

Independent Mid-Term Review of the Assured Artemisinin Supply System (A2S2) Project

FINAL

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All views represented in this evaluation are those of Dalberg and do not represent the views of UNITAID, the Project Management and Advisory Groups, or other entities quoted herein.

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Abbreviations

A2S2	Assured Artemisinin Supply System
ACT	Artemisinin based combined therapy
AMFm	Affordable Medicines Facility for malaria
API	Active pharmaceutical ingredients
FSC	FSC Development Services
MMV	Medicines for Malaria Venture
MSF	Médecins Sans Frontières
MT	Metric ton
N/A	Not applicable
RBM	Roll Back Malaria Partnership
Triodos	Triodos Investment Management
USD	United States Dollar
WHO	World Health Organization

Executive Summary

The Assured Artemisinin Supply System (A2S2) project was launched by UNITAID in July 2009 in response to the threat of shortages in artemisinin, which is needed for artemisinin based combination therapy (ACT) production. The main objective of the project was to reverse the contraction of artemisinin supply and to increase production in 2010 and 2011. This intervention was expected to expand ACT supply in line with increasing demand. The project was designed as a collaborative effort between four implementing partners - i+solutions, Artepall, FSC Development Services, and Triodos Investment Management. The implementation team had two objectives:

1. to provide a revolving finance facility for artemisinin extractors to expand supply of artemisinin, and
2. to provide market intelligence on the artemisinin supply situation.

By January 2011, the project had financed the production 26 metric tons of additional artemisinin (~15% of global demand and 65% of the project target) and collected a significant amount of market intelligence from 18 artemisinin extractors and 6 ACT manufacturers.

Mid-term review

In January 2011 the UNITAID Secretariat initiated an independent mid-term review of the A2S2 project to be conducted by Dalberg Global Development Advisors. The purpose of this review was (1) to assess the progress of the project to date and (2) to identify opportunities for improvements.

The mid-term review of the A2S2 project includes analysis of 82 project related documents and interviews with 22 stakeholders. Section 3 provides a summary of the approach taken by the evaluation team.

Findings

Detailed findings from this evaluation can be found in Section 4. In summary, the evaluation team found that:

- Project outcomes suggest that the A2S2 project has contributed to the security of artemisinin supply.
- However, the need for interventions to further secure the supply of artemisinin to meet the increasing demand for ACTs remains highly relevant, as demand for ACTs has not yet stabilized and the risk of shortages is not yet contained.
- A2S2 has been generally effective in its financing and market intelligence activities, although there are a number of opportunities for improvement (see Section 5).
- Management of the A2S2 project has improved over the life of the project; however effectiveness and efficiency can be enhanced.
- A2S2 has made limited progress towards ensuring sustainability of the project's impact beyond the current project timeline, ending in June 2011.

Recommendations

In the short-term, A2S2 should focus on (1) extending the reach of the pre-financing facility by identifying local lending partners, (2) standardizing market intelligence documentation to ensure broader utility, and (3) improving project reporting and management processes (e.g., using a log frame approach, as UNITAID is requiring going forward) to increase their effectiveness and efficiency.

In the event that A2S2 is extended beyond June 2011, the second phase should include (1) the transition of pre-financing to local lenders, (2) continued standardization of market intelligence reporting, (3) support for technical assistance initiatives, (4) service level agreements for project management, (5) and clearly defined indicators for when the intervention will no longer be necessary.

Conclusion

This evaluation has shown a continued need for risk management mechanisms such as A2S2 to secure the supply of artemisinin at least until semi-synthetic artemisinin is commercially available. Furthermore, it has shown that the A2S2 project has contributed to improved artemisinin supply and has collected significant market intelligence, which has been valued by stakeholders.

The project will remain relevant until such time as semi-synthetic artemisinin is widely available at competitive prices or demand for ACTs has stabilized and market uncertainties have abated. At such point, interventions to secure the supply of artemisinin will no longer be needed.

1 Introduction

In 2009, the Assured Artemisinin Supply System (A2S2) project was created with financial support from UNITAID to secure the supply of artemisinin – the essential pharmaceutical ingredient for artemisinin based combination therapies (ACTs). Since 2001, when the World Health Organization (WHO) recommended ACTs as first line treatment for uncomplicated malaria, the market for artemisinin has experienced significant volatility. Between 2003 and 2008 the number of countries that have adopted ACTs in their national policies increased from less than 20 to 77, representing all malaria epidemic countries except French Guiana, Guatemala and Haiti.¹ Forecasts during that period anticipated a rapid expansion of demand for ACTs.

Significant investment made to scale-up cultivation of *Artemisia annua*, the herb used to derive artemisinin, was unmet by demand for artemisinin from ACT manufacturers. Oversupply in 2007 forced many artemisinin extractors and producers out of the market and farmers to plant alternative crops. Liquidation of stocks from previous years created a significant drop in artemisinin prices, from over USD 1,100/kg in 2006 to below USD 200/kg in 2007.² As a result, market observers believed that insufficient levels of *Artemisia annua* were being planted during the 2008 season to meet global demand.

According to estimates, less than 5,000 hectares of *Artemisia annua* were planted in 2008, down from 28,000 hectares in 2006 and 14,500 in 2007.³ Overstock of artemisinin was believed to be sufficient to satisfy demand for refined artemisinin in 2009. However, decreased cultivation caused concern as the time required from planting to extraction is 12-16 months.⁴ Industry experts calculated that nearly 28,000 hectares of *Artemisia annua* would need to be planted in 2009 to replenish stocks and meet ACT manufacturer demand in 2010.⁵ Projections at this time lead many to believe that the market for refined artemisinin would be undersupplied by as much as 40 metric tons, or the equivalent of 80 million ACT treatments in the coming years.⁶

The challenge of ensuring sustainable artemisinin production and the risks presented by a potential shortage were the focus of discussion at the Artemisinin Forum hosted by the Medicines for Malaria Venture (MMV) and the WHO in November 2008. In response to these discussions, the A2S2 project was created with funding from UNITAID and guidance from, among others, the WHO, the Roll Back Malaria Partnership (RBM) Secretariat and Médecins Sans Frontières (MSF).

With the ultimate aim of reversing the ongoing contraction in the artemisinin supply chain and increasing plantings in 2010 and 2011, UNITAID agreed to provide USD 9.3 million to finance the revolving finance facility and related project activities of the A2S2 project for a

¹ WHO, "World Malaria Report 2009", 2009

² "A2S2 Project Plan", July 2009

³ Artepal, "Artemisinin Market Situation and the Need of a Financial Support Mechanism," 29 March 2009

⁴ A2S2, "Production Cycle: from Artemisia to ACT," 05 March 2010

⁵ Artepal, "Artemisinin Market Situation and the Need of a Financial Support Mechanism," 29 March 2009

⁶ Estimates varied, but 40 metric tons was envisioned as sufficient to fill the anticipated gap; "A2S2 Project Plan", July 2009

two year period from July 2009 to June 2011. The A2S2 Project Management Group - comprised of i+solutions, Artepal, FSC Development Services (FSC), and Triodos Investment Management (Triodos) - was given a dual mandate for the project:

1. to provide a revolving finance facility for artemisinin extractors supplying eligible ACT suppliers and intermediaries, and
2. to provide market intelligence on the artemisinin supply situation, enhancing transparency and market-responsiveness.

Security of artemisinin supply was considered essential to supporting the efforts of the global health community to control malaria. Financing from the A2S2 project was intended to bridge the gap between supply and demand in 2010 and 2011. Market intelligence from the project would contribute to a stable supply of artemisinin at fair prices.

2 Context

2.1 Background

In 2008 significant uncertainty in the future supply of artemisinin led UNITAID to create the A2S2 project, following recommendations coming out of the Guilin Artemisinin conference to create a financial mechanism to support artemisinin extractors. The project required the coordinated effort of four implementing partners - i+solutions, Artepal, FSC, and Triodos. The project was tasked with increasing plantings of artemisinin to ensure supply for ACT production in 2010 and 2011.

Achieving this objective required efforts in two areas. First, A2S2 would provide financing to artemisinin extractors through a fund set up by UNITAID. Pre-financing from A2S2 would allow extractors to purchase additional stocks of *Artemisia annua* from farmers and increase production of refined artemisinin. Loans were to be repaid after production and delivery of the artemisinin. This revolving fund is known as the A2S2 pre-financing facility. The second area of focus involved providing increased knowledge of the supply and demand of artemisinin to key stakeholders through site visits with artemisinin extractors and ACT manufacturers. It was envisioned that this information would be disseminated to the public through an online portal known as the "A2S2 Dashboard."

The A2S2 project is lead by i+solutions, a non-profit organization specialized in pharmaceutical supply chain management in developing countries. As lead organization, i+solutions is responsible for ongoing project implementation and operational management with the support of the other members of the Project Management Group. i+solutions is ultimately responsible for coordinating market intelligence activities. Additional responsibilities include managing information collection and dissemination to stakeholders outside the project, the promotion of fair pricing through publication of current market rates, and project reporting to UNITAID.

Artepal and FSC are responsible for compiling market intelligence through site visits with artemisinin extractors and ACT manufacturers. Their responsibilities include identifying eligible artemisinin extractors for the pre-financing facility and monitoring artemisinin supply and inventory levels throughout the supply chain.

Triodos manages the A2S2 pre-financing facility. Loans associated with the A2S2 project are made through an account within the Triodos Sustainable Trading fund at the sole discretion of Triodos. As manager of the fund, Triodos is responsible for analysis of loan applications, approval, disbursements, monitoring, and financial reporting.

The Project Management Group receives ongoing technical support and advice from a Project Advisory Group composed of representatives from the WHO, the RBM Secretariat and MSF. This group provides an advisory and monitoring function to the project and an independent source of knowledge and expertise to the management team.

The project was initially intended to launch during the first quarter of 2009, but was delayed during the finalization of agreements between the implementation partners and UNITAID.

The A2S2 project was officially launched in July 2009 when a memorandum of understanding was signed between UNTAID and i+solutions and funds to sustain the project were transferred to i+solutions.

Despite the delayed start and a number of unanticipated obstacles, in the first 18 months of the program the A2S2 Project Management Group has completed multiple field missions to Asia and Africa, which included visits to 18 artemisinin extractors and 6 ACT manufacturers. According to figures published in January 2011, the A2S2 project had finalized three loan contracts totaling 26 metric tons of refined artemisinin with an additional three contracts pending for an additional 23 metric tons. According to the Project Management Group, a further 18 metric tons worth of artemisinin contracts had been facilitated by the project, although not directly financed through the pre-financing facility.

2.2 Objectives of the review

In early 2011 the UNTAID Secretariat initiated a mid-term review to assess the progress of the A2S2 project to date. Dalberg Global Development Advisors, an international development consultancy, was selected to complete this review through a competitive bidding process. The objectives of this independent evaluation are twofold:

- to assess the project's progress towards agreed objectives, and
- to make recommendations on how the project's management can be improved to help the project achieve its objectives more effectively and efficiently.

This report is structured to reflect these objectives. The sections that follow summarize the methodology of this evaluation, present key findings on the progress of the A2S2 project to date, and provide recommendations on the way forward.

3 Methodology

This section provides an overview of the scope of the mid-term review along with the approach taken and constraints encountered while pursuing the previously stated objectives.

3.1 Scope

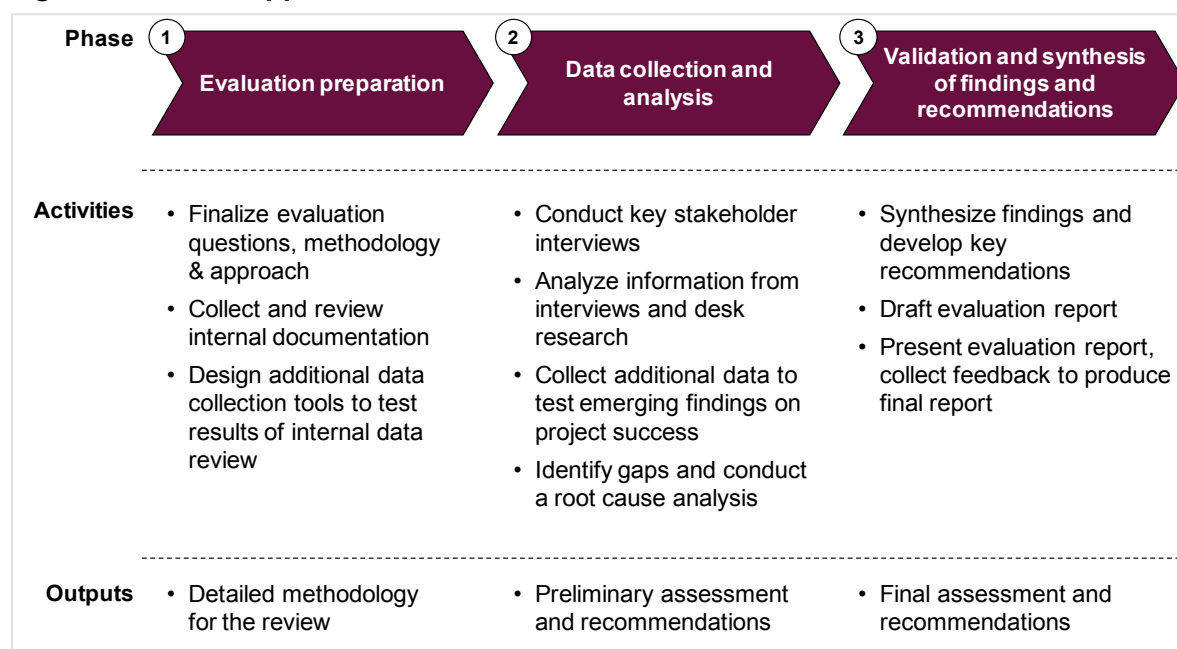
In order to provide an assessment of the likelihood of the A2S2 project achieving the objectives that were prescribed at the outset of the project, Dalberg was engaged to perform the following activities:

- review all project documentation, including periodic progress reports and financial statements;
- review the current reporting templates for both project activity and project financial reporting in order to suggest improvements to routine project reporting and processes;
- assess project management strengths, weaknesses, opportunities, and threats;
- rate the project management; and
- propose short-term course corrections and longer-term strategic revisions based the lessons learned during the initial 18 months of the project.

3.2 Approach

The mid-term review of the A2S2 project was implemented in three phases. In the first phase, the evaluation team worked closely with the UNTAID Secretariat to finalize the evaluation framework, including the evaluation questions, methodology and approach. Also during this phase, the evaluation team requested project documents and other relevant materials from the UNTAID Secretariat and Project Management Group. During the second phase, interviews were conducted with key stakeholders and a desk review of project documents was completed in order to establish a preliminary assessment and recommendations. In the final phase, findings were summarized and recommendations drafted for submission to the UNTAID Secretariat. Figure 1 below provides an overview of this approach.

Figure 1: Review approach



To assess the progress made towards the A2S2 objectives, the evaluation team reviewed 82 project related documents and interviewed 22 stakeholders. Documents reviewed include 3 related to the inception of the project, 45 related to progress reporting, 2 related financial reports, and 10 related to project communication as well as 22 documents from external sources. Stakeholders interviewed include 5 representatives from the UNITAID Secretariat, 5 members of the Project Management Group, 3 representatives of the Project Advisory Group, and 9 external stakeholders. A complete list of documents reviewed and interviews conducted as part of this review can be found in Annex 1 and Annex 2.

A summary of findings from this evaluation is found in Section 4. These findings have been grouped in the following categories:

- **Relevance.** Assessment of whether or not the current objectives of the A2S2 project, if achieved, will contribute to goals of UNITAID and wider efforts to control malaria.
- **Effectiveness and Efficiency.** Evaluation of project outputs completed to date against those envisioned in the project plan and partner agreements including an assessment of which outputs have been completed on-time and within stipulated budgets.
- **Impact.** Review of the progress to date towards the two main objectives of the project as well as a summary of any unintended impact (either positive or negative) generated by the project's activities.
- **Management.** Assessment of the management and governance arrangements of the A2S2 project and the extent to which they have been conducive to effective project implementation.
- **Sustainability.** Assessment of progress towards the A2S2 project exit strategy described in the project plan and a description of which benefits from the project are likely to continue after UNITAID funding is withdrawn.

For each category, a high, medium, or low rating is provided by the evaluation team. This rating is based on interpretation of key findings and demonstrated progress towards agreed project objectives.

Recommendations for the A2S2 project are presented in Section 5 and include both short-term course corrections and longer-term strategic adjustments. Short-term course corrections focus on improving the effectiveness and efficiency of activities over the remainder of the project. Longer-term recommendations are proposed in the event of a project extension and include potential project adjustments.

3.3 Constraints

The challenges faced during this evaluation fall into two categories: (1) determining additionality⁷ and (2) establishing the accuracy of market intelligence data gathered by the project.

Quantifying additionality is subjective and challenging to ascertain. While the evaluation team was able to identify the amount of tonnage sponsored by the A2S2 project, determining which contracts would not have been funded or completed without the intervention of A2S2 is very difficult.

The value of market intelligence gathered by the A2S2 project as well as its accuracy is difficult to validate. Using interviews with stakeholders such as artemisinin extractors and ACT manufacturers, a preliminary assessment of value has been drawn.

⁷ Additional in the context of the A2S2 project is defined as "any tonnage of artemisinin that would not have been produced without the support of A2S2. A more detailed explanation can be found in the A2S2 Additionality Policy (Appendix 7 to the second A2S2 periodic progress report).

4 Findings

This section presents the key findings of the mid-term review of the A2S2 project. These findings have been organized into five categories: relevance; effectiveness and efficiency; impact; management; and sustainability. Figure 2 below presents a high-level summary of key findings and mid-term review ratings for each of these categories, by project objectives.

Figure 2: Summary of key findings and ratings by project objectives

		Objective 1: Provide a revolving finance facility for artemisinin extractors to expand supply of artemisinin	Objective 2: Provide market intelligence on the artemisinin supply situation
Relevance	✓✓ Highly relevant	Relevant due to: <ul style="list-style-type: none"> Supply of artemisinin insecure Introduction of semi-synthetic artemisinin delayed Extractors experiencing eroding margins 	Relevant due to: <ul style="list-style-type: none"> Forecasting remains unreliable Users of market intelligence report high relevance of personally transmitted reports
Effectiveness and efficiency	✓ Medium effectiveness and efficiency	Effective due to: <ul style="list-style-type: none"> On track to complete specific activities in project plan On track to reach funding targets 	Effectiveness limited due to: <ul style="list-style-type: none"> Extensive market intelligence collected, but not documented consistently Personally delivered market intelligence is highly valued
Impact	✓ Medium impact	Impact on market: <ul style="list-style-type: none"> Contributed 26 tons of additional artemisinin production Increased professionalism reported 	Limited evidence of impact: <ul style="list-style-type: none"> Impact of market intelligence activities limited – reports of better information sharing
Management	○ Low / medium management	Some issues in launching project: <ul style="list-style-type: none"> Initial issues in starting project Issues resolving financing channel for funding in China 	Cost effective project management: <ul style="list-style-type: none"> Cost conscious project management – but without negative impact on outputs Sharing of market intelligence could be improved
Sustainability	✗ Low sustainability	Low sustainability due to: <ul style="list-style-type: none"> Limited progress to sustainable funding mechanism (commercial banks) 	Low sustainability due to: <ul style="list-style-type: none"> No alternative sources of funding identified

Interviews conducted and documents reviewed do not indicate that there have been unintended negative externalities as part of the project.

4.1 Relevance

Mid-term review rating: High⁸

The need for interventions to secure the supply of artemisinin to meet the increasing demand for ACTs remains highly relevant. Interviews with artemisinin market experts and industry representatives confirm that artemisinin supply remains insecure and without alternative sources of starting materials. While the market price of refined artemisinin has stabilized over the past two years, eroding margins and a lack of reliable demand forecasting continue to threaten the supply chain. For this reason, risk management

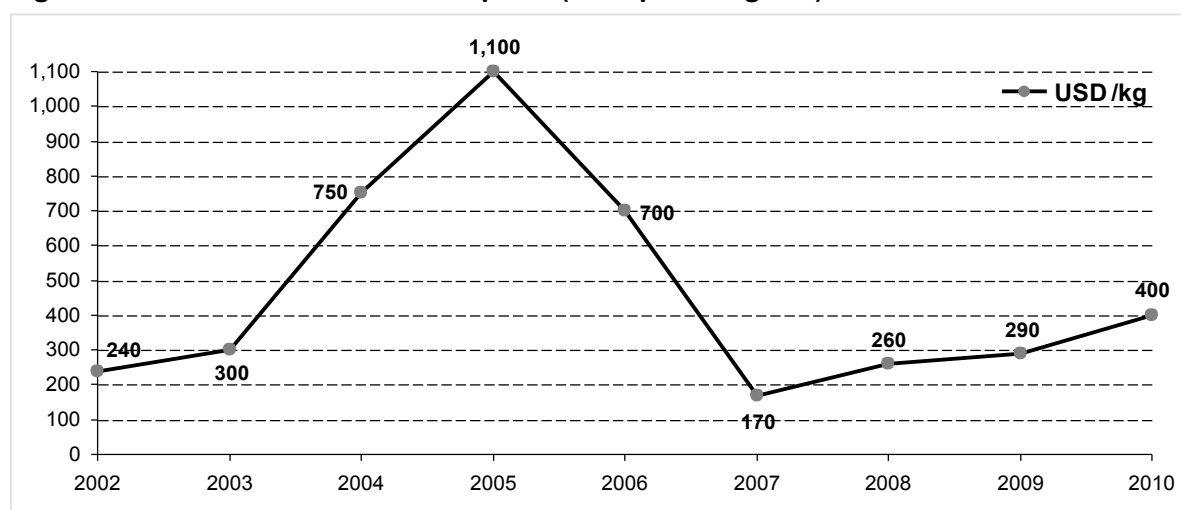
⁸ Findings constitute a combined qualitative and quantitative assessment of the different areas under review. They represent a summary of evaluator's views. A „high“ rating indicates that all or most goals in an area have been achieved; a „medium“ rating indicates that a significant portion of goals has been achieved, but that some important gaps exist. A „low“ rating indicates that the majority of goals in an area has not been achieved.

mechanisms remain necessary to ensure artemisinin supply and encourage increased production over the next 2-3 years.

4.1.1 The supply of artemisinin is insecure

Despite relative price stability, the reliability of artemisinin supply remains uncertain. Figure 3 shows the evolution of the refined artemisinin price between 2002 and 2010. Artemisinin extractors are hesitant to increase production without purchasing guarantees and access to financing for working capital. Both artemisinin extractors and ACT manufacturers indicate a need for longer-term contracts of 1-2 seasons in duration. Such contracts would allow extractors to encourage farmers to increase cultivation through the provision of similar multi-season guarantees. Multi-year contracts would also allow ACT manufactures to further stabilize prices with extractors and communicate demand expectations to famers.

Figure 3: Evolution of artemisinin price (USD per kilogram)⁹



Artemisinin extractors report limited access to affordable working capital loans. In Africa, lenders are only willing to provide loans for physical assets. Financial markets in Asia, particularly in China, tend to be very complicated and difficult for small businesses to access. While market interest rates are generally lower than what is offered through the A2S2 pre-financing facility, extractors report being forced to rely on A2S2 because of the difficulty of attaining alternative loans and the unwillingness of lenders to support agribusiness.

4.1.2 The introduction of semi-synthetic artemisinin has been delayed

The delayed introduction of semi-synthetic artemisinin continues to restrict the availability of alternative starting materials for ACT production. In 2008, it was anticipated that semi-synthetic artemisinin would be commercially available at competitive prices by 2011. Expectations shared with the evaluation team point towards a revised production date in 2012 or 2013. Initial production is expected be limited to 40 metric tons per annum, or approximately 20% of annual demand. The production cost of semi-synthetic artemisinin

⁹ Jacques Pilloy (A2S2), "Artemisinin market quantities and pricing," October 2010

has not been established, but it is anticipated that the final price will be in-line with current market prices of approximately USD 400-420 per kilogram. This price level is in line with competitive prices for non-synthetic artemisinin and should help to stabilize prices, rather than undercut non-synthetic artemisinin.

Until semi-synthetic artemisinin is widely available, the artemisinin market will need a mechanism to respond to uncertain demand. It is unlikely that semi-synthetic artemisinin will have a dramatic impact on current market prices due to limited initial production, representing approximately 20% of annual demand. However, the impact on supply security will be much greater given that production time for semi-synthetic artemisinin is expected to be between 1-2 months. This reduction in production time will allow the market to respond more quickly to demand shocks and therefore help to mitigate the risk of artemisinin supply shortages.

4.1.3 Artemisinin extractors are experiencing eroding margins

Pressure on the final price of ACTs is putting pressure on prices throughout the supply chain. Increasing food prices are further influencing the decision of farmers to consider more profitable alternatives to *Artemisia annua*. Stuck in the middle, extractors report reduced profitability. According to one extractor interviewed for this review, the profit margin in artemisinin extraction has been reduced to 3%. A second extractor reported leaving the artemisinin market in 2007 after significant losses.

Improved cultivation and extraction productivity could contribute to business sustainability and help increase profit margins for extractors. Interviews with artemisinin extractors, ACT manufacturers and other external stakeholders indicate a clear need for training and technical assistance at the extractor and farmer levels. Industry experts report inconsistent use of best practices and technology in extraction. Furthermore, processing techniques vary dramatically between regions and companies. It is widely acknowledged that artemisinin yield¹⁰ can be increased through access to improved processing techniques and high-yield agricultural inputs. Several stakeholders indicated that A2S2 should play a role in identifying opportunities to share best practices across regions and introduce new forms of technology to the industry.

4.1.4 ACT forecasting remains unreliable

The introduction of donor funding mechanisms has dramatically increased the demand for ACTs. This increase was anticipated, but the delayed implementation of programs such as Affordable Medicines Facility for malaria (AMFm) has caused demand to materialize slower than anticipated. As a result, the ACT manufacturers interviewed for this evaluation remain unconvinced by global demand forecasts and are reluctant to commit to increased production and procurement commitments. Rather than accept global forecasts, one manufacturer reported that ACT production planning is based on previous sales, purchasing commitments from buyers, and conservative growth forecasts.

¹⁰ Artemisinin yield is refers to the percentage of refined artemisinin extracted from harvested *Artemisia annua* which can be used in ACT production.

In general, the A2S2 project appears to be fulfilling a gap in wider efforts to control malaria. With funding for other Artepal and FSC market building activities expiring over the last year, A2S2 appears to be the only intervention with the specific objective of increasing artemisinin market intelligence. Also, A2S2 is the only known intervention designed to provide financing to artemisinin extractors in order to encourage additional production of refined artemisinin.

Over the next 2-3 years, security of the artemisinin market is likely to increase as ACT forecasting improves and alternative sources of starting materials for ACTs become available. Until such time, risk management mechanisms like A2S2 will be needed to ensure adequate supply of artemisinin and encourage increased production.

4.2 Effectiveness and Efficiency

Mid-term review rating: Medium

A2S2 has been generally effective in its funding and market intelligence activities, although there are a number of opportunities for improvement. The A2S2 project has completed, or is on track to complete, all of the specific activities listed in the project plan. Progress towards the two objectives has varied. As of January 2011, the A2S2 pre-financing facility had provided funding for 26 metric tons of artemisinin against a goal of 40 metric tons over the two year life of the project. This is, in part, explained by the late launch of the project. In the area of market intelligence, the project has collected substantial information which is currently being disseminated through three channels: the A2S2 website; conference presentations; and personal conversations. Stakeholder views on access and value of the information gathered by the A2S2 project vary. Additional detail on the value of information disseminated through different channels follows below.

4.2.1 A2S2 is on track to complete the specific activities outlined in the project plan

The specific activities listed in the original project plan are on track for completion before the end of the project, currently scheduled for June 2011.¹¹ Please refer to Annex 3 for a complete summary of progress towards the completion of these project activities and reporting requirements as defined in the A2S2 project plan.

Financial reports indicate that market intelligence and project management expenses to date have been significantly lower than budgeted. For example, in year 1 market intelligence and project management activities used only 47% and 68% of their respective budgets. This has been attributed to diligent management of project costs, especially at the beginning of the project. As the following sections show this has not inhibited the operation of the project in terms of loan disbursement or collection of market intelligence.

Table 1 provides a detailed account of non-financing related project expenses to date.

Table 1: Summary of market intelligence and project management expenses¹²

	Year 1 (July 2009 - June 2010)	Year 2 (July 2009 - mid-Dec.2010)

¹¹See "A2S2 Project Plan", Exhibit 1: Timetable with sequence of actions in Project Plan and timetable with reporting deadlines, July 2009

¹² "A2S2 Project Extension Proposal version 5.0 Annex 7b: Financial Update on Other Project Expenses", January 2011

	Budget (USD)	Used (USD)	Balance (USD)	Budget (USD)	Used (USD)	Balance (USD)
Market Intelligence						
Field visits (China, India, Vietnam, and Africa)	78,600	32,352	46,248	78,600	21,863	56,737
Other travel (inc. project meetings)	35,400	18,351	17,049	35,400	16,069	19,331
Salary expense	103,000	56,400	46,600	103,000	16,000	87,000
Data management and IT support	80,000	25,058	54,942	20,000	10,050	9,950
Misc. consultancy, reviews	90,000	50,345	39,655	90,000	57,600	32,400
Subtotal	387,000	182,506	204,494	327,000	121,582	205,418
Project Management						
Administration, finances and planning	23,000	20,000	3,000	23,000	17,500	5,500
Legal support	20,000	10,282	9,718	0	0	0
Other travel (inc. project meetings)	21,400	11,379	10,021	21,400	12,052	9,348
Report Writing	28,800	21,869	6,931	28,800	17,300	11,500
Subtotal	93,200	63,530	29,670	73,200	46,852	26,348
Total	480,200	246,036	234,164	400,200	168,434	231,766

4.2.2 A2S2 is on track to reach funding targets, despite delay and unanticipated obstacles

Implementation of the pre-financing facility was planned in two phases. The "pilot phase" aimed to increase planting in East Africa and Madagascar during June-August 2009. From September 2009, the "scale-up phase" was intended to focus on expanding the program to China and Vietnam. The goal of these two phases was to finance an additional 40 metric tons of refined artemisinin, with 5-15 metric tons from the pilot phase and 25-35 metric tons from the scale-up phase.

The delayed launch of the pre-financing facility caused the A2S2 project to miss the opportunity to impact artemisinin supply in 2010.¹³ The project launched in July 2009 and focused on providing funding to eligible extractors in both Africa and Asia. As of January 2011, A2S2 funding was projected to exceed its 40 metric ton goal by more than 20%.

Table 2 below provides a summary of A2S2 funding to date including contracts pending final approval, which are anticipated to be completed before July 2011.

Table 2: Summary of A2S2 funding, as of January 2011

Region	Planting Season(s)	Project Objectives (MT) ¹⁴			Actual Output (MT) ¹⁵		
		2009	2010	Total	Funded	Pending	Total
East Africa and Madagascar	June-August ¹⁶	5-15	--	5-15	6	10	16
China and Vietnam	January-February	--	25-35	25-35	20	13	33
Total		5-15	25-35	40	26	23	49

¹³ The A2S2 project was initially proposed for launch in the first quarter of 2009. Delays in finalization of contracts between the A2S2 implementation partners and UNITAID pushed the launch to July 2009.

¹⁴ "A2S2 Project Plan," July 2009

¹⁵ "A2S2 Project Extension Proposal version 5.0 Annex 7a: Financial Update on the 'Fund'", January 2011

¹⁶ Planting in East Africa and Madagascar is flexible allowing for multiple planting seasons. The A2S2 project intended to influence planting in this region during the June-August planting season.

According to the A2S2 Project Management Group, all outstanding loans are in good standing and without anticipated default. As of January 2011, USD 3.9 million in loans had been disbursed with USD 0.6 million pending disbursement for approved loans. Pending loans represent an additional USD 3.3 million in anticipated disbursements before July 2011.¹⁷ Several extractors interviewed for this review commented that Triodos had completed a comprehensive due diligence process prior to loan approval. Loan repayments are scheduled to begin during the first quarter of 2011 and continue through the third quarter of 2012, for both outstanding and anticipated loans.

Beyond direct financing, an additional 18 metric tons worth of contracts are reported to have been "facilitated" by A2S2. Interviewees stated that contracts have come as a result of individual consultation by members of the Project Management Group with ACT manufacturers and artemisinin extractors. In one interview, an ACT manufacturer reported having used A2S2 contacts to diversify their supply network outside of China. The precise contribution of A2S2 in this area is difficult to validate, but anecdotal evidence suggests that A2S2 market building efforts have been effective.

Table 3 below provides an overview of all contracts related to the A2S2 project, including those finalized, pending approval, and facilitated by the project.

Table 3: Summary of A2S2 contract, as of January 2011¹⁸

Contracts Finalized	Country	Volume (MT)
Contract 1	Madagascar	6
Contract 2	China	10
Contract 3	Vietnam	10
<i>Subtotal</i>		26
Contracts Pending Approval		
Contract 4	China	3
Contract 5	Kenya	10
Contract 6	China	10
<i>Subtotal</i>		23
Contracts Facilitated		
Contract 7	Vietnam	6
Contract 8	Vietnam	1
Contract 9	Uganda	1
Contract 10	China	10
<i>Subtotal</i>		18
Total		67

Several stakeholders have questioned the effectiveness of A2S2 financing in Asian markets. In China, financial regulation restricted A2S2 from providing financing directly to artemisinin extractors. Whether or not the A2S2 Project Management Group should have anticipated this restriction in advance of launching the project is a matter of expectations of UNITAID towards its grantee. The fact that the Project Management Group was unaware of this restriction shows that they were working in a market they were unfamiliar with. In

¹⁷ "A2S2 Project Extension Proposal version 5.0 Annex 7b: Financial Update on Other Project Expenses", January 2011

¹⁸ "A2S2 Project Extension Proposal version 5.0 Annex 1: Overview of (Loan) Agreements", January 2011

response to the restriction, the management team explored a number of alternative funding mechanisms, including establishing partnerships with local Chinese banks.¹⁹ Ultimately, the management team was able to channel funding through ACT manufacturers in the form of advanced payments.²⁰ In Vietnam, A2S2 funded a total of 10 metric tons through the A2S2 pre financing facility, with an additional 7 metric tons estimated as having been facilitated by the project. This appears to have satisfied critics who were concerned that the project was not focusing sufficiently on Vietnam.

4.2.3 Extensive market intelligence has been collected, but not consistently documented or shared

A review of the documents considered for this evaluation shows that a significant amount of market intelligence has been collected by the A2S2 project. This information has been collected primarily through field visits to artemisinin extractors and ACT manufacturers, and was supplemented by discussions at industry conferences and in other fora. Documentation of market intelligence consists of narrative reports prepared by members of the Project Management Team. These documents contain detailed information on anticipated extractor output and ACT manufacturer demand. Due to the confidentiality of this information, the content of these reports has not been shared publicly.

As of August 2010, members of the Project Management Team had visited 18 artemisinin extractors and 6 ACT manufacturers on behalf of the A2S2 project, including visits to all artemisinin extractors listed in the A2S2 project plan as potential beneficiaries.²¹ In addition to field visits, members of the Project Management Group have represented the A2S2 project at 5 artemisinin industry conferences. Table 4 below provides a summary of A2S2 field visits as well as conference attendance between July 2009 and August 2010.

Table 4: Summary of A2S2 field visits and conference attendance²²

Artemisinin Extractors			ACT Manufacturers		
Company	Country	Visit Date	Company	Country	Visit Date
Advanced Bio Extracts	Kenya	Sept-Oct. 2009	Novartis	Switzerland	Aug-Sept. 2009
Innovexx (Bionexx)	Madagascar	Sept-Oct. 2009	Sanofi-Aventis	Switzerland	Aug-Sept. 2009
Holley	China	November 2009	Cipla	India	August 2010
Beijing Gingko	China	November 2009	Strides	India	August 2010
China Chemical	China	November 2009	Ajanta	India	August 2010
Xieli Pharmaceuticals	China	November 2009	IPCA	India	August 2010
Fosun Guilin	China	November 2009			
Novanat	China	November 2009	Conferences		
Chongqing Hengstar	China	November 2009	Name	Country	Date
Chongqing Kerui Nanhai	China	November 2009	CHPI Conference*	China	June 2009
Kunming Pharma.	China	November 2009	WHO/MMV Artemisinin	India	September 2009
PIDI Standard	China	November 2009			

¹⁹ Representatives from the Project Management Group report that Chinese banks approached to act as an intermediary were unwilling to work with A2S2 citing, among other reasons, that artemisinin market was unknown and represented too much risk.

²⁰ The use of ACT manufacturers as intermediaries was viewed by some stakeholders as constituting a conflict of interest. The appropriateness of this arrangement is outside the scope of this review and has not been evaluated.

²¹ "A2S2 Project Plan; Exhibit 3: List of artemisinin extractors," July 2009

²² Source: A2S2 periodic progress reports, September 2009, March 2010, September 2010

Hung Thinh	Vietnam	November 2009	Conference*		
Saokim	Vietnam	November 2009	CHPI Conference*	Spain	October 2009
Mediplantex	Vietnam	November 2009	WHO/MMV	Madagascar	October 2010
IPCA	India	August 2010	Artemisinin		
Afro Alpine	Uganda	March 2010	Conference*		
AVT	India	<i>Not specified</i>			

Representatives from the UNITAID Secretariat and external stakeholders consulted during this review report that market intelligence gathered during A2S2 has been inconsistently documented and insufficiently reported. External stakeholders perceive a lack of rigorous analysis of the data collected. Several external stakeholders expressed concern that much of the market analysis shared by A2S2 is based on intuition rather than subjected to independent analysis. UNITAID Secretariat representatives report limited access to the data collected which could support other projects and forecasting activities carried out by the organization.

4.2.4 Stakeholders value personally delivered market intelligence, but have limited use for publically available information

External stakeholders report that information shared during personal conversations is extremely valuable to their operations. However, they find little value in the information publically available on the A2S2 website. Most of the artemisinin extractors and ACT manufacturers interviewed during this review report receiving valuable information on industry trends and supply levels from conversations with A2S2 representatives. Presentations and facilitated discussions by members of the A2S2 Project Management Group at industry conferences have also been well received. A number of external stakeholders report that this has led to increased information sharing and transparency between ACT manufacturers which is contributing to better forecasting for global artemisinin demand. Multiple stakeholders referenced the WHO/MMV Artemisinin Conference in Madagascar in October 2010 as the first time ACT manufactures openly shared information on production volumes. The overwhelming sentiment from external stakeholders is that representatives from A2S2 are viewed as unbiased advisors and a trusted source of information. Specifically, Malcolm Cutler and Jacques Pilloy are seen as leading experts on artemisinin market dynamics.

Stakeholders from all groups report drawing limited value from the information presented on the A2S2 website. According to external stakeholders, the website lacks region and country specific data. Data elements that were specifically mentioned as lacking were regional supply and demand trends, artemisinin production levels, current market price, and supplier contact information. A number of stakeholders questioned the appropriateness of using a website and expressed a preference for regular email and/or newsletter updates. Responding to calls for increased dissemination of data, members of the Project Management Group have emphasized that much of the data collected is confidential and not appropriate for public consumption.

In summary, the A2S2 project management has been able to overcome unforeseen obstacles and project delays in order to progress towards the objectives of the project. Financing objectives are on track to being achieved, albeit delayed by one planting season.

To achieve market intelligence objectives fully, there is a need for increased structure in documentation to standardize reporting of non-sensitive information.

4.3 Impact

Mid-term review rating: Medium

Project outcomes suggest that the A2S2 project has contributed to the short-term security of artemisinin supply. As of January 2010, the pre-financing facility had provided funding for 26 additional metric tons of artemisinin. Personally delivered market intelligence has been valuable to external stakeholders, while publicly available information has been less useful. Furthermore, market building activities carried out by A2S2 have encouraged more professional relationships between stakeholders. These outcomes, together, have impacted the evolution of the artemisinin market.

4.3.1 A2S2 funding has contributed 26 metric tons of additional artemisinin to the market

Interviews with loan recipients confirm 26 metric tons of increased artemisinin production as a result of funding from A2S2. One extractor reported that A2S2 was a "lifeline" and played a crucial role in sustaining their artemisinin business. Another noted that alternative financing would not have been available from local banks which were not willing to provide loans to businesses without a history of profitability. A third recipient reported that financing from A2S2 encouraged them to re-start the production of artemisinin, a market they had left after incurring significant losses in 2007 and 2008.

In addition, A2S2 is helping to ensure that artemisinin is being directed away from monotherapy producers. Artemisinin from contracts funded and facilitated by A2S2 is being directed to WHO pre-qualified ACT manufacturers. In this way, A2S2 has been ensuring that artemisinin from the project is only used for combination therapies, which is a goal of the project.

4.3.2 Market intelligence activities have had limited impact

Privately shared information is seen as valuable and trustworthy by most stakeholders. Several stakeholders report receiving valuable information on regional market trends, supply and demand expectations, and prevailing market prices during one-on-one conversations with A2S2 representatives. Conference presentations and facilitated discussions by A2S2 have been credited with increasing market transparency, particularly related to ACT production volumes.

Almost universally, stakeholders report receiving limited or no value from the information shared on the A2S2 website. Stakeholders considered this information limited and without sufficient regional detail. The UNITAID Secretariat has also not found the data shared through the A2S2 website to be useful.

4.3.3 Market building activities have contributed to increased professionalism

Market building activities have had an unforeseen, positive impact. One ACT manufacturer reported using the A2S2 network to diversify their supply of artemisinin beyond China into Vietnam and Africa. A relatively new extractor credited A2S2 facilitated discussions at a

recent industry conference with providing an introduction to major ACT manufacturers, leading to a long-term contract. Several other industry representatives recognized A2S2 as main source of contacts within the entire artemisinin supply network.

While the impact of A2S2 on the security of artemisinin supply has yet to be fully demonstrated, most industry representatives agree that it has contributed directly through increased artemisinin supply, and indirectly through increased market information, and introduced industry stakeholders to new markets.

4.4 Management

Mid-term review rating: Low/Medium, but improving

Management of the A2S2 project has improved over the life of the project. Increased equity in decision-making has resolved initial tensions within the Project Management Group. However, concerns remain around the clarity of roles and decision-making responsibilities. Project status reporting has been completed on time, but lacks the appropriate level of detail and many data elements. Feedback and communication from the UNITAID Secretariat can be improved to increase project efficiency.

4.4.1 Initial tensions within the management team have been resolved

Management of the A2S2 project suffered from initial disagreement on decision-making processes and financial management. Specifically referenced issues were travel arrangements (e.g., the size of per diems and class of travel) and timing of sign-off project on spending. Decision-making lacked consensus and is reported to have been taken unilaterally in many instances. Members of the Project Advisory Group believe that these challenges delayed the implementation of market intelligence and financing activities.

Reports from the Project Management Group indicate that these tensions have been resolved. Project management decisions are no longer taken unilaterally, but reached by consensus. Several members report an increased spirit of collaboration and improved efficiency within the group.

The precise roles and responsibilities within the Project Management and Advisory Groups remain undefined. While broadly defined in the project plan, interviews with representatives from each group indicate a lack of clarity. Specifically, the ability of the Project Advisory Group to mediate disagreements and resolve objectives is limited. Management of the project would benefit from documented decision-making and escalation protocols.

4.4.2 Reporting procedures lack structure

Both internal and external project reporting processes are incomplete and lack consistency. While periodic progress reporting has been on-time and well received by the UNITAID Secretariat, it has failed to provide the level of detail required. A potential remedy to this could be to implement a log-frame approach, something that UNITAID is requiring from its grantees going forward. Internal documentation of field visits and market intelligence gathering is inconsistent and without standard formatting. Financial reporting is in line with requirements, but would benefit from additional detail on outstanding and anticipated loans.

The A2S2 project plan defines monitoring and evaluation expectations, including a list of information to be reported.

Table 5 below provides a summary of these reporting areas and an indication of which have been included in regular project reporting.²³ While on time, periodic progress reporting has failed to consistently and completely report on all of the information areas required by the project plan.

Table 5: Summary of information monitoring and reporting requirements

Information area	Indicator/ measure	Required frequency	Reported frequency*
1. Forecasting of ACT and related kilograms of artemisinin required	Kilograms required	4 times/ year	Regularly on A2S2 website
2. Input of hectares planned and planted, by region (China, Vietnam, Africa, and South America)	Hectares planted	2 times/ year	<i>Unknown</i>
3. Anticipated input from semi-synthetic artemisinin production	Metric tons of additional input	2 times/ year	<i>Unknown</i>
4. Input stock of artemisinin at the extractor level	Metric tons of artemisinin	January and September	<i>Unknown</i>
5. Input stock of artemisinin at the ACT manufacturer level	Metric tons of artemisinin/ active ingredients	February and October	<i>Unknown</i>
6. Visit scheme for artemisinin extractors and ACT manufacturers	Planned and completed visits	2 times/ year	2 times/ year
7. Monitoring of quality assurance and prequalification standards	As defined by the WHO	4 times/ year	<i>Unknown</i>
8. Price developments and evolution of artemisinin	Price per kilogram	4 times/ year	October 2010
9. Number of contracts delivered by A2S2	Number of loans distributed	4 times/ year	2 times/ year
10. Output available from A2S2	Metric tons under contract through A2S2	4 times/ year	2 times/ year
11. Loan application procedures available on the A2S2 website	Available permanently on A2S2 website	N/A	N/A
12. Metrics of conversion (hectares to metric tons to ACTs); seed variations (yield and artemisinin content)	Available permanently on A2S2 website	4 times/ year, as needed	<i>Unknown</i>
13. Project progress and financial reporting (including information areas 1-12)	See above	Progress: 4 times/ year Financial: 1 time/ year	Progress: see above Financial: May 2010
*Assessment by the evaluation team based on available data and documents reviewed as part of the mid-term review. Areas where reporting frequency has not been demonstrated or shared with the evaluation team have been listed as 'unknown.'			

Documentation of field visits has been inconsistent and incomplete. While a significant volume of information has been collected, many of the indicators and measures listed in

Table 5 have not been captured. Market intelligence activities would benefit from standardized reporting which would include a template for recording and tracking the specific indicators and measure listed in the project plan.

²³ See section 5.3: Monitoring and Evaluation including Reporting to UNITAID; A2S2 Project Plan; July 2009

Financial reporting has been satisfactory, but would benefit from additional details on individual loans. Information to be added to reporting includes the payment status and anticipated schedule, risk assessment, and contract details (e.g., interest rate) for each loan.

4.4.3 Project launch and adjustment processes took longer than anticipated and affected project outputs

Members of the Project Management and Advisory Groups reported delays in the initial project approval and longer than anticipated timelines in decision-making by the UNITAID Secretariat. Some stakeholders indicated that timelines to approve project plan revisions limited funding opportunities, as the project missed one planting season. This limited the amount of loans the project was able to make.

The delay in project launch is related to the innovative nature of the project, which includes a financing component for extractors. WHO, UNITAID's host and thus legal representative, has strict conflict of interest policies that had to be addressed during project launch.

The aforementioned conflict of interest issues also affected the project when financing procedures in China required amendment due to changes in legislation.²⁴

A2S2 project management has demonstrated an ability to respond quickly to unforeseen obstacles and review project procedures as necessary. However, the Project Management Group reports that it has not received regular feedback on its periodic project reporting to UNITAID. The management would further benefit from increased clarity of management and advisory roles, standardized project reporting and market intelligence documentation, and defined communication mechanisms with both internal and external project stakeholders.

4.5 Sustainability

Mid-term review rating: Low

A2S2 has made limited progress towards the exit strategies detailed in the A2S2 project plan. The A2S2 Project Management Group has yet to identify local sources of extractor financing to replace the pre-financing facility and to attract alternative sources of funding for market intelligence activities.

To phase out the pre-financing facility, A2S2 planned to develop relationships with local banks and lenders. As part of the project, A2S2 planned to encourage these institutions to provide working capital financing to extractors who had demonstrated creditworthiness through the A2S2 project.²⁵ The evaluation team has seen little evidence that A2S2 has

²⁴ The later refers to a request made by the project management to use ACT manufacturers as intermediaries in order to complete lending transactions to Chinese extractors. This change in approach caused controversy due to a potential conflict of interest in implementation. While ultimately approved, both internal and external stakeholders raised concerns over the length of time required and process for receiving approval from the UNITAID Secretariat.

²⁵ See section 3.2.1: Exit Strategy; A2S2 Project Plan; July 2009

established relationships with lending institutions that will ultimately replace the role of the pre-financing facility.

Once the market intelligence dashboard was designed and operational, the A2S2 project plan anticipated that funding to sustain market intelligence activities would be attracted from sources other than UNITAID.²⁶ As of January 2011, A2S2 had not identified alternative sources of funding for these activities.

The A2S2 project was launched with an initial project timeline of two years. Over the course of this timeline, a clearly defined exit strategy anticipated that UNITAID would be able to phase-out its involvement and transfer responsibility to external partners. While there is continued need for risk management mechanisms to secure the supply of artemisinin, the effectiveness and impact of A2S2 would be enhanced by ensuring project sustainability beyond UNITAID support.

²⁶ See section 5.3.1: Market information available in public domain; A2S2 Project Plan; July 2009

5 Recommendations

This report presents a number of short- and longer term recommendations. Short-term corrections are those that can increase the effectiveness of project activities over the remainder of current project timeline. Longer-term adjustments should be implemented if the project is continued beyond June 2011.

5.1 Short-term course corrections

Over the remainder of the project, A2S2 should focus on extending the reach of the pre-financing facility, on standardizing market intelligence documentation, and on improving project reporting and management.

5.1.1 Extend the reach of the A2S2 pre-financing facility

A2S2 can increase the impact of its financing activities by developing additional channels for extractors to receive financing for working capital. As required in the project plan, A2S2 should identify local institutions to take over the financing role of A2S2.

To extend the reach of the project, A2S2 should leverage the experience of Triodos to encourage local financial institutions to provide working capital loans to artemisinin extractors. Bionexx (Madagascar) and Beijing Gingko (China) will be the first extractors to repay loans to A2S2. Both companies have payments starting in the first quarter of 2011, and are scheduled to complete repayment by year's end. Both firms have expressed a need for continued working capital financing. Rather than extending a second loan to these organizations, A2S2 should identify local alternatives, providing loan guarantees if necessary. The potential of loan guarantees should be explored to potentially share the risk during a transition period from A2S2 to local bank. Bionexx, for example, has a relationship with a local bank that is willing to finance capital expenditures. This relationship could be developed, with the help of A2S2, into a revolving source of finance for working capital.

Another way in which A2S2 could increase its reach is to introduce interest rates in line with local market rates. Since the due diligence performed by Triodos has confirmed the basic viability of eligible extractors, A2S2 should ensure that interest rates both reflect the cost of lending and are affordable. To an extent this has already been done, as loan agreements have not included a 2.5% administration charge that was originally scheduled to be included. A2S2 interest rates should match the local rate which would be available to extractors in an efficient market.

5.1.2 Standardize market intelligence documentation

A2S2 should introduce standardized documentation for market intelligence. This should include reporting for both past and future field visits along the indicators and measures similar to those listed above in

Table 5. These figures should be tracked at agreed intervals in a format which is made accessible to the members of the Project Management and Advisory Groups as well as the UNITAID Secretariat. In particular the UNITAID market dynamics team would benefit from this intelligence in its landscape analysis work.

Furthermore, the project should establish a confidentiality policy for market intelligence documentation and dissemination. While it is agreed that individual extractor and ACT manufacturer data must be protected, once aggregated at the country or regional level this information is less sensitive and can be shared more broadly. This would be useful for forecasting and planning purposes, given the different planting seasons for Artemisia in Africa and Asia. For example, it could be proposed that individual firm level data is kept confidential and confined to the management team and UNITAID Secretariat, but aggregated country and regional level data is made available for public consumption. The precise level of confidentiality needs to be agreed within the management and advisory team, and subsequently with UNITAID. Once agreed, the confidentiality policy should be shared with external stakeholders.

5.1.3 Improve project reporting and management

A2S2 should review reporting processes and define communication channels with external stakeholders. As described above, periodic progress reporting has been well received by the UNITAID Secretariat. However, it can be streamlined to be more efficient. Narrative summaries should be shortened by introducing a standard data template. These changes will both shorten the time required to prepare reports and increase the utility of information provided.

Decision-making procedures and partner roles and responsibilities need to be clarified within the Project Management Group. While decisions are reportedly reached by consensus, the process must be strengthened. To resolve inevitable disagreement within the group, a clear escalation policy should be established. As this is an operational issue, this should be developed by the project partners. A possible avenue would be to include mediation by the project advisors.

5.2 Longer-term strategic adjustments

In a potential second phase, A2S2 should include transition of pre-financing to local lenders, a distribution plan for market intelligence reporting, support for technical assistance initiatives, service level agreements for project management, and clearly defined indicators for when the intervention will no longer be necessary.

5.2.1 Transition pre-financing to local lenders

The A2S2 pre-financing facility should be maintained with existing funds and focus on transition of lending to local partners. As part of lending procedures, A2S2 and the participating extractor should identify target lenders for the second year. These local lenders should be made aware of the A2S2 loan in progress and encouraged to commit to providing similar financing in subsequent years if creditworthiness is established through A2S2.

A2S2 should avoid provided finance extractors in subsequent years. In line with UNITAID's mandate, the A2S2 pre-financing facility is designed to be transformational and not a permanent solution. Using the facility as a revolving source of financing for individual extractors would create dependence on A2S2. While lending should not be strictly limited to one year, subsequent lending should be limited to markets where sustainable alternatives

cannot be identified. Hence, A2S2 should only continue funding extractors in situations where creditworthiness has been established, but access to local financing remains infeasible.

5.2.2 Create a distribution plan for market intelligence reporting

In addition to the short-term measures listed in the previous section, market intelligence documentation should be formalized further to increase its value to external parties. A2S2 should create a detailed plan for the distribution of market intelligence data. This would include the development of a market intelligence database. While sensitive information must be protected according to an agreed confidentiality policy, access to non-sensitive data should be made available to external parties, for example members of the UNTAID Market Dynamics group.

A2S2 should produce regular market intelligence reports to be disseminated through a variety of channels, including newsletters and emails. These reports should share non-sensitive artemisinin market information such as regional and global production figures, market trends, and contact details for pre-qualified extractors and ACT manufacturers.

A2S2 should seek alternative funding sources for market intelligence activities. Once the value of information provided by A2S2 has been demonstrated, the project should be able to attract external sources of funding for market intelligence activities. Potential donors include ACT manufacturers and members of the donor community who rely on ACTs to fulfill their global health objectives.

5.2.3 Explore linkages between market intelligence and technical assistance

Interviews have revealed that representatives from A2S2 are uniquely positioned to identify specific training and input assistance needs during field visits with extractors, given their knowledge of the artemisinin market and network within the industry. This has led to the suggestion that A2S2's role should be extended to technical assistance.

A potential avenue to implement this would be to put in place a technical assistance fund separate from project management and market intelligence activities. This fund could finance technical assistance projects identified and approved by the Project Management and Advisory Groups. To avoid conflict of interest between the identification and implementation of technical assistance projects, implementation should not be limited to A2S2, and should be subject to competitive bidding above a pre-determined threshold value.

According to inputs collected during the review, assistance priorities should include access to high-yield inputs, training on best practices for cultivation and extraction, introduction to new technology, and assistance with pre-qualification for extractors and API manufacturers.

5.2.4 Introduce service level agreements for project management

In addition to the clarification of communication and reporting procedures and definition of project management processes, A2S2 should clearly define expected service levels with the UNTAID Secretariat. These service levels would define expectations and obligations

both for UNITAID and for A2S2. This should be supported by a standardized logical framework which clearly maps project inputs, outputs, and expected outcomes to desired project objectives and impact.

Building on this framework, monitoring and evaluation indicators can be defined against which service levels for the project management team can be measured. A timeline with clearly defined monitoring responsibilities and milestones should be established to assist in regular evaluation of project performance.

Part of this exercise should include a review of project targets. For example, the pre-financing facility funding target of 40 metric tons should be validated by external stakeholders. This will ensure that A2S2 continues to work towards bridging the gap between supply and demand, but does not manipulate the market unnecessarily.

5.2.5 Define indicators for when the intervention will no longer be necessary

An extension of the A2S2 project should clearly define conditions that will signal when the intervention is no longer needed. Figure 4 below provides an illustrative framework which could be used to define the criteria for when to phase-out A2S2's activities.

Figure 4: Illustrative framework for closing A2S2²⁷

<p>Terminate <u>Pre-Financing Facility</u> activities if:</p> <ul style="list-style-type: none"> • The facility is unsuccessful due to an extensive number of failed loans; • There is no longer demand for A2S2 loans from artemisinin extractors; <u>OR</u> • Semi-synthetic artemisinin production is confirmed to have capacity at competitive prices to fulfill global demand, if needed. 	<p>Terminate <u>Market Intelligence</u> activities if:</p> <ul style="list-style-type: none"> • ACT forecasts are consistent and widely accepted by stakeholders <u>AND</u> • ACT manufacturers report sufficient multi-season contracts to ensure adequate supply of artemisinin; <u>OR</u> • Semi-synthetic artemisinin production is confirmed to have capacity at competitive prices to fulfill global demand, if needed.
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Clearly defined termination conditions will allow for a timely phase-out of A2S2 and avoid unnecessary continuation based on subjective criteria. This will ensure that once A2S2 has been successful in its objectives or is no longer relevant the funds used to sustain the project can be deployed to other initiatives.

²⁷ This illustrative example does not take into account the 3-5 year time limit for funding to UNITAID projects.

6 Conclusion

The need remains for interventions such as A2S2 to secure the supply of artemisinin in order to meet global demand. This evaluation has shown that the A2S2 project has been an effective source of increased supply of artemisinin and has collected significant market intelligence which has been valued by stakeholders.

A project extension is warranted, if the previously detailed changes are implemented. This project extension should be seen in anticipation of semi-synthetic artemisinin becoming commercially available in 2013 and stabilization of ACT demand, driven by AMFm procurement, around the same time.

Composition of the extended project should include: (1) maintenance of the pre-financing facility with current funds; (2) continued market intelligence efforts with standardized reporting, (3) introduction of a mechanism to identify and fund needed technical assistance for artemisinin extractors. Improved project planning, for example using the UNITAID prescribed log frame approach, is important to the successful continuation of this project.

Several of recommendations for improved project management have been outlined above which will increase the effectiveness of activities and impact of the project.

Annex 1: List of documents reviewed

Document Title	Date	Type
UNITAID Resolution 5 - A2S2	1-Jan-09	1. Project Document
MoU A2S2	6-Jul-09	1. Project Document
Annex 1: A2S2 Project Plan	6-Jul-09	1. Project Document
1st Periodic Progress Report	1-Sep-09	2. Progress Report
Appendix 1: Timetable with sequence of actions and reporting deadlines in Project Plan	1-Sep-09	2. Progress Report
Appendix 2: Briefing to the industry	1-Sep-09	2. Progress Report
Appendix 3: Leaflet on the Artemisinin Pre-Finance Facility	1-Sep-09	2. Progress Report
Appendix 4: Overview intake and loan procedures	1-Sep-09	2. Progress Report
Appendix 5a: Agenda Project Management Group meeting 18-19 May 2009	1-Sep-09	2. Progress Report
Appendix 5b: Minutes Project Management Group meeting 18-19 May 2009	1-Sep-09	2. Progress Report
Appendix 6: Agenda conference call Project Management Group 8 July	1-Sep-09	2. Progress Report
Appendix 7: Minutes and action points conference calls Aug-Sept 2009	1-Sep-09	2. Progress Report
Appendix 8: Agenda meeting with the Project Advisory Group 9 September	1-Sep-09	2. Progress Report
Interim update on progress A2S2	9-Dec-09	2. Progress Report
Annex 1: A2S2Presentation_WHOMMVConference	9-Dec-09	2. Progress Report
Annex 2: ChinaVietnam_VisitReport_Nov09	9-Dec-09	2. Progress Report
Annex 3: Financial Projections	9-Dec-09	2. Progress Report
Annex 4: Findings MMV_WHO Conference Mumbai	17-Dec-09	2. Progress Report
Feedback from UNITAID 8 Jan	8-Jan-10	4. MISC / Correspondence
A2S2 Feedback on the UNITAID letter, re Interim update on progress A2S2_vs2.0	13-Jan-10	4. MISC / Correspondence
Feedback from UNITAID 29 Jan	29-Jan-10	4. MISC / Correspondence
2nd Periodic Progress Report	1-Mar-10	2. Progress Report
Appendix 1: Original timetable with sequence of actions and reporting deadlines	1-Mar-10	2. Progress Report
Appendix 2: Monthly financial reporting: China lending and currency exposure	1-Mar-10	2. Progress Report
Appendix 3: Updated M&E Model	1-Mar-10	2. Progress Report
Appendix 4: Agenda and minutes bi-weekly conference call	1-Mar-10	2. Progress Report

Document Title	Date	Type
Appendix 5: A2S2 presentation MMV/WHO Conference, Mumbai	1-Mar-10	2. Progress Report
Appendix 6: Recommendations MMV/WHO Conference, Mumbai	1-Mar-10	2. Progress Report
Appendix 7: Aditionality policy	1-Mar-10	2. Progress Report
Appendix 8: Visit report CPHI Madrid	1-Mar-10	2. Progress Report
Appendix 9: A2S2 presentation RBM Meeting, Brazil	1-Mar-10	2. Progress Report
Appendix 10: Agenda and planning meeting with Project Advisory Group	1-Mar-10	2. Progress Report
Appendix 11: Financial projections March 2010	1-Mar-10	2. Progress Report
Meeting Minutes: A2S2 Meeting with the Advisory Board	15-Mar-10	4. MISC / Correspondence
Clarifying questions UNITAID	9-Apr-10	4. MISC / Correspondence
Meeting Minutes: A2S2 Bi-weekly conference call - 19 May 2010	19-May-10	4. MISC / Correspondence
Financial Report	31-May-10	3. Financial Report
Annex 1: i+solutions' Annual Financial Report 2009	31-May-10	3. Financial Report
Visit Report: Visit report CPHI CHINA June 2010	1-Jun-10	2. Progress Report
Meeting Minutes: A2S2 Bi-weekly conference call - 25 Aug 2010	25-Aug-10	4. MISC / Correspondence
3rd Periodic Progress Report	1-Sep-10	2. Progress Report
Appendix 1: Example minutes bi-weekly conference call Project Management Group, 14 July 2010	1-Sep-10	2. Progress Report
Appendix 2a: Triodos China lending proposal	1-Sep-10	2. Progress Report
Appendix 2b: Lending China request	1-Sep-10	2. Progress Report
Appendix 2c: Additional clarifications and consent UNITAID, following 'Lending China request'	1-Sep-10	2. Progress Report
Visit Report: WHO/RBM/MMV Artemisinin Conference - Madagascar	1-Oct-10	2. Progress Report
MADAGASCAR ARTEMISININ CONFERENCE 2010 - Final report, representative presentations, etc (22 documents)	12-Oct-10	5. External Research
Memo Change of Management i+solutions	16-Dec-10	4. MISC / Correspondence
Market Intelligence: ARTEMISININ MARKET INTELLIGENCE TEMPLATE_VS4.0	31-Dec-10	4. MISC / Correspondence
Meeting Minutes: A2S2 Bi-weekly conference call - 6 Jan 2011	6-Jan-11	4. MISC / Correspondence
A2S2 Project Extension Proposal	Draft	2. Progress Report
Annex 1: Overview of (Loan) Agreements	Draft	2. Progress Report

Document Title	Date	Type
Annex 2: Visit Report China, Nov. 2010 (Extract)	Draft	2. Progress Report
Annex 3: A2S2 Newsletter no1 (Draft)	Draft	2. Progress Report
Annex 4a: Artemisinin Conference - Presentation Artemisinin Market: Quantities and Pricing	Draft	2. Progress Report
Annex 4b: Artemisinin Conference - Presentation A2S2: Progress and Status	Draft	2. Progress Report
Annex 5: Artemisinin Conference - Summary Break-Out Session on Forecast, A2S2 and Mono + Substandard	Draft	2. Progress Report
Annex 6: Summary Questionnaire Results	Draft	2. Progress Report
Annex 7a: Financial Update on the 'Fund'	Draft	2. Progress Report
Annex 7b: Financial Update on other Project Expenses	Draft	2. Progress Report
Annex 8: Detailed budget Proposal for Technical Assistance Programme	Draft	2. Progress Report

Annex 2: Summary of Interviews Conducted

Name	Organization	Organization Role	Title / Position
Ambachew Yohannes	UNITAID	Project secretariat	Technical officer (malaria); project focal person (A2S2)
Raquel Child	UNITAID	Project secretariat	Director, Market Dynamics and Operations
Brenda Waning	UNITAID	Project secretariat	Coordinator, Market Dynamics and Operations
Lorenzo Witherspoon	UNITAID	Project secretariat	Procurement Officer
Kvetka Dzackova	UNITAID	Project secretariat	Administration and Finance
Ellen van Haastert	i+solutions	Project Management Group, Lead agency	Project Officer
Jan van Duijn	i+solutions	Lead agency	Managing Director
Koert Jansen	Triodos Sustainable Trade Fund	Project Management Group, Pre-financing facility manager	Fund Manager
Malcolm Cutler	FSC Development Services	Project Management Group, Technical advisor	Managing Director
Jacques Pilloy	Artepal	Project Management Group, Technical advisor	Project Manager
Jean-Marie Kindermans	Médecins Sans Frontières (MSF)	Project advisor	President, MSF Belgium
Jan van Erps	Roll Back Malaria Secretariat	Project advisor	Coordinator Commodity Services
Andrea Bosman	WHO Global Malaria Programme	Project advisor	Medical Officer
Dean Bennett	Novartis	ACT manufacturer	Global Head of Supply, Coartem
Murali Sarma	IPCA, India	ACT manufacturer / API producer	Lead, Mission Malaria
Prashant Sisodia and Rahul Lande	CIPLA, India	ACT manufacturer	

Name	Organization	Organization Role	Title / Position
Parag Shah	Strides Acrolab; SeQuent Scientific; Elysian Life Sciences (India); Vedic Fanxipan (Vietnam)	Integrated ACT manufacturer/ Loan recipient	CEO, Elysian Life Sciences
Charles Gibrain	Bionexx, Madagascar	Extractor/ Loan recipient	Managing Director
Paul Reyntjens	Beijing Gingko	Extractor/ Loan recipient	Strategy Director, Beijing Gingko Group
Zhang Hong	Sichuan Xieli Pharmaceutical Co., China	Extractor	
Dr. Ian Bathurst	Medicines for Malaria Venture	External expert	Director, Drug Discovery and Technology
Prashant Yadav	MIT-Zaragoza	External expert	Professor of Supply Chain Management

Annex 3: Summary of Key Project Activities and Reporting Requirements

The following table presents the schedule of key project activities and reporting requirements as listed in Exhibit 1 of the A2S2 project plan. Progress towards completion of these activities has been tracked using project documents provided for evaluation including periodic progress reports and field visit reports. Where unknown, the completion date has been estimated using the first reference to completion in reporting from the A2S2 Project Management Group.

Key Project Activities			
<u>Activity</u>	<u>Current Status</u>	<u>Due Date</u>	<u>Completed Date</u>
Memo signed between i+solutions and UNITAID - July 2009	Completed	July 2009	July 2009
Finalize contractual arrangements with UNITAID and between partners	Completed	July 2009	July 2009
Disbursement of funds from UNITAID to i+solutions - July 2009	Completed	July 2009	July 2009
Website posting of disbursement procedures of Artemisinin Pre-finance Facility	Completed	July 2009	September 2009*
Determining M&E baseline value	Completed	July 2009	March 2010*
Visits to extractors - Africa**	Completed	October 2009	Aug-Sept. 2009
Visit to European manufacturers (Novartis and Sanofi)	Completed	June 2009	Aug-Sept. 2009
Communication/explanation on procedures for loan access and re-payment	Completed	January 2010	September 2009*
Development 'Dashboard'	Completed	January 2010	March 2010*
On-line publication and update of existing artemisinin inventories and production plans	Ongoing	Jan. 10-Jun. 11	March 2010*
Contract signed and loans disbursed to artemisinin extractors	Completed	Aug. 09-Mar. 10	March 2010*
Expansion of <i>Artemisia Annua</i> plantations as per agreed contracts	Completed	Sep. 09-Jul. 10	March 2010*
Harvesting, extraction and purification of artemisinin	Completed	Oct. 09-Sep.10	March 2010*
Publication of artemisinin metrics: from plant to finished pharmaceutical product	Completed	January 2010	March 2010*
'Dashboard' operational as of March 2010	Ongoing	March 2010	March 2010*
Review and update of procedures for loan access and re-payment **	Completed	August 2009	March 2010*
Assessment of global artemisinin supply requirements for year 2	Completed	March 2010	Sept. 2010*
Visit CPHI China**	Completed	June 2009	June 2009
Website posting of updated disbursement procedures	Completed	June 2009	Sept. 2010*
Communication/explanation on procedures for loan access and re-payment	Completed	July 2009	Sept. 2010*

Key Project Activities			
<u>Activity</u>	<u>Current Sates</u>	<u>Due Date</u>	<u>Completed Date</u>
Contract signed and loans disbursed to artemisinin extractors	Ongoing	August 2009	<i>Ongoing</i>
Expansion of <i>Artemisia Annua</i> plantations as per agreed contracts	Ongoing	September 2009	<i>Ongoing</i>
Visits to extractors - Asia**	Ongoing	August 2009	November 2009
Harvesting, extraction and purification of artemisinin	Ongoing	Dec. 10-Jun.11	<i>Ongoing</i>
Project evaluation and assessment of global artemisinin supply requirements for year 3	Ongoing	April 2011	<i>Ongoing</i>
Reporting Schedule			
Periodic Project Progress Report provided by i+solutions to UNITAID	Completed	Each Sept./Mar.	As scheduled
*Where the completion date has not been documented, the first mention of completed in A2S2 periodic progress reporting is listed			
**Ongoing activity; first due and completed date listed			