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Report of the

FAO EXPERT WORKSHOP ON INDICATORS FOR ASSESSING THE CONTRIBUTION OF SMALL-SCALE AQUACULTURE TO SUSTAINABLE RURAL DEVELOPMENT

Tagaytay, the Philippines, 6–8 August 2009

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PREPARATION OF THIS DOCUMENT

This document is the final report of the FAO Expert Workshop on Assessing the Contribution of Small-Scale Aquaculture (SSA) to Sustainable Rural Development held in Tagaytay City, Cavite Province, the Philippines, from 6 to 8 August 2009.

This report was prepared by Dr Melba B. Reantaso (Aquaculture Officer, Aquaculture Service or the FAO Fisheries and Aquaculture Department) with contributions from Chairpersons and rapporteurs of the different sessions and particularly from Mr Miao Weimin (FAO), Dr Harvey Demaine, Mr Pedro Bueno, Dr Roehl Briones, Dr Michael Phillips and Ms Jessica Villanueva.

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ABSTRACT

The FAO Expert Workshop on Indicators for Assessing the Contribution of Small-Scale Aquaculture (SSA) to Sustainable Rural Development (SRD), held from 6 to 8 August 2009, in Tagaytay City, the Philippines, and participated by a total of twenty-three experts, was convened to achieve the following: (i) present the outcomes (results and analysis) of the case studies which pilot-tested the Nha Trang SSA contribution indicators using various types of SSA in the Philippines, Thailand and Viet Nam; (ii) present the cross-country analysis and synthesis based on the outcomes of the pilot tests; (iii) refine and validate the indicators and evaluate their robustness, replicability and applicability in helping measure SSA sector performance for wider adoption and (iv) draw up a list of recommendations to further support (e.g. appropriate interventions, priority setting and resource allocation) to the SSA sub-sector of sustainable aquaculture and rural development programmes based on a broad understanding of sector performance (as measured by indicators) as well as risks and threats.

The expert workshop carefully looked at each of the 14 Nha Trang SSA indicators and its applicability to the wide spectrum of SSA systems, based on the outcomes of the three country pilot tests covering seven SSA types, and the cross-country analysis/regional synthesis. The expert workshop brought forward a number of issues/concerns with respect to methodology, direct attribution to SRD, source of data and constraints in data collection. Recommendations were provided on which of the 14 Nha Trang indicators need further refining, merging, and/or deleting from the list, additional indicators as well as some aspects of the methodology used.

A number of general recommendations was drawn for follow-up work in terms of SSA systems and scaling up, special research topics/studies including a number of issues of wider concern, e.g., biosecurity and food safety, natural disasters and risks, statistical considerations, indicators for assessing impacts of SSA to the environment and biodiversity and networking.

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BACKGROUND

1. The project "Methods and Indicators for the Appraisal and Evaluation of the Contribution of Small-Scale Aquaculture (SSA) to Sustainable Aquaculture and Rural Livelihood Development" is being carried out by the Aquaculture Service (FIRA), Fisheries and Aquaculture Department of FAO, through a combination of commissioned thematic review papers, two expert workshops and implementation of case studies. This project commenced in 2008 and funded through Regular Programme and the FAO Multi-Partnership Programme (FMPP) B.1 objectives being administered by FishCode.

2. The objective of the project is to provide a systematic assessment of how much and how small-scale aquaculture (SSA) is contributing to aquaculture and rural livelihood development. Assessment indicators can help measure the sector performance and may assist local, regional and national policy makers to account for the level of performance of the sector (good or poor), understand the risks and threats and thereby assist in determining appropriate interventions and aid in setting priorities and allocating resources.

3. In the past, a number of projects/studies attempted to assess and review the current status of SSA (at the country level) as well as the various issues (potential, limitations, constraints) affecting the sector. In addition, some methods/frameworks (e.g. rapid rural appraisal, impact assessment, etc.) for assessing the impact of small-scale rural aquaculture projects on poverty alleviation and food security – useful tools for sectoral planning and development, have been presented. However, there has not been a systematic assessment undertaken to date. This project, therefore, serves to fill in the gap.

4. Two expert workshops were undertaken to implement the above project. The first workshop, the FAO Expert Workshop on Methods and Indicators for Evaluating the Contribution of Small-Scale Aquaculture to Sustainable Rural Development, held from 24 to 28 November 2008, and hosted by Nha Trang University, in Nha Trang, Viet Nam, was participated by 20 experts whose fields of expertise/disciplinary specializations include aquaculture, aquatic animal health, ecology, sociology, human geography, law, economics and information. The Nha Trang expert workshop[1] achieved the following:

- characterization of the various features of SSA and an agreed working definition of SSA as basis for selecting pilot test study sites and development of the indicator system; guiding principles for sustainable aquaculture development as relevant to SSA in terms of goals, context, sustainability and measure of success;
- development of an indicator system, that can measure the contribution of SSA to rural development, through a linear and iterative process using the following steps: (i) understanding the subject of measurement; (ii) identifying an analytical framework and criteria; (iii) developing a list of contributions of SSAs; (iv) categorizing the contributions, and (v) devising/defining the indicators of contribution; and (vi) measuring the indicators;
- free listing of some 50 indicators covering the wider scope of sustainability indicators (economic viability, social responsibility and environmental sustainability); short-listing of indicators to 20 using the agreed sustainable livelihood approach

[1] Bondad-Reantaso, M.G. & Prein, M. (eds.). 2009. Measuring the contribution of small-scale aquaculture: an assessment. *FAO Fisheries and Aquaculture Technical Paper*. No. 534. Rome, FAO. 2009. 180p.

(SLA) analytical framework, and eventually to 14, based on pre-tests and initial pilot tests; and

- development of country case study concepts.

5. The finalization of the SSA indicator system was held during a Project Team Meeting held in Bangkok in March 2009; pre-testing of the instrument (i.e. survey questionnaires) and pilot testing in three countries (the Philippines, Thailand and Viet Nam) commenced from February to August 2009.

6. The second workshop, the FAO Expert Workshop on Indicators for Assessing the Contribution of Small-Scale Aquaculture to Sustainable Rural Development, held from 6 to 8 August 2009, in Tagaytay City, the Philippines, is the main subject of this report.

OPENING OF THE WORKSHOP

7. The workshop was moderated by Dr Victoria Espaldon of the University of the Philippines at Los Baños (UPLB). A seven-minute video clip entitled "One more small step for small farmers" was presented which explained the history of the SSA expert workshop and its rationale.

8. The video showed the importance of fish in the daily lives of people; the importance of aquaculture, among these are providing nutritious food, as a means of livelihoods (source of jobs and income), contribution to economic growth, helping in achieving social stability, and if done properly, helping in the improvement of the environment. Moreover, aquaculture offers many opportunities especially for women. The video clip tackled the contribution of SSA on 3 points: (1) what exactly have they done?; (2) how; and (3) how much they contributed/contributing to the development. This scenario asks for a measurement. But it is necessary to understand what is going to be measured or simply what is SSA. This is what the Nha Trang Workshop sought to do. The Nha Trang expert workshop synthesized the working definition, concepts, attributes, circumstances and aspirations of SSA. The gap they identified is the absence of a measure of how well or how much the people in SSA is contributing to sustainable rural development (SRD). This developed measure then was known as the Nha Trang SSA Indicator System. These indicators help to (1) understand issues and conditions; (2) know how well the system is working; and (3) determine solutions to a problem. The workshop would like to know the where SSA is heading and how far it is right now. From this clip, it was acknowledged that what they need is more than an indicator system and there's a long road to go and then it ended saying "but one more step together". The video clip set the mood of the workshop.

9. Dr Luis Rey Velasco, Chancellor of UPLB, welcomed the experts on behalf of the UPLB community. He gratefully recognized the efforts of FAO and UPLB School of Environmental Science and Management (SESAM) in making this workshop happen. For him, the development of an indicator system to measure the contribution of SSA to SRD is a big leap for the scientific community. These are useful for policy- and decision-makers at various levels. He also mentioned that with these, the gains in the aquaculture sector can be acknowledged. Small-scale aquaculture maybe small but he emphasized the wisdom in the saying that "small is beautiful". He noted that SSA can be a powerful instrument for nutritional and food security enhancement among the coastal communities, and the challenge of how to sustain the economic gains must be balanced with how to ensure that the natural

resource base is kept at a level that will continuously produce the benefits. He concluded his statement by wishing everyone a most productive and enjoyable workshop.

10. Director Gil Adora, Assistant Director for Technical Services of the Bureau of Fisheries and Aquatic Resources (BFAR), gave the opening remarks. He noted that the workshop provided a good venue for the contribution of the expertise and experiences in developing systems and support mechanisms. He considered the gathering as a momentous occasion, especially, because the focus is in conquering poverty, achieving food security and economic development for the rural communities. The Philippine aquaculture had been described as a big business. That it is now considered as "the centrepiece component of the government food production program". He viewed aquaculture as a source of predictable and profitable income. However, measuring the contribution of SSA in rural areas still is a work in progress, and which is the objective of this workshop. Understanding the concept and the component of SSA is a substantial step in targeting the earlier mentioned objective. The reality is that even though people know the importance of SSA through the years, it has not been given any prominence with respect to national consciousness. What is lacking is the information that will support the potentials of SSA. He noted that a focused communication package will be necessary as well. This information package should be based on evidence and statistics that will call for credible and reliable indicator system. He pointed out that this FAO expert workshop can give a story of hope and economic deliverance based on an indicator-based appraisal system. He anticipated that the optimism that will be carried on in this workshop and the resulting dynamic interaction will bear fruits of ideas that are all beneficial for SSA and the rural communities.

11. The FAO Representative in the Philippines, Mr Kazuyuki Tsurumi, in his remarks, recognized that truly the contribution of SSA is significant to the rural development particularly for economic growth and poverty alleviation. Noteworthy roles of SSA are reflected through income and employment multipliers, food and nutrition security, safety net mechanisms and coping strategies. However, the presence of a systematic assessment that clearly defines the measure of its contribution is lacking. The initiatives of developing the indicators based on agreed criteria of which are accuracy, measurability, and an analytical framework structured from the sustainable livelihood approach (recommended during the Nha Trang expert workshop) had been successful. This follow-up workshop provides a venue to validate and evaluate the indicators' strength, replicability and applicability. This is through the presentations of the case studies of the different countries who pilot tested the said indicators. These efforts are worthy to his credence.

12. Coffee table books were given to the Guest Speakers (Dr Velasco, Director Adora, and Mr Tsurumi) handed by FAO officers (Dr Melba Reantaso, Mr Miao Weimin and Mr Zhou Xiaowei). These books were sponsored by the Department of Tourism (DOT). A group picture taking followed. Before the coffee break, the experts and guests provided a self-introduction stating their designations and present affiliations.

PURPOSE OF THE WORKSHOP

13. The expert workshop had three objectives; these were to:

(i) present the outcomes (results and analysis) of the case studies which pilot-tested the Nha Trang SSA contribution indicators using various types of SSA in the Philippines, Thailand and Viet Nam;

(ii) present the cross-country analysis and synthesis based on the outcomes of the pilot tests; and
(iii) refine and validate the indicators and evaluate their robustness, replicability and applicability in helping measure SSA sector performance for wider adoption and use
(iv) to draw up a list of recommendations to further support (.e.g. appropriate interventions, priority setting and resource allocation) to the SSA subsector of sustainable aquaculture and rural development programmes based on a broad understanding of sector performance (as measured by indicators) as well as risks and threats.

14. The expert workshop agenda is attached as Appendix 1.

WORKSHOP PARTICIPATION

15. The expert workshop was participated by 23 experts, three invited Opening Ceremony guests and supported by five members of the FAO Secretariat from Rome, Bangkok and Manila (see Appendix 2 for a list of experts and a group photo as Appendix 5). The experts selected were among the Nha Trang workshop experts and additional experts from the SEAFDEC-AQD, the WorldFish Center, SSA and indicators/statistics experts and government representatives from China, India, the Philippines, Thailand and Viet Nam. It was deemed important to have this combination of experts to enable a transparent process of validating and refining of the indicator system. Limited resources did not allow representation from other regions although it was attempted to invite a few of them. Almost half of the participants came on a cost-sharing arrangement.

WORKSHOP HIGHLIGHTS –TECHNICAL SESSION

Session 1

16. Session 1 was opened with an introduction by the Chairperson, Dr Harvey Demaine, who briefed on the process of the development and pilot testing of the indicator system. He then introduced the objectives of the session and how the session would be conducted. He stressed that the participants should focus more on the methodology with which the case studies were conducted, the effectiveness of the indicators in assessing the contribution of SSA, how the indicators could be used to scale-up the exercises and recommendations for modifying the indicators developed rather than the results from the case studies themselves.

17. In her presentation, Dr. Reantaso introduced the outcomes of the Nha Trang workshop, the agreed working definition of SSA, the rationale for choosing the sustainable livelihood approach (SLA) as the framework of the indicator system and the criteria for the indicators (accuracy, measurability and efficiency). She reported on the pilot testing of the indicators immediately following the Nha Trang workshop.

18. The presentation was followed by a short discussion. The questions raised were mainly focused on the definition of SSA and coverage of Type II SSA. Some participants felt that the definition was not very explicit, particularly the definition for Type II SSA which may overlap with the newer concept of small and medium enterprises (SME). Some participants suggested that the indicator system should also address the large and commercial

aquaculture system because it is the general trend of aquaculture development. Some participants raised the question on the significance of labour use in defining the SSA.

19. Dr. Reantaso provided a short clarification/elaboration on some critical concerns which became the centre of debate during the first session. These refer to the definition of SSA and the list of indicators included in the indicator system. She briefly explained the reason why the current definition of SSA was adopted.

20. With respect to the definition of SSA, Dr Reantaso pointed that the Nha Trang workshop SSA definition was informed by various existing definitions of SSA available in the literature and it was not the intention to reinvent the definition. The Nha Trang workshop SSA definition was to serve a purpose, i.e. to be used in selecting SSA study sites and for general use in developing the SSA contribution indicator system. In drawing a specific definition of SSA for the above purpose, the Nha Trang workshop experts deliberated on the various features (through examples of the positive contribution and negative impacts) of SSA and agreed on a working definition based on scope, scale (typology), objectives and characteristics.

21. Dr Reantaso provided further elaboration on the issue of whether the objective of the FAO project was to come up with sustainability indicators (which has a broader scope covering economic viability, social responsibility, environmental sustainability) or be limited to contribution indicators (positive contribution and negative impacts). She emphasized that what was essentially important at that stage was to first understand the general principles, frameworks and processes (including terminologies) involved in drawing up an indicator system, and to use these as basis for drawing up methodologies for measurement. The Nha Trang workshop agreed that the most appropriate analytical framework to be used was the Sustainable Livelihoods Approach (SLA) whose strength lies in its ability to describe the relations between and the interactions among the five basic components of a sustainable livelihood system (natural, physical, social, human and financial capitals). As an analytical tool, it was deemed powerful and suitable for the appraisal of SSAs' sustainability and contributions to SRD. Following agreement on the analytical framework that will be used, the experts of the Nha Trang workshop also agreed on the criteria to be used, i.e. accurate, measurable and efficient or AME. This represents a shortened version of the SMART criteria.

22. Dr Reantaso concluded her intervention to the queries that the Nha Trang workshop succeeded in fulfilling these critical requirements. There were limitations but it was a step forward. The major achievement of the Nha Trang workshop was the development of an indicator system (conceptual framework, criteria, indicator definition and operational elements of case studies).

23. A free listing of some 50 indicators (see Appendix 3) was narrowed down to 14 using the SLA as the analytical framework and AME criteria. The 14 indicators include: (1) types and number of nutrient flows, (2) number of farm production uses of water, (3) number of SSA farms and farm areas increased over 3 years in the study area, (4) types and number of rural infrastructure investment induced by SSA, (5) types and number of rural infrastructure investment induced not purposely for SSA but benefit SSA, (6) per capita annual consumption of fish in SSA household, (7) season of the year when household relies more on their own harvest than on fish from other sources, (8) percentage of cash income from SSA to total household cash income, (9) economic return from SSA household, (10) percentage of economic value from SSA production from all aquaculture in the province, (11) percentage of farm households active members of SSA programs/associations/organizations,

(12) percentage of number of SSA farm activities in which women take a major decision-making role, (13) number of SSA households that share fish products and other farm resources/number of activities in which farmers work together to improved shared resources in the community, and (14) ratio of family labours who previously worked solely or mainly in non-SSA but now work in SSA. Appendix 4 lists the Nha Trang SSA indicators elaborated in terms of indicator definition/description with information on its importance and relation to sustainability, what it measures and how it can be measured.

Thailand case studies

24. Dr Tipparat Pongthanapanich, in her presentation on the Thailand case study, briefly introduced the status of SSA in Thailand followed by presentation of the results of the case study which covered two different SSA systems (pond polyculture of freshwater fish and monoculture of catfish in plastic-sheet lined pond) in Ang Thong Province. The methodology used in the test and design of the questionnaire used for the survey (i.e. pre-testing of instrument, survey proper and validation of the survey results) was presented. The results suggested that in the Thailand case study, some indicators contributed more in assessing the contribution of SSA. Dr Tipparat concluded that inadequacy of data resulted from poor record-keeping on the part of the farmers which undermined the usefulness of some of the indicators. Additional observations include: the study team requires experts of 3 disciplines for good work; some indicators need modification to facilitate use of more quantitative data; recommended to use the case study results as proxy value for similar case study; classifying SSA by agro-climatic and socioeconomic conditions may facilitate future study.

25. The issues raised after the presentation concerns the raw data to better understand the results presented and which was later shown; how the different indicators could be synthesized or integrated; the use of weighing (ranking) system; more quantitative validation system; questions on whether the same Thai questionnaires were used for the pilot test in other countries.

26. On the issue concerning the uniformity of survey questionnaires, Dr Reantaso explained that the Thai questionnaires were developed immediately following the Nha Trang workshop based on the agreed framework and criteria with slight revision to meet the requirements of the Thai case study. The Thai questionnaires were then used as template for developing the Philippine and Vietnamese questionnaires with similar revisions based on local requirements and the type of SSA selected.

27. Dr Ponthanapanich indicated that the special value in the testing of the indicator system is that it demonstrated the lack of indicators reflecting past trends and future prospects and the issue of whether the study should be done on a regular basis to which the response was affirmative.

28. Some experts recommended to include additional indicators for comprehensive assessment of the contribution with respect to financial capital (e.g. fish in the pond, money in the bank), financial security assessment and trends analysis. It was also recommended to generate supportive and complimentary indicators to better capture farmer’s will in future practice/development to provide a better indication of the household’s view of the future relevance of SSA to their livelihood.

Philippine case studies

29. Dr Victoria Espladon, presented the objectives of the Philippine case studies on tilapia cage and seaweed farming and described briefly the status of SSA in the Philippines.

30. The results of the survey included the socio-economic characteristics of SSA farmers with different farming systems, covering demographic, socio-economic and aquaculture-related data such as average age; gender, educational status, household size, main occupation, secondary occupation, average household income, SSA contribution to household income, average household expenditures, years of engagement in aquaculture. The results indicated significant difference between the two farming systems.

31. The survey results showed that some indicators, e.g. water use efficiency, human capital and seasonal food security were not very applicable for the two SSAs used. However, the two SSA farming systems significantly contributed to income, women empowerment and social safety net. The study suggested to include an indicator for water quality under natural capital to address the environmental impacts of SSA, particularly tilapia cage farming. Under the financial capital, the study revealed difficulty in assessing the contribution of SSA at the provincial level.

32. The issues raised after the presentation concerns, for example, the average farm size which in the case of tilapia was 14 cages/household which may not reflect an SSA system. Concern was also raised regarding fluctuation in market price of seaweed which may have affected the case study results significantly; it was recommended to use appropriate methodology to correct the variation in the study.

Viet Nam case studies

33. Dr Huu Dung Nguyen, in his presentation on the Vietnamese case studies on lobster cage culture and fish/shrimp pond polyculture, introduced the topic through a brief elaboration of the potential of aquaculture in Viet Nam, national aquaculture policy, major systems and species involved in freshwater and costal marine/brackish aquaculture in the country as well as development trends.

34. He noted that the selection of the two systems for pilot testing was largely due to the recent decline in shrimp production due to diseases and the rapid increase of finfish culture. He noted further the recent downward trend in the culture of lobster again due to disease problems. Lobster farmers involved in the study have an average size of 5-6 cages/household. Some 140 households were included in the shrimp/finfish case study.

35. Observations collected from the survey include the following: for physical capital, there had been no significant increase in the number of farms in the past; availability of land was the major constraint limiting the expansion of farming; no infrastructure was induced by lobster culture; water supply system was jointly established for shrimp/finfish culture. Under human capital, both lobster and shrimp/finfish systems had significant direct contribution to food and nutrition security as the products were basically not for family consumption. In terms of financial capital, results showed higher contribution from lobster than from shrimp/finfish. No data was available to assess the contribution to provincial economy. Under social capital, SSA significantly promoted women empowerment (women keep money).

Instead of sharing products, knowledge sharing and cooperation in purchasing inputs were more common.

36. Case study results showed that SSA significantly contributed to society safety net. Significant numbers of fishermen shifted to SSA, which reduced pressure on capture fisheries. Small-scale aquaculture presents a new job opportunity for the local people.

37. Other observations include limited expertise in economics and time constraints caused difficulty in getting good response from fish/shrimp farmers; poor household data record keeping resulted in difficulty in obtaining important information; complexity caused by rotation farming system (shrimp/fish) increased the difficulty; record keeping book is needed for future studies; questionnaire could not capture the job created for local, such as special harvesting labour and input supply business.

38. The discussion following the presentation suggested to include possible comparison between SSA and non-SSA systems. The matrix used to present the results of analysis was appreciated and the workshop suggested to share the experience with others. It was also suggested to add notes to the table when presenting the results.

39. Dr Kim Anh Nguyen, in her presentation on the case study on black tiger shrimp farming in Ben Tre Province, elaborated on the contribution of tiger shrimp culture development to the economy. She confirmed that her study team was very comfortable with the definition of SSA and the contribution indicators agreed during Nha Trang workshop, which fit the Vietnamese situation quite well. She briefly introduced aquaculture and black tiger shrimp development in Ben Tre Province and the methodology used for the case study, which included 102 farming households out of total 400 practicing households. Face-to-face interview was used by lecturers and M.Sc. students who previously received training in conducting surveys.

40. The Ben Tre case study results showed difference in the applicability of the 14 indicators developed in Nha Trang. In particular, indicators for financial and social capitals produced good results. Ten of 14 indicators produced good results. Indicators 1 and 2 under natural capital and indicators 6 and 7 under human capital were neither applicable nor produced good result. These indicators presented difficulty in their application to shrimp farming.

41. Based on the results of the case study, a number of recommendations were provided. These include the following: data related to other occupations is needed for comparing SSA with non-SSA systems; study team structure needs to be improved to include other experts from different disciplines for achieving better result; the scope of the study needs to be expanded and comparative methodology should be added. Additional indicators were suggested, such as: percentage of farms using biosubstances; percentage of farms with water and waste management systems and adequacy of SSA income for household livelihood. It was also suggested that provincial government should invest in marketing infrastructure and should develop policy and strategy for coordinating the different players in the value chain, i.e. the SSA farmers, the marketing chain and the processing sector.

42. Participants made few comments on the case study including improvement in market relationship that can benefit SSA although it may not have significant impact on production.

Some participants stressed the importance of looking at the negative impacts of SSA on the environment. Some participants pointed out the importance of risk assessment.

General discussion on the overall results of the case studies presented

43. A general discussion session following presentations of the outcomes of the case studies involving 7 SSA systems in three countries raised the following observations:

- A further review be made on the current working definition of SSA, the need to explicitly categorize and define different SSA systems and practices as it may subsequently affect the assessment of its contribution to rural development.
- Limitations of the 14 indicators in assessing the contribution of a range of SSA systems and practices - some indicators are either duplicating or non-applicable; they should be dropped; some additional indicators should be included to address missing aspects.
- The current indicator system focused only on positive contribution of various SSA systems and practices. Negative impacts may imply risk and unsustainability of certain SSA systems and practices, thus additional indicators to reflect the negative impacts are needed in the future.
- Development of indicators for assessing the impacts of SSA on the environment and biodiversity were strongly recommended.
- In assessing the contribution to human capital, the focus should not only be on the percentage of household labour involved in SSA; employment of labour outside the SSA household should also be considered.
- Assessing the contribution of SSA to the provincial economy is difficult under most circumstances; therefore, it was advised to make the assessment at lower levels, i.e. municipal or even local community level. Comparison against the per capita GDP was also suggested as a good indicator under financial capital.
- The indicator system should take into consideration the ecosystem approach to aquaculture (EAA) being promoted by FAO. The indicator system should consider the inter-sectoral linkages, interaction with other resource users, watershed management and governance issues.
- Under human capital, it was suggested to address equity issue when external labours are used in SSA operation;
- Access to natural resources and public infrastructure in connection with certain SSA practices, particularly the right of local residents, should be considered.
- Contribution to local food and nutritional security and indirect contribution to food security should also be considered.
- The issue of interpretation of results from different indicators and what kind of ranking system to be used need to be looked at.
- The need to integrate or incorporate the indicator system into existing management frameworks, e.g. lake and coastal management and how such indicators can fit into programme and policy development, e.g. food security programme, economic, social and environmental policies.

- Externalities to SRD, the impact of SSA practices on livelihoods of other users at higher level than just a farmer also need to be considered.
- Cross-occupational (SSA household vs. non-SSA household) comparison should be introduced to the exercise; and such exercise should be conducted on a regular basis.
- An indicator for assessing additional contribution of SSA, such as creating water sources for other potential uses was suggested.
- Participants from China, India, the Philippines and Viet Nam indicated the importance of SSA in their respective countries and expressed their interest to see the scaling up of the work and involvement of their countries in future activities.
- Noted that the indicators generated could contribute to the FAO statistic data collection system or vice-versa. It was also suggested that parameters used in rural statistic system used in some countries can be good reference for modifying the current indicator system.

WORKSHOP HIGHLIGHTS - WORKING GROUP SESSION

Session 2

44. Dr Melba Reantaso presented the guidelines of the Working Group discussions. She recalled the two main objectives of the expert workshop, i.e. (i) to refine and validate the indicators and evaluate their robustness, replicability and applicability for wider adoption and use; and (ii) to draw a list of recommendations that will provide further support to the development of the SSA subsector in sustainable aquaculture and rural development programmes. A number of detailed questions were provided to address the two objectives. A suggested membership of the four working groups was also provided

45. The composition of the four working groups are presented in boxes followed by the main outcomes of the working group discussions presented as a narrative below.

Working Group 1

Working Group 1

Chairperson: Harvey Demaine
Rapporteurs: Carol Duran, Zenaida Sumade
Presentor: Zenaida Sumade
Members: Kim Anh Nguyen, P Krishnaiah, Clarissa Matre, Decha Rodrarung, Mark Prein, Melba Reantaso

Comments on indicators

Natural capital

46. On natural capital, the two indicators under this heading were accepted as applicable. However, N1 (relating to nutrient flows) was felt to be more appropriate to low external input systems, where it added value to the limited available farm resource base. As such, its

contribution to SRD is usually rather small. On the other hand, indicator N2 (relating to water flows) was applicable across the whole spectrum of SSA and its contribution to SRD could be very significant, even in small-scale marine aquaculture. However, there were potentially negative impacts unless nutrient flow was properly managed. For both these indicators, data gathering from household questionnaire survey was costly and it was felt that PRA methods, including focal group discussion and RESTORE-type diagrams, could be adequate to capture the situation.

47. The group considered the feasibility of adding water quality measurement to assess these negative impacts, but it was decided that regular gathering of such data was rather expensive. It was felt that an indication that this problem was being addressed could be captured with an indicator relating to collective action under social capital.

Physical capital

48. On physical capital, indicators P1 and P2 were accepted as being applicable to all systems, although P2 was more relevant to small-scale commercial systems (Type II). Both were seen as offering a significant contribution to measurement of the importance of SSA to SRD, although the growth of culture area under P1 might be constrained by the resource base and policies (e.g. restrictions on numbers of cages). The only problem with P2 was attribution of the growth of infrastructure to the aquaculture sector. Both indicators could best be collected from secondary data (e.g. time series data, GIS data) and/or key informant interviews. The group decided that P3 (use of infrastructure for aquaculture) could not measure the contribution of SSA to SRD, but rather the reverse. It was rejected as not being applicable.

Human capital

49. On human capital, the group accepted that indicator H1, the role of aquaculture products in nutrition and food security, was applicable, although the current formulation of the indicator referring to fish produced within the farm was narrow. If this were to be applicable to small-scale commercial aquaculture, then it should encompass total fish consumption, whether produced or bought-in from earnings from sale of aquatic products. It probably required primary data. Indicator H2 was also relevant, but more difficult to collect and the 'value-addition' of this indicator was probably quite small. As such, the group proposed dropping it.

50. There was some discussion about possible inclusion of health and education indicators under this heading. It was decided, however, that improvements in this direction were the result of improvements in financial capital. However, the group felt that a new indicator should be added to capture the employment generation effect of SSA. This had been one of the original Nha Trang SSA indicators, but had been subsumed under S4 (safety net). The employment generating effects were wider than just the household (relevant largely in Type I systems) and an attempt should be made to add indirect employment impacts, even though this would entail broader data collection.

Financial capital

51. On financial capital, the group had little difficulty in accepting indicators F1 and F2, despite the obvious cost of the household survey questionnaire. It had more difficulty with F3

because the wider data base was rarely available for Type I systems and attribution was a general problem in the context of provincial GDP.

Social capital

52. On social capital, there was considerable discussion on this section, especially in relation to collective action. There was a strong feeling that S1 should reflect both organized and *ad hoc* collective activity, but that involvement in organized farmer institutions was the most important dimension of sustainability, especially for small-scale commercial systems. Such institutions were important with regard to water quality management and best practices for certification and traceability (which had been included in the original Nha Trang SSA indicator list). It was considered that involvement in projects (like the Thai case study) should not be equated with participation in farmers' organizations. The main source of data could be key informant interviews and focal group discussions.

53. There was general acceptance of the appropriateness of indicator S2, measuring women's involvement, since this was a key element in SRD. It was accepted that primary data might be required.

54. Indicators S3 and S4 were felt to be less sound. If the element of collective action was combined with S1, then the sub-indicator on social participation (sharing) was felt to be quite a weak indicator of SRD; many of the elements discussed were very traditional aspects of village society and not specific to SSA. In the case of S4, the employment dimensions had been covered in the new H3.

Recommendations

Systems and scaling up

55. The group felt that the pilot exercises to-date were too much oriented on Type II systems and that a wider range of case studies was needed for Type I systems. This was particularly true since one of the Thai case studies was in the context of a special Royal Project and the second in an area close to the industrialized northern suburbs of Bangkok. It was thus recommended that further Type I cases should be carried out, as follows:

- flow-through and VAC systems in northern Viet Nam
- integrated agriculture-aquaculture systems in the Mekong Delta
- Northeast Thailand pond polyculture (possibly in Khonkaen Province as part of a provincial level scaling-up exercise)
- *Macrobrachium* systems in Bangladesh
- pond polyculture in the Philippines

56. There was also a need to include molluscs and, in the Philippines, mud crabs in mangroves.

57. It was recognized that upscaling would require the production of a Manual of Operations about the indicators, methodology and data collection procedures and analysis.

Wider issues

58. As suggested above, it was felt that wider issues such as negative environmental impacts, biosecurity and food safety could be addressed through refinement of the social capital indicators related to farmers' organizations.

59. The question of natural disasters and risk (both natural hazard and economic risk) should be addressed through building in a temporal dimension to some of the indicators, to show variation in production, yields and costs and returns. It was recognized that risk is a problem for the operation of SSA, especially Type II systems in which farmers often made considerable investment and therefore risked heavy losses. A workshop relating risk to SSA was proposed.

Working Group 2

Working Group 2

Chairperson: Curtis Jolly
Rapporteur: Alvin Morales
Presentor: Pedro Bueno
Members: Didi Baticados, Tipparat Pongthanapanich, Roger Pullin, Carmelita Rebancos, Miao Weimin

60. Working Group 2 suggested revisions are elaborated below:

Comments on indicators

Indicators considered not relevant

a. More efficient use of built capital assets – rationale for deletion: the finding – except of the shrimp case study – is that SSAs do not induce the establishment of rural infrastructure; SSA farms do benefit from these but these are not purposely built for them. A question that arises here is that the contribution is phrased as "more efficient use" which implies that SSAs maximizes their use notwithstanding that they were not meant for SSAs. If the contribution, as stated, is deemed valid, it is the indicator that may need to be changed. The original indicator (5) - Types and number of rural infrastructure investment induced not purposely for SSA but benefit SSA.

b. Seasonal food security - it is already captured by the indicator of the preceding contribution, which is "SSA contribution to household food budgets including seasonal and annual per capita consumption of SSA produce. This indicator is a revision of the original which was per capita annual consumption of fish in SSA household (only fish from their own SSA harvest.)

Indicator statement that need to be revised

c. "Providing a social safety net" to "Providing for fallback/alternative employment". Rationale: The reason for this revision is that "safety net" implies a failsafe structure, which aquaculture may not always be.

Indicators to revise

d. Types and number of nutrient flows to "Efficient use of nutrients, energy and other inputs (i.e. food conversion ratio, use of renewable energy on farm, use of natural food)". Rationale: The statement of indicator reflects more appropriately the contribution "Efficient use of materials and energy saving" rather than an indicator. It may also apply to systems other than the integrated pond polyculture.

e. "Number of farm production uses of water" expanded to two indicators: (i) "Increasing the multipurpose use of water" and (ii) Maximize production per unit volume of water. Rationale: Both would be better indicators of efficient use of water and the second can apply to cage culture.

f. "Per capita annual consumption of fish in SSA household. (Only fish from their own SSA harvest.)" to "SSA contribution to household food budgets including seasonal and annual per capita consumption of SSA produce". Rationale: see b above.

g. "Percentage of economic value from SSA production to the value of production from all aquaculture in the province" to "Percentage of economic value from SSA production to the local economy" Rationale: a better picture can emerge against the backdrop of a local economy, which in any case is where SSAs immediately contribute to provincial, county, or state figures would be too huge making it appear as if SSA would be very insignificant.

h. "Percentage of number of SSA farm activities in which women take the major decision-making role to "percentage of number of SSA farm activities in which women actively take part in decision-making". Rationale: not always easy to identify which are the major decisions

Indicators that needs better measurement

i. The period covered to measure changes of SSA farms and farm areas should be lengthened from 3 years to 5 years i.e. Change of SSA farms and farm areas over 5 years.

j. Type and number of rural infrastructure investment induced by SSA. This indicator stays but to better measure, it would require an inventory prior to and after aquaculture adoption. Attribution is crucial; the purpose of each named rural infrastructure should be properly attributed as to which sector it was intended for/or induced its establishment.

Indicators not relevant

k. Types and number of rural infrastructure investment induced not purposely for SSA but benefit SSA (see a above)

l. Season in the year when household relies much more on their own fish harvest than on fish from other sources (see b above)

m. No. of activities in which farmers work together so as to improve the shared resources in the community (i.e. water system, farm roads, reservoirs). Rationale: The group thought there was hardly any relevant to SSA, although the Ang Thong case studies found that there are special occasions in which farmers (all villagers in fact) work together to repair, clean and build common village facilities.

Recommendations

61. Working Group 2 made the following recommendations:

- Researchers and organizations with large historical datasets from SSA development to apply these indicators to those datasets and to report to FAO their results in terms of estimated SSA contributions to rural development, information gaps and the applicability of the indicators. Participants in the workshop could take a lead in this by analyzing one or more of their own SSA datasets.
- Include indicators to assess the impact of different types of SSA on environment and biodiversity.
- Encourage the establishment of a network of SSAs across countries.
- Add an indicator for employment in SSA

Working Group 3

Working Group 3

Chairperson: Premachandra Wattage
Rapporteur: Zhou Xiaowei
Presentor: Nerissa Salayo
Members: Michael Phillips, Vu Dzung Tien, Victoria Espaldon, Dilip Kumar, Ma. Theresa Mercene-Mutia

General considerations

62. Working Group 3 suggested revisions are elaborated below:

a. Indicators concerned with SSA households should be separated from those indicators more concerned with sustainable rural development (SRD). The contribution of SSA to rural development cannot be measured by only analysing households involved with SSA. SRD analysis requires indicators that measure the whole rather than only SSA.

b. Unit of analysis for considering the contribution of SSA to SRD may be different depending on the purpose of the analysis, but might include:

   i. households
   ii. village/community level
   iii. lake or other shared waterbodies or resource system
   iv. watershed or coastal ecosystem
   v. administrative divisions (district>province>country)

c. A time series of data is required to assess impacts of SSA on SRD.

Comments on indicators

- Efficient use of materials and energy saving. Generally relevant, but nutrients and energy data likely to be costly and difficult to get at. Household level analysis would be relatively easier than analysis in the wider rural development context, but still costly and time consuming to collect. Indicators might also consider:
    1. recycling of farm/household materials
    2. integration with other farm activities
    3. environmentally beneficial practices/species (aquatic plants; filter feeders)
- Efficient use of water. Generally relevant and important, but water quality data would be costly and difficult to collect. Efficient use of water at community level might be assessed through indicators such as the number of conflicts, number of conflicts resolved and number of water users.
- Build up of SSA farms and farm assets in rural assets. Generally applicable but indicators should be more specific. Uncertain about the significance for rural development. Clarity on types of infrastructure and time series data would help in analyzing the significance of for rural development.
- Build up of rural physical assets. Generally applicable, but some overlap with next indicator ("more efficient use of built physical assets in rural area"). Historical data would be needed to strengthen understanding of the contribution of rural physical assets with SSA.
- More efficient use of built physical assets in rural area. Same comments as previous, and ideally would merge with previous contribution.
- Food and nutrition security. Generally applicable, indeed important SRD indicator. Contribution to SRD should also consider an indicator that measured contributions of SSA and other forms of aquaculture to food and nutrition to non-SSA households. Food and nutrition would be costly and difficult data to obtain.
- Seasonal food security. Generally applicable, but might be better merged with "Food and nutrition security" contribution and associated indicators above.
- Household cash income. Generally applicable. Indicator would ideally include time series data to determine contributions of SSA. Contributions to SRD would

require analysis of SSA incomes to other household income sources, and comparisons with non-SSA households. Data would be costly to collect.

- SSA serves as a source of household economic security. Same comments as "Household cash income".
- Contribution to provincial economy. Generally applicable, but unit of measurement should be more clearly defined. Such indicators would be more widely useful in assessing contribution of SSA to SRD.
- Social participation. Generally applicable. Indicators could include access to government and non-government services including institutional credit and capacity building when analyzing social capital.
- Women empowerment. Generally applicable, but there was a need to be clearer about how this contribution might be measured. No recommendations on improvement of this indicator.
- Fostering social harmony. Generally applicable. Should include analysis of ability to arrive at consensus with conflict resolution in SSA and non-SSA in community. Present indicators require extensive fieldwork, and not likely to be workable beyond research project level.
- Providing social safety net. Generally applicable. Employment should be added as an additional indicator to include also upstream and downstream employment. Employment data may be difficult to collect.

Indicators to be added

n. No suggestions were made to add more indicators. Rather an attempt should be made to reduce the number to a limited number that (i) describe the "whole" SRD context; and (ii) those more specifically targeted at SSA.

Recommendations

63. Working Group 3 made the following general recommendations:

- FAO to encourage governments to integrate small-scale aquaculture into national census
- Important indicators useful for measuring SSA and SRD be included in the FAO statistical system
- Analysis of impacts of SSA should also consider small scale stakeholders involved along the value chain (nurseries, hatcheries, grow-out, etc.)
- Case studies be conducted across countries for testing of approaches

Working Group 4

Working Group 4
Chairperson: Jobert Toledo Rapporteur: Roehl Briones Presentor: Roel Bosma Members: Peter Edwards, Liu Yadan, Nelson Lopez, Jintana Sungkhao, Jessica Villanueva, Reinelda Adriano

Comments on indicators

64. Group 4 went directly to a discussion of the indicators. In general recommendations for the indicator system are grouped into two: first is for the mainstream statistical system in a developing country; the second is for a project-based, special study.

Natural capital

65. Under natural capital, the discussion first tackled nutrient flows. Aside from nutrient cycling in a farming system – which is appropriate for mainstreaming at least for freshwater aquaculture– the more general concern is actually the release of external nutrients in an open water body. If there is, the group recommends a special study in the form of an environmental impact assessment (EIA) of such nutrient flows. Complementary questions might be: 'Does the use of water by the SSA farms reduce the quality of the water for others?', or for cage-culture: 'Does the SSA activity hamper the common use of the waterspace?' If yes, then do an EIA. For water recycling, the group recommends mainstreaming the indicator as proposed for freshwater aquaculture.

Physical capital

66. Under physical capital, the group recommends to measure not the increase in number of farms, but a simple change; the change should be defined over a "recommendation domain", such as an agro-ecological zone, e.g. a bay, a floodplain, etc. The indicator should be supplemented by Focus Group Discussions to identify explanations of the trend, i.e. why the number of farms is increasing/decreasing (see also the last proposed indicator under *Social capital*).

67. Infrastructure induced by SSA should be measured in two ways. The bottom-up manner would ask whether farmers engaged in collective action to build community infrastructure; this can be elicited from farm household surveys. The top-down manner would ask two things: how much revenues (tax or license fee) were collected from SSA farmers, and used or earmarked to improve or construct community facilities; the other would be to identify which rural infrastructures were specifically constructed to cater to SSA. These top-down indicators should be asked from key informants, i.e. government officials, rather than farmers, to avoid subjectivity and conjecture. As for infrastructure benefiting SSA but not specifically constructed for SSA, the group recommends omitting it from the indicator systems.

Human capital

68. Under human capital, the group recommends the indicator on per capita consumption of fish from own SSA to be mainstreamed, and expressed as percent of national per capita estimate (FAO data). Net cash income as percentage of household food expenditure is desirable, but in practice can only be conducted by way of a special study. Concurrently, seasonality of per capita consumption of fish from own-SSA can be measured by such a special study.

Financial capital

69. Under financial capital, it is important to collect net cash income and economic returns via a cost and returns survey, on a routine basis, for the major types of aquaculture at least every three years; for narrower systems, cost and returns analysis can be conducted on a special study basis. The special study should also identify systems in which SSA may make a major contribution to rural livelihood, by agro-ecological zone.

70. Contribution of SSA should be expressed as percentage of aquaculture output of the lowest administrative disaggregation (e.g. province for the Philippines, county for China). Special studies can be undertaken to analyze further the SSA share for various agro-ecologies and coastal zones.

Social capital

71. Under social capital, rather than active membership in SSA association, which glosses over informal associations, a better indicator would be – does the farmer benefit from a 'business' network, whether formal or informal. This can be elicited from farmers on a routine basis.

72. Gender-related indicators should all be maintained; however this is not expected to change often, hence these can be conducted by special studies, perhaps repeated sporadically (to capture long term changes in cultural attitudes).

73. Indicators related to sharing and collective action should be maintained and incorporated in mainstream statistics. As for collective action it is partly captured under one of the *physical capital* indicators. Lastly the safety net indicator needs to be restated; over a reference period, the regular farm household survey should record the changes in the number of SSA family workers, and identify reasons why, i.e. whether additions were due to the safety net function of SSA, or subtractions were due to family members finding better livelihood opportunities elsewhere.

Additional indicators

74. The group also recommended some additional indicators. First is employment related: the routine farm household survey should collect data to compute the percentage of workers in a village employed by SSA (on full-time job equivalent basis). A special study can be conducted to measure the employment multiplier along the aquaculture supply chain, both at the village level, and externally. The second additional indicator is risk-related: it simply involves asking the farmer, in the routine farm household survey, to compare the scale of production from the past three to five years ago (a simple ranking or rating can be used); some open-ended questions on environmental impact can be asked as well.

Recommendations

75. Lastly the group recommends some *special research topics* related to SSA. First is a study to define cut-offs for size measures of the various major systems (i.e. area for freshwater pond, volume for cage culture, etc.), at and below which the farm is deemed classified as SSA. Other cut-offs in terms of employment (i.e. number or percent of full-time family workers) may be formulated. Another special topic would be the implications of

scaling up SSA on market competition, prices, and the environment. A final special study would be to identify the systems and areas where SSA has a good potential, most impact on reducing poverty, and least impact on the environment; and identify measures that would most efficiently promote these SSA systems in these areas.

CONCLUSIONS AND THE WAY FORWARD

Session 3

76. Session 3 chaired by Dr Mark Prein, presented the major outcomes of the workshop, as narrated below.

Refining and validating the list of SSA contribution indicators. Session 3 noted that the four working groups carefully looked at each of the 14 Nha Trang SSA indicators and its applicability to the wide spectrum of SSA systems, based on the outcomes of the three country pilot tests covering 7 SSA types, the cross-country analysis/regional synthesis and the subsequent plenary discussions which brought forward a number of issues/concerns with respect to methodology, direct attribution to SRD, source of data and constraints in data collection. The Working Groups provided recommendations on which of the 14 Nha Trang indicators need further refining, merging, and/or deleting from the list and recommendations for additional indicators. With respect to methodology, the issues raised include the following: (i) for the unit of analysis to include wider context, i.e. households, village, lake or water bodies, watershed/coastal ecosystem, administrative divisions (e.g. district, province, country); (ii) to separate the household from the wider SRD context indicators; (iii) collection of time-series data is important.

General recommendations for follow-up work

These include the following:

(i) SSA systems and scaling up

- further pilot tests using a wider range of Type 1 systems, e.g. flow-through and VAC systems in northern Viet Nam; integrated agriculture-aquaculture systems in the Mekong Delta, pond polyculture in Northeast Thailand, *Macrobrachium* systems in Bangladesh, pond polyculture in the Philippines and to include also mollusks, seaweeds and mud crabs in mangroves
- further testing to include representative types of aquaculture operations engaged by SSAs (e.g. hatchery, nursery, grow-out, etc.)
- application of the refined/validated SSA indicators to researchers and organizations with large historical datasets from SSA development and for them to report the results in terms of estimated SSA contributions to rural development, information gaps and applicability.
- production of a Manual of Operations about the indicators, methodology and data collection procedures and analysis

(ii) Special research topics/studies related to SSAs such as:

- defining cut-offs for size measures of the major SSA systems (e.g. area for freshwater pond, volume for cage culture system, etc.),

- defining cut-offs in terms of employment
- scaling up of SSA on market competition, prices and the environment
- identification of systems and areas where SSA had a good potential, with most impact on reducing poverty and least impact on the environment and identification of measures that would most efficiently promote these SSA systems in these areas

(iii) Wider issues. A number of issues were brought forward both during plenary discussion and working group discussions. These include:

- environmental impacts, biosecurity and food safety could be addressed through refinement of the social capital indicators related to farmer's organizations
- concerns of natural disasters and risks (both natural hazards and economic threats) should be addressed through building in a temporal dimension to some of the indicators, to show variation in production, yields, and costs and returns. Risk was recognized as a problem for the operation of Type 2 systems where farmers often make considerable investment and therefore risked heavy losses.
- convening of a workshop relating to risks to small-scale aquaculture was proposed
- development of indicators that will assess the impact of different types of SSA on the environment and biodiversity
- encourage governments to integrate SSA into national census survey
- include important indicators useful for measuring SSA and sustainable rural development in the FAO statistical system
- encourage the establishment of a network of SSAs across countries

CLOSING

77. On behalf of FAO and UPLB, Dr Melba Reantaso and Dr Victoria Espaldon, respectively, thanked the participants for their productive contribution to the expert workshop, noting that this project is one small step in a long process of recognizing the contribution of SSA to SRD. After providing details of the field trip to tilapia cage farms, the workshop was officially closed.

APPENDIX 1

Expert workshop programme

Date and time	Activities
6 August 2009	Thursday
08:30-09:00	Registration
09:00-09:10	7-min video clip: One more small step for small farmers
09:10-10:00	Welcome Address UPLB Chancellor –Luis Rey Velasco Opening Remarks BFAR Assistant Director – Gil Adora Remarks FAO Representative in the Philippines – Kazuyuki Tsurumi Self-introduction of experts
10:00-10:30	Coffee break
10:30-10:45	Introduction to Session 1 Chairperson: Harvey Demaine Rapporteur: Miao Weimin
10:45-11:05	Presentation 1: Development of an indicator system to measure the contribution of small-scale aquaculture (SSA) to sustainable rural development (Melba B. Reantaso)
11:05-11:50	Presentation 2: Pilot testing of indicators for measuring the contribution of small-scale aquaculture to sustainable rural development: Thailand case study (Tipparat Pongthanapanich, Pedro Bueno and Jintana Sungkhao)
11:50-12:30	Discussion (Harvey Demaine)
12:30-14:00	Lunch break
14:00-14:45	Presentation 3: Pilot testing of indicators for measuring the contribution of small-scale aquaculture to sustainable rural development: Philippine case study (Victoria Espaldon)
14:45-15:30	Presentation 4: Contribution of SAA to sustainable rural development: A case of lobster culture and shrimp - finfish farming in the coastal area of Khanh Hoa Province – Viet Nam (Nguyen Huu Dung and Nguyen Thi Kim Anh)
15:30-16:00	Presentation 5: Pilot testing of indicators for measuring the contribution of SSA to sustainable rural development: a case study of tiger shrimp culture in Ben Tre Province, Viet Nam (Nguyen Thi Kim Anh)
16:00-16:30	Coffee break
16:30-17:30	Discussion (Harvey Demaine)

7 August 2009	**Friday**
08:30-08:45	Introduction to Session 2 Chairperson: Michael Phillips Rapporteur: Zhou Xiaowei
08:45-09:30	Presentation 6: Cross-Country Synthesis (Roehl Briones)
09:30-10:15	Discussion (Mike Phillips)
10:15-10:45	Coffee break
10:45-11:00	Presentation 7: Working group guidelines (Melba Reantaso)
11:00-12:30	Parallel working group discussions: Four working groups will tackle two major issues: 1. Refining and validating the indicators and evaluating their robustness, replicability and applicability for wider adoption and use 2. Drawing up a list of recommendations that will provide support to the development of the SSA subsector in sustainable aquaculture and rural development programmes
12:30-14:00	Lunch break
14:00-16:00	Continue working group discussions
16:00-17:00	Working group presentations
17:00-17:30	Discussion
17:30-18:30	Presentation of conclusions and the way forward (Mark Prein)
19:00	Dinner and closing
8 August 2009	**Saturday**
08:00-20:00	Field trip
9 August 2009	**Sunday**
08:00	Departure of participants

APPENDIX 2

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APPENDIX 3

Free listing of SSA contribution indicators

1 biological control of pests e.g. mosquitoes
2 pest population size
3 reduction of incidence of animal and human diseases harboured in aquatic environments, e.g. bilharzias, dengue
4 frequency (prevalence and incidence) and severity of diseases
5 recycling of household wastes and nutrients
6 significant re-use/ disappearance of farm wastes
7 change in diversity of aquatic products
8 provision of water supply for production of vegetables and fruit trees
9 change in amount of water used
10 reduced time for watering crops
11 change in amount of vegetables and fruit produced
12 quantity of out-of season vegetables produced
13 change in the quantity of aquatic products
14 utilization of under-utilized resources
15 increase in total farm production
16 increase in farm productivity
17 recycling of household wastes and nutrients
18 significant re-use/disappearance of farm wastes
19 sectoral linkages
20 change in the number and strength of allied enterprises
21 inter-household exchange of products
22 change in product transfer among households
23 reduction in migration from rural areas to towns
24 number of social conflicts reported and resolved
25 diversification of products (risk management)
26 number of species of aquatic products
27 additional cash income
28 total household income
29 proportion of income from SSA and derived from SSA
30 change in the number and strength of allied enterprises
31 export earnings
32 total export earnings
33 proportion of export earnings from SSA
34 contribution to gross domestic product (GDP)
35 percentage of GDP from SSA
36 food security and improved nutrition
37 change in aquatic product consumption
38 human capital enhancement (extension services)
39 number of farmers receiving extension services
40 number of farmers who are members of active farmer associations and/or community organizations
41 proportion of aquatic production from SSA
42 conversion of aquatic production types to protein
43 utilisation of family labour
44 return to labour of household members
45 enhanced social capital
46 social harmony

APPENDIX 4

Nha Trang Small-Scale Aquaculture Indicators (FAO, 2009)[2]

Contribution	Indicators	Explanation	Means of Verification	Methods for data collection
Natural capital				
1. Efficient use of materials and energy saving	**1. Types and number of nutrient flows**	Recycling of household and farm waste and by-product among various farm enterprises improve material use and save energy.	Farm survey - questionnaire	- Ocular observation of farm - Develop a schematic diagram with farmer that depicts material flows in the farming system - Use the RESTORE model as a template (Prein, 2009)
2. Efficient use of water	**2. Number of farm production uses of water**	Reuse of water in a farm indicates an efficient use of water resource. This contributes to environmental sustainability.	Farm survey - questionnaire	- Ocular observation of farm - Develop a schematic diagram with farmer that depicts the flow of water uses in the farming system.
Physical capital				
3. Build up of SSA farms and farm assets in rural area	**3. Number of SSA farms and farm areas increased over 3 years in the study area**	Increase of SSA farms and expansion of farm areas indicate growth in physical capitals due to SSA Remarks: - This contribution can be induced by programmes not solely targeted at SSA. - The trend might be contraction.	- Key informant survey - Farm survey - questionnaire	- Discuss with village head on Number of SSA farms and farm areas increased over 3 years in the study area - Ask farmer about farm enterprises and land use changes over 3 years (2006-present)
4. Build up of rural physical assets	**4. Types and number of rural infrastructure investment induced by SSA**	SSA induces a building up of rural physical assets (such as water system, rural market, rural road, and energy distribution system).	- Key informant survey - Farm survey - questionnaire	- Discuss with village head on number and types of rural infrastructure investment induced by SSA - Cross-check by asking farmer about types of rural infrastructure investment induced by his/her SSA business

[2] The Nha Trang Small-Scale Aquaculture Indicators was developed by some 25 experts who participated in the FAO Expert Workshop on Methods and Indicators for Assessing the Contribution of Small-Scale Aquaculture to Sustainable Rural Development, held from 24 to 28 November 2008 at Nha Trang University (NTU) in Nha Trang, Viet Nam. The indicator system was further developed in March 2009 and elaborated to include a detailed indicator definition (name, brief description, unit of measurement) description as well as information on its importance and relation to sustainability, what it measures and how it can be measured, now reflected in this table and which became the basis for the FAO-commissioned pilot tests carried out in the Philippines, Thailand and Viet Nam between February and July 2009.

5. More efficient use of built physical assets in rural area	**5. Types and number of rural infrastructure investment induced <u>not purposely for SSA but benefit SSA</u>**	More sectors including SSA using the built infrastructure would lead to a more efficient use of the assets.	Farm survey - questionnaire	Ask farmer about the village infrastructure being used and shared with other households.
Human capital				
6. Food and nutrition security	**6. Per capita annual consumption of fish in SSA household (only fish for their own SSA harvest.)**	The high per capita consumption indicates a more food and nutrition security that SSA provides.	Farm survey - questionnaire	Ask farmer about the amount of fish harvest and the allocation of the harvest for household consumption that included fresh and processed products.
7. Seasonal food security	**7. Season of the year when household relies more on their own harvest than on fish from other sources**	SSA contributes to seasonal food security if there is a season that household consumption much relies on their own fish harvest rather than on buying or fishing.	Farm survey - questionnaire	Ask farmer: - Which months in a year when farmer harvests fish for household consumption and how much for each month - Substitution fish or protein sources when farmer does not harvest fish (processed fish, get from friend and relatives, fishing, eat other proteins, etc.)
Financial capital				
8. Household cash income	**8. Percentage of cash income from SSA to total household cash income**	This indicates reliance of the household on SSA for its cash income i.e. liquidity	Farm survey - questionnaire	Ask farmer to indicate the percentage rather than the absolute amount of income.
9. SSA serves as a source of household economic security	**9. Economic return from SSA to household**	This indicates the household economic value obtained from SSA when both cash and non-cash returns/ /opportunity and economic forgone are considered.	Farm survey - questionnaire	- Ask farmer on economic costs and revenue from SSA operation. Cash (tangible costs and revenue) and non-cash (intangible costs and revenue) data are classified. - Cost-return analysis (amount/unit/year)
10. Contribution to provincial economy	**10. Percentage of economic value from SSA production to the value of production from all aquaculture in the province**	This measures the relative importance of SSA in provincial aquaculture sector.	Government statistics	- From the statistic data, classify the SSA systems and species in the study province - Estimate the SSA production value by systems and species - Calculate the sum of the SSA production value and the percentage can be calculated.

Social capital				
11. Social participation	**11. Percentage of farm households who are <u>active</u> members of SSA programs/ associations/ organizations**	The higher the percentage indicates the higher social participation brought by the SSA programs/ associations/ organizations	- Key informant survey - Farm survey - questionnaire	- Discuss with DOF local official and village head on the SSA programs/ associations/ organizations existing - Ask farmer about programme/ association/ organization participation and then ask about type of activities, time spent, number of meeting per year participated, cost and benefit from being member. - From the above information, the active SSA household members can be noted for the calculation of the percentage.
12. Women empowerment	**12. Percentage of number of SSA farm activities in which women take the major decision-making role**	The degree to which the women are involved in various activities associated with SSA and in decision-making pertaining to SSA operations and household management	Farm survey – questionnaire by checklist of activities	Develop a checklist of decision-making in farm and household operation activities: 1) starting the farm business; 2) taking care of the farm operation; 3) buying/procuring farm inputs; 4) selling/distributing of the harvest; 5) keeping income and record; 6) allocating household expenses; and 7) borrowing money
13. Fostering social harmony	**13.1 Number of SSA households that share fish products and other farm resources** **13.2 Number of activities in which farmers work together as to improve the shared resources in the community (such as water system, road and reservoir)**	Sharing of farm products, farm resources and cooperating in community activities foster social harmony	Farm survey – questionnaire	Interview farmer on: 1) share of the fish products and other farm resources with other community members 2) types of activities in which farmers help each other to improve the shared resources in the community
14. Providing social safety net	**14. Ratio of family labours who previously worked solely or mainly in non-SSA (incl. off-farm jobs) but now work in SSA (X) to total family labours (Y)**	Increase family labour in SSA indicates the importance of SSA as a fallback employment/an opportunity to non-SSA and off-farm jobs and an alternative source of income.	Farm survey - questionnaire	- Check list of family members and employment status over 3 years - Calculate X:Y ratio

APPENDIX 5

Expert workshop group photo

Twenty-three experts, with three invited Opening Ceremony guests (UPLB Chancellor R Velasco, FAO Representative K Tsurumi, and BFAR Assistant Director G Adora), five members of the FAO Secretariat from Rome, Bangkok and Manila, participated in the FAO Expert Workshop on Indicators for Assessing the Contribution of Small-Scale Aquaculture to Sustainable Rural Development, held from 6 to 8 August 2009, in Tagaytay City, the Philippines. The experts included some of the Nha Trang workshop experts and additional experts from the SEAFDEC-AQD, the WorldFish Center, SSA and indicators/statistics experts and government representatives from China, India, the Philippines, Thailand and Viet Nam.

The FAO Expert Workshop on Assessing the Contribution of Small-Scale Aquaculture (SSA) to Sustainable Rural Development was convened by FAO to present the outcomes (results and analysis) of the case studies which pilot-tested the Nha Trang SSA contribution indicators using various types of SSA in the Philippines, Thailand and Viet Nam and the cross-country synthesis; to refine and validate the indicators and evaluate their robustness, replicability and applicability in helping measure SSA sector performance for wider adoption and use and to draw a list of recommendations for generating further support to the SSA subsector of sustainable aquaculture and rural development programmes based on a broad understanding of sector performance (as measured by indicators) as well as risks and threats.

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