Workshops and Test Administration

<table>
<thead>
<tr>
<th></th>
<th>MNR</th>
<th>PHL</th>
<th>KHM</th>
<th>LAO</th>
<th>VNM</th>
<th>MYS</th>
<th>BRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dates of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>July 30</td>
<td>Aug</td>
<td>Sept 3-13-17</td>
<td>Sept</td>
<td>Oct 8-10-14</td>
<td>Nov</td>
<td>Jan 7-11</td>
</tr>
<tr>
<td>workshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Admin</td>
<td>Jan 19</td>
<td>Feb 19</td>
<td>Mar 19</td>
<td>Apr 19</td>
<td>May 19</td>
<td>Oct 19</td>
<td>Oct 19</td>
</tr>
</tbody>
</table>

A draft set of Technical Standards, including the sampling standards for SEA-PLM have been finalised with initial feedback by all countries. In-country sampling and orientation workshops have taken place in two of the seven countries with Cambodia and Lao PDR planned for September, 2018. Contractual and financial agreements have been tentatively agreed with all countries which includes technical support from ACER and country level financial needs for the implementation of the main survey. Discussions continue with regard to a new governance structures for SEA-PLM.

Selection of items for the main survey has commenced. Development of a full set of English source booklets is planned to take place in September, 2018. The booklets will be arranged using a similar structure to that used during the field trial. Six clusters of 15 minutes each will be developed in each of the three cognitive domains. A fully rotated booklet design will be implemented which will require the development of 18 different test booklets. The student questionnaire will be reduced to one booklet to minimise the printing burden for countries. Translation (or verification of existing translations) will be conducted concurrently in September and October 2018. The first administration of the main survey for SEA-PLM will take place in Myanmar in January, 2019.
5. Key Recommendations

A number of recommendations have emerged as a result of the finalisation of the field trial stage of SEA-PLM, especially as the program turns its sight to the implementation of the main survey. Recommendations related to capacity development plans are highlighted in each of the specific country plans and so is not repeated in this report. Other recommendations related to the institutionalisation of a governance structure for SEA-PLM and a strategy for longer term financial sustainability of the program are also addressed in alternative SEA-PLM reports. The recommendations presented in this report therefore relate specifically to how SEA-PLM can be best utilised to positively influence teaching and learning practices across the ASEAN region.

- **Building 21st Century Skills**

Building and strengthening 21st Century Skills is key priority of all ASEAN member countries and of all countries participating in SEA-PLM. Adopting a 21st Century Curriculum is articulated as one of the 7 priority areas outlined by SEAMEO’s Action Agenda for 2016-2020. Specifically SEAMEO member countries are committed to designing a common framework for a 21st Century Curriculum with 21st characteristics/skills adopted (Priority Area 7.10). SEA-PLM is identified as a means to achieving this result and to build a common framework of student assessment in this field across all SEAMEO member countries (Priority Area 7.15). Critical thinking, communication, collaboration and creativity provide the foundations for a 21st Century Curriculum. These skills are both complimentary to, as well as provide the foundations for, the teaching of literacy and numeracy.

The Assessment Framework for SEA-PLM, takes as its starting point a literacy orientation to traditional cognitive domains, and highlights the importance of being able to apply knowledge to everyday life. How students can transform language and texts to convey ideas and information, how they analyse information and break complex aspects into component parts to recombine and create new knowledge, how students solve problems and make decisions on more complex issues are all critical components of building 21st Century Skills. This, combined with the innovative development and possible extension of the global citizenship domain for SEA-PLM which explores students' understanding of self-awareness, sense of belonging and empathy of others are all important contributors to this common regional objective. SEA-PLM therefore provides a critical part of the ASEAN member countries commitment to building student’s 21st Century Skills. It provides the means to understand how students’ apply knowledge and how they connect with others. The principals outlined in the SEA-PLM Assessment Framework therefore provides a foundation for collective regional reform of curricula and teaching practices across the region.

- **National Sector Plans, Assessment Frameworks and SDG Reporting**

A national education sector plan which is based on valid and reliable evidence provides a strong stimulus for positive change and the implementation of assessment should be deeply integrated with all other elements of an education system in order for the system to be effective in improving learning outcomes. This integration is illustrated in the below conceptual framework which shows how learning assessment data is a central source of information for evidence-based decision making and action.
Of the 7 participating SEA-PLM countries, 6 have approved education sector plans and 4 are GPE member countries. The capacity development plans for each of the SEA-PLM countries recognise the importance of integrating student assessment data into national sector plans. Therefore, as part of the next stages of implementing SEA-PLM a strong focus will be to ensure that the results of SEA-PLM are well understood and key recommendations for national sector reform can be drawn from the SEA-PLM findings. This will give countries the opportunity to support their education system to develop national assessment strategies that generate meaningful data and assist the system with the improvement of learning outcomes. In some cases where national assessment data is not available for end of primary, SEA-PLM can help to inform national systems of student performance in mathematics, reading and writing.
Significant gains may also be achieved through the development of a national student assessment strategy, embedding SEA-PLM into national student assessment objectives and ensuring that these objectives are linked back into curriculum and teacher competency frameworks. By reviewing documentation related to curriculum frameworks, teacher guides, assessment policy, examination frameworks, teacher training syllabi and examination report cards, a detailed insight into a country’s assessment system can be obtained. This coupled with an in-depth mapping of relevant stakeholders involved in national assessment processes will ensure synergies are formed between system level assessment activities, national examination practices and classroom based student assessment.

Another key point to highlight is that the SEA-PLM Assessment Framework adopts a ‘literacy orientation’ which means it can be extended down to early primary years and up into lower secondary. With the possibility therefore of developing a single progressive scale for each of the learning domains associated with the SEA-PLM opportunities therefore exist with regards to SEA-PLM member countries to extend SEA-PLM for the purposes of an expanded reporting regime to cover the early primary years and the early secondary years as per the requirements of the global SDG indicators.

• **Common Metrics for the ASEAN Region**

The implementation of the SEA-PLM main study will provide the necessary student performance data to build a common set of metrics (scales) in mathematics, reading and writing for primary school students across the ASEAN region. These empirical scales have the potential of being linked to other internationally recognised metrics. However, measuring student performance must be for the purposes of diagnosis, rather than for the purposes of comparison.

To achieve this it is recommended that a set of performance level descriptors are developed to work alongside the empirical scales which will provide common descriptions of learning progressions in the three cognitive domains of SEA PLM. An example of numerical and descriptive components of a learning progression is shown in Annex A. The process of developing performance level descriptors is complex and requires specialist support from subject experts in each of the domain areas. Whilst complex, the development of performance level descriptors will provide an important tool for countries to locate students on a learning continuum which can in turn meaningfully inform curriculum and teacher education programs.

• **An Effective Communication Strategy**

Building a stronger understanding of the SEA-PLM assessment, including its purposes and use, is an essential first step towards a fully informed stakeholder base. There is still a limited understanding amongst relevant stakeholders about SEA-PLM, and in particular why SEA-PLM is important, how SEA-PLM can be linked to different levels of assessment in an education system and how different types of assessment (such as from large-scale to classroom based assessment) provide different information. To participate successfully in SEA-PLM, national leadership and commitment is required and this will only be achieved through the implementation of an effective communication strategy around SEA-PLM at the school, community, national, regional and international levels.

Drawing upon these above points, it is recommended that a comprehensive communication strategy is developed for SEA-PLM in partnership with all participating countries, UNICEF, SEAMEO and ACER, using a range of different communication strategies and mechanisms.

• **Conclusion**

The completion of the field trials for SEA-PLM is a milestone in the evolution of SEA-PLM and in the development and construction of a new regional assessment for Southeast Asia. SEA-PLM now has a full set of tools and protocols to move to the implementation of the main survey. There is considerable regional and country level ownership of this important initiative and a significant achievement of SEA-PLM is the relationships that it has forged across the ASEAN region of Ministry of Education assessment departments.
SEA-PLM stands alone in many aspects: it is the only assessment globally to measure global citizenship across a region for primary school students; it is the only assessment to measure writing across languages and scripts; and is the only cross national assessment that has an associated extensive capacity development and support strategy which is targeted to the country level. Furthermore, given the robust technical standards adopted for SEA-PLM, the results from the assessment will provide vital data for countries of the SEAMEO and ASEAN region to report against the global SDG indicators.

SEA-PLM is still a new program and there is still considerable work to be done in order to move to the implementation of the main survey, yet if successful, SEA-PLM has the potential to provide countries with the means to critically examine national policy objectives, based on real time empirical data, while keeping children’s learning at the centre of the ASEAN agenda.
Annex I - Empirical and Narrative Components of an Example Reporting Scale

<table>
<thead>
<tr>
<th>Empirical Scale</th>
<th>Description of Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels</td>
<td>Strands</td>
</tr>
<tr>
<td>6.0 -&gt; 7.2</td>
<td>Retrieve</td>
</tr>
<tr>
<td>5.0 -&gt; 5.9</td>
<td>Interprete</td>
</tr>
<tr>
<td>4.0 -&gt; 4.9</td>
<td>Recognise</td>
</tr>
<tr>
<td>3.0 -&gt; 3.9</td>
<td>Notice Print</td>
</tr>
<tr>
<td>2.0 -&gt; 2.9</td>
<td>Retrieve</td>
</tr>
<tr>
<td>1.0 -&gt; 1.9</td>
<td>Identify</td>
</tr>
<tr>
<td>0.0 -&gt; 0.9</td>
<td>Recognise</td>
</tr>
<tr>
<td>-0.9 -&gt; -1.0</td>
<td>Notice Print</td>
</tr>
<tr>
<td>-2.0 -&gt; -2.9</td>
<td>Retrieve</td>
</tr>
<tr>
<td>-3.0 -&gt; -3.9</td>
<td>Identify</td>
</tr>
<tr>
<td>-4.0 -&gt; -4.9</td>
<td>Recognise</td>
</tr>
<tr>
<td>-5.0 -&gt; -5.9</td>
<td>Notice Print</td>
</tr>
</tbody>
</table>

Level Descriptors (Level 6)

Retrieve
Locate information using direct word matching. Match identical words to locate adjacent information and link related, adjacent, information to provide simple explanations in practice texts. Identify obviously realistic or imaginative elements of a story. Listen to authentic texts: Link multiple pieces of evidence to explain events.

Interpret
Link adjacent pieces of related information in practice texts when clues are prominent and sometimes supported by illustrations to provide simple, literal explanations for behaviour, feelings or the cause of events. Listen to authentic texts and link multiple pieces of aural information to infer a character's overarching attributes or the likelihood of an event.

Reflect
Identify obviously realistic or imaginative elements of a practice text when they are well supported by illustrations. Listen to authentic texts and identify the purpose of familiar conventions, such as repeating images to reinforce a key idea.

Decode
Distinguish all the phonemes in multi-syllabic words. Produce new words or sound combinations by deleting or substituting phonemes in the middle of words. Read aloud practice texts and simple, authentic texts in a wide range of phonetically regular words and high frequency irregular words. Group words into meaningful clusters and use volume, tone, pace, and expression to support meaning. Identify the sounds for most letter clusters including common words with irregular sounds for letter clusters.
Annex II - 14 Key Areas of an Assessment Program

The 14 key areas of a robust assessment program

1. Reporting & dissemination
2. Policy goals and issues
3. Project team & infrastructure
4. Technical standards
5. Assessment framework
6. High quality cognitive instruments
7. High quality contextual instruments
8. Sample design
9. Test design
10. Linguistic quality control
11. Standardised field operations
12. Data management
13. Scaling methodology
14. Data analysis
Annex III - List of contributors

All ministries of participating countries, as well as members of the SEA-PLM Secretariat hosted by SEAMEO and UNICEF have been involved in this process.

The list below present specific names of experts involved specifically associated with the development and validation of this publication.

Australian Council for Educational Research
The following report is a consolidation of the first and second phase of the field trial reports on SEAPLM. In the interests of completeness, this report includes some material already presented in previous SEA-PLM reports as well as materials described in the associated technical reports of SEAPLM.

The report begins by outlining the purpose and features of SEA-PLM and then describes the work already undertaken as part of the SEA-PLM field trials including some of the lessons learnt throughout this process.

The second part of the report outlines the key findings from the field trial phase and next steps. The final section of the report provides a set of recommendations for SEA-PLM as it moves into the main survey phase.