

Facilitating access to asset financing to support agri-mechanization for rice farmers

Japtini Asset Finance

Ahero & West Kano, Kenya

Service Delivery Model Analysis

February, 2023



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transforming markets



Introduction

Smallholder livelihoods

Agriculture plays a key role in the wellbeing of people and planet. 70% of the rural poor rely on the sector for income and employment. Agriculture also contributes to and is affected by climate change, which threatens the long-term viability of global food supply. To earn adequate livelihoods without contributing to environmental degradation, farmers need access to affordable high-quality goods, services, and technologies.

Service Delivery Models

Service Delivery Models (SDMs) are supply chain structures which provide farmers with services such as training, access to inputs, finance and information. SDMs can sustainably increase the performance of farms while providing a business opportunity for the service provider. Using IDH's data-driven SDM methodology, IDH analyzes these models to create a solid understanding of the relation between impact on the farmer and impact on the service provider's business.

Insights & Innovations

Our data and insights enable businesses to formulate new strategies for operating and funding service delivery, making the model more sustainable, less dependent on external funding and more commercially viable. By further prototyping efficiency improvements in service delivery and gathering aggregate insights across sectors and geographies, IDH aims to inform the agricultural sector and catalyze innovations and investment in service delivery that positively impact people, planet, and profit.

Report outline

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Executive Summary



Introducing Japtini Asset Finance and mechanization in Kenya

Japtini Asset Finance

- Japtini Asset Finance (JAF) sits within the broader Arila Group ecosystem which includes primary production, input supply, input finance, processing, energy, and logistics.
- Arila, through Alluvial Limited, works with rice farmers in Kenya on 1,000 acres and aims to expand within East Africa to support farming operations covering rice, maize, soyabean, sorghum and sesame value chains by 2027.
- JAF will initially leverage the operations of Alluvial Limited for market entry. The company's operations will however extend beyond the Arila Group ecosystem.
- JAF aim to catalyze the mechanization space by employing a platform business model matching farmers to mechanization service providers (MSPs) and MSPs to asset financing partners to ensure 1) effective, efficient and affordable mechanization services for farmers; 2) increased access to asset financing for MSPs; 3) efficient access to markets for MSPs

Farming & Mechanization

- Agriculture in Kenya, and Africa in general, remains largely dependent on human labor with minimal levels of mechanization. Estimates show that Kenya has 2.52 tractors per 1000 hectares compared to South Asia's and Latin America's 10 tractors per 1000 hectares.
- Land fragmentation and diminishing farm sizes are contributing factors as most of the farming is carried out by smallholder who cannot afford to own and manage agri-equipment economically on small pieces of land.
- This creates opportunities for mechanization-as-a-service and MSPs have emerged to provide these services to farmers. However, the large initial capital investment required limits supply of these services.
- The rice value chain within the Ahero and West Kano schemes, which JAF targets, is characterized by mechanization in land preparation, harvesting, milling and transportation. Farmers have however reported challenges in accessing quality and timely mechanization services affecting farm productivity.



Recommendations (1 of 4): Farm mechanization requirements amount to a USD 10million asset financing need and create significant value for all players in the ecosystem

Observation	Recommendation
Farm mechanization requirements <ul style="list-style-type: none">Irrigated farms within the government schemes produce only in 1.5 cycles instead of the potential 2 cycles per annum due to challenges in accessing mechanization to support production.Out-grower farms are largely rainfed and produce for 1 cycle per annum, attaining low yields of 2,850 kgs/acre due to inconsistent water supplyFarmers also experience post-harvest losses of up to 15% due to manual and semi-mechanized harvest practicesThe total demand for mechanization equipment by 2027 is <u>7 small tractors, 4 large tractors, 7 combine harvesters and 2,500 irrigation pumps</u>.	<ul style="list-style-type: none">Consider developing a risk-based lending approach in collaboration with FSPs where loan terms and/or interest rates are different based on the loan applicant risk profileCollaborate with providers of input and other production cost financing to ensure farmers can produce over the 2 cycles
Value creation <ul style="list-style-type: none">MSPs are constrained in accessing asset financing thus affecting supply of mechanization services and in turn negatively influencing farmer productivity.Increased asset financing generates an aggregate income of USD 3.5 million for MSPs over 5 years.FSPs benefit from access to quality pipeline that generates interest income of USD 4.3 million over the 5 years.Efficiency in supply of quality mechanization services results in an income increase of up to USD 2,600 per annum for farmers	<ul style="list-style-type: none">Create a robust credit scoring functionality in platform to be developed to demonstrate value proposition to FSPs and understand potential value capturePerform <u>asset financing demand planning</u> to align financing demand with supply from FSPs.

These topics, challenges and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found [in the annex](#)



Recommendations (2 of 4) | While the assets present positive earning potential for MSPs, the business case is unproven. Collaborative testing with other players in the ecosystem is advised

	Observation	Recommendation
Financing pre-requisites	<ul style="list-style-type: none">• Eligibility criteria is based on the <u>risk profile, repayment capacity and asset needs of different asset owner segments</u>.• Individual farmers taking up irrigation equipment will be assessed based on historical farm productivity.• FOs and (non-individual) MSPs need legal registration and active operations of above 1 year.• While FOs are formally organized and are a potential market for JAF, they are ridden with governance issues which pose challenges in accessing financing.	<ul style="list-style-type: none">• Align on initial assessment on loan applicants with FSPs.• Provide insights on farmer demand for mechanization to incentivize FSPs to lend to MSPs.• Develop capacity building initiatives to manage governance issues at FO level before venturing into working with them.
MSP business case	<ul style="list-style-type: none">• JAF’s collaboration with Alluvial Limited, a sister company working with rice farmers, can guarantee efficient market clearing for mechanization services leading to high asset utilization.• <u>All assets generate positive EBT over the five years and positive ROI within the 5 years.</u>• Most assets have a <u>PBP of between 4-5 years except the large truck whose PBP is above 5 years.</u>• All assets also <u>generate sufficient cashflow to repay asset loans</u>• There is insufficient critical mass of agri-entrepreneurs with credit history to attract financing partners.	<ul style="list-style-type: none">• Develop a robust recruitment criteria for potential MSPs to ensure bankability• Introduce additional incentives for MSPs such as bonuses to increase loyalty.

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Recommendations (3 of 4)| The model presents a positive business and impact case. JAF will need to raise funding to support the business' operations in the initial lossmaking years

	Observation	Recommendation
Farmer business case	<ul style="list-style-type: none">• Access to land preparation, harvesting and irrigation equipment results in:<ul style="list-style-type: none">○ <u>51% increase in net income from irrigation scheme farmers</u> due to an increase to 2 crop cycles per annum and a reduction of post harvest losses from 15% to 3%○ <u>185% increase in net income for out-grower farmers</u> due to an increase in yields to 3,800 kgs/acre, 2 crop cycles per annum and a reduction of post harvest losses from 15% to 3%	<ul style="list-style-type: none">• Collaborate with providers of input and other farm production expenses such as Alluvial Limited to ensure farmers can afford mechanization services
JAF's business case	<i>For business sensitivity reasons, we have excluded this section from the public report.</i>	

These topics, challenges and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found [in the annex](#)



Recommendations (4 of 4) | The pilot phase will be essential to overcome key barriers to scale and define JAF's pathway to scale the model

	Observation	Recommendation
Risks, returns and impacts	<ul style="list-style-type: none">• JAF is at a design phase and thus far from being the platform at scale it aims to be. Assumptions on scale and resulting asset numbers has an impact on JAF's financial performance• Key factors influencing design, operational efficiencies and scale include :<ul style="list-style-type: none">○ undemonstrated value proposition for potential MSPs○ the revenue model's reliance on asset financing by FSPs and loan repayments by MSPs○ MSP loyalty to JAF's model○ poor infrastructure and land fragmentation within the rice farming regions targeted which lower asset utilization○ fierce competition for tech talent from big tech companies○ potential competition from other MSPs	<ul style="list-style-type: none">• Build and showcase evidence of a successful mechanization partnership to convince potential MSPs to access JAF brokering services• Collaborate with other Arila Group ecosystem companies for human resourcing especially leveraging Angala Fintech's development team and Alluvial Limited's rice operations• Collaborate with NIA to develop a block farming model

These topics, challenges and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found [in the annex](#)

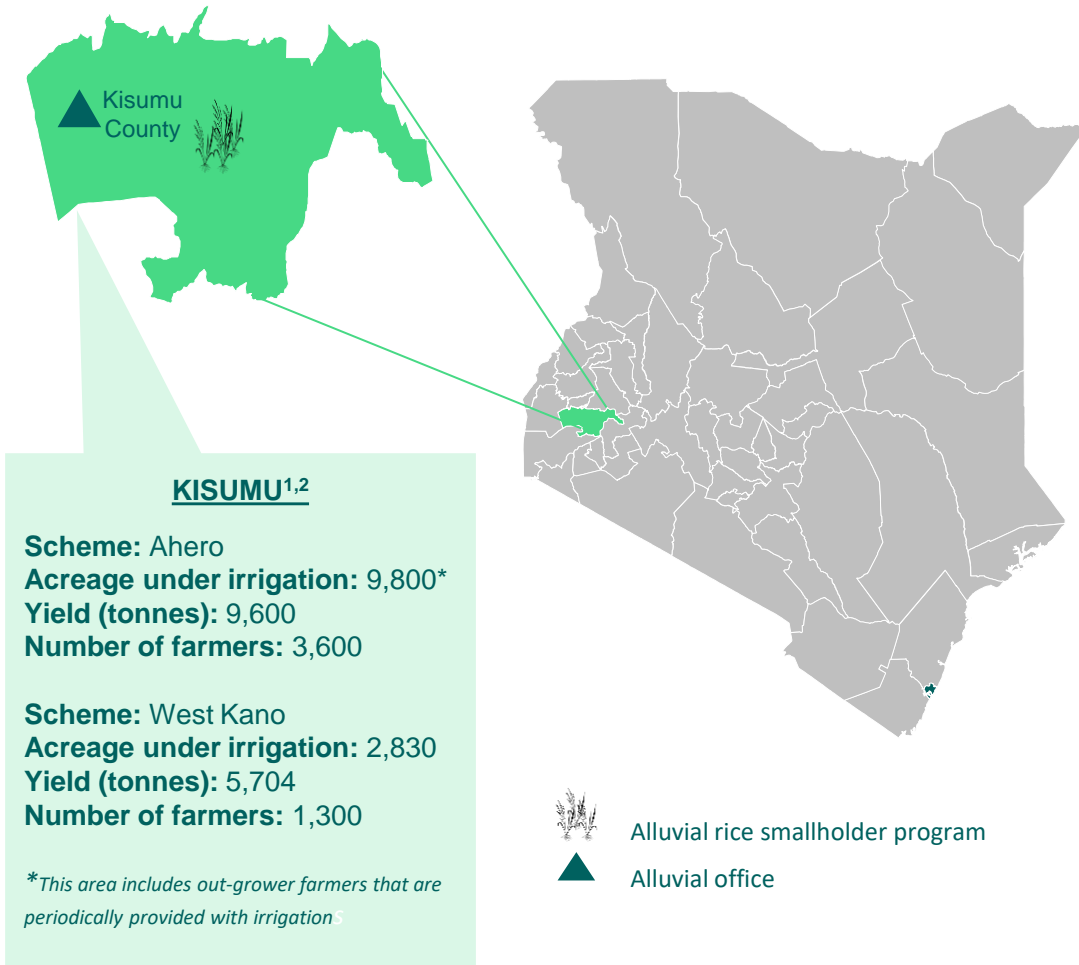


2

The Service Delivery Model



Location | JAF aims to enter the asset finance market through the Alluvial operations in Ahero and West Kano irrigation schemes before expanding to neighboring regions

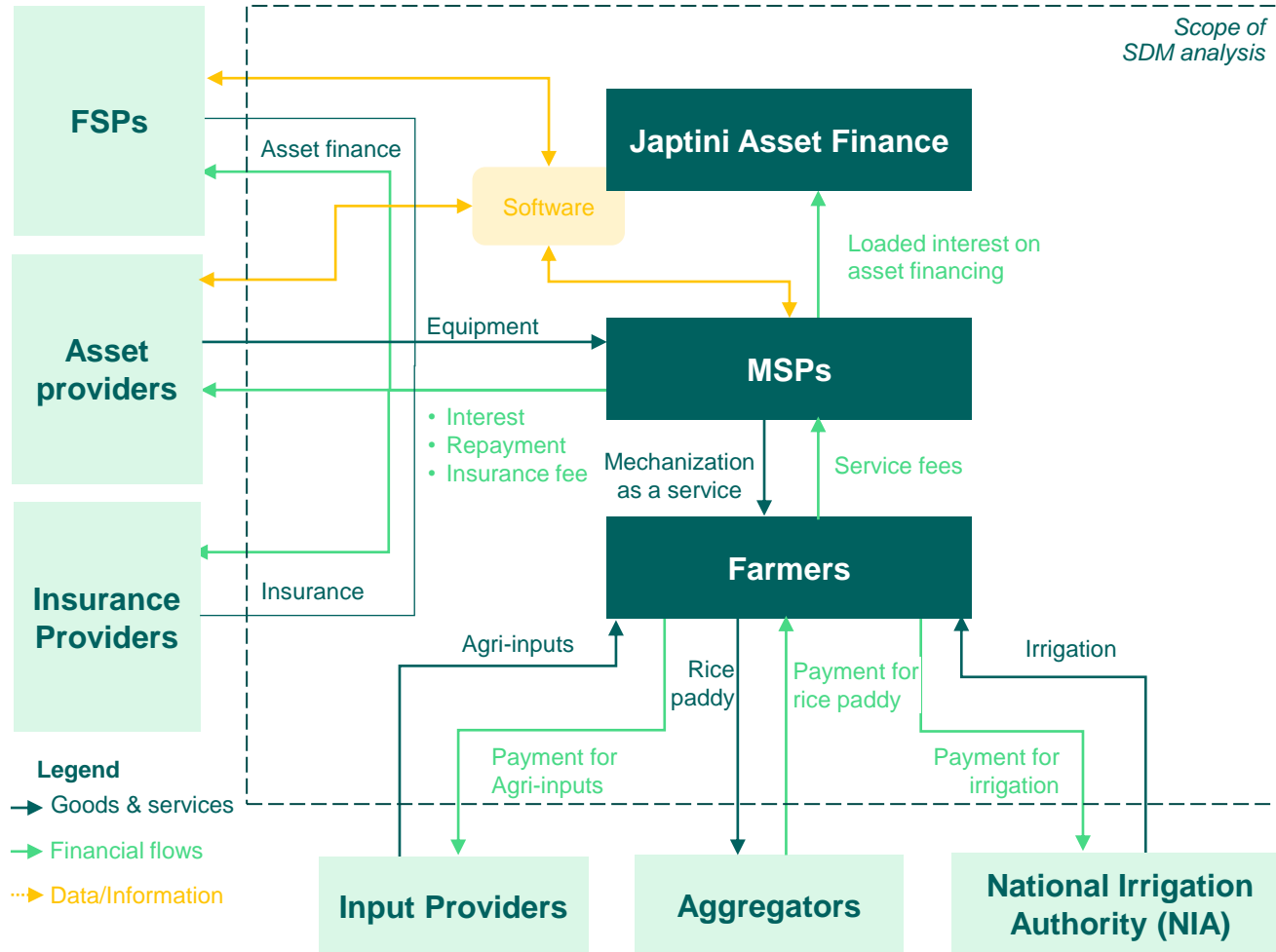


- In Kenya rice is mainly produced by small-scale farmers in Central (Mwea), Western (Bunyala), Coast (Tana delta, Msambweni) and Nyanza provinces (Ahero, West Kano, Migori and Kuria)¹.
- Ahero and West Kano irrigation schemes are the second and third largest schemes growing rice in the country after Mwea. The total land area under rice production in the two schemes was estimated at 23,000 acres in 2019/2020¹.
- About 4,900 rice farmers hold rice plots in both schemes and provide labor and also earn their livelihood out of the crop's production¹. These two schemes create access to an additional network of smallholder farmers in the bordering out-grower farms.
- The Government is working towards increasing the acreage under irrigation in the Ahero scheme to 10,500 acres as one of the measures to achieve rice self sufficiency. This expansion is projected to increase rice production within the scheme to 29,000 tonnes¹ from the current 9,600 tonnes² produced.
- Alluvial Limited is currently working with 800 farmers on 1,000 acres of land in both schemes representing 4% of the total acreage under cultivation.

Sources 1. National Irrigation authority 2. KNBS – Economic Survey 2021 3. <https://yourfreetemplates.com/free-kenya-editable-map/>



SDM Overview | JAF's platform will connect players in the agri-mechanization space to increase asset financing for MSPs and improve access to mechanization for smallholder farmers.



- JAF will employ a platform model aimed at:
 - increasing access to asset financing for MSPs;
 - organizing and structuring fragmented farmers and distributed MSPs;
 - facilitating their interactions to increase the accessibility and efficiency of mechanization service provision to support on-farm production
- To enable this JAF will:
 - Partner with financiers, offering them pipeline and initial vetting of potential asset owners (MSPs);
 - Partner with equipment suppliers for the supply of trucks, tractors, combine harvesters and water pumps to MSPs;
 - Create access to a market for mechanization services for the MSPs by matching them with farmers in their network
- These partnerships are not yet in place, but JAF is in early stages of discussion with some for potential collaboration
- In turn, JAF will receive a 'loaded' interest component from MSPs on every loan brokered

Source: JAF interviews







Stakeholders | It is important for JAF to align its value proposition and service offering with the interests of all stakeholders, especially banks who provide a critical product within the SDM.

Actor	Legal Status	Function (within this SDM)	Revenue model	Incentive to participate (within this SDM)
Equipment suppliers	Private limited companies	<ul style="list-style-type: none"> Sells agricultural equipment/assets to farmers, FOs and agri-entrepreneurs Offer training on equipment/asset use to farmers, FOs and agri-entrepreneurs 	Margin on agri-asset sales	<ul style="list-style-type: none"> Expand customer base Increase sales of agri-equipment
Commercial Banks	Private limited companies (Cooperative Bank, KCB, AFC)	<ul style="list-style-type: none"> Plays a critical role of providing loans to agri-entrepreneurs originated through JAF Provides farmers with bank accounts and (in future) loans 	Interest on loans	<ul style="list-style-type: none"> Increased loan disbursements thus increased revenues Improved access to data to attract new agri customers
Aggregators	Private limited companies (Alluvial Limited)	<ul style="list-style-type: none"> This role will initially be done by Alluvial Limited but with the potential to work with other off-takers at scale. Plays a critical role of creating demand for mechanization through its farmer network 	Margin on rice sales	<ul style="list-style-type: none"> Secure and increase sustainable product supply Transforming the sector Contributing to alleviation of poverty in rural communities
Insurance companies	Private limited companies	<ul style="list-style-type: none"> Partners in developing insurance products for farmers, FOs and agri-entrepreneurs 	Insurance premiums	<ul style="list-style-type: none"> Increased sales of insurance products through new agri customers
Irrigation Authority	Governmental organizations (NIA)	<ul style="list-style-type: none"> Provides irrigation infrastructure for farmers to support rice production Plays a critical role of developing block farming model, alongside JAF. 	Payment for irrigation	<ul style="list-style-type: none"> Provide value-add service to farmers



Potential clients | Farmer organizations and agri-entrepreneurs will get access to asset financing while farmers will access mechanization services

	 Baseline	 Farmers	 Farmer organizations	 MSPs
Description	Individual farmers owning or leasing 1-2 acres of land for rice farming	Individual farmers owning or leasing land for rice farming. Can be with full or partial access to irrigation	A 20-50-member farmer organization structured to support farming efforts for its members through providing access to information	One-person informal to a large formal businesses providing mechanization services* to rice farmers
Key characteristics	<ul style="list-style-type: none"> • Average farm size of 2 acres • Minimal/no access to mechanization • Average yield of 2 MT/acre • High post-harvest losses 	<ul style="list-style-type: none"> • Average farm size between 2-5 acres • Mechanized production • Average yield of 4-6 MT/acre • Reduced post-harvest losses 	<ul style="list-style-type: none"> • Average member farm size of 5 acres • Mechanized production • Irrigated farms in the case of out-grower farmers outside of the serviced schemes • Yield of 4-6 MT/acre • Reduced post-harvest losses 	<ul style="list-style-type: none"> • Individual transporters and entrepreneurs who own 1 - 2 agri-asset • Own farms and grow rice • Organizations can own a large number and variety/range of agri-assets
Services received	None	<ul style="list-style-type: none"> • Mechanization services (provided by MSPs) • Financing for irrigation pumps 	<ul style="list-style-type: none"> • Asset financing • Mechanization services 	<ul style="list-style-type: none"> • Asset financing • Mechanization services market

Sources: Arila Go-to-Market Strategy, Arila rice solution model, Interviews with Alluvial staff, Farmer and agri-entrepreneur interviews

Notes: * Include land preparation, planting, harvesting, transport and milling



Financing Prerequisites| Eligibility criteria for the different asset owner segments is guided by the risk profile, repayment capacity and asset needs



	Farmers	Farmer organizations	MSPs
Eligibility Criteria	<ul style="list-style-type: none"> Productive land – minimum acreage of 5 acres Rice sales contract with off-taker (Alluvial Limited preferably) Demonstrable historical farm profitability* Demonstrable history of credit repayment* 	<ul style="list-style-type: none"> Registration under legal provisions i.e., cooperatives, farmer organization, society etc. Farmer membership - Minimum of 50 members who are rice farmers Operations – Active minimum 1 year Productive land - total acreage of 100 acres under rice cultivation 	<ul style="list-style-type: none"> Registration under legal provisions i.e., company, partnership etc. for non-individual applicants Operations – Active minimum 1 year
Requirements	<ul style="list-style-type: none"> No deposit requirements for irrigation pumps Documentation <ul style="list-style-type: none"> 6-month bank or MPESA statement 	<ul style="list-style-type: none"> 20% deposit for assets Documentation <ul style="list-style-type: none"> FO financials 6-month bank statement 	<ul style="list-style-type: none"> 20% deposit for assets Documentation <ul style="list-style-type: none"> Financials preferably audited 1-year bank statement or MPESA statements in the case of individuals
Asset Types	<ul style="list-style-type: none"> Irrigation pumps 	<ul style="list-style-type: none"> Farming assets – Tractors and combine harvesters Small trucks 	<ul style="list-style-type: none"> Farming assets – Tractors and combine harvesters Logistics assets

Sources: Interviews with Alluvial staff, MSP interviews

Notes: * Can be assessed through Alluvial Limited's farmer history



Client relationships | JAF will act as the interface for asset owners and FSPs and will need to create a robust selection, contracting, segmentation and data collection procedures



Outreach

- Outreach for farming assets will initially be done through Alluvial Limited and the NIA
- For logistics assets, Japtini Logistics and Alluvial Limited will support JAF.
- Develop pipeline through JAF's Business Development team



Selection

- Potential MSPs, farmers and FOs with prior working relationship with Alluvial Limited and Japtini Logistics preferable initially
- Potential MSPs that can demonstrate ability to repay loans. Criteria for farmers will be provision of bank statements and/or credit history with Alluvial and business/bank statements for MSPs



Contracting

- In addition to loan agreement with FSP, financing applicant will need to sign a contract indicating the total loan amount, 2% 'loaded' interest and conditions for asset utilization via JAF platform.



Segmentation

- JAF currently focusses on the rice but is aiming to expand to other value chains.
- Asset owner segmentation is expected to be:
 - Farmers - irrigation equipment
 - FOs - irrigation equipment and farming assets and small trucks
 - Experienced MSPs - asset financing for farming and logistics assets



Graduation

- To be based on successful repayment of initial asset financing brokered through JAF.
- Farmers can graduate into MSPs



Data collection

- Financial data to be collected for vetting prior to brokering/financing.
- Data on supply of mechanization services collected via platform
- Over time, this should allow JAF to build a more intentional selection, segmentation and potential graduation of asset finance applicants



Services | JAF's business model is anchored on four core services to the different players within the farm mechanization ecosystem

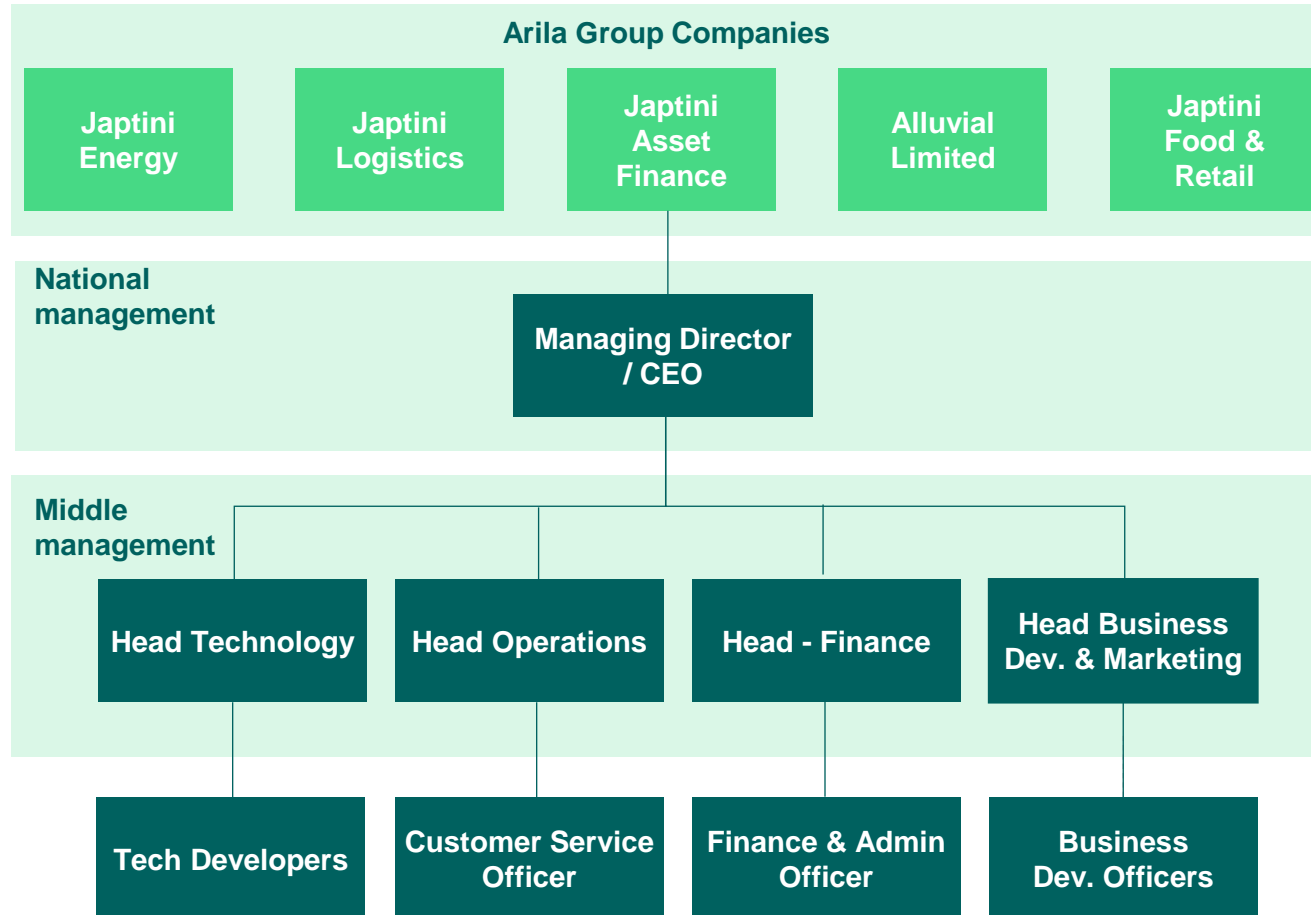
Category	Service	Envisioned impact	Implementation	Recipients	Revenue model	Status
Training & information	Training	Increased awareness and improved management and optimization of mechanization services	Providing learning experiences on asset ownership, management and operation of the assets	MSPs, asset operators and farmers*	Potential training fees	Piloting in 2023
	Market intelligence	Improved insights to facilitate financing in the agri-equipment and mechanization market.	Transaction taking place through the platform providing information on supply and demand of funding	FSPs and MSPs	None	Piloting in 2023
Financial services	Brokering	Increased funding deployment through improved access to data and information.	Matchmaking banks, asset providers and farmers through software to accommodate asset sales and loans	FSPs, MSPs and equipment suppliers	Loaded interest on every asset loan disbursed	Piloting in 2023
	Vetting	Improved data-driven screening mechanisms for increased efficiencies	Conducting rigorous financial background checks on potential loan applicants, translating into credit score to assess eligibility for asset loans.	MSPs for use by FSPs	None	Piloting in 2023

Source: JAF interviews

Notes: *As JAF is plugging into Alluvial's existing farmer base, farmers working with JAF in this SDM will already be receiving other services (including training on rice production) through Alluvial with JAF providing training to support efficient use of irrigation equipment for production



Organizational structure | The SDM will be fully integrated within the wider organization of JAF and staff will be utilized across Arila Group companies



- JAF's business model allows for a lean team to sustain the businesses operations.
- With the business yet to be operational, JAF is currently utilizing staff within JAF Logistics and Alluvial who have existing operations in Kenya.
- Being a platform business and thus tech-driven, the business will need a robust tech team supported by a marketing, finance and operations team.
- Considerations on gender will be made in filling the positions in line with the Arila Group's strategy.

Sources: Arila strategy documents, JAF interviews



SWOT | Building an agri-platform reliant on smallholder farmer demand comes with many challenges and as with any platform model, scale will be critical in the success of JAF's business

Strengths

- Dedicated team at the Group level with a clear vision
- Extensive experience in the rice value chain both in Nigeria and in Kenya
- In line with other Arila Group companies, JAF has strong focus on continuous improvement (pilot first, then scale)
- The business plans to expand to other value chains which is expected to create more impact for farmers and MSPs
- Existing farmer membership base through sister company and the irrigation schemes within which rice operations are carried out

Opportunities

- Mechanization access remains a challenge within the scheme with farmers reporting delays in land preparation and harvesting services due to constrained supply
- The region has a strong rice growing culture and mechanization will play a role in increasing productivity and curb post-harvest losses
- Value chain support from the Government of Kenya with rice being one of the Big4 and a priority value chain in the Agriculture Sector Transformation & Growth Strategy, creating significant opportunities to exploit within the value chain

Weaknesses

- The mechanization platform business model remains unproven and there is insufficient critical mass of agri-entrepreneurs with credit history to attract financing partners
- The business' model is reliant on successful MSP financing
- Need to create a team in marketing, IT and operations to support operationalizing and scaling the business
- The business' operational efficiencies and scale are heavily reliant on irrigation infrastructure (for transition to block farming) within the rice schemes targeted and farmer origination through Alluvial Limited.

Threats

- Fierce competition for tech talent
- The business model is dependent on other enabling infrastructure from other partners such as funding and asset owners creating limitations for scaling
- Intensifying competition from current and other mechanization providers

Sources: Arila strategy documents, ISF_RAFL Agricultural Platforms Report, Observations during client visit



Gender assessment | JAF intends to ensure women participation in the farm mechanization services. Progress on their gender plan can be achieved by documenting the gender strategy

Questions	Answer	Explanation
Gender strategy: Is gender equality a strategic goal for JAF which is communicated in documents?	No	While gender equality is a strategic goal for JAF, this is currently not documented. JAF is currently in its design phase and thus documented internal policies are yet to be developed.
Data collection: Does JAF collect data on staff or customers/farmers disaggregated by gender?	No	JAF is currently in its design phase but aims to incorporate gender as a key data point in its operations.
Inclusive workplace: Does JAF have policies or practices to make the workplace inclusive for both women and men?	Partly	As a subsidiary of the wider Arila Group, JAF will borrow heavily from Arila's existing policies. Amongst others, Arila's objective is to target women and youth in all operations and activities to close widening gender and youth gaps in critical areas/sectors.
Inclusive consultation: Does JAF speak to or consult both male and female customers (farmers) to learn about their different needs and preferences when designing a product	No	JAF aims to work consultatively with all farmers when operations start. However, the company expects local cultural practices to influence the gender proportions.
Inclusive tailoring: Does JAF tailor services based on how needs may be different for men and women?	Partly	Although JAF will not provide gender-focused services, they aim to make considerations in marketing these services to reach both men and women.
Independence and control over resources: Do services enable women to improve their independence, control over resources and/or value capture?	No	JAF aims to work with potential female MSPs to increase their access to finance. JAF also plans to create opportunities for women by training women aged between 20 and 40 to work as tractor operators.

Sources: Interviews with JAF staff, Arila Group strategy documents



Enabling Environment (1/3) | While aspects such as technology favor JAF's operations, poor infrastructure and road network in the irrigation schemes threatens asset utilization

		Opportunity	Neutral	Risk
Definition	Situation	Impact on SDM		
Technology	<ul style="list-style-type: none"> Mobile penetration: There were 59.24 million mobile connections in Kenya in 2021¹ and mobile money penetration stood at 73.8%² in 2022². Internet penetration: Internet penetration in Kenya stood at 42% in 2022, an increase of 7.4% from 2021¹ Digital agricultural technologies (DATs): Kenya has about 113 institutions offering digital solutions for agriculture, 64 of which are headquartered within the country.³ 	<ul style="list-style-type: none"> Leveraging digital technology and internet and mobile penetration will allow for more efficient market clearing both at the access to financing and access to mechanization levels and extend the reach of these services to more users. 		
Environment	<ul style="list-style-type: none"> Production systems: While one segment of farmers targeted under the SDM operate in irrigation schemes, for out grower farmers, largely rely on erratic rainfall patterns which limits farming to only one crop cycle in a year. Crop Insurance: Despite the high vulnerability of agricultural production to the effects of climate change and market inefficiencies, penetration of risk management solutions remains low. 	<ul style="list-style-type: none"> Provision of reliable solar powered irrigation kits will result in increased farmer incomes for the out-grower farmer segment by increasing the number of crop cycles in a year while using renewable energy 		
Infrastructure	<ul style="list-style-type: none"> Irrigation infrastructure: While the National Irrigation Authority (NIA) is responsible for development, operation and maintenance of irrigation infrastructure within the schemes, the infrastructure is poorly maintained with observed siltation⁴. Some MSPs reported challenges in mechanization provision resulting from this Road networks: Roads within the schemes are unpaved and not properly maintained making logistics difficult especially during the rainy season. 	<ul style="list-style-type: none"> Poor infrastructure increases the cost of value chain operations impacting the profitability of both the farmer and the SDM operator. 		

Notes: 1. [Digital 2021: Kenya](#) 2. [Communications Authority of Kenya, 2022](#) 3. [Digital Agriculture Profile – Kenya](#) 4. [National Rice Development Strategy \(2019-2030\)](#) 5. Discussions during country visit



Enabling Environment (2/3) | Stiff competition and low farm gate prices in the rice sector create disincentives for investment in production

		Opportunity	Neutral	Risk
Definition	Situation	Impact on SDM		
Labor	<ul style="list-style-type: none"> Labor availability: While some activities in rice production are already mechanized, some such as weeding and bird chasing largely rely on manual labor. Rural-urban migration has resulted to labor scarcity and high labor costs. Traditionally, most smallholders depend on family labor to carry out various farming activities. 	<ul style="list-style-type: none"> Increased access to mechanization is expected to reduce the need for manual labor in the rice production process. 		
Inputs & Financing	<ul style="list-style-type: none"> Input financing: Smallholder farmers in Kenya use low levels of inputs due to lack of access to credit resulting in lower yields and low farm returns¹. Asset financing: While financing institutions have asset financing products, agri-equipment lags behind other assets due to low demand for mechanization given land fragmentation, high deposit requirements, insufficient financial institution skills for client risk assessment, market risks associated with assets used as collateral among others² 	<ul style="list-style-type: none"> Inadequate financing limits farmer productivity and impact. Low asset financing rates to the agri sector results in lower productivity for farmers and low revenues for the SDM operator. 		
Trading System	<ul style="list-style-type: none"> Kenya is a member of the Eastern African Community (EAC) and COMESA trading blocks, with substantial cross border trade with Uganda and Tanzania. The movement of uncertified rice see across the borders is detrimental to rice sub-sector development. The blocs however present major opportunities for trade and sharing of germplasm³. 	<ul style="list-style-type: none"> Trading blocs provide a market for produce from farmers working JAF, whether directly or indirectly through aggregators 		
Pricing & Competition	<ul style="list-style-type: none"> Competition: Poor market organization in the region has led to market dominance by cartels and adulteration of rice. Locally produced rice continues to face still competition from cheap poor-quality rice which is fraudulently repackaged and sold in local markets⁴. Pricing: Farmer have decried low farmgate prices against rising costs of production. 	<ul style="list-style-type: none"> Stiff competition from cheaper imported products results in lower prices for rice farmers and disincentivizes investment in production 		

Notes: 1. [Kenya Markets Trust, 2019](#) 2. [FSD Africa, 2017](#) 3. [National Rice Development Strategy \(2019-2030\)](#) 4. [Production and marketing of rice in Kenya: Challenges and opportunities](#)



Enabling Environment (3/3) | Institutional frameworks and social norms such as gender equality that can support rice farming remain weak

		Opportunity	Neutral	Risk
Definition	Situation	Impact on SDM		
Institutional Stability	<ul style="list-style-type: none"> There is an inadequate, uncoordinated and fragmented policies and institutional legal framework in the rice subsector³. Some government institutions such as NIA and KALRO however continue to support farming through irrigation infrastructure and coordinated research efforts on seeds 	<ul style="list-style-type: none"> Institutional stability is critical for creating a predictable environment that spurs value chain investment. 		
Land Tenure	<ul style="list-style-type: none"> Ownership: Cultural norms still underpin ownership of land with men observed to own land more than women even though women are key players in rice production¹. Tenure: The tenure system in rice growing regions is unfavorable as farmers do not have formal titles to the land that they own¹. 	<ul style="list-style-type: none"> Rice farmers carrying out production within the schemes will require mechanization despite land tenure challenges . 		
Social Norms	<ul style="list-style-type: none"> Healthcare: Lack of adequate sanitation facilities in the irrigation schemes has created healthcare and environmental concerns. There is need for strengthening of health services in rice growing areas to reduce incidences of waterborne diseases¹. Gender equality: While women are instrumental in the provision of farm labor, their decision making is limited². 	<ul style="list-style-type: none"> There is need for deliberate efforts to include women in the SDM for maximum impact. 		

Notes: 1. [National Rice Development Strategy \(2019-2030\)](#) 2. [Production and marketing of rice in Kenya: Challenges and opportunities](#)



3a

**Business
Case**



Assets | The platform will offer a range of loan products tailored to the type of asset and client. The product portfolio is guided by the biggest pain points for farmers operating in the value chain

	Irrigation system	Combine Harvester	Small tractor	Large tractor	Small truck	Large truck
Description	5-10 acres	80-150hp Harvesting 5-10 acres of land per day*	80-150hp tractor Cultivating 10-20 acres per day*	>150hp tractors mainly used for large farming operations	11-tonne trucks for transportation from farms to aggregation centers	30-tonne truck used for long-distance product hauling
Impact	Increase productivity by 50% for out-grower farmers	Reduce post-harvest losses by 12%	Increase productivity by 7%	Increase productivity by 7%	Increase efficiencies of getting products from farms	Increase efficiencies of getting products to market
Client	Out grower farmers/FOs	Agri-entrepreneurs**	Agri-entrepreneurs**	Aggregators	Agri-entrepreneurs**	SMEs
Supplier	Japtini Energy	CMC New Holland	CMC New Holland	CMC New Holland	Isuzu, Tata	Isuzu, Tata
Asset value (USD)	830	58,000***	61,000****	110,000****	66,000	124,000
Tenor	18 months	4 years	4 years	4 years	5 years	5 years
Interest	15% p.a	13% p.a	13% p.a	13% p.a	14% p.a	14% p.a
Deposit	30%	20%	20%	20%	30%	30%

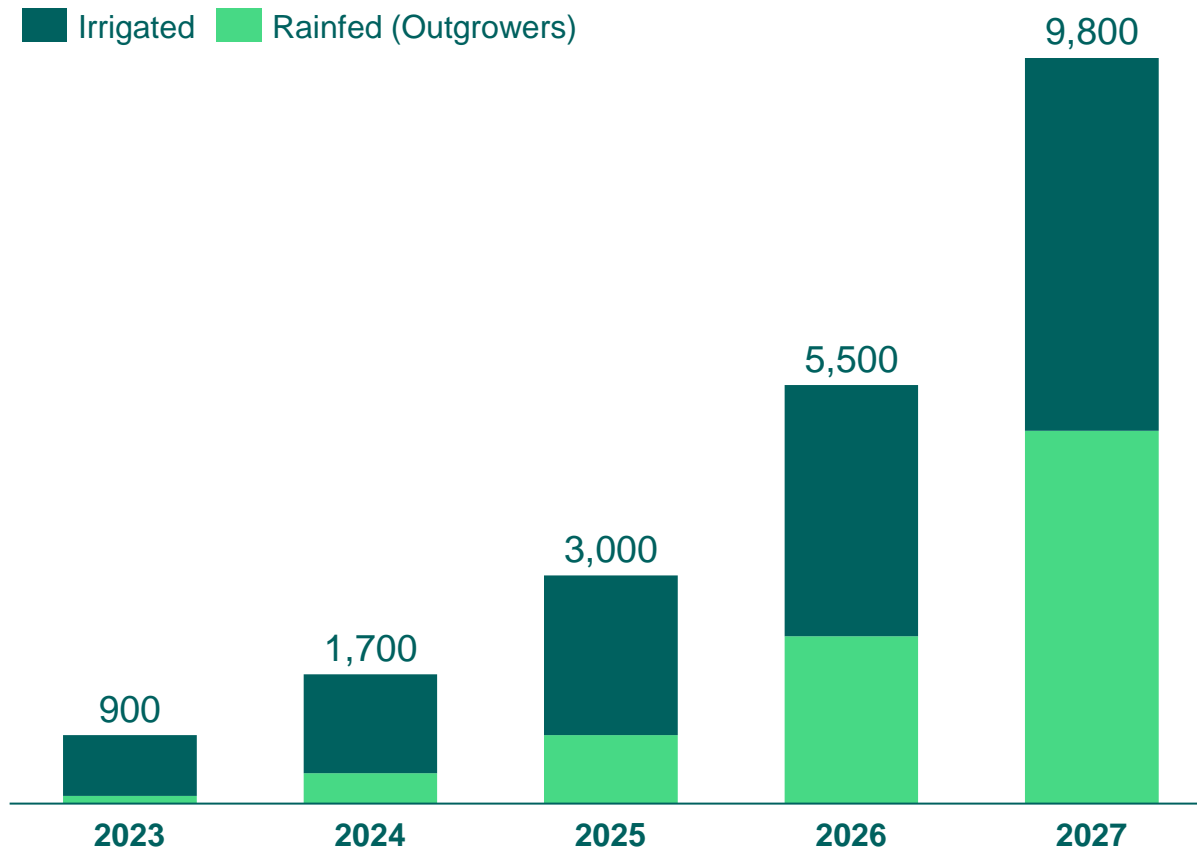
Sources: Arila Go-to-Market Strategy, Arila rice solution model, Interviews with Alluvial and JAF staff, Farmer and agri-entrepreneur interviews

Notes: *the capacities are low due to small fragmented land parcels **Agri-entrepreneurs are entrepreneurs within the rice farming ecosystem who have the potential to convert to MSPs upon signing up for JAF services ***includes the cost of a tipping trailer **** includes the cost of implements (tiller, harrower, planter, fertilizer spreader)



Scale | JAF is expecting to increase the acreage serviced within the rice value chain in the Western Kenya region by 89% y-o-y over 5 years

Number of farmers and acreage by segment



- Through Alluvial operations, JAF has immediate access to 1,000 acres of land to provide **mechanization services** to under 900 farmers and targets to reach 10,000 farmers by 2027.
- JAF will also provide access to **irrigation equipment** to out-grower farmers within these schemes who depend on unsteady water supply from the irrigation schemes.
- In addition, JAF will broker asset financing to support **transportation services** that will haul rice sourced from farmers in the Western Kenya.
- In addition to the two irrigation schemes, JAF seeks to expand into the Bunyala Irrigation scheme in the neighboring Siaya/Busia counties. The scheme has an area of 2,500 acres under irrigation working with 2,000 farmers. The irrigation potential in this scheme is about 20,000 acres.

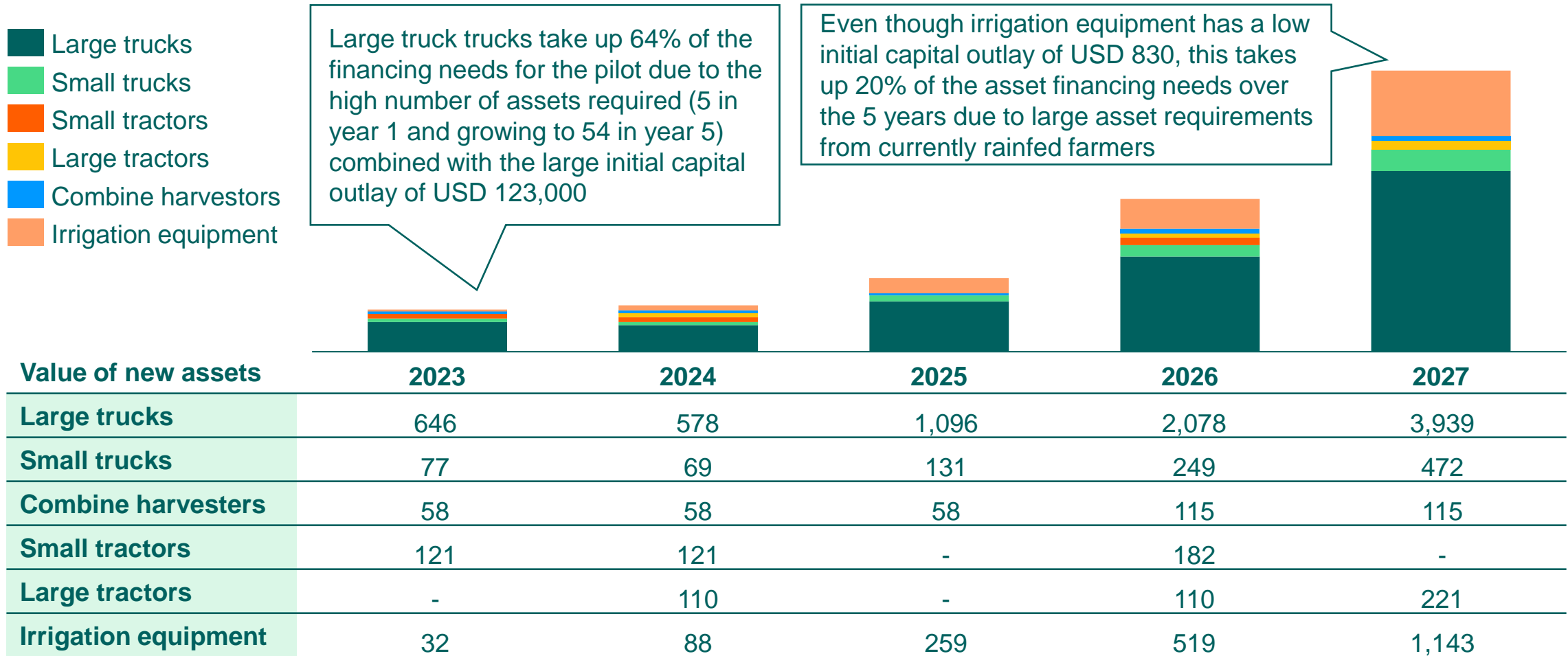
Source: JAF interviews

*Farmer numbers are calculated from acreage targets, farmer proportions and size of land for each farmer segment. JAF initially works with a larger proportion of irrigation scheme farmers but increasingly grows out-grower farmers as the opportunities for growth outside of the schemes are unconstrained by land size.



Asset requirements | For the pilot, large trucks for long distance haulage present the largest asset financing requirement needs followed by irrigation equipment financing

Financing requirements* and value of new assets for 2023-2026 ('000 USD)



Sources: MSP interviews, JAF interviews, Japtini Energy, CMC Holland

Notes: *Financing is provided up to 70-80% of the value of the assets for farming assets and logistics assets respectively as potential MSPs are required to raise deposits of 30% for farming assets (excluding irrigation equipment) and 20% for logistics assets



Asset revenues | Revenues from large trucks present the highest growth commensurate with the value of the assets acquired through the platform

Asset revenues ('000 USD) and scale of assets for 2023-2026



Scale of assets	2023	2024	2025	2026	2027
Large trucks	5	9	16	29	54
Small trucks	1	2	4	7	12
Combine harvesters	1	2	3	5	7
Small tractors	2	4	4	7	7
Large tractors	-	1	1	2	4
Irrigation equipment	40	150	460	1,100	2,500

Irrigation equipment is a large-volume low-revenue asset fetching 13% JAF's total revenue and USD 7 of revenue per asset in 2024

Large truck revenues present a growth of 1,000% from 2023 to 2027 which provides insight into JAF's business model that targets to develop smallholder markets which require efficiency at off-taking and distribution. The revenues are also commensurate with the value of assets

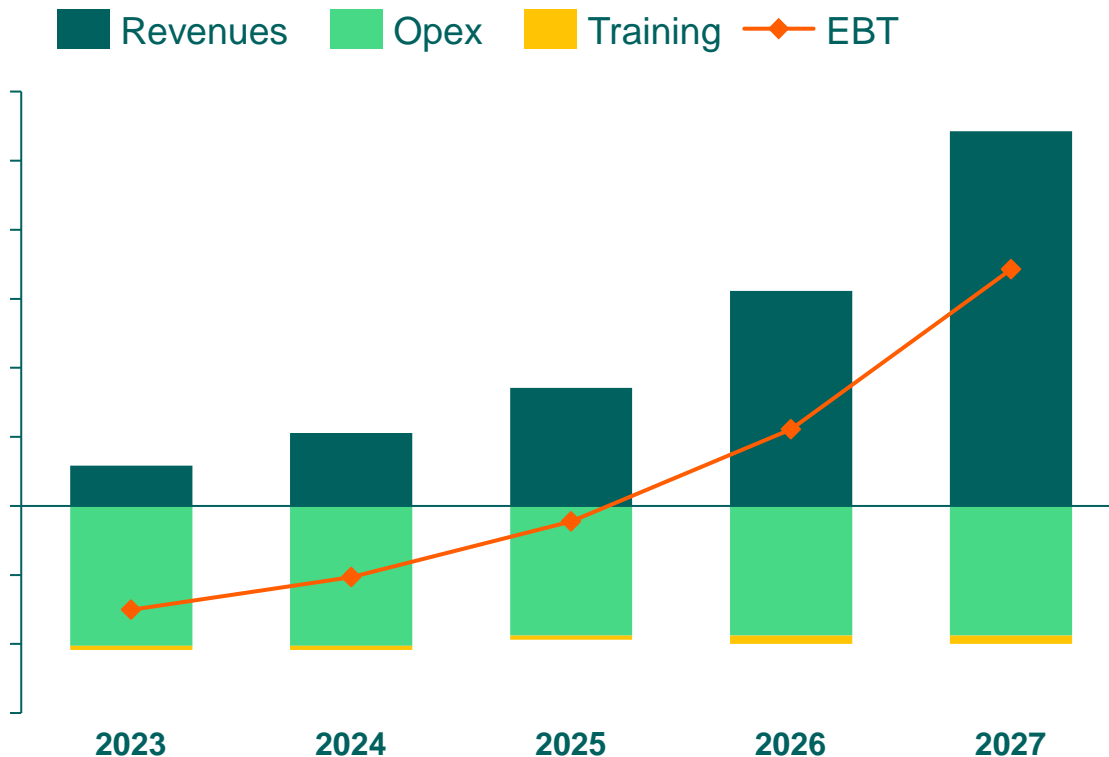
Irrigation equipment has the largest asset growth numbers at 6,200% depicting the scale of currently rainfed out-grower farmers that JAF is targeting

Sources: MSP interviews, JAF interviews, Japtini Energy, CMC Holland



P&L over time | Given the previously discussed growth trajectory, JAF is expected to break even in 2026

Profit and loss for 2023-2027 ('000 USD)



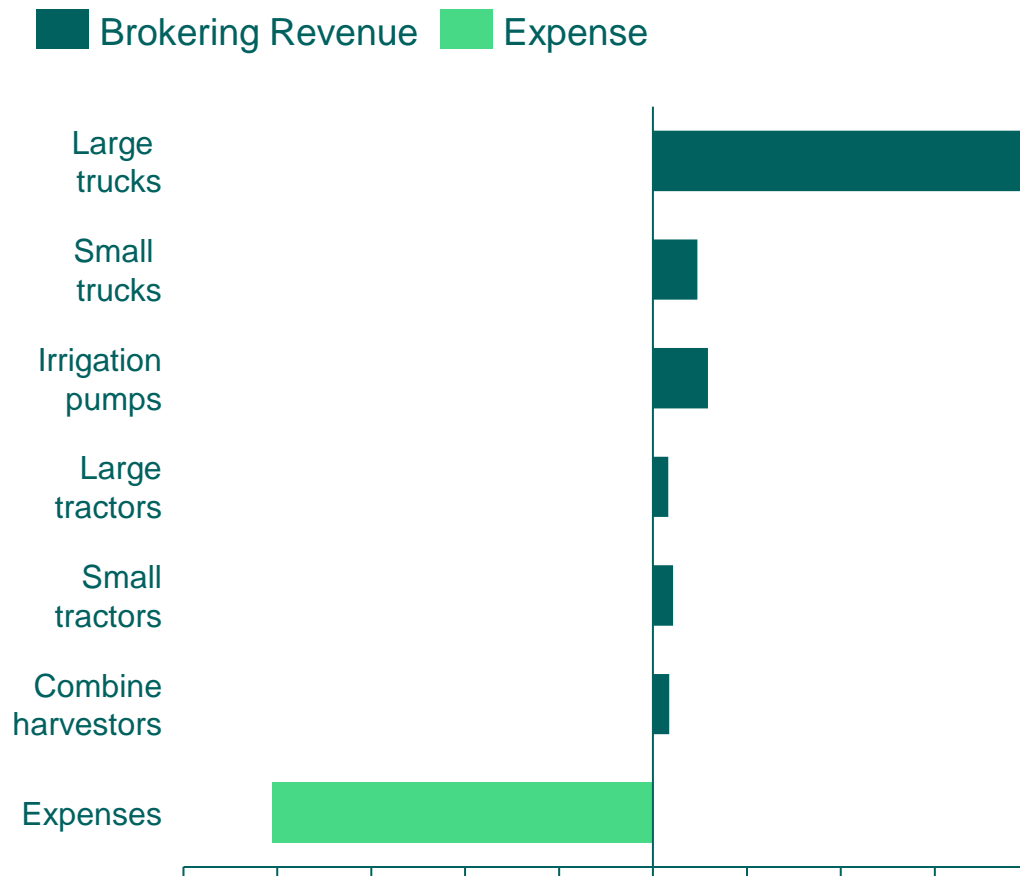
- Given the aforementioned scale and complementing asset requirements within the rice value chain in Western Kenya, JAF is expected to break even in 2026.
- Despite JAF being a lean business, it still takes some time to break-even due to low margins and the need for scale/volumes.
- While the time to break-even for this pilot is consistent with trends observed in platform businesses, there is insufficient data to predict how this will unfold at larger scale
- Intermediation risks impact JAF's P&L as the success and growth of the business is dependent on creating access to affordable financing for potential asset owners.
- In addition, farmers' ability to pay for mechanization services (which would allow MSPs to service their loan obligations in a timely manner) is heavily reliant on the capacity of farmers to access a farming financing package.
- Furthermore, the "loaded interest" component may act as a disincentive, particularly for customers who already have banking relationships and access to bank funding.

Source: JAF interviews



P&L by service segment | Logistics assets generate the highest revenue at 79% while the biggest cost element is salaries taking up 50% of all expenses

Revenues and expenses, 5-year average ('000 USD)



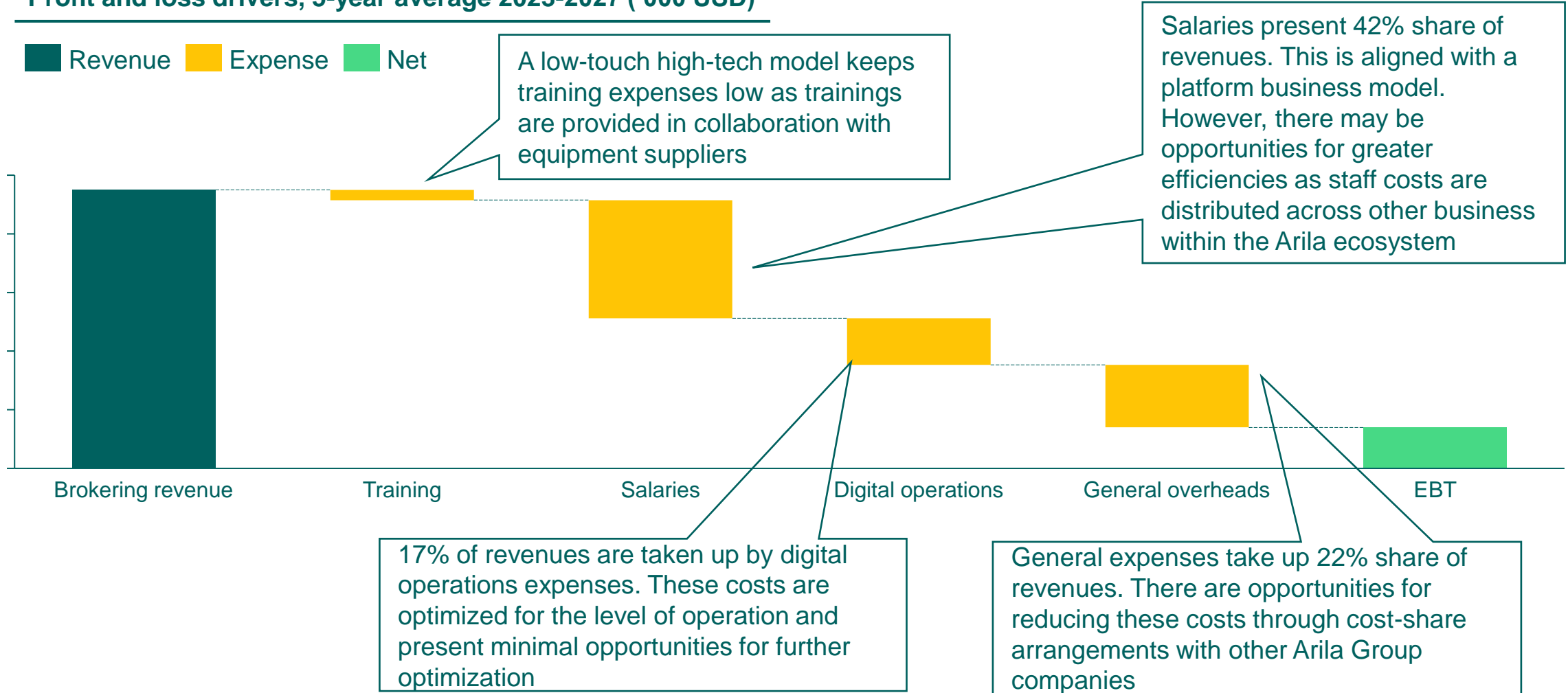
- Logistics assets generate 79% of all brokering revenues. Brokering revenues from large trucks carry 71% overall share of revenues.
- This is consistent with the asset requirements at logistics level required to facilitate efficient distribution of rice produced.
- Irrigation equipment carries 11% of total revenues and is aligned with the growth of out-grower farmers anticipated to be serviced with irrigation equipment over the 5 years.
- Farming assets contribute 10% to total revenues with small tractors contributing the largest portion at 4% of total revenues. This is largely driven by the smaller numbers required at this scale of business
- The biggest expense is salary costs averaging 50% of expenses and 41% of revenues.
- Digital operation costs, general expenses and training costs are expected to average 20%, 26% and 4% of expenses respectively.
- The business generates gross margins of 90% growing to 98% in year 5 riding on low direct costs from training. The net margins increase from -251% in year one to 770% in year 5 as a result of steady and low overhead costs resulting from lean operations.

Source: JAF interviews



P&L build-up | JAF generates a positive EBT over the 5 years on the basis of lean overheads as it relies on resources from other Arila Group ecosystem companies

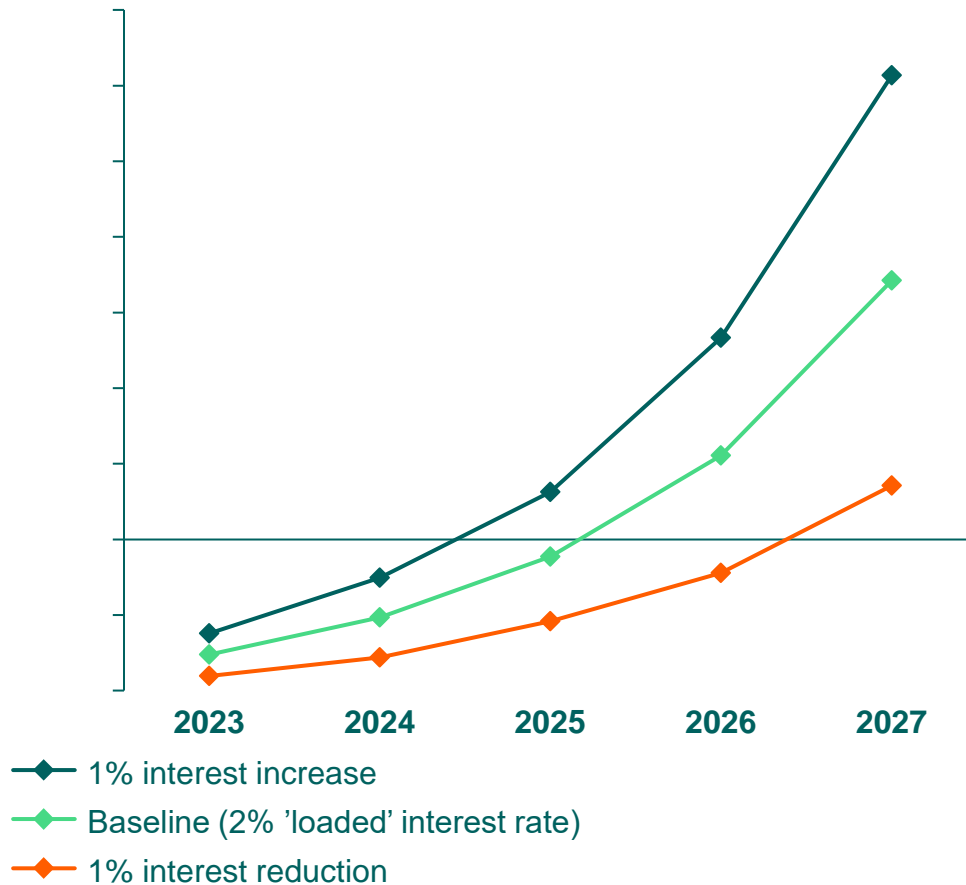
Profit and loss drivers, 5-year average 2023-2027 ('000 USD)



Source: JAF interviews

Scenario analysis | Price-setting may be a challenge for JAF due lack of market share and the need to initially demonstrate a value proposition for MSPs

Projections of income ('000 USD)



Source: JAF interviews

- The business is highly sensitive to 'loaded' interest rate changes. A reduction of this rate by one percent reduces earnings by only 18% in 2023 as the scale of assets is low. With sufficient scale demonstrated in year 3, income reduces by 376%
- The break-even period is 2.45 years, 3.17 years and 4.38 years at 3%, 2% and 1% interest rates respectively
- While JAF's services are somewhat differentiated in the market, the basis for setting the 2% 'loaded' interest is unclear and this pilot will facilitate the determination of an ideal rate to charge for these services
- To grow its market share, JAF will likely be a price-taker initially as:
 - MSPs, especially those with existing banking relationships, can access information on interest rates and thus be unwilling to pay a premium of 2% for brokering services
 - The value proposition for MSPs is not sufficiently distinguished as the service is typically similar to what banks provide
- MSPs may however be open to negotiating the price for brokering in exchange for lower customer acquisition costs and service fulfilment costs. This may also present opportunities to charge commissions on revenues for facilitating market clearing for MSPs



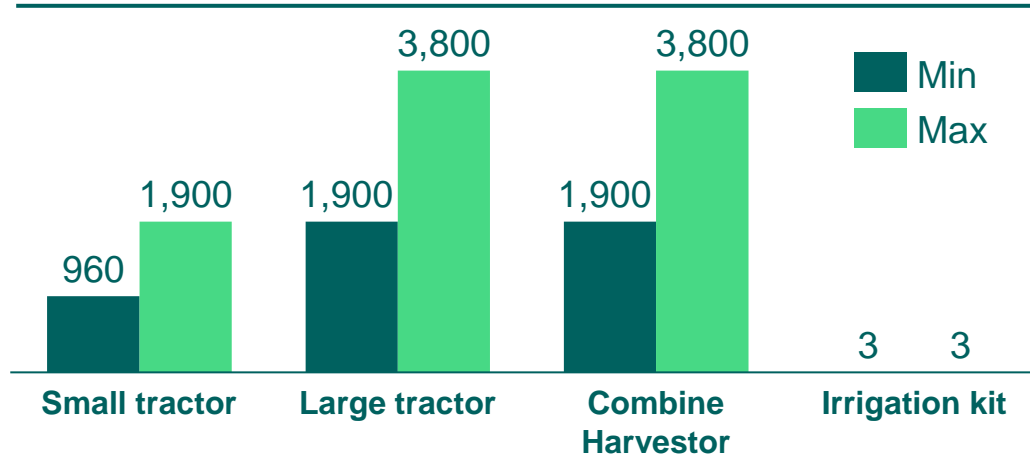
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Business Case: MSPs



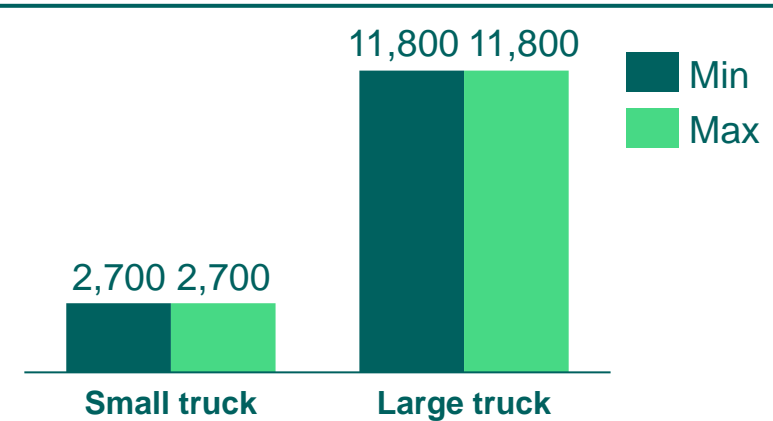
Capacity | Land fragmentation limits the utilization of farming assets and the strategy to cluster farms into blocks will be crucial in proving the business case for these assets.

Farming asset capacity, acres per asset per year



- Larger capacity is driven by JAF's move to cluster farmers into farming blocks for better mechanization efficiency.
- Block farming is expected to increase acreage serviced through farming assets by 200% by year 5.
- While the large tractor and combine harvester have the capacity to service 20 acres per day, fragmentation lowers this to 10 acres per day initially.
- Utilization of small tractors is also sub-optimal, initially servicing 5 acres per day with the capacity to grow to 10 acres per day

Logistical asset capacity, MT per asset per year



- Logistical assets do not encounter utilization constraints, as these assets do not face land fragmentation encountered in farming.
- While volumes hauled are based on volumes from farmers working with JAF in rice production, these assets can be utilized to haul other agri products within the region.

Sources: MSP interviews, JAF, Japtini Logistics



Financing Terms | While farming assets are typically considered higher risk and thus attract poor funding terms, there are opportunities to negotiate better terms under the envisioned model

Terms of financing by asset type

	Small Tractor	Large Tractor	Combine Harvester	Small Truck	Large Truck
Repayment Period	4	4	4	5	5
Interest (%)	13%	13%	13%	14%	14%
Monthly repayment	1,100	2,100	1,100	1,200	2,300

- The financing terms for farming assets are based on terms provided by CMC Holland, an agri-equipment supplier, and provide a marginally lower interest rate and a shorter repayment period compared to logistics assets.
- Banks typically steer away from funding farming assets due to the risks inherent in primary production and the low quality of asset collateral arising from low recovery in secondary markets.
- They will typically also charge a higher rate of interest in financing farming assets to cover for the cashflow risk, unless backed by financing from other enterprises.
- JAF will de-risk cashflows from these farming assets by matching supply with demand for mechanization services. Coupled with this, the farmers to be serviced are irrigated and will carry out production all year-round eliminating seasonality risks, thus positively impacting farming assets.
- The terms for logistics assets are drawn from banks through logistics service providers. Logistics assets are considered low risk and thus present opportunities for negotiating better financing terms.

Sources: Interviews with JAF staff, Agri-entrepreneur interviews



Return on Investment| Earnings from all assets generate a positive ROI for all assets with repayment periods of less than 5 years for most asset types

Investment and returns by asset type

	Small Tractor	Large Tractor	Combine Harvester	Small Truck	Large Truck
Earnings*	102,000	148,000	102,000	75,000	107,000
Initial Investment	61,000	110,000	57,000	66,000	124,000
Salvage Value	6,000	11,000	5,700	13,000	25,000
PBP(Years)	3.9	4.4	3.9	4.6	>5
ROI (%)	78%	44%	88%	33%	6%

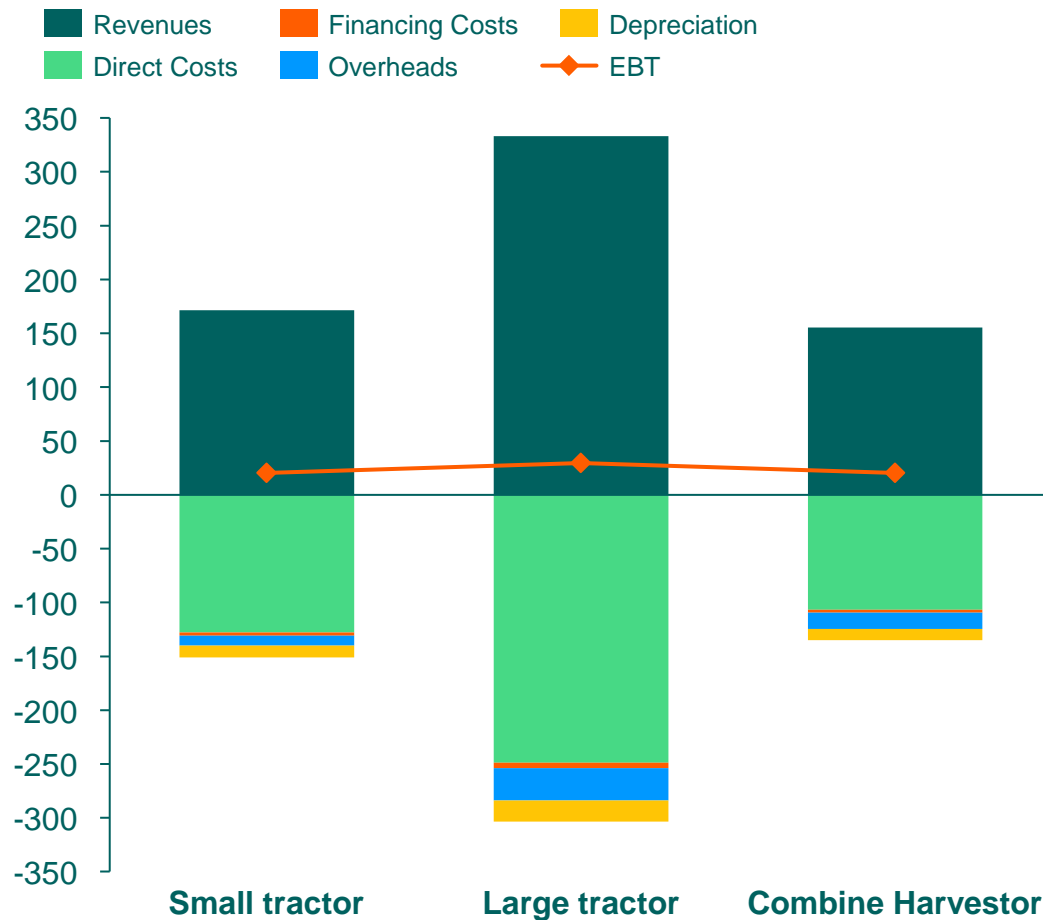
- All assets show a breakeven period (PBP) of less than five years except the large truck.
- The return on investment (ROI) is positive for all assets. Low earnings against initial capital for logistics assets result in a lower ROI compared to farming assets.
- Farming asset returns present a compelling opportunity for MSPs especially when combined with JAF's proposition for market clearing and training that will drive asset utilization.
- Even though the ROI for farming assets is generally higher than for logistics assets, risks arise from:
 - Susceptibility of earnings to similar risks as those facing other agri-enterprises.
 - Reliance on transition to block farming to drive utilization. This will especially affect large tractor earnings.
 - Reliance on infrastructure provided by NIA within irrigation schemes which affects asset use.
- Logistics assets provide more stable earnings in comparison as they may be employed in other crop or non-crop haulage in the event of months of low rice productivity.

Notes: *The total earnings over the 5-year period



Farming Asset P&L | A critical factor for increasing farming asset profitability is increased utilization which will result from increasing size of land blocks to allow for efficient utilization.

Average profit and loss for 2023-2027 ('000 USD)



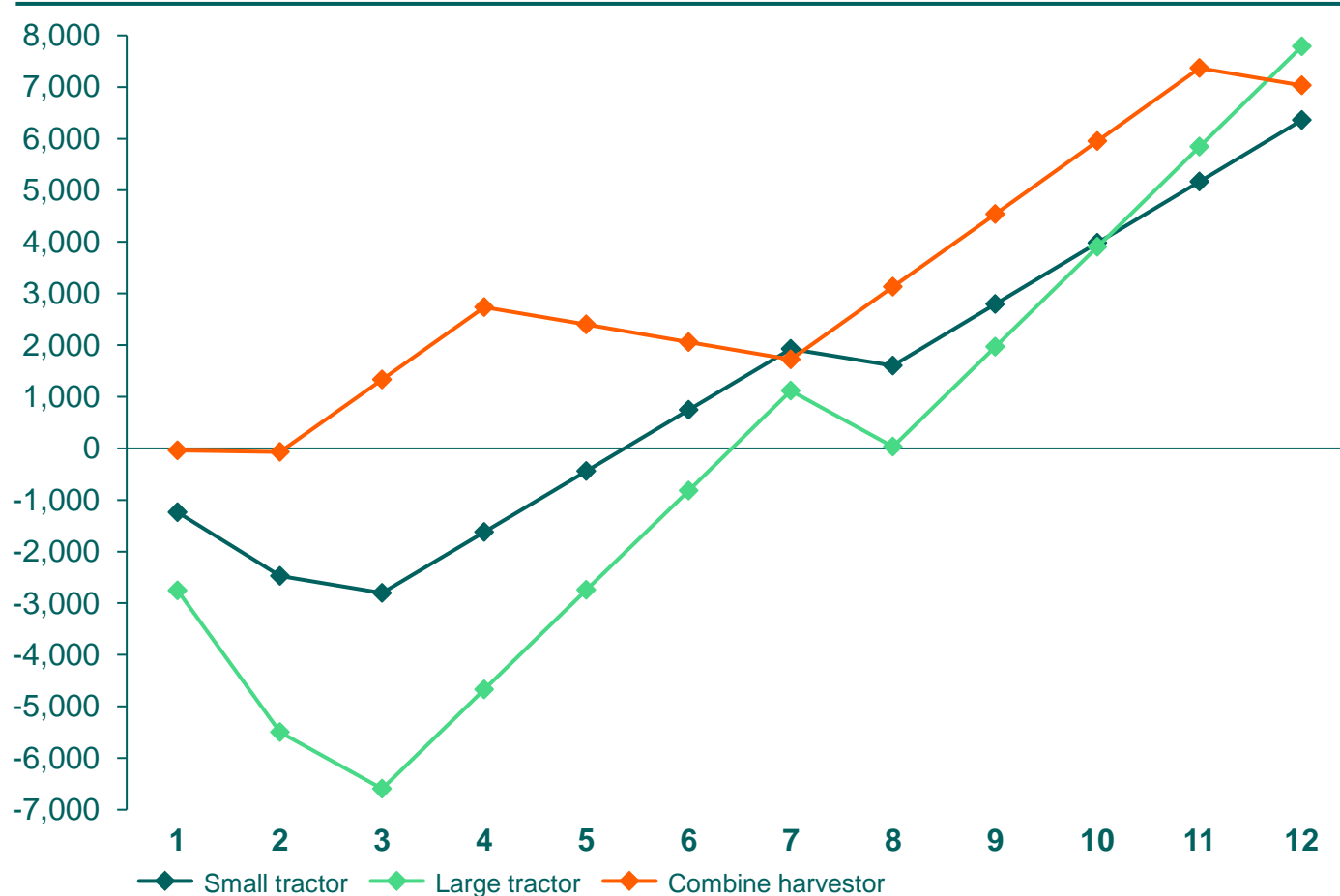
- All farming assets generate a profit from the first year of operation.
- The main driver of earnings is asset coverage which is expected to increase from 5 to 10 acres per day for a small tractor and from 10 to 20 acres per day for the large tractor and combine harvester as land is converted into larger blocks.
- A small tractor generates a profit of USD4,000 in year 1 and USD 40,000 by year 5 while a large tractor generates earnings of USD 3,700 growing to USD 65,000 in year 5.
- A combine harvester, on the other hand, generates profits of USD 4,900 growing to 42,000 by year 5.
- Low earnings in initial years are due to land fragmentation and expected customer friction. It will be critical for JAF to work with the NIA to convert land into blocks which will increase asset use efficiency and drive utilization.
- While assets can be used all year round due to irrigated farming, JAF will need to carry out proper production planning in collaboration with Alluvial Limited and its farmers to ensure asset use remains largely high most of the year.
- Fluctuating oil prices are also expected to impact farming asset earnings.

Notes: The small tractor and large tractor each have accompanying implements that include a disc plough, harrow, planter and fertilizer spreader. Tractors are expected to carry out all the activities of land preparation, planting and fertilizer spreading for each acre of land contracting for services.



Cashflow over time | While farming assets are utilized through out the year, the cashflows are affected by seasonality in farming

Farming asset cashflow for Year 1 (USD)



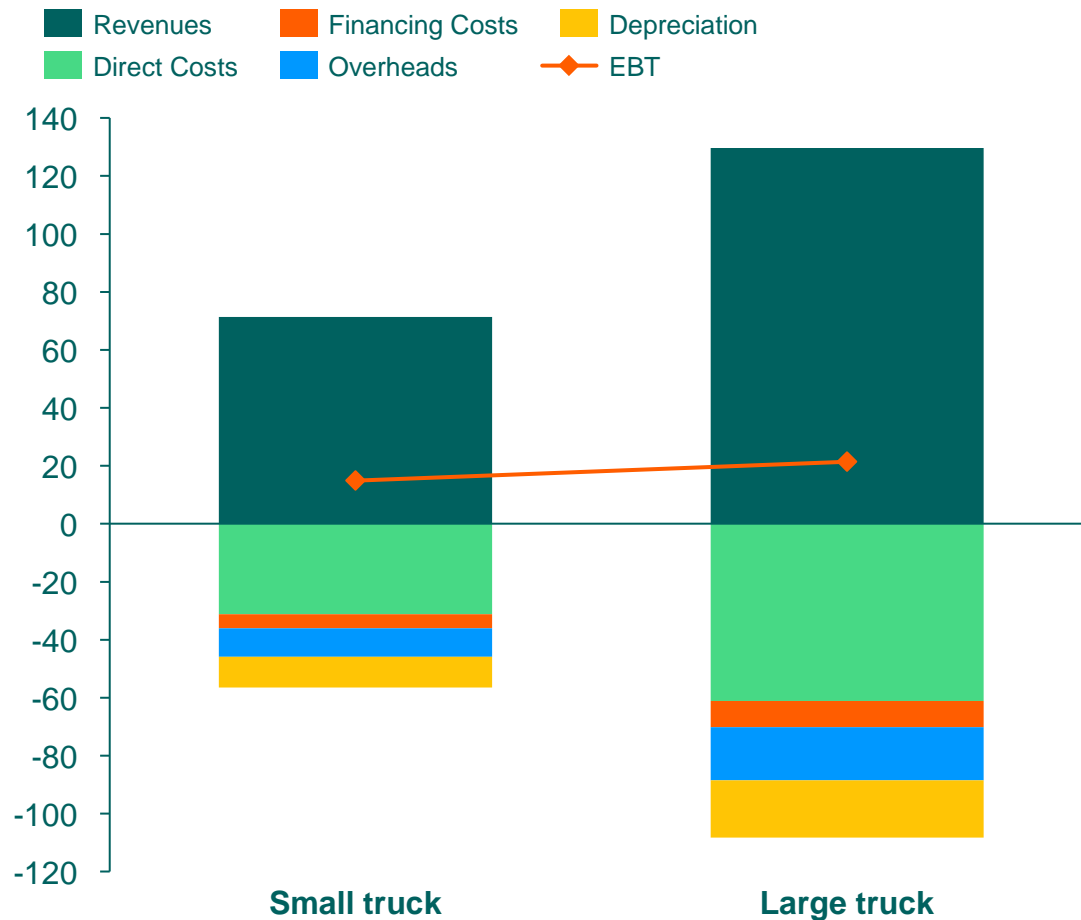
- All farming assets generate a positive cashflow in the first year of operations.
- Farming asset use is however affected by seasonality. Harvesting is largely carried out in the dry season while land preparation takes place just before the on-set of the rains.
- All farmers working with JAF will however carry out irrigation farming, producing all year-round (producing at different times) resulting in adequate asset utilization most of the year.
- While cashflow from the assets is sufficient to cover for the loan principal repayments, conversion of land into farming blocks will be a key success factor in ensuring these farming assets generate sufficient cashflows to cover repayments over the loan tenure.

Sources: Agri-entrepreneur Interviews, JAF interviews



Logistics Assets P&L | Logistics assets generate positive average earnings and are expected to be stable over the 5 years as assets can be employed in transport of other products

Average profit and loss for 2023-2027 ('000 USD)



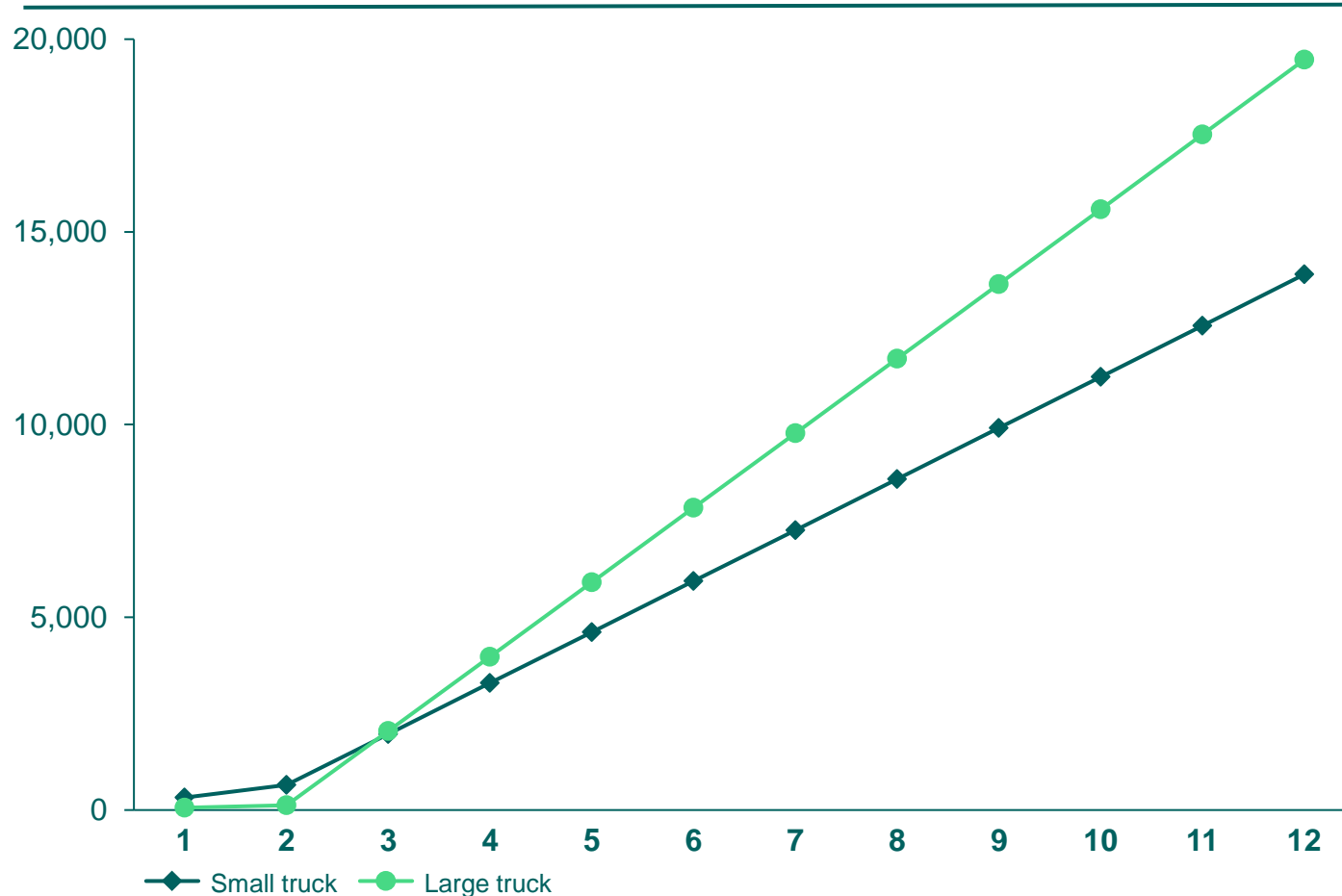
- The small truck and large truck have a capacity of 11 MT and 30 MT, respectively.
- The volumes to be transported per annum for each asset is:
 - 11,800 MT for a small truck based on the assumption that each truck makes an average of 4 trips per day
 - 2,700 MT for a large truck, a lower figure as trips typically take between 2 to 4 days on average.
- A small truck generates a profit of USD11,200 in year 1 growing to USD 19,100 in year 5. A large truck generates earnings of USD 14,400 growing to USD 29,300 in year 5. The increase in earnings is largely attributable to the reduction in interest costs.
- Growth in earnings is however limited by capacity constraints and a critical factor in the profitability of these assets is reducing downtimes to keep utilization levels high.
- In addition to utilization levels, fluctuating oil prices are also expected to drive logistics assets earnings. High oil prices will lead to a reduction in margins.

Notes: Small trucks will be utilized in the transportation of produce over short distances, farm to aggregation centers and to local markets. Large trucks will be used to haul produce over long distances, both locally and in export markets.



Cashflow over time | Logistical assets generate a stable positive cashflow from the first year as they are unaffected by crop seasonality

Logistics asset cashflow for 2023-2027 (USD)



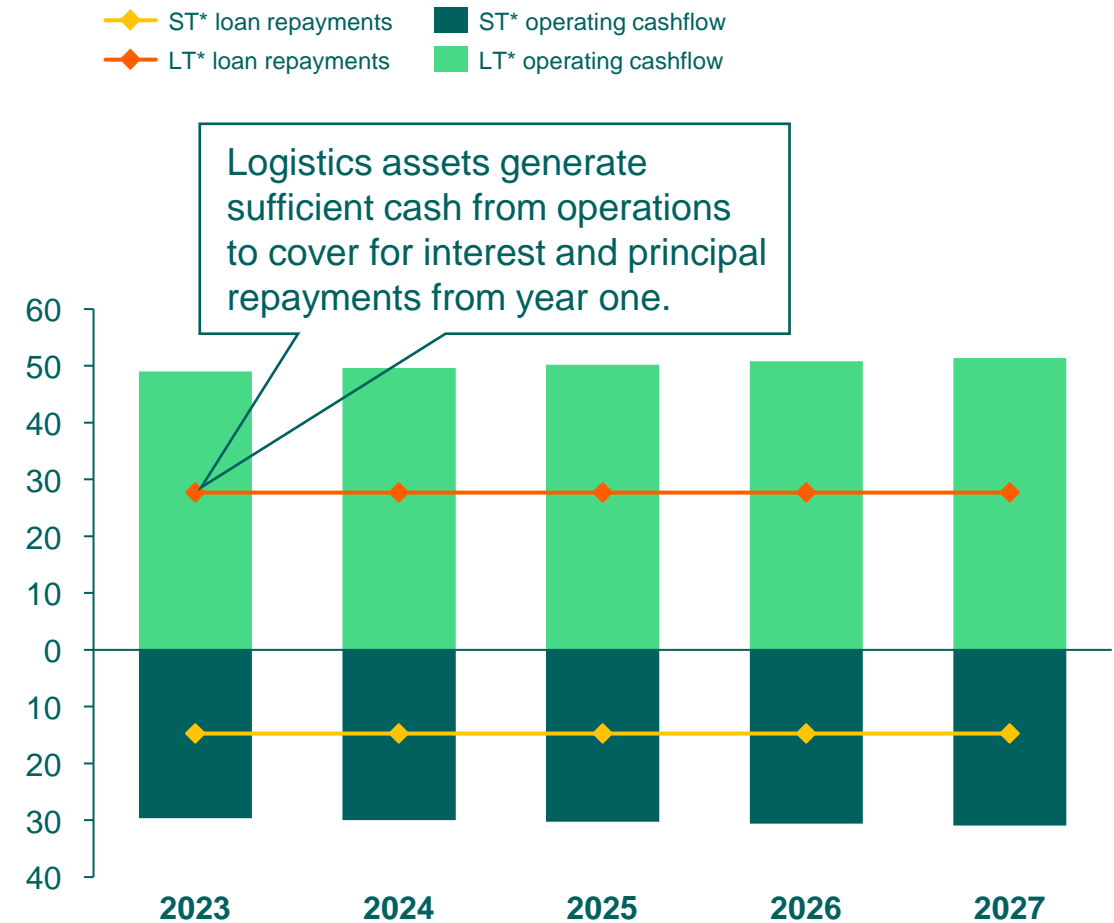
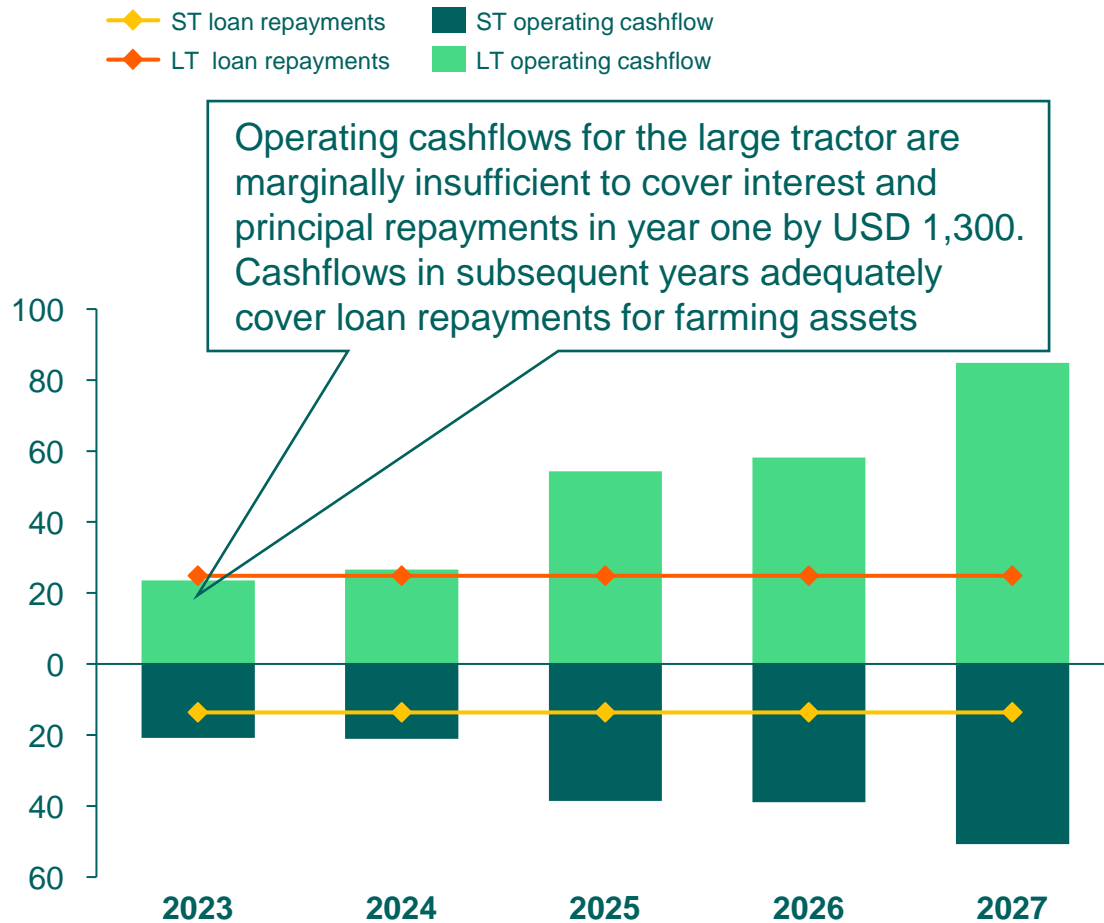
- Both assets generate positive cashflows from start of operations.
- Cashflows from logistics assets are expected to be stable as assets will be employed in transport of other produce and thus seasonality will not play a big factor in asset utilization.
- Proper management and maintenance of the assets, including satisfactory and timely repair and maintenance will be key in ensuring these logistics assets generate sufficient cashflows to cover repayments over the loan tenure.

Sources: Agri-entrepreneur Interviews, JAF interviews



Asset operating cashflow vs loan repayments| Most assets generate sufficient cashflow to cover for principal repayments in each period reducing loan default risks.

Loan repayments against operating cash flow



Notes: ST – Small tractor LT – Large tractor ST* – Small truck LT* – Large Truck







4

Impact Case



Farmer segments | JAF's farmer base is segmented into farmers within irrigation schemes who can carry out farming year-round and out-grower farmers who currently do rainfed production

				
Characteristics	Baseline 1	Baseline 2	SDM 1	SDM 2
Current yield	3.8 MT/acre	2.8 MT/acre	3.8 MT/acre	3.8 MT/acre
Maximum yield	5 MT/acre	4 MT/acre	6 MT/acre	6 MT/acre
Farm size	2 acres	3 acres	2 acres	3 acres
Crop cycles	1.5	1	2	2
Farm-gate price	0.32 USD/kg	0.32 USD/kg	0.32 USD/kg	0.32 USD/kg
Services				
Equipment & Labor				
Land preparation	Mechanized*	Mechanized*	Mechanized**	Mechanized**
Planting	Manual	Manual	Mechanized	Mechanized
Harvesting	Mechanized***	Mechanized***	Mechanized	Mechanized
Financial Services				
Irrigation	Yes	No	Yes	Yes

- Baseline 1 represents **rice farmers within the irrigation schemes** who have supply of water from the NIA. Challenges in accessing mechanization however limits production to **1.5 cycles per annum******
- SDM 1 farmers are Baseline 1 farmers that have access to the services in the SDM. This provides them with timely access to mechanization and a broader mechanization service offering for increased efficiencies
- Baseline 2 represents **out-grower farmers** in the regions surrounding the irrigation schemes who have inconsistent supply of irrigation water and largely carry out rainfed farming which allows them **1 crop cycle** per annum. These farmers are also semi-mechanized
- SDM 2 farmers are Baseline 2 farmers who, in addition to receiving timely mechanization services and a broader farm mechanization offering, have **access to loans to support acquisition of irrigation pumps**

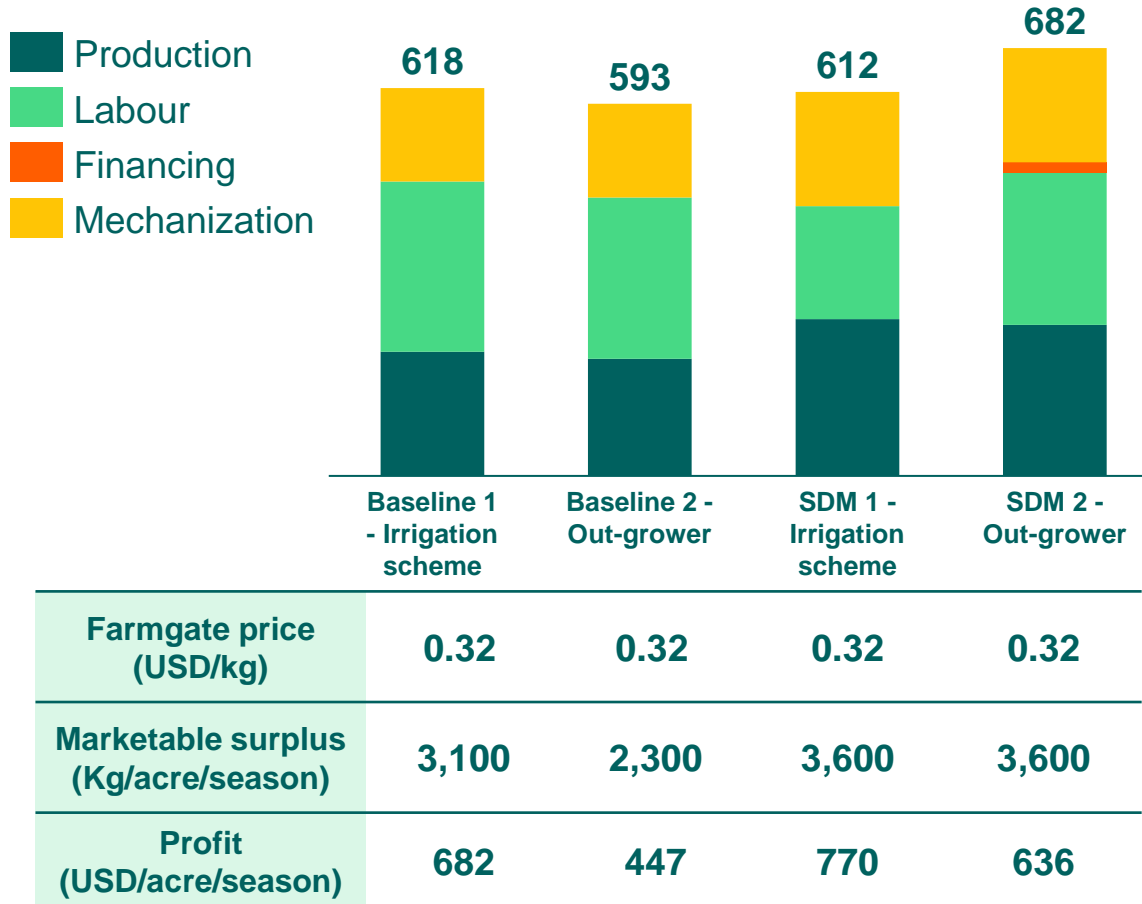
Sources: JAF interviews, Farmer interviews

Notes: *semi-mechanization covering land preparation **broader range of mechanization which includes land preparation, planting, fertilizer spreading and harvesting ***Harvesting is mechanized but loading and offloading is manual leading to losses post-harvest ****3 cycles every 2 years



Service package cost | Out-grower farmers incur higher production costs, but this is offset by an increase in revenues resulting from increased productivity largely due to investment in irrigation.

Cost of service package (USD/acre/season)



- Baseline 1 and Baseline 2 farmers are semi- mechanized with mechanization costs amounting to USD 149 per acre.
- Under the SDM, JAF will transition farmers from manual planting and fertilizer spreading to mechanized planting and fertilizer spreading. For these services, labor expenses are expected to reduce as mechanization expenses increase.
- For SDM 1 farmers, labor expenses are 34% lower compared to Baseline 1 farmers and mechanization expenses are 23% higher. The combined effect leads to a reduction in costs of 14% (USD 91)
- For out-grower farmers, there is a marginal net increase of 4% in total labor and mechanization costs. The increase in costs is due to incurring additional labor expenses for manning irrigation equipment (USD 61). This figure is higher than the combined labor cost savings (USD 77) and increased mechanization expense (USD 33)
- This is however offset by an increase of 56% (USD 421) per acre per season in revenues as out-grower farmers transition to production over 2 crop cycles facilitated by access to irrigation equipment.

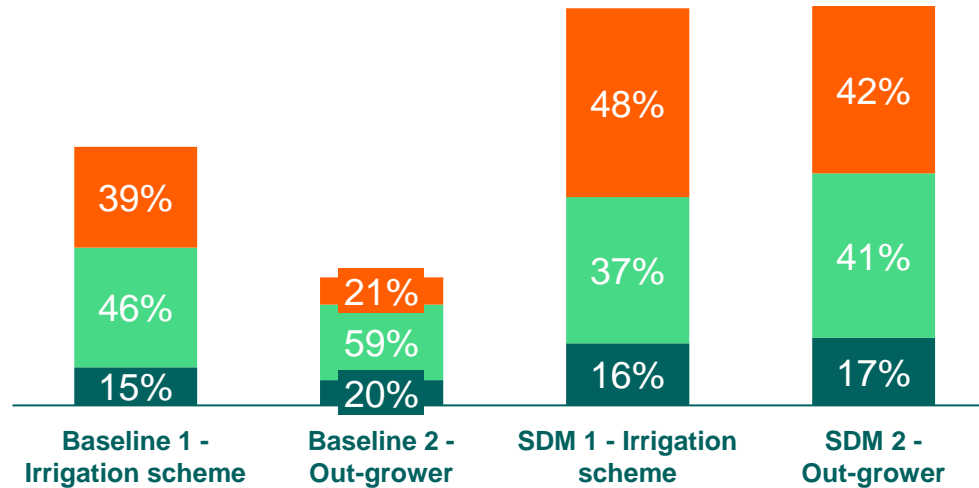
Notes: The costs exclude land clearing costs of USD 17 per acre and land lease costs of USD 330 per acre per year as these are not incurred by all farmers.



Profitability per acre | Improved access to mechanization increases profit per acre for each segment of farmers with out-grower farmers realizing a 97% jump in profits.

Cost of production and profit (USD/acre)

■ Service package cost ■ Remaining cost of production ■ Profit



Marketable surplus (Kg/acre)	4,700	2,300	7,200	7,300
Profit (USD/acre)	600	160	1,100	990
Profit (USD/MT)	125	67	153	135

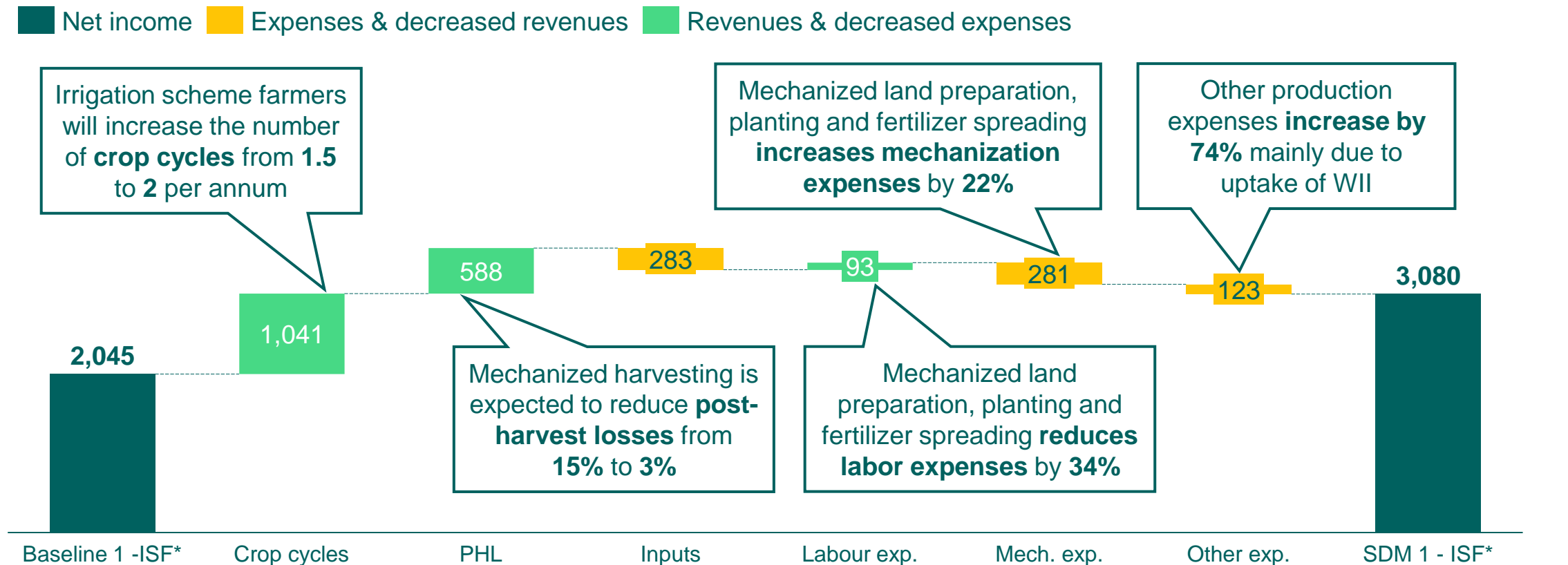
- Mechanized land preparation and harvesting allows irrigation scheme farmers to increase their profitability per acre by 21%. This is achieved through:
 - increased crop cycles from 1 to 1.5 due to better accessibility to mechanized land preparation services
 - reduced post harvest losses from 15% to 3% due to mechanized harvesting
- This increases production costs by 32%, but this is offset by a 54% increase in revenues.
- Out-grower farmers realize a 97% growth in profit resulting from:
 - an increase in crop cycles per annum from 1 to 2 due to ability to irrigate during dry months
 - an increase in yields from 2.9 MT to 3 MT due to consistent water supply
 - a reduction in post harvest losses from 15% to 3% due to mechanized harvesting
- This increases production costs by 130% but is offset by a 212% increase in revenues

Sources: JAF interviews, Farmer interviews



Income build-up (1 of 2) | Irrigation scheme farmers expect a 51% net income increase that can be attributed to increased crop cycles and reduced post-harvest losses

Drivers of income improvement (USD per farm per year)

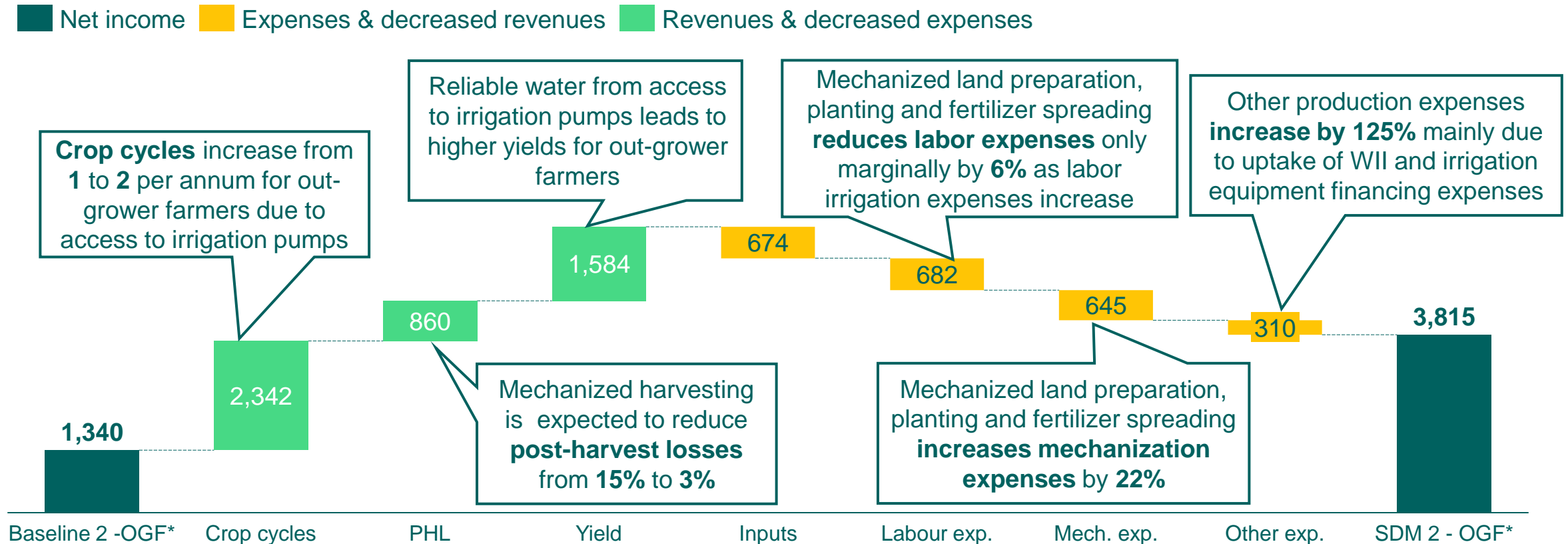


Sources: Farmer interviews, JAF interviews
Notes: *ISF – Irrigation scheme farmer



Income build-up (2 of 2)| For out-grower farmers, 185% net income increase realized is attributable to increased crop cycles, increased yields and reduced post-harvest losses

Drivers of income improvement (USD per farm per year)

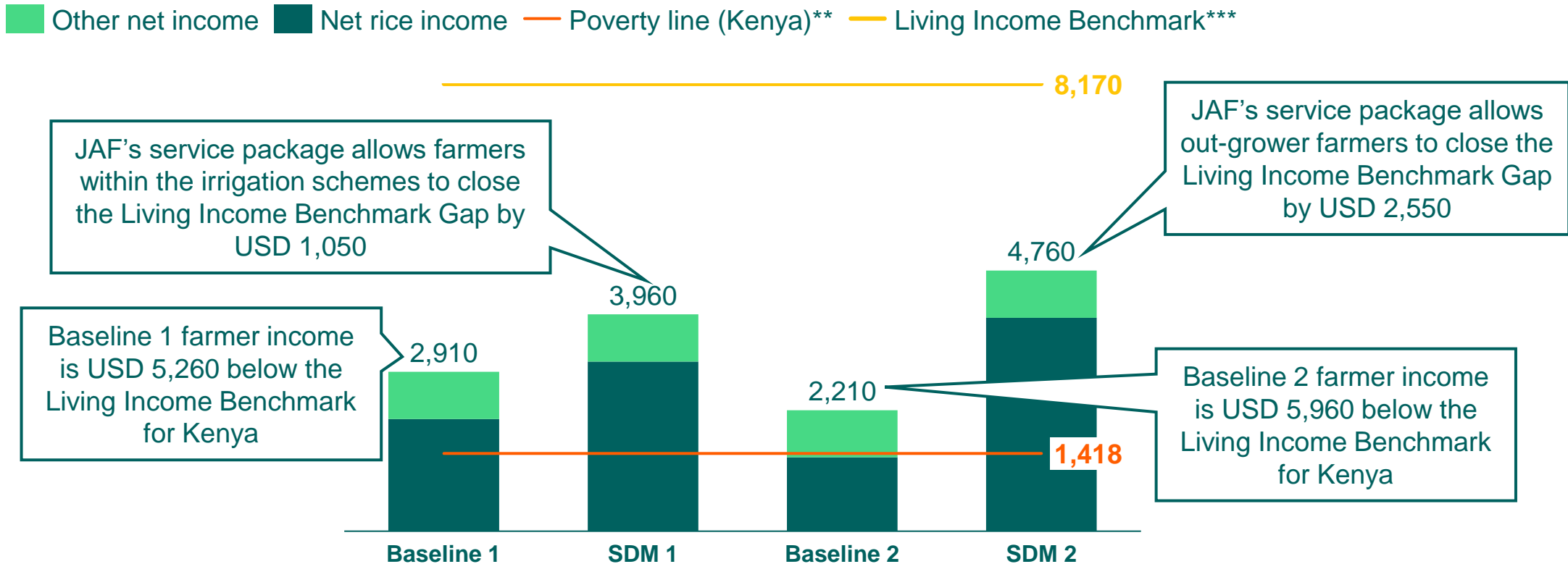


Sources: Farmer interviews, JAF interviews
Notes: OGF – Out-grower farmer



Farm P&L | While JAF's current service package* allows the farmer segments to increase their income, they are unable to close the gap to a living income USD 8,170

Average profit and loss for 2023-2027



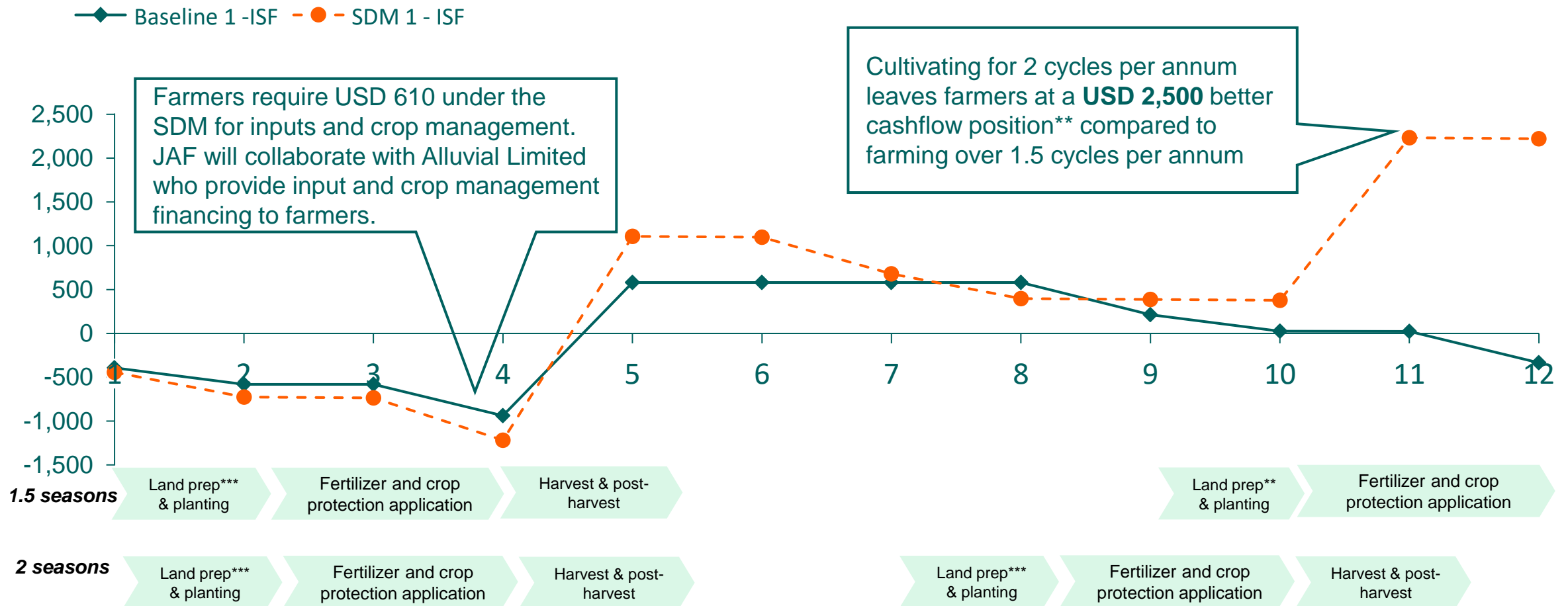
Source: [Poverty & Equity Brief](#)

Notes: *JAF's package is complemented by Alluvial's input and farm expense service package **The World Bank poverty line was adjusted to a household of 5 members and a PPP conversion factor of 46.41 KES per USD. ***The living income benchmark is based on the family composition of 2 adults and 3 children with 1.7 FTE. The data was based on the living wage for a standard family from Wage indicator (2019) and corrected for inflation



Monthly cash flow | Irrigation scheme farmers are cash constrained in the first season, and rice production over 2 seasons per year results in an 87% increase in cashflow at year end.

Cumulative net cash flow* (USD)



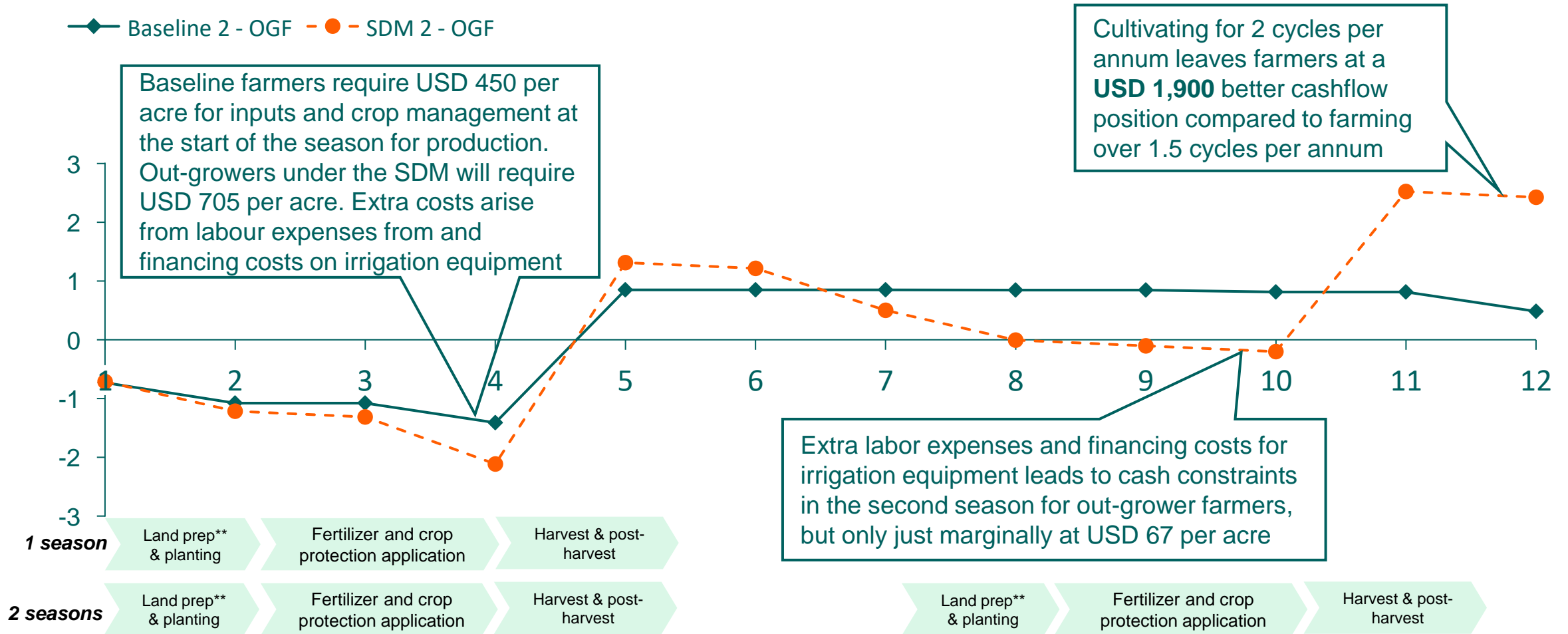
Sources: JAF interviews, farmer interviews

Notes: *Includes only rice income, **cashflows from harvest for Baseline 1 farmers are received in month 13. ***Ploughing, rotavating, harrowing, ISF – Irrigation Scheme Farmers



Monthly cash flow | Out-grower farmers will require input and crop management financing to cover cash constraints expected in both seasons.

Cumulative net cash flow* (USD '000)



Sources: JAF interviews, farmer interviews

Notes: *Includes only rice income **Ploughing, rotavating, harrowing



Sensitivity analysis | Closing the gap to a living income for irrigation scheme farmers could be challenging as income driver changes required are unfeasible

The table below shows the relative change that is needed (all else equal) for each of the income drivers* to increase farmer incomes to the level of the living income benchmark of 8,170 USD/year. With a current annual income of USD 3,960, an income increase of USD 4,210(+106%) is required.

Income driver	Current value	Required value	% change	Comment
Farm size (acres)	2.00	6.3	+215%	Farmers have the option of leasing additional land at a cost of USD 165 per acre per season. Increasing farm size within the scheme is difficult as land is limited and JAF and the farmers have no influence on the expansion of irrigation scheme resources
Yield (kg/acre/season)	3,800	8,100	+113%	With quality and timely input application, the varieties of rice grown by the farmers can only provide maximum obtainable yields of 6,000 Kgs/acre/season. JAF's influence on this driver is limited and would require other partners to provide input financing.
Farm-gate price (USD/kg)	0.32	0.68	+110%	This increase in farm-gate price is not feasible. While the partner off-taker (Alluvial Limited) can influence the prices, the maximum farm-gate price that farmers have obtained for the variety of rice grown is USD 0.45.
Cost of production (USD/year)	2450	N/A	N/A	Reduction in cost of production is not feasible as irrigation scheme farmers would require +100% reduction in income to reach the living income benchmark
Other income (USD/year)	860	5,949	+592%	The farmers are situated in rural regions with most of other income drawing from other farm activities and thus the increase required is not feasible.

Notes: *The different income drivers influence the farm income through the following simplified formula: $Total\ household\ income = Farm\ size \times Yield \times Price - Cost\ of\ production + Other\ income$



Sensitivity analysis | The gap to a living income for currently rain-fed farmers could be closed further if farmers increase their yields

The table below shows the relative change that is needed (all else equal) for each of the income drivers* to increase out-grower farmer incomes to the level of the living income benchmark of 8,170 USD/year. With a current annual income of USD 4,760, an income increase of USD 3,410 (+72%) is required

Income driver	Current value	Required value	% change	Comment
Farm size (acres)	3.00	7.03	+133%	Land outside of irrigation schemes is not limited and farmers have the option of leasing additional land at a cost of USD 165 per acre per season
Yield (kg/acre/season)	3,800	6,215	+64%	With quality and timely input application, the varieties of rice grown by the farmers can provide maximum obtainable yields of 6,000 Kgs/acre/season. JAF's influence on this driver is limited and would require other partners to provide input financing
Farm-gate price (USD/kg)	0.32	0.52	+62%	This increase in farm-gate price is not feasible. While the partner off-taker (Alluvial Limited) can influence the prices, the maximum farm-gate price that farmers have obtained for the variety of rice grown is USD 0.45
Cost of production (USD/year)	4,010	N/A	N/A	Reduction in cost of production is not feasible as out-grower farmers would require +100% reduction in income to reach the living income benchmark
Other income (USD/year)	860	5,137	+497%	The farmers are situated in rural regions with most of other income drawing from other farm activities and thus the increase required is not feasible

Notes: *The different income drivers influence the farm income through the following simplified formula: $Total\ household\ income = Farm\ size \times Yield \times Price - Cost\ of\ production + Other\ income$



Sensitivity analysis | While rice paddy prices have been rising steadily, a reduction in price to the minimum reported farmgate price still earns farmers a positive income

Irrigation scheme farmers

		Yield (kg/acre/year)				
		7200	7400	7600	7800	8000
Farm-gate price (USD/kg)	0.26	1,937	2,029	2,122	2,214	2,306
	0.29	2,390	2,495	2,601	2,706	2,811
	0.32	2,844	2,961	3,080	3,198	3,316
	0.36	3,297	3,427	3,559	3,690	3,820
	0.39	3,750	3,894	4,038	4,182	4,325
	0.42	4,204	4,360	4,517	4,673	4,829
	0.45	4,657	4,826	4,996	5,165	5,334

Out-grower farmers

		Yield (kg/acre/year)				
		7200	7400	7600	7800	8000
Farm-gate price (USD/kg)	0.26	2,092	2,231	2,369	2,508	2,647
	0.29	2,776	2,934	3,092	3,250	3,408
	0.32	3,461	3,638	3,815	3,992	4,169
	0.36	4,145	4,341	4,538	4,734	4,930
	0.39	4,829	5,045	5,260	5,476	5,691
	0.42	5,513	5,748	5,983	6,218	6,453
	0.45	6,197	6,451	6,706	6,960	7,214

- Farmgate rice prices have been steadily rising the last two years and have averaged USD 0.32. The lowest price off-takers have paid for paddy is 0.29 USD/kg with prices going as high as 0.45 USD/kg
- Rice yields have the potential to increase with JAF collaborating with other partners to provide input and crop management financing to farmers

Sources: Interviews with Alluvial Limited, Farmer interviews

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IDH Annual Report 2021

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Thanks

IDH would like to express its sincere thanks to the management of Japtini Asset Finance, Alluvial and Arila Group for their openness and willingness to partner through this study. By providing insight into their model and critical feedback on our approach, Japtini Asset Finance is helping to pave the way for service delivery that is beneficial and sustainable for farmers and providers



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5

Annex



Learning questions

With this SDM analysis, we aim to answer the following questions:

Topic	Question
Main Question	<ul style="list-style-type: none">How can JAF ensure financial sustainability of service delivery while increasing income and income stability for farmers/farmer organizations and agri-entrepreneurs (MSPs) in the rice value chain?
Sub 1	<ul style="list-style-type: none">What are the mechanization requirements for farmers/farmer organizations to increase productivity in the rice value chain?
Sub 2	<ul style="list-style-type: none">What is the perceived and actual value accruing to rice value chain actors from asset finance services?
Sub 3	<ul style="list-style-type: none">What prerequisites are necessary for farmer organizations and agri-entrepreneurs (MSPs) to gain access to asset financing?
Sub 4	<ul style="list-style-type: none">How can JAF roll out these asset financing services in an efficient and commercially viable way?
Sub 5	<ul style="list-style-type: none">Do the risks, returns and impacts of the investments in the different segments build a business case that favors JAF?



Abbreviations

Abbreviation	Meaning
EBT	Earnings before taxes
FSP	Financial Service Provider
GDP	Gross domestic product
MSP	Mechanization Service Provider
MT	Metric ton (1,000 kg)
NI	Net Income
P&L	Profit and loss statement
SDM	Service delivery model
SHF	Smallholder farmer
SWOT	Strengths, weaknesses, opportunities and threats
USD	United States dollar (currency)
WII	Weather Index Insurance



Asset assumptions

Asset Requirements	Unit	2023	2024	2025	2026	2027
Small tractors	#	2	4	4	7	7
Large tractors	#	-	1	1	2	4
Combine harvesters	#	1	2	3	5	7
Small trucks	#	1	2	4	8	15
Large trucks	#	5	10	19	35	67

Asset	Unit	Small tractors	Large tractors	Combine harvesters	Small trucks	Large trucks
Asset owner deposit	%	30%	30%	30%	20%	20%
Cost of finance	%	13%	13%	13%	14%	14%
Tenure of loan	Years	4	4	4	5	5
Downtime*	%	20%	20%	20%	10%	10%
Asset utilization	Days per month	20	20	20	25	25
Repair & maintenance	% of asset cost/annum	10%	10%	10%	8%	8%
Insurance Premiums	% of NBV/annum	3%	3%	3%	3%	3%
Useful life	Years	5	5	5	5	5
Salvage Value	% of asset cost	10%	10%	10%	20%	20%

*periods of breakdown during utilization

Sources: 1. Agri-entrepreneur interviews 2. JAF interviews












Farmer assumptions

Variable	Unit	Baseline 1	Baseline 1	SDM 1	SDM 2
Farm size main crop	Acres	2.0	3.0	2.0	3.0
Share of farmers increasing their farm size	%	0%	0%	0%	0%
Yield	Kg/acre	3,800	2,850	3,800	3,800
Post-harvest losses	%	15%	15%	3%	3%
Home consumption	Kg	255	255	255	255
Volume sold to JAF (coalition)	Kg	9,435	7,013	14,489	21,861
Farm-gate price	KES/Kg	39	39	39	39
Cost of input package	KES/acre	1,700	800	556	376
Land preparation	Mechanized/Manual	Manual	Manual	Mechanized	Mechanized
Planting	Mechanized/Manual	Manual	Manual	Mechanized	Mechanized
Fertilizer application	Mechanized/Manual	Manual	Manual	Mechanized	Mechanized
Bird chasing	Mechanized/Manual	Manual	Manual	Manual	Manual
Harvesting	Mechanized/Manual	No	No	Yes	Yes
Drying	Mechanized/Manual	Semi-mechanized	Semi-mechanized	Semi-mechanized	Semi-mechanized
Irrigation financing	Yes/No	No	No	No	No
Insurance	Yes/No	No	No	Yes	Yes



Business model canvas | The business model of JAF is premised on providing a digital platform to facilitate asset financing for MSPs and timely mechanization for rice farmers

Key partners  <ul style="list-style-type: none"> Financial service providers Mechanization service providers Equipment suppliers National Irrigation Authority Alluvial Limited* 	Key activities  <ul style="list-style-type: none"> Facilitating access to asset financing through credit scoring on behalf of MSPs** Training asset operators on good asset operation practices Facilitating access to high quality mechanization services to farmers 	Value propositions  <ul style="list-style-type: none"> Increase access to quality pipeline for FSPs*** through credit scoring of applicants Increase accessibility to asset financing for MSPs** Provision of quality and timely mechanization for rice farmers Provide digital platform to facilitate market clearing for mechanization services 	Customer relations  <ul style="list-style-type: none"> Transparency to farmers on mechanization costs Transparency to MSPs on mechanization prices and costs of asset finance brokering Realization of asset utilization through collaboration with Alluvial Limited 	Customer segments  <p><i>MPSs</i></p> <ul style="list-style-type: none"> Agri-entrepreneurs Farmer organizations Individual farmers <p><i>Farmers</i></p> <ul style="list-style-type: none"> Irrigated farmers within government owned irrigation schemes Out-grower farmers carrying out rainfed rice production
Key resources  <ul style="list-style-type: none"> Digital infrastructure and data Agreements with FSPs, equipment suppliers, NIB, and county government Collaboration with Alluvial Limited 	Key channels  <p><i>Farmers</i></p> <ul style="list-style-type: none"> Aggregation through Alluvial Limited <p><i>Farmers</i></p> <ul style="list-style-type: none"> Aggregation through Alluvial Limited 	Cost structure  <ul style="list-style-type: none"> Training costs Staffing costs Digital operation costs Marketing costs General and admin expenses 		Revenue streams  <ul style="list-style-type: none"> 'Loaded' interest on loans brokered

Notes: *Alluvial Limited will act as a partner in providing farming packages to farmers and aggregating rice produce under JAFs pilot scheme **FSP – Financial Service Provider **MSP – Mechanization Service Provider

Field-level barriers to scale | The main challenges at field level will be completing MSP profiles eligible for credit scoring and the loyalty of farmers and MSPs to the JAF model

Scale driver	(Expected) Threat	Reasons
MSP recruitment	High	Existing individual MSPs are not organized in any formal way and are very distributed. Recruiting and onboarding agri-entrepreneurs for potential MSP roles will be a challenge as a result. FOs are a potential market as they are formally organized. However, governance issues observed will pose issues for financing institutions and threaten JAF's model. The 'loaded' interest component may be further a deterrent for potential MSPs. JAF will need to develop a robust recruitment criteria especially for agri-entrepreneurs with no proven business case.
MSP retention	Medium	There is currently no data available, and retention will rely on quality of MSPs recruited. JAF's strategy to create a market for mechanization services coupled with payments to MSPs in cash for services is expected to increase loyalty.
Farmer registration	Low	Farmer availability is not a challenge and JAF will leverage the database of Alluvial Limited, who have been providing farmers in the Ahero and West Kano irrigation schemes with working capital packages and rice off-take arrangements.
Farmer activation	Low	As JAF will initially leverage Alluvial's operations, farmer activation is expected to be straightforward. There is need to create a simple process to request for mechanization services through the platform that JAF will deploy.
Farmer retention	Low	There is no data available for mechanization services. However, with farmers receiving a working capital package from Alluvial, farmer retention is expected to be high in line with Alluvial's current operations.
Land sizes	Medium	Rice farmers, as with most smallholders in Kenya, are highly fragmented and this is expected to reduce efficiencies in JAF's service delivery. MSPs reported low utilization of equipment partly as a result of the small land parcels. JAF will need to develop a strategy to transition farmers to block farming. This process can take a long time as it will involve the National Irrigation Authority (NIA), who are responsible for managing the infrastructure in the irrigation schemes.
Loan repayment	N/A	There is no data available to JAF on loan repayments by MSPs. This will be assessed once the business is running and upon the successful onboarding and funding of an initial group of MSPs.

Sources: CF+ interviews

Operational barriers to scale | Asset financing for MSPs is the largest barrier to scale, as unlocking it requires a sizeable number of bankable MSPs and alignment with FSPs and other partners

Scale driver	Barrier	Reasons
Access to finance	High	JAF does not currently have a credit scoring platform to support vetting of potential MSPs. While JAF could leverage operations of a sister company within the Arila Group, there will be need to align with financing partners on credit scoring algorithms as financing partners may require different data points. The process to getting a robust vetting mechanism that can be used by banks may take a long time to finalize.
Technology	Medium	For maximum efficiencies in service delivery, JAF will need to create a platform where all players in the mechanization ecosystem can interact in addition to a vetting/credit scoring mechanism (discussed under access to finance). There may also be need for integrations with mobile service providers which can take a long time. JAF will tap into Arila Group’s roadmap towards digital solutions. Further, most farmers and agripreneurs within the ecosystem are digitally-enabled and with minimal training are expected to take up the service once the system is running
HR	Medium	With the business being reliant on tech, JAF will need to fill back-end developer vacancies. Fierce competition from big tech that have set up offices in Kenya may pose a challenge for JAF in the initial years as it may be difficult to match salaries and brand.
Finance	Medium	JAF’s business model is expected to be very lean. However, for rapid scaling the business may be required to demonstrate ‘skin in the game’ to financing partners. JAF may thus need to raise financing to de-risk potential MSPs to increase their access to financing. There is need to consider the type of financing that would be suited for such a model and plan for fundraising.



Gender ladder



Gender unintentional

No steps taken to understand the different needs and preferences of men and women, or target gender gaps/barriers.

Gender intentional

Considers the different needs and constraints of women and men and takes some steps to create gender equality. Such projects adapt to the needs of women and men without seeking to change gender norms or barriers.

Gender transformative

Understands the different needs and constraints of women and men and address the root causes of gender inequality. A gender transformative approach needs to foster changes in **individual capacities (agency)**, **gendered norms and expectations (relations)**, and **institutional rules and practices (structures)**.

Why we believe investing in women can work for business

- By tailoring goods and services to the needs of women, companies can reach a large and often underserved market, potentially increasing revenues from service provision or enhancing their supply security.
- If women had similar access to and control of productive resources as men, yields of female farmers could increase by up to 30 percent. Higher farm yields and incomes create greater business opportunities for companies working with those farmers.
- Companies that are committed to gender equality outperform their peers. Improving gender diversity in the workplace can improve a company's financial performance by up to 25 percent.
- When companies are seen to invest in gender equality, this has the potential to lead to higher levels of farmer and/or worker loyalty. Conversely, unequal opportunities for women can negatively affect companies' reputations which can lose businesses customers as well as workers.

LI definitions

