

## **Intellectual property management and commercialisation of agricultural research: A case of MARDI**

(Pengurusan harta intelek dan pengkomersialan penyelidikan pertanian: Satu kajian kes MARDI)

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### **Abstract**

Agriculture continues to represent an important source of income for Malaysia. The government provides majority of the funding for agricultural research and development (R&D). The relatively high and increasing R&D investment in Malaysia has strengthened its agricultural productivity, particularly in terms of the country's major export commodities. The country's main public agricultural R&D agency is the Malaysian Agricultural Research and Development Institute (MARDI), where more than a quarter of national agricultural research is invested here. The country's commodity-based research agencies are namely the Malaysian Palm Oil Board (MPOB), the Malaysian Cocoa Board (MCB), and the Malaysian Rubber Board (MRB). These three agencies' research investment focus mainly on high value export crops and other related commodity-based resources. Investment in R&D will fully benefit from strong intellectual property (IP) and commercialisation regimes. Similarly, it will also propel more R&D investment. Meanwhile, the main purpose of the National Intellectual Policy of Malaysia is to harness IP as a new engine of growth for the enhancement of economic and social prosperity. The focus on the development of proficient IP management capabilities covers the whole IP chain activities from creation to protection with support of good infrastructure for IP transaction, protection of National IP interests at the same time it promote foreign investment and technology transfer to ensure IP as a stimulant for innovation. Thus, to ensure the relevancy in the mainstream of national invention and innovation arena, MARDI has proactively strengthened her in-house IP management portfolio. This paper aims to share an overview of agriculture research investment in Malaysia, MARDI's IP and commercialisation management, focusing on managing the R&D&C as well as innovation effectively, thus stimulating and fostering technology transfer. It also provides an overview of operational approaches, success stories as well as issues and challenges in IP management and commercialisation in the context of MARDI.

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## **Overview of agricultural research investment in Malaysia**

Agriculture continues to represent an important source of income for Malaysia especially to the rural population, propelling its continued importance in the overall economy. Government spending has become more volatile in recent years due to fluctuations in government funding levels. However, investment in agricultural research and development (R&D) still remains. The proportion allocated by Malaysia is considerably high compared to other developing countries. The relatively high and increasing R&D investment in Malaysia has strengthened its agricultural productivity, particularly in terms of the country's major export commodities. Malaysia's R&D expenditures are basically generated through internal sources such as government budgetary allocations. In other words, the Malaysian government provides majority of the funding for agricultural R&D. Competitive research grants under the IRPA (Intensification of Research Priority Areas) programme, and revenues levied on oil palm and rubber exports are also part of the sources. Besides that, minimal donor funding were received for joint research activities with international and regional partners.

Compared with other developing countries, bilateral and multilateral donor funding played only a marginal role in agricultural R&D in Malaysia. The country's main public agricultural R&D agency is Malaysian Agricultural Research and Development Institute (MARDI), accounting for more than a quarter of national agricultural research investment. Narrowing down to commodity-based research agencies, the Malaysian Palm Oil Board (MPOB), the Malaysian Cocoa Board (MCB) and the Malaysian Rubber Board (MRB) come into the picture. These three agencies' research investment mainly focuses on high value export crops and other related commodity-based resources. The Forestry Research Institute Malaysia

(FRIM) is also a large government research agency operating in Malaysia in which its research investment covers the aspect of forestry and the environment, as well as forest and other natural products. Other agencies include the Veterinary Research Institute (VRI) and the Fisheries Research Institute (FRI). Sabah and Sarawak, two of Malaysia's states, operate their own research agencies. Sarawak's public agencies include the Department of Agriculture, the Forest Research Centre and the Sarawak Fisheries Research Institute. Sarawak Biodiversity Centre, the policy advisory arm of the government, may also be included in the list. Meanwhile, investment for agricultural research in Sabah is largely channelled to Sabah's Department of Agriculture and Department of Fisheries. Higher education institutions also conduct extensive agricultural research activities in Malaysia.

On the other hand, the private sector undertakes limited research in the agriculture sector. The private sectors involved were mostly government-linked companies or subsidiaries of government agencies. FELDA Agriculture Services Sdn. Bhd. is one such example, conducting oil palm research. Sime Darby Plantation, formed by the merging of Sime Darby Berhad, Golden Hope Plantations Berhad and Kumpulan Guthrie Berhad, provides most of the private sector R&D investment. In the Eleventh Malaysia Plan (2016 – 2020), the private sector has been identified as a key driver for innovation and productivity. Private investment across all sectors, including the agriculture sector, will therefore be promoted to spearhead economic growth.

Relatively high and increasing (R&D) investment in Malaysia has strengthened agricultural productivity, particularly export commodities such as oil palm and rubber. In 2010, public investment in agricultural R&D in Malaysia was RM696 million or 401 million purchasing power parity (PPP) dollars, both in 2005 constant prices (*Table 1*). As of 2010, government spending on agricultural R&D had doubled since the

Table 1. Overview of public agricultural R&D spending and research staff levels, 2010

Type of agency	Total spending			Total staffing	
	Malaysian Ringgit	PPP Dollars	Shared	Number	Share
	(million 2005 prices)		(%)	(FTEs)	(%)
MARDI	183.0	105.5	26.3	578.0	35.9
Commodity boards (3)	304.4	175.5	43.7	305.0	19.0
Sabah and Sarawak (7)	28.9	16.7	4.2	109.4	6.8
Other government (9)	110.1	361.2	15.8	378.8	23.6
Subtotal government (20)	626.3	361.2	90.0	1,372.2	85.3
Higher education (13)	69.4	40.0	10.0	237.3	14.7
Total (33)	695.6	401.2	100	1,609.4	100

Sources: Calculated by authors from ASTI–MARDI 2011 – 2012; Stads, Tawang and Beintema 2005; and Universiti Malaysia Sarawak 2012

Notes: Figures in parentheses indicate the number of agencies in each category. Data exclude degree-qualified technicians lacking official researcher status

1980s while more volatile in recent years due to fluctuating government funding. As part of this growth, public agricultural research capacity reached 1,609 full-time equivalent (FTE) researchers in 2010. This growth occurred across all institutional categories. Note that, unless otherwise stated, all dollar values presented have been calculated using PPP exchange rates, which reflect the purchasing power of currencies more effectively than do standard exchange rates because they compare the prices of a broader range of local, as opposed to internationally traded, goods and services. Investment in R&D will fully benefit from strong IP and commercialisation regimes. Similarly, it will also propel more R&D investment.

MARDI is the country's main agricultural R&D agency, accounting for more than a quarter of national agricultural research investments and 36% of human resource capacity in 2010. MARDI, administered by the Ministry of Agriculture and Agro-Based Industry, encompasses three branches (research, technology transfer and commercialisation and operations) oversees 29 regional research stations. Year-to-year spending levels fluctuated moderately at MARDI throughout the past three decades.

### National IP policy

The main purpose of the National Intellectual Policy is to harness intellectual policy (IP) as a new engine of growth for the enhancement of economic and social prosperity. The policy is needed to facilitate the formation of an environment that stimulates and fosters the creation, protection, enforcement, management and maximum exploitation of IP aimed ultimately at developing a vibrant IP industry as a future driver of growth of the nation.

There are several objectives of the policy which will put the highest standard of IP protection system through strengthening the IP administration of the Intellectual Property Corporation of Malaysia (MyIPO) as well as promotion of IP generated and commercial exploitation activities. These activities are focusing on managing the research and development of innovation more effectively among the research institutions, universities and individuals by providing incentives, grants, enforcement and dispute settlement.

Furthermore, the suitable valuation methods, contractual and licensing rules to facilitate commercial exploitation of IP are also emphasised. The policy is also focusing on the development of proficient IP management capabilities

covering the whole IP chain activities from creation to protection with support of good infrastructure for IP transaction. On the other hand, protection of National IP interest, promotion of foreign investment and technology transfer, plays a vital role to ensure IP as a stimulant for innovation.

### **MARDI's IP management**

The history of MARDI's IP generation and management started in 1994 when MARDI first filed her IP in the MyIPO for an invention entitled 'Method of producing dietary fibre powder from oil palm trunk and function food thereof' (22 April 1994 and obtained Patent no. MY 129137-A). Ever since, MARDI has given full consideration and equal accent on technology generation and invention and technology protection under various IP laws locally and overseas. IP matters in MARDI are managed by Research and Innovation Management Programme of Strategic Planning and Innovation Management Centre placed directly under the Director General's Office of MARDI. This placement indicates strong commitment on improving and strengthening IP management.

### ***MARDI's IP Policy and Manual***

To ensure every employee comprehends the same vision and to synergistically replicate success in R&D&C of technology and innovation, MARDI has published her own version of the IP Policy and Manual. MARDI's IP Policy and Manual elucidate top management views, the technology management committees' role, IP management office's function, employees' terms of references and responsibilities. It also elaborate and demonstrate the process and flow of technology/innovation management from the ideation stage to commercialisation. MARDI IP Policy and Manual will be the source and guideline for any IP development, protection and exploitation inclusive of references for profit sharing and/or dispute settlement. The manual contains templates of

technology declaration forms, template of commercialisation agreement, collaboration agreement and non-disclosure agreement as well as a few other items. In brief, the objectives of MARDI's IP policy are:

- a) To protect MARDI's integrity and interests.
- b) To promote, facilitate and encourage creativity and innovative capability among employees.
- c) To create a secure environment where original inventions/innovations can be protected and rightfully owned.
- d) To provide the employees with fair and reasonable recognition, awards and incentives to encourage them to develop new inventions/innovations.
- e) To encourage and develop the institute's growth, progress and success through active application of research, development and commercialisation activities.
- f) To facilitate and enhance the transfer of institute inventions/innovations derived from research and the dissemination of knowledge to the food and agriculture sector.

The ownership will be claimed by MARDI if the intellectual property is:

- a) created from a specific project funded by MARDI or funds obtained by MARDI.
- b) created from substantial use of its resources and/or services.
- c) created by employees during the course of study which is sponsored by MARDI.
- d) resulted from the use of pre-existing intellectual property owned by MARDI.
- e) part of intellectual property created by a team of employees and non-employees.
- f) from any courses that are printed, videotaped or recorded using any other media and may not be distributed without permission.

### ***The operational side***

Operationally, IP management in MARDI is a certified process and the procedure adhered to the quality management standard

of MS ISO 9001:2008. This is to guarantee all IP related issues and matters to be well managed. To ensure all generated technology and inventions are properly protected and managed, MARDI has established a clear process flow for technology management. It involves declaring the generated technology to a technology management committee, whereby the committee will eventually decide on the way forward of the technology. The committee will recognise the generation of said technology, give endorsement on IPR protection whichever necessary, and give judgment on the commercial strategies and approach.

However, prior to that, there will be a few experts who will assess on the novelty, patentability, market potential, market feasibility and technology viability and commercialisation mode and will compile a report for the technology management committee for their reference during the technology management meeting. By having a technical assessment stage, the pathway of generated technology will be crystal clear and may ease the committee to make decisions, recommendations and endorsements, i.e. either to be patented or not, to which country deemed to be protected in, the commercial mode and strategy to be adopted. Further, budget allocation for IP management will be utilised accordingly to only necessary technology for patenting. There will be no wasting of

time on attaining unfit technology either for IP protection and commercialisation effort. Furthermore, along the way, the technology is currently allowed and deemed fit to enter national and international technology competitions, exhibitions, conferences or publications.

### **Output from proper IP management**

With proper IP management, MARDI will gain benefits from profit sharing by commercialising the technologies. Currently MARDI has generated 183 IPs in various IP categories and protected in various countries (*Figure 1*).

MARDI has also been actively involved in initiating awareness on IP to her stakeholders. This has been done via conducting, giving, participating in, inviting, channelling various IP related activities such as seminars, workshops, consultations, clinics and so on to the stakeholders. MARDI also works closely and actively involved with Malaysia IP authority (Malaysian Intellectual Property Office – MyIPO) in nurturing IP in Malaysia. With that aspect in 2015, MARDI’s IP Office has been awarded the ‘National Intellectual Property Management Award’ during Malaysia Intellectual Property Day 2015. This is an award that recognises the IP office of Malaysian organisations on their standard of managing organisation’s IP and their contribution towards nurturing IP in the

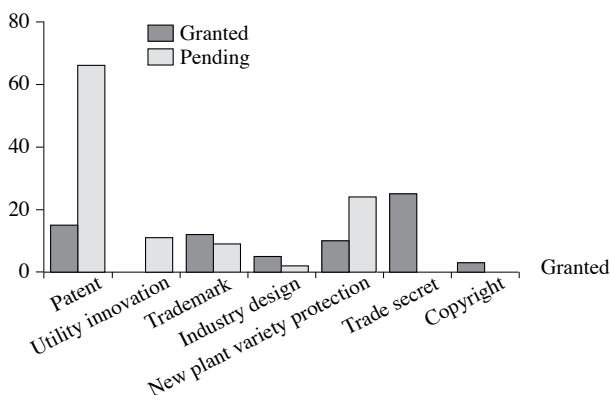


Figure 1. Summary of the portfolio in IP management

country. It is the highest recognition to IP related practitioner/organisation/management in Malaysia.

### **Commercialisation of MARDI's technology**

Commercialisation is a process of transferring research outcome to a successfully marketable product. MARDI was established on 28 October 1969. Subsequently the amendment of the MARDI Act in 2002 had driven the initiative in technology commercialisation with the activities of promoting and exploiting research findings. It has been of MARDI's interest to generate various technologies related to food, agriculture and agro-based industry. Eventually, the technologies generated should be commercialised and taken up in order to help improve and increase wealth to the community.

It is essential that any patentable invention be analysed for its industrial relevance and commercial potential. The technology transfer unit of a R&D institution should endeavour with the inventor, to answer the following questions:

- a) Does the technology offer a cheaper and/or a better way of accomplishing something?
- b) Are there competing technologies available and if so, how much better is the invention?
- c) Does the invention provide a technological answer to an existing problem?
- d) Does it have the potential for creating a new market?
- e) How much investment, in terms of both time and money, will be required to bring the invention to the market place?
- f) Will the inventors continue to work on the invention?
- g) What will be the potential pay-off for a company that makes an investment in the development of the invention?

Commercialisation of MARDI's technology is managed by the evaluation and

upscaling programme. This programme is under the Promotion and Business Development Centre. The technology commercialisation is guided under the MARDI's commercialisation policy. This policy is intended to ensure that the rules and procedures for MARDI's technology commercialisation are being followed.

The flow of commercialisation will start from an ideation stage until the determination of commercialisation mode. The ideas invented from MARDI's pool of experts in relevant fields will have to pass several development stages in order to successfully transform into innovation. This innovation has taken into consideration the needs of pre commercialisation, commercialisation or public good. Generally, the commercialisation of MARDI's technologies are through licensing, consultation, outright sales and arrangement of contract manufacturing (OEM). The majority of commercialisation mode (more than 80%) is through licensing which is the key driver in MARDI's commercialisation success.

### ***Technology commercialisation process***

There are seven major steps in the commercialisation process that are being practised in MARDI. These steps are:

Step 1: Technology package evaluation including evaluation of viability, feasibility and current market accessibility.

Step 2: Technology promotion to enhance 'technology on offer' and to find the potential partners by business matching, forum, exhibition and business talk which are common vehicles for technology promotion.

Step 3: Potential investors or partners will submit the letter of intent (LOI) with several screening criteria such as the company status, financial capability, the availability of the interested technology and the company expertise.

Step 4: Preparation of terms of business and non-disclosure agreement (NDA). The terms of business will be reviewed by the company prior to the confirmation. Meanwhile the NDA is crucial to secure the secrecy of the technology from the third party.

Step 5: Preparation of technology licensing agreement based on the agreeable licensing terms and conditions including specific technology IP right.

Step 6: Upon agreement by both parties, the technology licensing agreement which includes the agreeable royalty fees and management fees is due for signing to complete the licensing process.

Step 7: Scheduled monitoring of commercialisation status and progress is conducted to identify any arising issues and challenges faced by the commercial partner. This step is subjected to royalties payment as stated in the technology licensing agreement.

### ***The impact of MARDI's technology commercialisation***

From 2005 to mid-2015, a total of 85 technologies were commercialised.

It involved a total of 47 companies and 66 licenses were given out. The value of technology involved is worth RM42.6 million. A total of RM6 million has been collected in the form of royalties. Examples of technologies commercialised are as in *Table 2*.

### **Issues and challenges**

MARDI has increasingly deployed the tools of patenting and technology transfer to advance the generated technologies and innovations. Patents for research outputs are sought for novel processes and products, while plant variety protection is sought for new crop varieties. Copyrights and trade secrets are protection for the use of experimental techniques and formulations. This is to ensure the ownership of IP used by a research organisation is respected by all who use the property, and organisations are in a position to identify, secure, manage, and exploit the IP that they generated. However, there are also underlying issues and challenges that need to be addressed.

Firstly, despite having workshops and forums, researchers still seem to lack awareness and understanding of the importance of IP and IP rights (IPRs) related to their research. Lack of awareness of IP concerns indicated that researchers are

Table 2. Examples of commercialised technologies

	Technologies generated	Beneficiary/Commercial partners
1	Rice varieties: MR 219, MR 253, MR 263, MR 269, MARDI 284	Rice farmers, rice regional authorities
2	Rice clear field system: MR 220CL1 and MR 220CL2	BASF International, farmers
3	Rice foundation seed	12 rice seed producers
4	Specialty rice varieties: MARDI Wangi 74 and 76	5 anchor companies
5	Eksotica papaya	Exotic Star and Far East Company
6	Josapine pineapple	South Fruit Sdn. Bhd.
7	Minimal processing of jackfruit and durian	Libro Agro Sdn. Bhd. and others
8	Starfruit under netted structure	Sri Balakong Sdn. Bhd.
9	Growpine fertiliser for pineapple	PK Fertilizers Sdn. Bhd.
10	Omega 3 eggs	LTK Bhd.
11	Nitrohumic acid	CCM Fertilizers Sdn. Bhd.
12	New modified virgin coconut oil (MVCO)	EVCO Sdn. Bhd.
13	Tiger milk mushroom	Ligno Biotech Sdn. Bhd.
14	Salmonella detection kit (MicroTez)	OPHC Holdings Sdn. Bhd.

missing out, fail to commercialise their own ideas and sometimes fail to prevent others unfairly exploiting their research. Research output can only be effectively leveraged by making IP a key focus.

In the joint venture research scenario, contract negotiation arrangement and IP ownership are the biggest drawbacks. Similarly, in the licensing of technology, negotiations between parties are very important in ensuring successful transactions. However, research organisations frequently lack the skills in negotiating with potential users and business counterparts which contribute to the failure of exploiting the full potential of IP commercialisation to maximise its impact on innovation. The challenges also lie in the insufficiency of experience and knowledge in managing IP for the organisation. The absence of a dedicated department or body, technology office (TTO) or technology commercialisation office (TCO), which functions by offering assistance with the IP issues relating to research contracts, providing access to expert information on IP and helping researchers to protect and exploit their intellectual property may also contribute to the inability to fully exploit the maximum potential of IP.

Funding for IP is crucial. In the Malaysian context, there seems to be a lack of funding for IP filing and maintenance especially for international applications. Patent applications are costly, and more so for international applications. It can be said that the process for international patents is also more complicated where the patent examination is stricter, hence creating hesitation in the willingness to invest in the IP filing. However, if the government is willing to initiate patent fund policy, it can effectively stimulate patent output, which would further increase utilisation of the patent system, provide market incentives, and promote diffusion of technological innovations. For example, China has issued a policy of providing special government-backed funds for individuals or enterprises

who file international patent applications which are also the vital drivers for China's pattern surge. The policy also helps to optimise patent structure which has its great positive impacts on promoting innovation in China (Jin et al. 2013).

Another area of constraint is the lack of competent workforce on authority and enforcement portfolio, especially IP judge and expert witness. For instance, policies aimed at improving IP management capabilities at research organisations are unlikely to have a big impact unless the legal protection of IP is sufficiently strong and enforcement of IPRs is effective. Authority should therefore address simultaneous flaws in the IP regime along the entire continuum from the management of IP in research organisations, enterprises and financial firms to the legal and institutional system for IP protection, and to IPR enforcement.

### **The way forward and conclusion**

Concerning the future direction, MARDI is planning to establish a technology commercialisation office (TCO). Commercialising IP is about getting products or services into the market place. Commercialisation strategy depends on many variables such as individual circumstances, business capabilities, competitive environment and access to finance. Licensing is the most common commercialisation method, but it is just one of many options for taking IPs to the market place. Questions that are crucial and need to be considered are such as whether to commercialise in-house or with a partner; manufacture, market or sell own product or outsource. There are also different issues to consider when commercialising internationally.

Concerning the future direction, MARDI is planning to establish a Technology Commercialisation Office (TCO) combining the current IP Management Unit in research and innovation management programme with the evaluation



and up-scaling program as a one-stop centre to manage IP and commercialisation activities. By embarking on this step would mean more efficient and effective protection and management of IPs, partners for licensing, partners for supporting research contracts and funding as well as support new technology-based spin-offs. Moreover, it would further enhance and strengthen the key success elements such as technology internationalisation and prototype support as well as active support for IP protection.

### References

- Executive Summary Eleventh Malaysia Plan (2016 – 2020) Putrajaya: Prime Minister's Department
- Gert-Jan, S., Ariffin, T. and Nienke, M.B. (2005). Agricultural Science and Technology Indicators: Malaysia. ASTI Country Brief No. 30. Retrieved on 21<sup>st</sup> April 2016 from [http://www.asti.cgiar.org/pdf/Malaysia\\_CB30.pdf](http://www.asti.cgiar.org/pdf/Malaysia_CB30.pdf).
- Jin, H.J., Tu, Y.L. and Wang, S.T. (2013). Government-backed patent funds in China. Their role as policy tools to promote innovation by SMEs. *Tech Monitor* p. 24 – 30
- Kathleen, F. and Rozhan, A.D. (2013). Malaysia recent development in agricultural research in agricultural science and technology indicators (ASTI). Retrieved on 1st Nov. 2015 from <http://www.asti.cgiar.org/pdf/Malaysia-Note.pdf>
- MARDI intellectual property manual and guidelines (2012). Serdang: MARDI
- MARDI Intellectual Property Policy (2012). Serdang: MARDI
- National Intellectual Property Policy, Malaysian Intellectual Property Office. Retrieved on 1st Nov. 2015 from [http://www.myipo.gov.my/documents/10180/21979/ip\\_policy\\_eng.pdf](http://www.myipo.gov.my/documents/10180/21979/ip_policy_eng.pdf)
- Nor Kamariah, K. and Alina, S. (2013). A case study of R&D technology commercialization: challenges, issues and the way forward. *Proceeding of ICTMBE 2013 2nd international conference on technology management, business and entrepreneurship*, Melaka, Malaysia, 5th Dec. 2013
- United Nation Economic Commission for Europe (2011). Intellectual property commercialization. In: *Policy option and practical instruments*. New York: United Nations
- World Intellectual Property Organisation (2002). Guidelines on developing intellectual property policy for universities and R&D organisations, Geneva: WIPO Publication

## **Abstrak**

Pertanian terus menjadi sumber ekonomi penting bagi Malaysia. Majoriti pembiayaan untuk penyelidikan dan pembangunan (R&D) dalam bidang pertanian masih ditanggung oleh kerajaan. Pelaburan R&D yang agak tinggi di Malaysia telah mengukuhkan produktiviti pertanian terutamanya kepada eksport utama negara. Institusi penyelidikan pertanian awam utama negara iaitu Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI), diperuntukkan lebih daripada satu perempat dana penyelidikan pertanian. Di samping itu, terdapat juga institusi penyelidikan awam berasaskan komoditi seperti Lembaga Minyak Sawit Malaysia (MPOB), Lembaga Koko Malaysia (LKM) dan Lembaga Getah Malaysia (LGM). Pelaburan dana penyelidikan ketiga-tiga agensi tersebut tertumpu kepada tanaman eksport yang bernilai tinggi. Pelaburan dalam R&D mendapat manfaat sepenuhnya daripada perlindungan harta intelek (IP) dan pengkomersilan, seterusnya mendorong lebih banyak pelaburan dalam R&D. Ini sejajar dengan matlamat utama Dasar Harta Intelek Negara iaitu memanfaatkan IP sebagai enjin pertumbuhan baru dengan tujuan meningkatkan kemakmuran ekonomi dan sosial. Tumpuan utama pembangunan keupayaan dan kemahiran pengurusan IP meliputi keseluruhan aktiviti rantaian nilai daripada peringkat reka cipta kepada perlindungan. Disokong oleh infrastruktur IP yang baik sekali gus dapat menyediakan perlindungan kepada kepentingan negara. Ini akan menggalakkan pelaburan asing dan pemindahan teknologi serta dapat memastikan IP sebagai perangsang untuk inovasi. Oleh itu, untuk memastikan kesesuaian dan kemampuannya dalam arus perdana bagi arena reka cipta dan inovasi, MARDI secara proaktif telah mengukuhkan portfolio dalaman untuk pengurusan IP. Artikel ini bertujuan untuk berkongsi pengetahuan mengenai gambaran keseluruhan pelaburan penyelidikan pertanian di Malaysia, pengurusan IP dan pengkomersilan teknologi MARDI. Tumpuan juga diberi kepada keberkesanan pengurusan penyelidikan dan inovasi yang dapat merangsang dan memupuk pemindahan teknologi dengan lebih baik. Selain itu, artikel ini juga memberikan maklumat umum berkaitan pendekatan operasi, kisah-kisah kejayaan serta isu-isu dan cabaran dalam pengurusan IP dan pengkomersilan teknologi dalam konteks MARDI.