



World Food  
Programme

# フィリピンにおける鉄分強化米の生産 能力、サプライチェーン、キャンペー ンの取り組みに関する WFP 調査

最終報告書、2022 年 6 月 27 日



フィリピンにおける鉄分強化米の生産能力、サプライチェーン、キャンペーンの取り組みに関する WFP 調査 (WFP/PH/RFP/006/2022)

フィリピン栄養財団 (NFF)

頭字語一覧 iv

エグゼクティブサマリー .....	vi
1.0 導入と根拠 .....	1
2.0 フィリピンにおける米の栄養強化の進展 .....	3
2.1 米の栄養強化の復活に向けた研究 .....	5
2.2 主な政策・プログラムの展開 (2019 年～現在) .....	6
3.0 目標 .....	10
3.1 一般的な目的 .....	10
3.2 具体的な目標 .....	10
3.3 研究成果 .....	11
4.0 方法論 .....	Error! Bookmark not defined.
4.1 デスクレビュー .....	11
4.2 キーインフォーマントインタビュー .....	11
4.3 フォーカス・グループ・ディスカッション .....	13
5.0 結果および考察 .....	15
5.1 地元の鉄分強化米の穀粒 (IRK) 生産者・販売者 .....	15
5.2 IRK の輸入元 .....	19
5.3 微粉末ピロリン酸第二鉄の輸入業者 .....	21
5.4 米の栄養強化用機器の製造・供給業者 .....	21
5.5 鉄分強化米生産者 .....	23
5.6 米の仕入先 .....	29
5.7 複数の微量栄養素の強化 .....	30
5.8 米の栄養強化のための資金・技術援助 .....	30
5.9 社会的セーフティネットプログラム／米を使った給食プログラム .....	32
5.10 栄養と鉄分強化米に対する消費者の見方 .....	38
6.0 調査目的に基づく結果の分析 .....	40

6.1	鉄分強化米の供給、受容、消費の低さを説明するためのギャップ .....	40
6.2	フィリピンにおける米の鉄分強化能力とキャンペーン活動のマッピング ....	41
6.3	米の栄養強化義務化の実施を妨げるサプライチェーン上の問題点 .....	42
7.0	結論と提言 .....	45
7.1	最も費用対効果の高い、効率的な IFR の対象受取人への提供.....	46
7.2	IFR の消費拡大のための戦略.....	47
7.3	IFR の知識と受容を高めるためのコミュニケーション戦略.....	48
7.4	全体的な結論 .....	49
参考文献	Error! Bookmark not defined.	
アネックス	Error! Bookmark not defined.	

## 図の一覧

図 1.	フィリピンにおける貧血の有病率の推移（1998 年～2013 年）（食品・栄養研究所（FNRI）、国民栄養調査	1
図 2.	各年齢層・人口層における貧血の有病率 2018 年、2019 年。（FNRI、国民栄養調査 2019）	2
図 3.	フィリピンにおける米の栄養強化のエコシステム	14
図 4.	フィリピンにおける鉄製米穀と強化米穀の生産者と販売者のマッピング	15
図 5.	フィリピンにおける米の栄養強化用機器の製造業者と販売業者のマッピング	22
図 6.	鉄強化米の現在の生産者のマッピング	23
図 7.	トレーニングおよびキャリブレーション段階での生産者のマッピング	25
図 8.	栄養と Sangkap Pinoy シールに関する情報源	39
図 9.	米の栄養強化のためのサプライチェーンの課題	43

## 表の一覧

表 1.	BARMM における栄養不良に影響を与える要因。	2
表 2.	鉄製米びつの現地生産者の推定生産能力	18
表 3.	現在の鉄強化米の生産者の生産能力	24
表 4.	鉄強化米の最大生産能力と鉄の必要量 米穀	27
表 5.	ルソン島からビサヤ、ミンダナオ島への米の輸送コスト	45

## 附属書

- 附属書 1. NNC 運営委員会決議第 1 号シリーズ 2019 年-フィリピンにおける社会的セーフティネットプログラムのための鉄分入り米の強化の規模拡大 ..**Error! Bookmark not defined.**
- 附属書 2. FDA Circular No 2007-010-A - Bureau Circular No 2007-010 を改正した鉄-米プレミックスの規格の更新について ..... **Error! Bookmark not defined.**
- 附属書 3. 実施したキーインフォーマントインタビューのリスト ..... **Error! Bookmark not defined.**
- 附属書 4. IRK（鉄製米粒）の生産者リスト ..... **Error! Bookmark not defined.**
- 附属書 5. 米飯強化用加工業者一覧..... **Error! Bookmark not defined.**
- 附属書 6. 鉄強化米（IFR）の生産者リスト..... **Error! Bookmark not defined.**
- 附属書 7. 全国の NFA 米強化ブレンド施設の所在地 ..... **Error! Bookmark not defined.**
- 附属書 8. 栄養強化用 DSM ライスカーネル ..... **Error! Bookmark not defined.**
- 附属書 9. DepEd 学校部門事務所による鉄強化米の調達（2021 年） ..... **Error! Bookmark not defined.**
- 附属書 10. DepEd SBFP（2022 年）および DSWD SFP（2015 年）の地域ごとの IFR 要求 ..... **Error! Bookmark not defined.**
- 附属書 11. リージョン 1 地域開発評議会決議第 104 号 s.2019 .... **Error! Bookmark not defined.**
- 附属書 12. 米の栄養強化のためのコミュニケーションと戦略計画 ..... **Error! Bookmark not defined.**
- 附属書 13. FNRI と共同開発した IFR IEC 資料 ..... **Error! Bookmark not defined.**

## 頭字語一覧

<b>AHMP</b>	加速する飢餓緩和プログラム
<b>BangUn</b>	バンサモロ・ニュートリション（栄養価の向上
<b>BARMM</b>	ミンダナオ島バンサモロ自治区
<b>CEST</b>	科学技術のためのコミュニティ・エンパワーメント
<b>DepEd</b>	教育省
<b>DO</b>	部門別受注状況
<b>DOH</b>	保健省
<b>DSWD</b>	社会福祉・開発省
<b>DSWD-DRMB</b>	DSWD-災害対応管理局
<b>DSWD-NRLMB</b>	DSWD-国家資源・ロジスティクス管理局
<b>DSWD-PMB</b>	DSWD-プログラムマネジメント局
<b>DTI</b>	通商産業省
<b>EPAHP</b>	飢餓と貧困の撲滅に向けたパートナーシップの強化
<b>FDA</b>	Food and Drug Administration（食品医薬品局
<b>FGD</b>	フォーカス・グループ・ディスカッション
<b>FNG</b>	栄養不足を補う フィリピン
<b>FNRI</b>	食品栄養研究所
<b>FSP</b>	フード・フォー・スクールプログラム
<b>GIA</b>	助成金
<b>IATF-ZH</b>	インターエージェンシー・タスクフォース・ゼロ・ハンガー
<b>IEC</b>	情報・教育・コミュニケーション
<b>IFR</b>	鉄分強化米
<b>IRK</b>	鉄分強化米の穀粒
<b>KII</b>	キーインフォーマントインタビュー
<b>LGU</b>	地方公共団体
<b>MBHTE</b>	基礎・高等・技術教育省
<b>MOA</b>	合意覚書
<b>MOST</b>	科学技術省
<b>MSMEs</b>	零細企業、中小企業
<b>NBC</b>	株式会社ニュートリションアンドビヨンド
<b>NCR</b>	首都圏
<b>NFA</b>	国家食糧安全保障局
<b>NFMC</b>	ニュートリデンスフード製造株式会社

<b>NGO</b>	非政府組織
<b>NNC</b>	国民栄養協議会
<b>NNC-GB</b>	国民栄養協議会理事会
<b>PPAN</b>	フィリピンの栄養に関する行動計画
<b>PhilRice</b>	フィリピン稲作研究所
<b>RA</b>	共和国法
<b>SBFP</b>	学校給食プログラム
<b>SETUP</b>	中小企業技術高度化プログラム
<b>SFP</b>	補助栄養プログラム
<b>SMS</b>	ショートメッセージサービス
<b>SPS</b>	Sangkap Pinoy Seal
<b>SSNP</b>	社会的セーフティネットプログラム
<b>SY</b>	学年
<b>S&amp;T</b>	科学技術
<b>TAPI</b>	技術応用推進機構
<b>TLA</b>	技術ライセンス契約
<b>TWG</b>	技術ワーキンググループ
<b>UNICEF</b>	国連国際児童基金
<b>WFP</b>	世界食糧計画
<b>WHO</b>	世界保健機関
<b>4Ps</b>	Pantawid Pamilyang Pilipino プログラム

## エグゼクティブサマリー

はじめに フィリピンでは、2000年11月7日に共和国法（RA）8976（フィリピン食品強化法）が成立し、2004年に完全実施され、米の鉄分強化が義務化されている。

2005年、飢餓軽減加速プログラムの学校給食プログラム（FSP）では、硫酸第一鉄でコーティングした鉄強化米（IFR）を使用した。FSPでは、特定の公立小学校に在籍する1年生と就学前の子どもたち、およびDSWDが監督する特定のデイケアセンターにいる3〜4歳のすべての子どもたちに、1キロの米が支給されました。国家食糧庁（NFA）は、2010年初頭まで、このプログラムのIFR要件を提供していた。

また、2007年には当時の市長で現大統領のロドリゴ・ロア・ドゥテルテによる行政命令に基づいて、ダバオ市の外食施設でIFRが提供されるようになった。また、この頃、食品栄養研究所（FNRI）は、強化剤として微粉化ピロリン酸第二鉄を用いた高温押出技術やブレンドの開発を進めていた。FNRIは2013年にこの技術の移転を開始し、オリオン、バター、ザンバレス、ダバオ・デ・オロの各州で地域限定の米の栄養強化活動を行ったが、ダバオ・デ・オロ以外はあまり成功しなかった。

2014年、「アジアにおける米の強化のスケールアップに関するワークショップ」に参加したフィリピン代表団は、当初、米の強化は社会的セーフティネットプログラムに焦点を当てることで合意した。これは、フィリピンで消費される米の量（約10.2MT）を強化するという課題の中で、より脆弱な人々のIFRへのアクセスを確保する必要性を認識したためである。

2018年、公立小学校と児童発達センター（旧称デイケアセンター）における栄養失調児への給食義務に関するRA 11037が成立した。この法律では、とりわけ、これらの給食プログラムにおける強化食品の使用を制度化した。

2019年、世界食糧計画（WFP）は、マギンダナオ州の学校給食プログラムにおけるIFRの使用に関するパイロットスタディを実施した。IFRは、地元パンガシナン州のIRK、地元の米、NFAのブレンド施設を使用して製造された。このパイロットスタディでは、地元農家の米を使ったIFRが学校給食プログラムに使用できることを見事に実証した。

2020年、ドゥテルテ大統領は、内閣官房長官を長とする「飢餓ゼロに関する省庁間タスクフォース（IATF-ZH）」を組織する大統領令を発出した。2021年にIATF-ZHの会合が数回開かれ、協同組合や政府機関を対象に2回の*Kumain*（文字通り食べるという意味）ウェビナーが実施された結果、科学技術省（DOST）の支援により米強化活動が急増し、IFRの生産者と教育省（DepEd）の購入が増加した。

このような背景から、WFP フィリピンは、WFP、国際生命科学研究所、DSMの日本のパートナーの支援を受け、フィリピンにおける米の強化能力、サプライチェーン、キャンペーンの取り組み全般に関する調査を実施することとした。



## 目的

**全体的な目的** 本調査は、鉄強化米の供給、受容、消費の低さを説明しうるサプライチェーン、アドボカシー、キャンペーンのギャップを明らかにすることを目的とした。

**具体的には**、フィリピンの鉄分米強化能力およびキャンペーンの取り組みをマップ化し、RA8976に規定されている米の強化義務化の実施を妨げるサプライチェーンの問題を特定することを目的とした。

**期待される成果**には、それに沿った提言が含まれる。

1. 最も費用対効果の高い、効率的な IFR のターゲット受信者への配信。
2. 社会的セーフティネットプログラムを通じた IFR の消費拡大のための戦略、及び供給サイド、すなわち IRK 供給業者と精米業者、流通業者、小売業者を通じた IFR 生産者の商業化、及び IFR の生産技術へのアクセスのための地元農民とコミュニティの関与；及び
3. 消費者、地方公共団体、非政府組織、およびその他の利害関係者による、IFR の知識と受容を高めるためのコミュニケーション戦略。

**方法論** 本研究では、米の栄養強化に関する先行研究および活動についてのデスクレビューを行った。また、米の栄養強化の生態系に関する枠組みに基づき、ステークホルダーを対象としたキーインフォーマントインタビュー（KII）とフォーカスグループディスカッション（FGD）を実施した。KII の対象者は、鉄粉生産者 7 名、鉄強化米生産者 11 名、機械製造・輸入業者 4 名、BARMM の農民組合 4 名、社会的セーフティネットプログラム（給食プログラム、災害対応）関係 4 機関、国・地域レベルの DOST 代表、BARMM の 4 政府機関・組織代表である。デスクレビュー、KII、FGD の結果は、米強化に関する提言のベースとして分析された。

**結果と考察** 現在の IFR 生産能力は 181,440 MT/年であり、強化可能な米 1,020 万 MT のわずか 1.81% である。

IFR の供給と、DepEd と社会福祉開発省（DSWD）の給食プログラムによる需要を分析すると、DepEd と DSWD が必要とする 55,233MT の IFR の 3 倍以上の 181,440MT まで生産できる能力が存在することがわかる。

IRK の最大生産能力は 1,359.36MT で、DepEd と DSWD のプログラム用 IFR の生産に必要な IRK の 5 倍近くである。

現在、IRK の生産者は 2 社、IRK とマルチ栄養ライスカーネルの輸入業者は 2 社です。2022 年末に生産施設が稼働すれば、さらに 2 社の IRK 生産者が増える予定である。IFR の生産者は 10 社であり、2023 年末までにさらに 8 社の IFR 生産者が操業する予定である。これらの IFR 生産者の大半はルソン島にいる。DOST と FNRI は、ほとんどの IFR 生産者に対して、それぞれ財政支援と技術支援を行っている。NFA は、2023 年までにバッファーストックの 50%（15 万 MT）をフル生産することを目標に、4 地域で IFR の生産のパイロッ



トテストを開始した。さらに、25の潜在的な IFR 生産者が FNRI に対して技術支援を要請している。これらの要請は現在評価中である。このシナリオでは、2022-2023 年に IFR の生産が大幅に増加し、DepEd と DSWD の給食プログラムに IFR を供給するのに十分な量になると予想されている。しかし、IFR の生産者のマッピングによると、現在、ビサヤ地方には生産者がおらず、ミンダナオ島には2者いる。このため、これらの地域で IFR を使用する場合、特に流通コストに沿ったサプライチェーン上の懸念がある。

生産者によると、強化により4ペソの追加コストが発生している。この追加コストの半分強（米1kgあたり約1.88～2.25ペソ）は、IRK（現地価格375～450ペソ）のコストである。ある IFR 生産者は、ブレンドのコストを P65/50kg あるいは P1.30/kg と見積もっている。しかし、NFA の混合コストは、P35/50kg または P0.70/kg に過ぎない。強化コストのもう一つの要素は、FNRI の技術導入のためのロイヤリティで、総売上上の2%である。

IRK と IFR の生産者のほとんどがルソン島にいたため、流通と物流は IFR のサプライチェーンで考慮すべき重要な要素である。ルソン島からビサヤ地方やミンダナオ島に IFR や IRK を輸送する場合、強化のコストに加えて、1kg あたり 2-5 ペソの追加コストがかかる。従って、FNRI の技術導入要請の評価では、ビサヤおよびミンダナオ島のグループに IRK および IFR の生産者がいないことを考慮する必要がある。

その他のサプライチェーン上の懸念は、輸入米の強化や IFR 生産者の品質監視である。RA11203 または米の関税化法によって米産業における NFA の規制機能が廃止されたからである。これらの問題はまだ解決されていない。

IFR に関するアドボカシーとコミュニケーションキャンペーンはより地域的なものであったが、国レベルの現在のアドボカシー活動は IFR の生産に焦点を当てたものである。リージョン1とダバオ・デ・オロにおける IFR のアドボカシーとプロモーションは、他の地域や州でも再現できるモデルとして考えられるだろう。IFR を推進するためのコミュニケーション計画は2016年に策定されたが、実行には至らなかった。また、2018年に地方自治体単位や消費者を対象とした様々な情報教育・コミュニケーション資料が作成されたが、IFR の供給に関する問題から利用されていない。

栄養や米の強化に関する消費者の主な情報源は、テレビ、保健所、ソーシャルメディアである。

## 結論と提言

フィリピンには、公立小学校や児童発達センターで行われる義務的な給食プログラムの要件に合わせて米の栄養強化を行う能力がある。しかし、この能力は義務的な給食プログラムの要件を上回っている。一方、IRK と IFR の生産者のほとんどがルソン地域にいたため、IFR の生産能力はビサヤとミンダナオで比較的弱い。

より費用対効果の高い効率的な流通のために、1) 微粉末ピロリン酸の代替・安価な供給源の検討、2) 混合コストの削減、3) FNRI ロイヤリティ要件の見直しにより、強化コストを

半減させることをまず提言した。その結果、FGDの結果に基づくと、コストは消費者の手の届く範囲に収まる。

さらに、IRKとIFRの両方の生産地を互いに近づけるという指針を採用することが推奨される。IFR生産の主要な支援者であるDOSTとFNRIはこの点で重要な門番であり、ビサヤ地方とミンダナオ地方に焦点を当てるべきであろう。また、酸性化合物の継続的な使用と、品質向上のための努力も推奨される。

IFRの消費を増やすために、1) 非政府組織の社会的セーフティネットプログラム、病院や刑務所のような米を使用する政府機関、従業員に米を支給する民間企業、2) 商業市場、をカバーする市場の拡大が推奨される。さらに、保健省、内務自治省、労働雇用省などの国家機関や地方自治体によるIFRの利用に関する関連政策（地方条例や法律の形で）の発行と実行が推奨される。

IFRの需要を高めるために、消費者と同様にIFRを利用できる国、地方政府、非政府組織をターゲットにしたIFRを配布する最善の方法について、地元の生産者を支援するために、支援活動とコミュニケーション計画が策定・実施されることができると言える。リージョン1とダバオ・デ・オロでの経験は、他の地域やLGUで適応させるために共有することができる。IATF-ZHのKUMAINウェブセミナーおよびDOST地域セミナーは、IFRの供給と需要を増加させるために継続的に実施することが可能である。消費者にIFRの利用を呼びかけるために、ソーシャルメディア・チャンネルとバルク・テキスト・メッセージを併用することが可能である。既存の対人コミュニケーションチャンネルを活用することができる。例えば、国家栄養評議会（NNC）のTutok Kainanプログラムの食育コンポーネント、Pantawid Pamilyang Pilipinoプログラム（4Ps）の家族開発セッション、DSWDの両親効果セッション、保護者会のオリエンテーションやミーティングなどである。2016年に策定されたコミュニケーションプランは、この取り組みの出発点となり得る。

最後に、報告書に記載された提言の数を考慮すると、次のステップは、IATF-ZHとNNCが主導し、次期政権の優先プログラムとして提唱できるフィリピン米強化プログラムの資金調達と実施の基礎となる省庁間戦略・運営計画の策定であるだろう。

## 1.0 導入と根拠

フィリピンでは、2000年に共和国法（RA）8976「フィリピン食品強化プログラムおよびその他の目的を定める法律」が制定され、2004年までに強制強化が完全実施されることになっている。RA8976では、精米に鉄、小麦粉にビタミンAと鉄、食用油にビタミンA、精製糖にビタミンAの強化が義務付けられている。また、*Sangkap Pinoy Seal*（SPS）をメインコミュニケーションハンドルとして、加工食品にビタミンA、鉄、ヨウ素の任意強化を行うことが規定されている。

2004年以降、さまざまな問題や懸念から、この法律は完全には実施されていない。米の強化は散発的に実施された。小麦粉、植物油、パーム油は強化されているが、強化レベルへの準拠を確認する必要がある。輸入小麦粉、透明包装の食用油（シェア約65%）は強化されておらず、精製糖は強化されたことがない。

このような挫折があったとしても、貧血有病率を含む微量栄養素欠乏症は、2008年から、あるいはRA8976の完全実施後、改善されている（図1）。貧血有病率の減少は2019年まで続き、2013年から2018年にかけてはわずかに増加した。

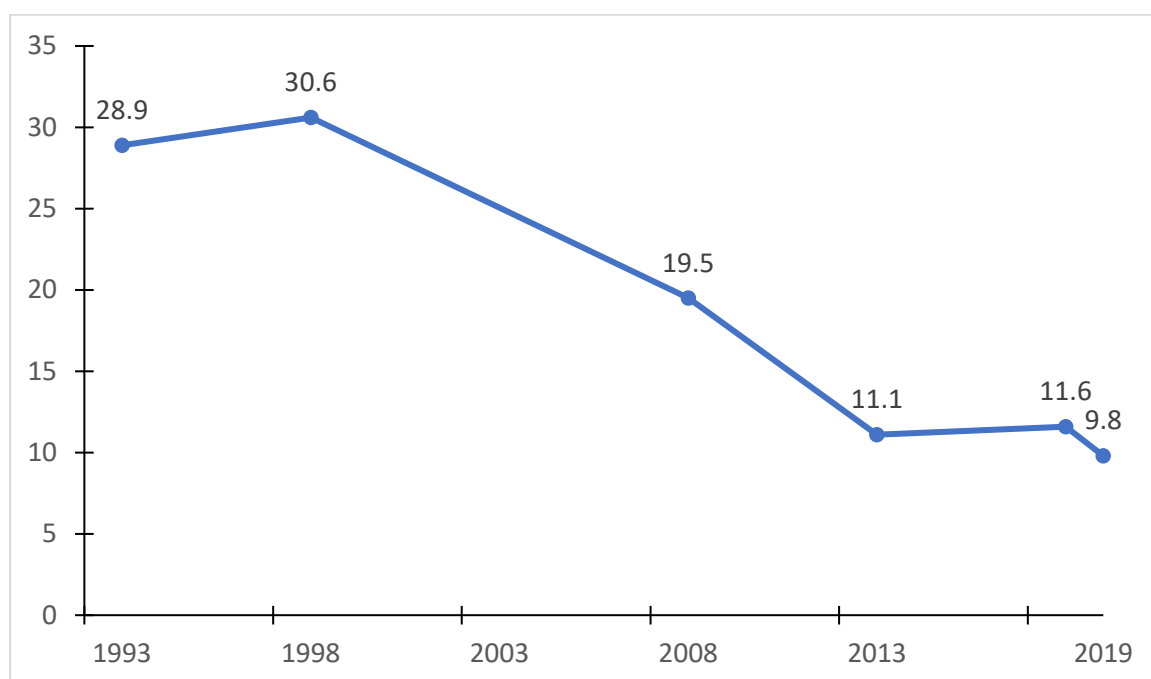


図1. フィリピンにおける貧血の有病率の推移（1998年～2013年）（食品・栄養研究所（FNRI）、国民栄養調査）

1998年と2018年、2019年の間の貧血の有病率の減少は、すべての年齢層と人口層で明らかになった（図2）。世界保健機関（WHO）の公衆衛生上の意義のカットオフに基づくと、貧血が中程度のレベルである6～11ヶ月齢と1歳児を除き、ほぼすべての年齢／人口集団の有病率は軽度の問題を示している。

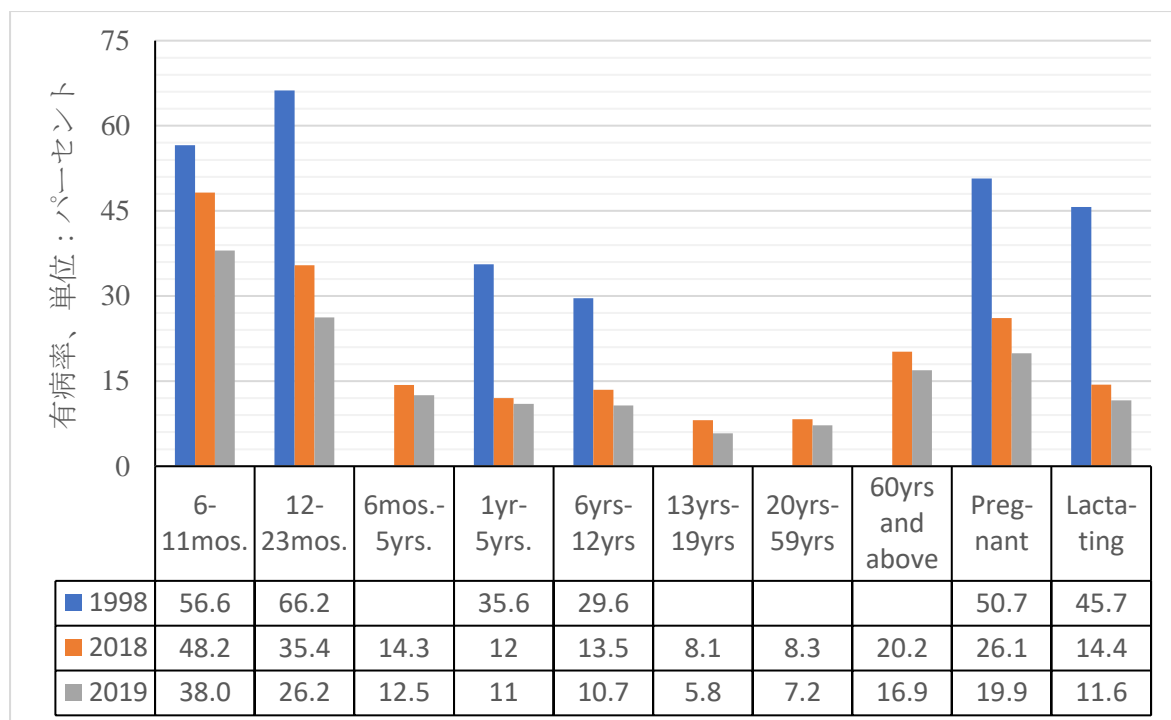


図2. 様々な年齢層と人口層における貧血の有病率 2018 年と 2019 年。(FNRI、国民栄養調査 2019)

世界食糧計画（WFP）は、2006 年にフィリピンでのプレゼンスを再構築して以来、内戦と不安のために基本的な社会サービスへのアクセスが制限され、人間開発で最下位に位置するバンサモロ自治区（BARMM）を中心に技術支援を行っている。2018 年、WFP は「Fill the Nutrient Gap (FNG) Philippines」と題した調査を実施し、栄養分析のフレームワークと意思決定ツールを作成した。

表 1 は、FNG の調査結果の概要で、特に BARMM のプロジェクトエリアにおいて、栄養不良に影響する要因を他の地域と比較して示している。

表1. BARMM における栄養不良に影響を与える要因。

インジケータ	BARMM における結果	ランキン グ	最下位/最上位地域の 結果	BARMM の備考
発育障害（5 歳未満児に おいて）	45%	1	23%（リージョン 3）- 最も低い普及 率	地域別で最も 高い率
世帯の 1 日当たり食費の 中央値（農村部）	P154	2	P151 （地域 10）- 最低支 出額	2 番目に低い支 出額
世帯の 1 日の食費の中央 値（都市部）	P155	1	P370（首都圏 [NCR]）- 支出額 が最も多い。	最低の支出額

インジケーター	BARMM における結果	ランキン グ	最下位/最上位地域の 結果	BARMM の備考
エネルギー制限食の 1 日のコスト	P120	2	P133 (NCR) - 最高コスト	1 日のコストは 2 番目に高い
エネルギー使用のみの食事ができない世帯の割合	23%	1	NCR は 0% で最下位-割合が低い	全地域の中で最も高い
栄養価の高い食事にかかる 1 日のコスト	P 165.00	4	P 148.00 (第 5 地域) - 最低	栄養価の高い食事の 1 日のコストは 4 番目に低い
地域別の栄養価の高い食事にかかる 1 日のコストと手の届きにくさの関係	58%	2	59% (リージョン 10) - 最低	1 日のコストは 2 番目に低い

WFP の技術支援の一環として、教育省（DepEd）Department Order (DO) 39, S. 2017 - 「2017-2022 年度の学校給食プログラム実施に関する運用指針」に基づく学校給食が実施されている。

RA 11037 「フィリピンの子供たちの飢餓と栄養不良に立ち向かうため、公立のデイケア、幼稚園、小学校における栄養不良の子供たちへの国家給食プログラムを制度化し、そのための資金を計上する法律」は、公立小学校と児童発達センター（旧称デイケアセンター）における給食プログラムを制度化したものである。この法律では、RA8976 で規定されているように、給食プログラムに鉄強化米（IFR）を使用することが奨励されている。しかし、学校給食における IFR の使用は、RA 11037 の制定以前にパンガシナン州とダバオ・デ・オロ州の地方政府ユニット（LGUs）が支援していた一部の地域に限られている。

このような背景から、WFP はマギンダナオ州で学校給食への IFR 活用に関するパイロットスタディを実施し、その結果を文書化し、特に内閣官房長官を長とする政府の「飢餓ゼロに関する省庁間タスクフォース」（IATF-ZH）を中心に様々な関係者に発表している。

パイロット調査の成功を受けて、WFP はフィリピンにおける鉄分強化米の能力、サプライチェーン、キャンペーンの取り組みに関する本調査を実施している。この調査結果は、BARMM のみならず、全国的な米の栄養強化の拡大に活用されることが期待される。

## 2.0 フィリピンにおける米の栄養強化の進展

フィリピンでは、1946 年にホフマン・ラロシュ社の技術により、ナイアシン、鉄に加え、脚気の問題に対処するためにチアミンを添加し、有効性試験に成功したことから、米の栄養強化は微量栄養素の栄養不良に対処する戦略として長く行われてきた。この研究は、フィリピン栄養財団（Nutrition Foundation of the Philippines, Inc.）の創設者である当時の保健長官、フアン・サルセド・ジュニア博士が先駆的に行ったものである。フィリピンでは、脚気を確実に撲滅するために、1952 年に「ライスエンリッチメント法」を制定したが、この法律

が課税の根拠となったため、結局実施されなかったが、1950年代末には脚気が撲滅された。

前述の米の栄養強化の成功は、科学技術省（DOST）の食品栄養研究所（FNRI）が1980年代から1990年代にかけて米の鉄強化に関する研究を継続的に行った基礎となった。

当時は、普通の米に鉄分をコーティングして IRK（Iron-Rice Kernel）を作り、これを精米に混ぜて IFR を製造していた。この技術をもとに制定されたのが、RA8976 である。この法律の施行規則（IRR）では、精米 100g あたり 6~9mg の鉄分強化が義務づけられた。

この技術は、飢餓緩和加速プログラム（AHMP）の学校給食プログラム（FSP）の米の鉄分強化に使用された。FSP では、特定された公立小学校に在籍する 1 年生と就学前の子どもたち、および社会福祉開発省（DSWD）が監督する特定されたデイケアセンターの 3~4 歳の就学前の子どもたちに、1 キロの米が提供された。IFR は国家食品局（NFA）から提供され、ベトナムからの輸入米、または米国ライトグループの硫酸第一鉄を使用した IRK コーティングを施した現地生産米が使用された。これは 2005 年から 2010 年まで NFA によって行われた。

2011 年から 2013 年にかけて、NFA は主に IFR の供給を掃討するために、商業店舗を通じた IFR の配布のための大規模なコミュニケーションキャンペーンを実施した。IFR の供給が尽きると、商業流通も中止された。

2007 年、ダバオ市は米の強化に着手した LGU の一つで、当時のダバオ市長で現大統領のロドリゴ・ロア・ドゥテルテが大統領令第 19 号を発行し、予算 50 万ペソでダバオ市監視タスクフォースを設立した。タスクフォースは、ヨード添加塩と IFR の使用について、食品サービス施設を監視しました。保健所の職員がショッピングモールでアドボカシー活動を行った結果、ジョリビー、チャウキング、マクドナルドなどの主要なファーストフード店で IFR が提供されるようになった。METAVCO 精米所は、Grains Fortificant Marketing を販売代理店として、CLG Foods のコーティング IRK を使用して IFR を製造した。しかし、2010 年に現地の指導者が交代したため、タスクフォースのための資金が提供されず、このプログラムは廃止された。

2002 年、FNRI は IRK 製造のために、鉄をコーティングする代わりにカーネルに埋め込む熱間押出技術の開発を開始した。IFR に IRK を使用した場合、鉄分の保持率は 90% 以上となり、コーティング技術の鉄分保持率 50% と比較すると、はるかに高いことが分かった。(2006 年に Superlative Snacks Corporation が、2007 年には大手ファーストフードチェーンの Goldilocks Corporation が、IFR をライスミールに採用した。また、2006 年に FNRI はバターン州オリオンで IFR の商業化に関する市場試験を実施し、条例とコミュニケーション・キャンペーンの支援を得た。さらにザンバレス州では、1 市 7 町において IFR の商業化を実施し、テレビ、イベント、パレード、看板、情報・教育・コミュニケーション（IEC）資料などを用いたコミュニケーションキャンペーンを実施した。政権交代に伴い、オリオンとザンバレスでは、これらの取り組みが中止された。ほぼ同時期に、図 1 に示すようにフィリピン人の貧血が大幅に減少している。

2014 年、「アジアにおける米の強化のスケールアップに関するワークショップ」において、政府機関（DSWD、FNRI、食品医薬品局（FDA）、国家栄養会議（NNC）、NFA）、ユニセフ、WFP、精米業者・貿易業者（Nutridense Food Manufacturing Company, Nutrition and Beyond Corporation, Philippine Confederation of Grains）の代表で構成するフィリピン代表団は、まず社会安全網プログラム（SSNPs）を中心に米強化を進めることに決定した。

これは、フィリピンで供給されるすべての米を強化することは、その量を考えると困難であるとの判断からである。

フィリピン統計局のデータによると、2018 年、一人当たりの年間平均消費量は 103.25kg で、推定人口 1 億 1000 万人、推定総米摂取量は業務用 70% で 113 億 7550 万トン、米の義務強化では約 800 万トンの強化が必要である。これは、米の栄養強化を行うべき精米業者の数を考えると、実現は困難である。そのため、通常 SSNP の対象となっている、より困窮度の高い弱者グループに IFR を重点的に配布することで、管理と監視が可能な強化用米の数量になる。

## 2.1 米の栄養強化の復活に向けた研究

2010 年の AHMP 終了、2013 年の NFA IFR 商業配布を経て、米の栄養強化復活に向けた様々な研究が行われ、FNRI は押出成形 IRK の現地生産に関する技術移転（現在 IRK の現地生産に使われている技術）と、そのブレンダーによる米栄養強化に着手した。NNC が担当したこれらの研究は、以下の通り。

2.1.1 "フィリピンにおける米のサプライチェーン診断"、2014 年、ユニセフと食品強化イニシアチブの支援により実施された。この調査では、米のサプライチェーンと米の強化に関連する経験を調べ、米の強化がどのようにスケールアップできるかを判断した。これを受けて、NNC は米の強化に関するアドホック技術作業部会（TWG）を組織した。TWG は調査結果に基づき、政府の SSNP を通じて配布される米に米の強化の焦点を当てることに合意し、そのためのワークプランを作成した。

2.1.2 "フィリピン政府および非政府組織の SSNP のための米消費"、2015-2016 年、ユニセフの支援により実施された。これは、フィリピンにおける米の栄養強化のスケールアップのためのフォローアップ技術支援プロジェクトであった。この調査では、特に DepEd と DSWD の様々な SSNP を特定し、その給食プログラムに IFR を使用するコストを見積もり、IFR の供給源を特定し、LGU による実施のために SSNP 向けの米強化のモデルを示した。この調査は、IFR の供給源がある地域でアドボカシー活動を行うために利用された。また、SSNP のための米の栄養強化を促進するためのコミュニケーション計画も策定された。

2.1.3 "SSNPs のための米の強化に関する技術支援"、2017-2018 年、Nutrition International の支援を受けています。この取り組みでは、以下のような様々な活動を行った。



- 2.1.3.1 SSNP のための米の栄養強化に関する景観政策分析の実施。
- 2.1.3.2 ダバオ・デ・オロ市とウルダネータ市の LGU による米の栄養強化の実施に関するベストプラクティスの文書化。
- 2.1.3.3 SSNP のための米の栄養強化に関わる政府機関のための国策ガイドランスの開発。
- 2.1.3.4 SSNPs 内での IFR の生産、供給、分配のための仕組みの開発。
- 2.1.3.5 米の栄養強化に賛同する NNC 理事会決議の策定（2019 年承認）、および
- 2.1.3.6 地元の首長や消費者を対象に、SSNP のための米の強化について提唱するための IEC 資料の作成。

## 2.2 主な政策・プログラムの展開（2019 年～現在）

前述の研究の実施と、DepEd と DSWD の給食プログラムにおける IFR の利用のための継続的なアドボカシー、および前述の報告書で明らかになったダバオ・デ・オロ市とウルダネータ市における IFR を用いた学校給食の実施モデルを受けて、IFR の生産と消費の増加に関する主要な政策とプログラムの開発は以下のとおりであった。

- 2.2.1 **RA 11037** 「フィリピンの子どもたちの飢餓と栄養不足と闘うために、公立デイケア、幼稚園、小学校の栄養不足の子どもたちのための国家給食プログラムを制度化し、そのための資金を充当する法律」または「*Masustansyang Pagkain para sa Batang Pilipino Act*（フィリピンの子どもたちに栄養のある食べ物を）」を可決したこと。2017 年 7 月 24 日に成立したこの法律は、栄養失調の学童のための DepEd の学校給食プログラムと DSWD の児童発達センターのすべての就学前の子どもたちのための IFR の使用を奨励するものである。

RA 11037 を受けて、法律以前から給食プログラムを実施していた DepEd と DSWD は、その実施を確実にすると同時に、IFR の利用を促進するためのガイドラインを作成したのである。

- 2.2.2 **国家栄養評議会運営委員会決議第 1 号 S.2019** 「フィリピンにおける社会的セーフティネットプログラムのための鉄を含む米の強化の拡大」（付属書 1）による SSNPs における IFR の使用に関する方針の採択。
- 2.2.3 2019 年に 14 の国家政府機関、14 の国家政府機関の 10 の付属機関、2 つの政府銀行の間で覚書を締結し、**飢餓と貧困に対する強化されたパートナーシップ（EPAHP）**を採用すること。中でも、このパートナーシップは、農業生産性と所得の向上、食料安全保障と栄養の確保、飢餓と栄養失調の緩和を目

的としている。特に、戦略的施策として、補助給食プログラムに必要な食糧の供給者として地域密着型組織を活用し、これらの組織が補助給食プログラムに必要な食糧を供給できるように能力強化を図ることが挙げられる。能力強化には、信用施設へのアクセス向上、コミュニティベースの調達への参加能力向上、農業技術や改良普及サービスの提供を可能にする政策やプロセスの採用が含まれる。

- 2.2.4 2020年、ロドリゴ・ドゥテルテ大統領による大統領令 101 号を通じて、**飢餓ゼロに関する省庁間タスクフォース (IATF-ZH) を組織すること**。IATF-ZH のトップは内閣官房長官である。IATF-ZH は、国家食糧政策の採択と実施を通じて、国連の持続可能な開発目標第 2 号に沿った形で、2030 年までに飢餓をなくすことを目標としている。

国家食糧政策は、*a)* 飢餓ゼロに関連する既存の政策、規則、規制の見直しと合理化、*b)* 入手可能で安価な食糧の確保、*c)* 栄養の適切性の確保、*d)* 食糧の入手可能性と安全性の確保、*e)* 持続的食糧システム、食糧回復力、安定性の確保、*f)* 情報、教育、意識、人々の参加の確保、という 6 項目の主要成果分野を対象としている。2021 年 12 月に加盟機関から報告された成果は以下の通り。

- 2.2.4.1 DepEd 学校給食プログラム (SBFP) 用の IFR を 85,640,857.81 ペン分調達した。ルソン島を中心とする DepEd の地区事務所が関与しているが、ミンダナオ島の 2 都市 (マティ市、ディゴス市) は発注確認待ちの状態であった。IFR の価格帯は、主に輸送費により 1kg あたり 60~90 ペンであった。
- 2.2.4.2 マギンダナオの学校給食における IFR の使用に関する WFP のパイロット調査の実施。この調査では、パンガシナン州に拠点を置く Nutridense Food Manufacturing Corporation の IRK を使用し、NFA の施設と地元農家の米を使って BARMM で IFR を製造することの実現可能性を示した。
- 2.2.4.3 FDA Bureau Circular 2007-0010A (Annex 2) の発行に伴う IRK の基準改定。2019 年 WFP 調査実施時、IFR の生産に使用される基準は、RA8976 とその IRR で規定される 60~90ppm の鉄だった。これは、法律が制定された当時、唯一の技術であった IRK の製造のためのコーティング技術に基づくものであった。しかし、FNRI は IRK 製造に熱間押出技術を使用し、鉄の損失を最小限に抑え、コーティング技術で製造された IFR と比較して、より許容できる官能特性と物理特性を持つ IFR の開発およびテストに成功した。FNRI の研究に基づき、IRK の規格改訂案を検討するために様々な会議が開催された。2021 年 12 月 20 日の IATF-ZH の会議の後、保健省 (DOH) は改正規格の承認を確約し、最終的に翌 21 日に発行された。

IFR の鉄分の基準は 60ppm～90ppm から 20ppm～60ppm に引き下げられた。

- 2.2.4.4 2022 年の米強化に関する NFA ワークプランの策定、NCR およびリージョン 2、3、4-A の IFR のパイロット生産のためのブレンド機 4 台の調達から実施。NFA は、2022 年のパイロット調査から、最終的に米のバッファストックの 50%を強化することを目標としている。2022 年の試験的 IFR 生産の予算要件を満たすことができ、2023 年の年間予算案にバッファストックの 50%の強化が含まれる予定。
- 2.2.4.5 2021 年 8 月に IATF-ZH が主催した第一回 *Kumain*（文字通り食べるという意味）ウェビナーの実施は、特に DOST Community Empowerment for Science and Technology（CEST）プログラムを通じて IFR の生産者や潜在的生産者の数を増加させるきっかけとなった可能性がある。2022 年 1 月 25 日、*Kumain* のフォローアップウェビナーが開催された。セクション 5.0 の関連する議論を参照されたい。
- 2.2.4.6 NNC の栄養補助食品プログラム「*Tutok Kainan*」（対象を絞った栄養補給）の実施により、妊婦と生後 6～23 ヶ月の子ども向けに 127,999kg の IFR が調達されたと報告されている。
- 2.2.4.7 DOH は、すべての DOH の病院、食堂、プログラム、プロジェクトが IFR のみを使用するための方針を発表し、IFR のコミュニケーションキャンペーンを設計・実施することを約束する。
- 2.2.4.8 フィリピンの食品強化プログラムに関する NNC の評価が進行中であり、まもなく完了する。この評価では、特に、食品強化プログラム、特に米の強化の規模を拡大する際に考慮すべき、食品強化を促進および阻害する因子が特定されている。
  - 2.2.4.8.1 括弧内は回答者に応じて実施した KII に基づく米の栄養強化を促進する要因。
    - 2.2.4.8.1.1 国、LGU、政府機関（NFA、DSWD-国家資源・物流管理局（NRLMB）、重要なサプライヤー）の支援を受けている。
    - 2.2.4.8.1.2 他の参加機関（NFA、フィリピン稲研究所（PhilRice）、DSWD-NRLMB）との継続的な研究・開発。
    - 2.2.4.8.1.3 強化製品の使用に関するプロモーション・キャンペーン（PhilRice、DSWD-Program

Management Bureau (PMB)、DSWD-NRLMB  
)

2.2.4.8.1.4 栄養剤の入手可能性 (DSWD-PMB)

2.2.4.8.1.5 規制監視 (DSWD-PMB、DSWD-NRLMB)

2.2.4.8.1.6 関係機関の協議、連携、調整 (DSWD-災害  
対応管理局 (DRMB)、DSWD-NRLMB、  
重要な供給者)。

2.2.4.8.1.7 IFR の NFA 生産量 (DSWD-DRMB)

2.2.4.8.1.8 食品強化の費用対効果に関する政治的アド  
ボカシー (DSWD-NRLMB)

2.2.4.8.2 米の栄養強化の阻害要因

2.2.4.8.2.1 IFR の利点に関する情報発信の欠如  
(NFA)

2.2.4.8.2.2 IFR 生産のための予算要件 (NFA、DSWD-  
DRMB)

2.2.4.8.2.3 米の栄養強化機器の能力制限と生産維持の  
必要性 (NFA、DSWD-DRMB)

2.2.4.8.2.4 強化費用 (DSWD-PMB、DSWD-NRLMB)

2.2.4.8.2.5 政府プロジェクト用の米はすべて NFA か  
ら購入することを義務付ける大統領令 51  
号 (1998 年) (DSWD-DRMB)

2.2.4.8.2.6 適切な食糧管理の欠如 (DSWD-NRLMB、  
PhilRice)

2.2.4.8.2.7 栄養強化のためのスタートアップ費用  
(DSWD-NRLMB)

2.2.4.8.3 米の栄養強化のすすめ

2.2.4.8.3.1 コンプライアンスを厳しく監視する適切な  
機関を特定する (NFA)。

- 2.2.4.8.3.2 監視対象機関、精米業者、貿易業者（NFA）間の覚書（MOA）を作成し、実施する。
- 2.2.4.8.3.3 定期的なモニタリングと厳格な実施（PhilRice）
- 2.2.4.8.3.4 政府機関間の効果的なコミュニケーションのための機関連携強化(PhilRice)
- 2.2.4.8.3.5 官民パートナーシップと明確な提携条件の設定（重要なサプライヤー）
- 2.2.4.8.3.6 栄養強化食品普及のための民間セクター支援（DSWD-DRMB）
- 2.2.4.8.3.7 脆弱な人々やリスクのある人々に手を差し伸べるための戦略の開発、手が届かない場合の補充を検討 (DSWD-NRLMB)
- 2.2.4.8.3.8 より積極的な政策提言と、公的セクターの支援と民間セクターの関与のための立法・規制に対する政治的意思の必要性 (DSWD-NRLMB, PhilRice, Fortificant Supplier)
- 2.2.4.8.3.9 資源、制約、品質保証、消費パターン、受容性、コストの評価 (DSWD-NRLMB)
- 2.2.4.8.3.10 民間パートナー（重要なサプライヤー）に対する税制上の優遇措置

これらの動きは、米の鉄分強化のギャップに対処するためのアクションを決定する上で考慮すべき重要なものである。

## 3.0 目的

### 3.1 一般目標

本調査の目的は、鉄強化米の供給、受容、消費の低さを説明しうるサプライチェーン、アドボカシー、キャンペーン（社会・行動変容コミュニケーション）のギャップを明らかにすることである。

### 3.2 具体的な目標

#### 3.2.1 フィリピンの鉄ライス強化能力とキャンペーン活動のマップ化

- 3.2.2 2000年フィリピン食品強化法およびその施行規則に規定された米の強化義務化の実施を妨げるサプライチェーンの問題を明らかにすること。

### 3.3 研究成果

この研究の成果には、微量栄養素の不足に対処するためのより強力な政策を生み出すための提言や実行可能なガイドラインが含まれており、具体的には次のようなものがある。

- 3.3.1 最も費用対効果の高い、効率的な IFR のターゲット受信者への配信。
- 3.3.2 SSNP を通じた IFR の消費拡大と、供給側（IRK サプライヤーと IFR 生産者）が製粉業者、流通業者、小売業者を通じて商業化し、地元の農民とコミュニティが IFR の生産技術にアクセスできるように関与するための戦略、および
- 3.3.3 消費者、地方公共団体、非政府組織（NGO）、およびその他の利害関係者による IFR の知識と受容を向上させるためのコミュニケーション戦略。

## 4.0 方法論

データ収集方法は以下の通りである。

### 4.1 デスクレビュー

また、フィリピンにおける米の栄養強化の進捗状況を確認するため、関連する文献を調査した。机上調査は、主要情報提供者インタビュー（KII）とフォーカス・グループ・ディスカッション（FGD）のガイドの作成に役立った。検討した資料は、フィリピンにおける食品強化に関する WFP の報告書、SSNP における米の強化のスケールアップに関する各種調査、IATF-ZH に関与した機関の成果報告書などである。

机上調査の概要は 2.0 節に示すとおりである。

### 4.2 キーインフォーマントインタビュー

#### 4.2.1 インタビューしたステークホルダー

鉄分強化米のエコシステムの枠組み（図 3）を作成し、KII の対象となるステークホルダーを決定する際に使用した。このエコシステムでは、IFR の生産に必要な投入物、すなわち IRK（国産および輸入）、精米、そしてこれらの生産に必要な投入物、すなわち強化剤、機械（押出機および混合機）、支援、技術支援が示されている。また、IFR の利用者、特に政府の SSNPs も示している。IFR エコシステムに基づき、以下の方々がキーインフォーマントとしてインタビューに答えられた。

- 4.2.1.1 IRK の生産者／潜在的生産者／輸入者 7 名。
- 4.2.1.2 IFR の生産者／潜在的生産者 11 名。
- 4.2.1.3 押出機、混合機の製造・輸入業者 4 社。
- 4.2.1.4 BARMM の 4 つの農家協同組合と精米業者。
- 4.2.1.5 社会的セーフティネットプログラムに関わる 4 つの国の政府機関の代表者 20 名。
- 4.2.1.6 国および地域レベル（4 地域）の DOST からの代表者（FNRI および技術応用推進研究所（TAPI）からの代表者を含む）。
- 4.2.1.7 BARMM の 4 つの政府機関/組織と、マギンダナオの 4 つの LGU の代表者。

ほとんどの KII は Zoom プラットフォームを使用してバーチャルに行われた。ただし、BARMM、Nutrition and Beyond、DSM の関係者については、対面式で KII を実施した。インタビューした人たちのリストは、付録 3 に記載されている。

必要な場合は、回答者から通常 E メールで追加情報が送られた。



#### 4.2.2 キーインフォーマントインタビューガイド

キーインフォーマントガイドは、各ステークホルダーに特化して作成された。例えば、米の栄養強化に取り組む理由、生産能力、SSNPにおけるIFRの利用範囲、複数の微量栄養素強化剤の使用に関する考え、直面した問題、IFRの生産と分配の規模拡大に役立つ提言などである。

### 4.3 フォーカス・グループ・ディスカッション

また、学校給食にIFRを使用しているマギンダナオの公立小学校4校を対象に、4回のフォーカス・グループ・ディスカッションを実施した。FGDは、プロジェクトチームのメンバーがファシリテーターおよびドキュメンターとして、学校給食コーディネーターの支援を受けながら、対面式で行われた。

FGDでは、参加者が栄養について知っていること、情報源、*Sangkap Pinoy Seal*について、また学校給食プログラムで使用されているIFRについての考えや経験、IFRの購入可能性などを調査した。

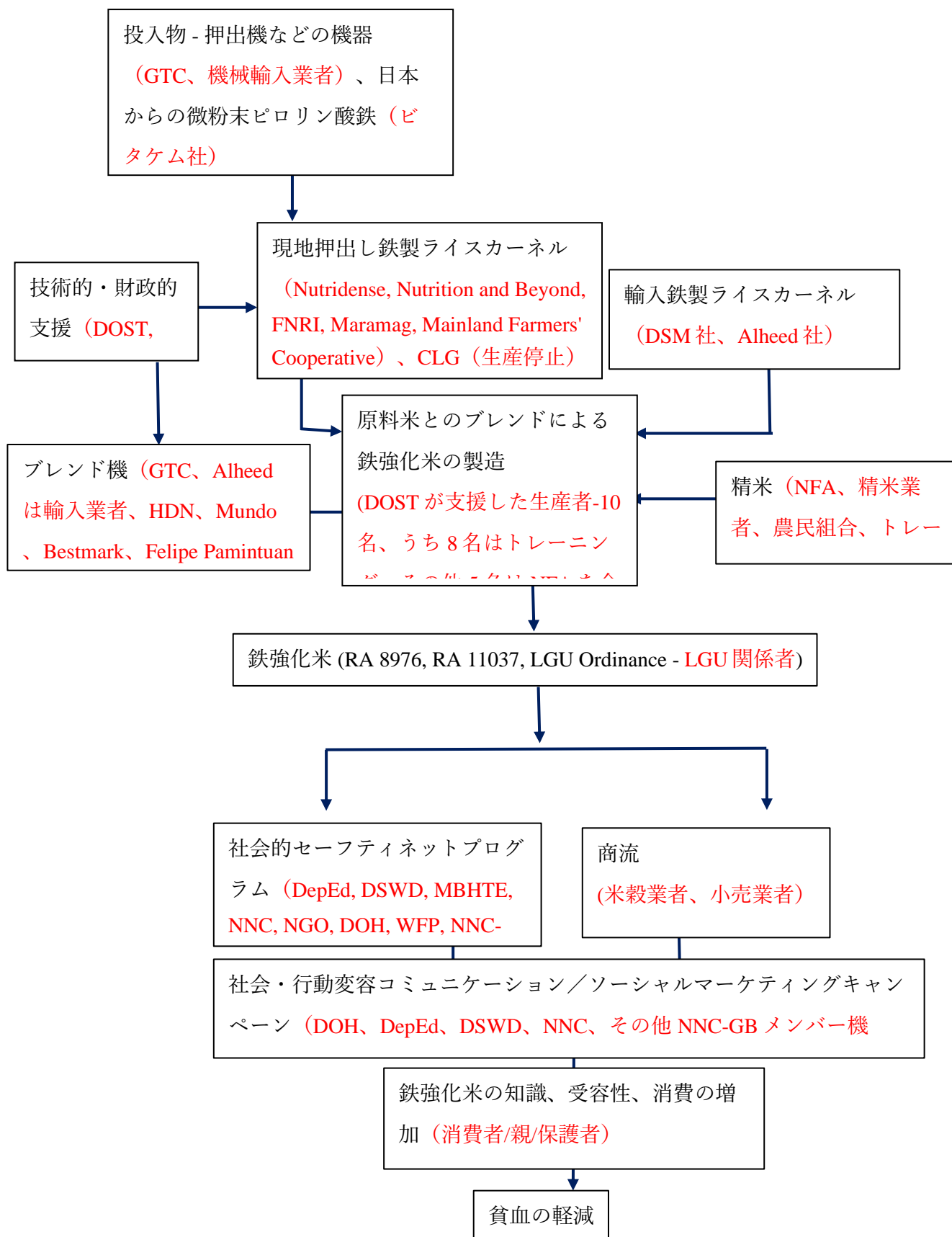


図3. フィリピンにおける米の強化エコシステム。

## 5.0 結果および考察

以下は、KII と FGD で得られた主な知見とハイライトである。5.1 節から 5.8 節は IFR 作成能力に関連するステークホルダー、5.9 節と 5.10 節は IFR のユーザーと潜在的ユーザーについて述べている。

### 5.1 現地の鉄分強化米の穀粒 (IRK) 生産者・販売者

机上調査によると、IRK の生産者または販売業者は 8 社あり（付属文書 4）、そのうち 6 社が現地生産者、2 社が輸入業者であることがわかった。現地生産者 6 社のうち、3 社は操業中（ルソン島に 2 社、北アフリカに 1 社）、2 社は DOST の支援を受けた組織段階（ビサヤ地方とミンダナオ地方）、一方、DOST の支援を受けた技術の早期採用者の 1 社（ミンダナオ地方）は需要不足で事業を停止している（図 4）。輸入・販売業者 2 社も複数の微量栄養素含有米プレミックスを保有している。これらはマニラ首都圏に拠点を置いている。

ルソン島リサル州の Food Baskets Corporation、ルソン島第 5 州の CamSur Multipurpose Cooperative、ミンダナオ島サウスコタバトの Faeldonia Rice Trading の 3 社は、IRK を生産する意思を表明している。

以下は、そのインタビューと運営に関わる調査結果です。



図4. フィリピンにおける鉄製米穀と強化米穀の生産者と販売者のマッピング

5.1.1 **Nutridense Food Manufacturing Corporation (NFMC) - IRK と IFR 技術の 2 番目の適応企業は、パンガシナン州スタ・バーバラに拠点を置く NFMC である。** NFMC は、DOST-FNRI の他のいくつかの技術の適応者でもある。

同社は、FDA から営業許可証と製品登録証明書を取得している。また、フィリピン政府電子調達システムに登録されており、政府機関や LGU の高額調達の入札に参加することができる。

2014 年に開催されたバンコクのワークショップ「Scaling Up Rice Fortification in Asia」に当法人の理事長が参加したことがきっかけで、米の強化に取り組むことになった。

ニュートリデンセの社長、ラッキードクター氏は、「バンコクのワークショップは私にとって画期的な出来事だった」と語った。彼は、ワークショップの中で、自分たちの小さな会社でも、米の栄養強化を通じて貧血の

同社は、DOST Region I の Small Enterprises Technology Upgrading Program (SETUP) の下、DOST からのソフトローンで押出機を取得した。

最初の数年間は「市場の需要が元気がなかった」ため「心細かった」ものの、2015 年に IRK の生産を開始した。

NFMC は、WFP が 2019 年に BARMM の学校給食プログラムで IFR を使用する試験運用で使用する IRK を供給しました。そのため、IRK をわざわざマギンダナオ州まで輸送する必要があり、IRK のコストが上乗せされた。

2020 年の最終四半期から 2021 年、2022 年にかけて、主に DepEd と DSWD の給食プログラム向けに IFR、ひいては IRK の需要が急増しました。この急増は、RA 11037 の実施と IATH-ZH による IFR の推進が原因であると考えられる。この需要の急増により、押出機の実稼働は 80-100kg/hr から 2021 年には 150kg/hr のフル稼働となる。NFMC は、2021 年に IRK の生産用に約 1,240kg の微粉化ピロリン酸第二鉄を調達した。

NFMC は IFR の生産者でもあり、関連する議論は 5.4 節で行っている。

**5.1.2 Nutrition and Beyond Corporation /JD Aguilar Commercial, Inc. - JD Aguilar Commercial, Inc.**は、ヌエバエシハ州サンレオナルドに拠点を置く大手精米会社。IRK の生産に FNRI の押出技術を採用した最初の会社のひとつ。

IRK の製造のために Nutrition and Beyond Corporation (NBC)を設立した。その押出機やその他の設備は、DOST-FNRI の支援のもと、ILSI Japan からの助成金によって提供された。

NBC は IFR の商業的な販売も試みており、高級な消費者をターゲットにしている。NBC は、高級消費者をターゲットに IFR の商業的な販売を試み、良質の米を 90 ペソ/kg で販売し、スーパーマーケットで流通させた。一時期、IFR の生産を中止した。スーパーマーケットで販売する際に問題となったの

は、出品手数料の追加費用と、マーケティングやプロモーションキャンペーンの不足で損失が生じたことである。

2021年にDepEdのIFR要件の一部を供給するために操業を再開し、IFRのコストは17/350グラムであった。2021年、IFRの需要急増に対応し、NBCは微粉化ピロリン酸第二鉄を200kg調達し、同じく生産していたIFRのIRKを生産した。

IFR100袋から対応。ブレンドの生産性は300袋(50kg/袋)/時間。

配送料は、生産地から150km以内は無料。150kmを超える場合は、50kgのIFRを1袋につきP45の配送料がかかる。

NBCが提起した懸念は、パンデミック時にDepEdがバーチャルラーニングにより、通常の米の代わりにIFRの予算を確保し、維持費やその他の運営費の予算を削減したように、今後もIFRを調達し続けるかどうかというものであった。

5.1.3 ブキドノン州マラマグのマラマグ・コミュニティ多目的協同組合は、連続ライン押出機と混合機一式を試運転、校正、トレーニングのために納入し、2022年7月に稼働する予定。この機械はDOST CEST ProgramからDOST Region 10を通じての助成金である。このプロジェクトは、施設の改善と建物の建設に資金を提供するブキドノン州政府と連携している。この協同組合は、ミンダナオ島のIFR生産者にIRKを供給する機会を持つことになる。

5.1.4 **FNRIの栄養食品加工施設** DOST-FNRIの栄養食品加工施設はタギッグ市のBicutanにある。この施設は、研究所が開発した新技術に基づく製品を少量生産するために使用されている。この施設は、使用しないときは、ライセンスを受けた(技術ライセンス契約を結んだ)FNRIのパートナーやアダプターに、1時間あたり一定の料金で貸し出されている。FDAのGMP認定を受けた施設である。米の栄養強化のために、加工工場にはパイロットスケールの押出機、試験用押出機、完全連続ラインの押出機などがあり、それぞれ50〜80、5〜10、80〜100kg/時の容量がある。2020年の最後の四半期から2021年にかけて、DepEdの給餌プログラム用にIFRの需要が急増したとき、NBCはこの施設を借りて数トンのIRKを生産した。NFMCのような他のパートナーも、IFRの商業化に先立ってこの施設を借用した。このパイロットプラント施設では、IRKだけでなく、さまざまな種類の多栄養素押出米粒も生産している。

5.1.5 メインランド農民生産者組合と提携した第8地域の北サマル州ラオアンのLGU。DOST 8-Northern Samarは、LaoangのLGUに、完全なラインの押出機とブレンドマシンを購入するためのプロジェクト資金をダウンロードした。これもCESTプログラムによる支援である。現在、LGUラオアンは機械購入のための入札書類を作成しており、一方、協同組合はDOST-FNRIか

らの趣意書を通じて IFR 技術の利用に向けて動いている。同協同組合は、運用開始後、レイテ島とサマール島の IRK と IFR のニーズに応えることができ、場合によっては、ビサヤ地方の他の地域にも対応することができる。

5.1.6 ジェネラルサントス市に本社を置く **CLG Health Food, Inc.**は、DOST-SETUP からのソフトローンによる支援を受けて、FNRI の押出技術を利用して IRK を最初に生産した企業の 1 つである。それ以前の 2006 年には、IFR を製造するためにコーティングされた IRK を製造していた。しかし、需要不足による損失が発生したため、生産を中止した。最後の生産は、DOST-FNRI がマラウイ市で実施した研究用の多栄養素押出米穀であった。最近、その押出機がまだ良好な状態で稼働していることが確認された。現在、CLG は DOST Region 12 および FNRI と、押出機稼働のための次のステップについて協議しているところである。

現在稼働中の IRK 生産業者とブキドノン州マラマグの生産予定業者がフル稼働した場合、1 年間の IRK 生産量は約 1,360 トンとなる（表 2）。これは、押出機が 1 時間当たりフル稼働し、1 日 8 時間、1 週間に 6 日、48 週間稼働することを想定している。ただし、これは理想的なシナリオであり、必要に応じて増加させたり（例：8 時間シフトを 2 回行う）、需要に応じて減少させたりすることが可能である。価格 350～400 ペソ/kg の場合、総売上高は P475,776,000 から P543,744,000。

1:200 の混合比を使用すると、1 年間の IRK の推定生産量は、約 271,872 トンの IFR を生産することができます。

**表 2.** 現地生産者の鉄砕石生産能力の推定値

プロデューサー	最大能力（単位： kg/hr	総生産量(kg)	
		1 日あたり (8 時間/日)	年ごと (1 日 8 時間×週 6 日×48 週間)
ニュートリデンセー ーフード製造会社	100	800	230,400
株式会社ニュート リションアンドビ ヨンド	200	1,600	460,800
エフエヌアールア イ	190	1,520	437,760
マラマグ（2022 年 7 月までに一旦 運用開始）	100	800	230,400

プロデューサー	最大能力（単位： kg/hr	総生産量(kg)	
		1 日あたり (8 時間/日)	年ごと (1 日 8 時間×週 6 日×48 週間)
合計、単位：kg	590	4,720	1,359,360
合計（単位：メー トル トン	0.59	4.72	1,359.36

FRK の最大現地生産量は、1 日 8 時間、週 6 日、48 週間の 1 シフトで 1,359.36 MT。しかし、これは最も理想的なシナリオであり、需要に応じて（2 シフト）増加または減少する可能性がある。価格は 375～450 ペソ/kg で、総売上は約 5 億ペソ/年に達する可能性がある。

## 5.2 IRK の輸入元

5.2.1 アルヒード・インターナショナル・トレーディング・コーポレーション - IRK や米の強化用ブレンダーなどの農業機械を輸入している。姉妹会社に IFR を生産するアルヒード・インターナショナル・アグロ・インダストリーズ社がある。

米国オハイオ州に本社を置く Wright グループから輸入した IRK をコーティングしたものと押し出し成形したものを供給している。Wright Group は IRK や IRONRICE に加えて、ビタミン A、鉄、葉酸を含むマルチ微量栄養素カーネルである NUTRARICE も供給している。Alheed International Trading Corporation の担当者によると、Wright グループは、IRONRICE を通じて、バイヤーの仕様に基づき、1：100 から 1：400 までの様々な混合比率で IRK を供給することが可能であるとのこと。

Alheed International Trading Corporation は、2005 年から 2010 年までの AHMP 期間中、硫酸第一鉄を含むコーティング IRK を NFA に供給していた。インタビューによると、コーティング IRK はライトグループの押出 IRK より安価であるとのことである。現在、Alheed 社は IRK や IRONRICE を販売できていない。

最低発注量は 5 トンで、アイロンライスの輸入には 60 日のリードタイムを見込んでいる。



コーティングされた IRONRICE は 5 年、エクストルード IRK は 2 年の賞味期限。

- 5.2.2 **DSM/IMCD。** DSM は栄養成分や医薬品原料、工業用化学品を製造し、世界中に販売しています。主な栄養製品のひとつに米の栄養強化用ライスカーネルがある。

フィリピンでは、IMCD フィリピンが販売代理店の一つであり、DSM とともに DSM の強化米穀の普及と販売に取り組んでいる。DSM の強化米は、タイで生産された押出成型米である。そのプレミックスは 8 種類のビタミンとミネラルで構成されている。付録 8 は、DSM の強化米粒のビタミンとミネラルの組成と、2002 年の推奨エネルギー・栄養素摂取量 (FNRI) (現在も FDA が栄養表示に使用) に基づくこれらの微量栄養素の摂取量を示したもので、弱者が DSM 強化米粒と精米を 1 : 100 で混合した 100g または 200g の強化調理米を消費すると仮定している。しかし、強制的な食品強化基準 (Annex 2) は鉄のみを対象とし、DSM 強化米粒に含まれる他の栄養素は対象外であることに留意する必要がある。

IMCD は、当初 5 トンの強化米穀を供給した。フィリピンの米の栄養強化プログラムでは

DSM 社製強化カーネルの表示鉄分 600mg/100g を精米と 1 : 100 で混合すると、強化米には 6mg/100g となり、現在の IFR の基準である 2mg~6mg/100g の上限を超えることになる。

このことから、DSM の強化カーネルを現地で製造された IRK と同様に 1:200 の比率で混合することは可能であり、その場合、IFR は 100 グラムあたり約 3mg の鉄を含むことになり、100 グラムあたり 2mg から 6mg という規格の範囲内であることがわかった。この比率で、DSM は炊飯された強化米の鉄分含有量を検査し、規格に規定されている炊飯米 100 グラムあたり 0.6mg を下回らないことを確認する必要があります。

DSM 社の強化米穀は、鉄分だけでなく 7 種類のミネラルやビタミンを加えても、フィリピンの米の栄養強化プログラムに使用できる価格と判断された。

製造ロットの関係上、最低発注量は 5 トンである。1:200 の割合で混合した場合、この最小発注量では 1,000IFR 生産者の能力を考えると (セクション 5.5 参照)、これだけの量の米と IRK を調達するために必要な予算を考えると、これは強化米穀の販売にとって制限要因となる可能性がある。NFA など、強化米粒の要求量が多いところだけしか、これだけの量の強化米粒を購入する能力がないかもしれない。その他の IFR 生産者は、能力が限られているため、現地で強化穀粒を購入せざるを得ない可能性がある。

最低発注量 5 トン (MT) を考慮すると、1 年という賞味期限が再び制限要因になる可能性がある。

DSM の場合、強化米穀の納品に 3 ヶ月のリードタイムが必要である。

輸入強化穀粒の市場は、5MT という最小要件によって制限されています。これは、1:200 の混合比率で IFR を生産するために 100 万 kg の米を必要とし、約 5000 万ペソの投資が必要なためです。この量の IRK を購入できるのは、NFA など大きな

### 5.3 微粉末ピロリン酸第二鉄の輸入業者

**Vitachem Industries** は、太陽化学株式会社の微粉化ピロリン酸第二鉄の独占販売代理店。同社は、IRK 製造のための押出技術に同社の強化剤を使用する FNRI の研究に資金を提供した、日本に拠点を置く太陽化学株式会社の独占販売元である。現在、現地の IRK 製造に使用されている強化剤は、微粉末のピロリン酸第二鉄のみである。

2021 年には 1,440kg を供給し、現在 1,500kg の在庫を保有し、供給可能な状態を維持している。製造元は、太陽化学が需要の減少により生産に支障をきたしていることを考慮し、必要な供給量を予測するよう要請している。

### 5.4 米の栄養強化用機器の製造業者および供給業者

米の栄養強化のための機器の主要サプライヤーは 6 社あるが、IRK の製造のための押出機の完全なラインを供給しているのは 1 社のみである（付属文書 5）。

これらのサプライヤーのうち 5 社はルソン島に、1 社はミンダナオ島にある。図 5 は、これらの加工業者とサプライヤーの所在地を示したものである。

5.4.1 **GTC Propack Corp**（本社：Taguig City）は、80～120kg/h の連続ライン押出機と 30～40 袋（50kg/袋）/h の混合機の輸入業者。両機とも中国製で、すでに押出機 5 台、混合機 1 台を納入。

5.4.2 ダバオ・デ・オロ州ナブントゥランに拠点を置く **Mundo Engineering Works** は、30～40 袋/時のポータブルブレンディングマシンを製作し、すでに 4 台のブレンディングマシンを納入している。

5.4.3 **HDN Technology and Resources Inc.**は、カビテ州カルモナを拠点に、30～40袋（50kg/袋）/hのポータブルブレンダーを製造しており、すでに9台のブレンダーを主に協同組合向けに供給している。この会社は、ブレンダーの製作



に FNRI の設計を利用したため、DOST-FNRI と TLA を締結している。

## 図5. フィリピンにおける米の栄養強化用機器の製造・販売業者の分布図

5.4.4 パンガシナン州サンタバーバラを拠点とする **Bestmark Agro Industrial Corporation** は、毎時 50 袋（50kg/袋）の調合機を製作し、既に 3 台の調合機を納入している。

5.4.5 パンガシナン州サンカルロス市を拠点とする **Felipe Pamintuan Machine Shop and Fabrication** は、50 袋（50kg/袋）/時間の混合機を製作し、すでに 1 台の混合機を納入している。

5.4.6 パシグ市に拠点を置く **Alheed International Trading Corporation** は、ベトナムから 5 トン（1 袋 50 キログラムの袋を 100 個）/時間の調合機を輸入している。2005 年から 2010 年まで AHMP 用に 23 台の調合機（これらの調合機の位置は付属文書 7 参照）を NFA に供給したが、NFA はスペアパーツがない

アルヒード・インターナショナル・トレーディング・コーポレーション  
は、アフターサービスの一環として、2005 年から 2010 年まで AHMP に

ため復活は難しいと述べた。現在は鉄飯強化に関する NFA パイロット試験用に新たに調合機 4 台を供給中である。

## 5.5 鉄分強化米生産者

付録 6 は、ブレndینگマシンを保有する IFR 生産者のリストである。これらの生産者のほとんどは、DOST 地域事務所と DOST-FNRI の様々な資金・技術支援プログラムによって支援を受けている。23 の生産者のうち、10 社が稼動している。8 社はすでに機器を納入しており、これらはまだ校正が必要である。1 社は機器を調達中、1 社はパートナー協同組合を組織中、1 社はパイロットテスト中（NFA）、2 社は操業を停止している。

### 5.5.1 ブレンドینگマシンが稼動している IFR 生産者

10 の IFR 生産者のうち、2 社だけがミンダナオ島にあり、残りはルソン島にある（図 6）。これらのうち 8 社は FNRI と TLA を締結しているが、2 社は TLA を締結していない。図 6 は現在の IFR 生産者のマッピングであり、表 3 はそれぞれの生産能力を示している。



図 6. 現在の鉄強化米の生産者のマッピング

表3. 鉄強化米の現在の生産者の生産能力

会社名・グループ名	生産能力（トン／時間）
<i>DOST が FNRI TLA に協力</i>	
1. パンガシナンのニュートリデンセ食品製造株式会社	4.5
2. パンガシナン州アラミノス市の自治体によるタンカラ ン・テクノ・デモ・ファーム	2.5
3. サンパブロ多目的協同組合	2.5
4. JD Aguilar Commercial, Inc.	5.0
5. 株式会社フードバスケット	5.0
6. カムスール多目的協同組合	2.0
7. アントフェルトレーディング／サーベドラ精米所	2.0
8. FNRI（FNRI ライセンス生産者向けレンタルのみ）	4.5
<i>FNRI との TLA はなく、機械は自社で購入していた</i>	
1. アルヒード・インターナショナル・アグロインダスト リー社	5.0
2. ファエルドニア・ライス・トレーディング	5.0

5.5.2 **DOST-スタッフのトレーニングと機械の校正のために、ブレンディングマシンを支援**-現在進行中の FNRI と DOST 地域事務所によるトレーニングと機械の試運転を終え、2022 年の 3<sup>rd</sup> 四半期までに、IFR の生産者が 8 人追加される。

図 7 は、これらの将来の IFR 生産者のマッピングである。この 8 社のうち 7 社がルソン島に、1 社がミンダナオ島に拠点を置いている。ルソン島にある 7 社のうち、4 社はリージョン 1 である。このうち 7 社は 2 トン/時の生産能力を持ち、1 社は 2.5 トン/時とやや高い生産能力を持っている。

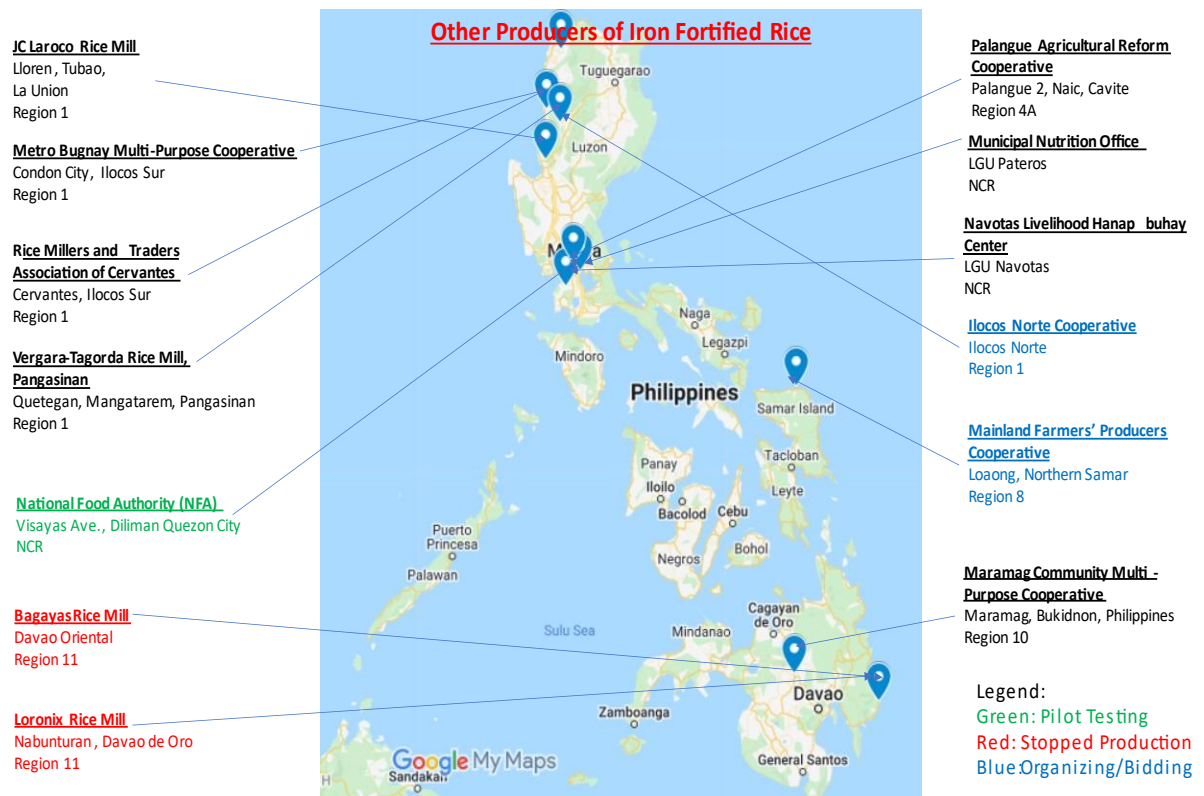


図7. トレーニングおよびキャリブレーション段階での生産者のマッピング

5.5.3 鉄強化米の「その他」カテゴリー-稼働中および年末に向けて稼働予定の IFR 生産者に加えて、「その他」のカテゴリーに入れることができる IFR 生産者がいる。

5.5.3.1 NFA は IFR の製造のパイロット・テストを行う。NFA は 4 台の混合機を調達し、リージョン 2、3、NCR、4（いずれもルソン地域）の NFA 倉庫に設置する予定です。各ブレンディングマシンの最大生産能力は 5 トン/時。パイロットテスト用に約 84,000kg（84MT）の IRK が調達される予定。

パイロットテストが成功すれば、NFA は 2023 年までにバッファーストックの 50%（または IRK750MT を必要とする約 15 万 MT）を強化する目標を達成するために、27 台のブレンド機を追加調達する予定である。

NFA はかつて、生産者と消費者を価格ショックから守るために、補助金付きの価格で米を売買していたことが思い出される。また、1998 年の行政命令 51 号により、米を使用する政府プロジェクトには NFA 米の調達が義務付けられている。

NFA は以前、グロリア・マカパガル・アロヨ大統領時代に AHMP の一環として、コーティング技術で製造された IRK を IFR として配布していた。RA 8976 の実施に向けた取り組みの一環として、

付属書 7 に示すように、全国にブレンディングマシンを設置した。

しかし、2018 年に RA 11203 または米の関税化法が制定され、政府の規制および米の安定化機関であった NFA の役割は、DSWD と LGUs が緊急事態に使用するために確保した米のバッファストックに限定されるようになった。その結果、IFR 生産を含む米業界をどの機関が監視するのかという懸念が生じた。この問題は、農務省、FDA、貿易産業省 (DTI) の間でまだ解決されていない。

それでも、2021 年に NFA は緩衝在庫の 50% を強化することを約束した。5 億 3,050 万ペソの予算で作業計画を作成した。この作業計画に基づき、NFA は既存の混合機を使用しないことにした。また、1 億 7500 万ペソの費用で 31 台の新しい混合機を調達することになる。このセクションで述べたように、このうち 4 台はすでに調達されている。

5.5.3.2 イロコスノルテ、リージョン 1 (ルソン)。イロコスノルテでの IFR 製造のための設備は揃っているが、DOST リージョン 1 がパートナー協同組合を特定中。

5.5.3.3 第 8 地域のメインランド農民生産者協同組合と提携した北サマール州 LGU ラオアン (ビサヤ地方)。DOST の資金は、IFR 生産のための機器を調達している LGU にダウンロードされ、入札の段階にある。

5.5.3.4 ダバオ・デ・オロ、ナブントウランのロロニックス・ライスミルとダバオ・オリエンタルのバガヤス・ライスミル。この 2 つの生産者はミンダナオのリージョン 11 にあり、DOST-Region11 から最初にブレンディングマシンを利用したが、IFR の需要がないため、操業を停止している。これらの生産者は、それぞれ 2 トン/時間の生産能力を持っている。

#### 5.5.4 IFR と IRK の現地生産に必要な最大能力

現在運用中の IFR と訓練・校正段階にある IFR の最大生産量は、年間 116,928MT で、約 585.08MT の IRK を必要とする (表 4) これは、IRK の最大現地生産量 1,359.36MT の 43% である。輸入 IRK を購入する可能性がある NFA を除く「その他」カテゴリの IRK 要件を含めると、さらに 92.16MT の IRK が必要となり、合計 677.24MT となる。この必要量は、最大 IRK 生産量の約 50% に相当する。



IRP/IFR 技術を利用するための 25 通の趣意書が承認されれば、IFR の生産能力がさらに高まり、IRK の生産能力を「満たす」ことができるようになるかもしれない。

**表 4.** 鉄強化米の最大生産能力および鉄強化米穀の必要量

プロデューサー	最大能力 (単位： MT/hr	総生産量 (単位：メート ル トン		IRK 要件 (IRK : 米 =1 : 200 の割合で 配合)
		1 日あたり (8 時間/日)	年ごと (1 日 8 時間 ×週 6 日 ×48 週間)	
ニュートリデンセー フード製造株式会社	4.5	36	10,368	51.84
パンガシナン州アラ ミノス市の自治体に よるタンカラン・デ クノ・デモ・ファー ム	2.5	20	5,760	28.80
サンパブロ多目的協 同組合	2.5	20	5,760	28.80
JD Aguilar Commercial, Inc.	5.0	40	11,520	57.60
株式会社フードバス ケット	1.25	10	2,880	14.40
カムスール多目的協 同組合	2.0	16	4,608	23.04
アントフェルトレー ディング/サーベド ラ精米所	2.0	16	4,608	23.04
エフエヌアールアイ	4.5	36	10,368	51.84
アルヒード	5.0	40	11,520	57.60
ファエルドニア	5.0	40	11,520	57.60
<b>現在稼働中</b>	<b>34.25</b>	<b>274</b>	<b>78,912</b>	<b>394.6</b>
JC ラロコ精米所	2	16	4,608	23.04
メトロブグネー多目 的協同組合	2	16	4,608	23.04

プロデューサー	最大能力 (単位： MT/hr)	総生産量 (単位：メート ルトン		IRK 要件 (IRK：米 =1：200 の割合で 配合)
		1 日あたり (8 時間/日)	年ごと (1 日 8 時間 × 週 6 日 × 48 週間)	
セルバンテス精米業 者協会	2	16	4,608	23.04
ベルガラ-タゴルダ精 米所	2.5	20	5,760	28.80
パランゲ農業改革協 同組合	2	16	4,608	23.04
パテロス市栄養局	2	16	4,608	23.04
ナボタス・リブライ フ・ハナブヘイ	2	16	4,608	23.04
マラマグ地域多目的 協同組合	2	16	4,608	23.04
トレーニングおよび キャリブレーション 段階の生産者	16.5	132	38,016	190.08
エヌエフエー	20	160	46,080	230.40
イロコスノルテ州、 DOST リージョン I	2	16	4,608	23.04
メインランド農業生 産者協同組合	2	16	4,608	23.04
バガヤス精米所	2	16	4,608	23.04
ロロニクスの精米所	2	16	4,608	23.04
その他	28	224	64,512	322.56

DOSTの支援を受けたIFRの生産者の多くによると、強化のコストは約4ペソである。この追加コストは、1) IRKのコスト（1.88～2.25 ペソ/kg（IRKは375～450 ペソ/kgと仮定）、2) Faeldoniaの推定による混合コスト（1.30/kgまたは65/50kg-バッグ NFAは25/50kg-バッグのみ） 3) FNRIロイヤリティ（売上総額の20%） 4) DepEd

#### 5.5.5 IFR生産者の課題・懸念事項

- 2021年のIRK供給不足またはIRK取得の遅れは、生産者が準備していなかった急激な要求の急増が一因である。
- 米の栄養強化に関するプロモーションが不十分であったため、需要が低くなり、最終的に初期の技術採用企業2社が閉鎖された。
- FNRIのロイヤリティは、TLAの15,000ペソの費用に加えて支払わなければならないため、不利になるとのことである。インタビューに応じた人々、特にDOSTの州局長からは、特に協同組合に対してこれらの手数料を引き下げるか免除することで、特に協同組合からより多くの適応者を奨励する方法であるとの要望もあった。
- NFA米の価格は市販米の価格よりはるかに低いため、NFAがIRKの生産を開始すると、IFR生産者の売上にマイナスの影響を与える可能性がある。
- DepEdのIFRの最高入札価格が低い。精米価格と強化、梱包、輸送の追加コストを考えると現実的ではない

## 5.6 米の仕入先

精米業者は米の主要な供給者である。IFRの生産者やIFRの生産に関心を示した生産者のいくつかは農民組合であり、米の栄養強化によって収益性を高めることができると期待されている。

現在、IFRを生産している精米会社は、NBC、Alheed International Agro-Industries, Inc、CamSur Multi-Purpose Cooperative、Antofel Trading、Faeldonia Rice Tradingと、パイロットテスト後のNFAである。

South Cotabatoの4つの農民組合と1つの民間製粉業者にインタビューを行い、以下のようなハイライトを得た。

- #### 5.6.1
- 3つの協同組合が精米所を持っており、いずれもBARMM農業省からの助成金で支援されている。他の2つの協同組合は、ダトゥ・サウジ・アンパトゥアンのパマトウラダンで精米機の修理が必要なため、グインドゥルガンのタラパソで電力供給不足のため、稼働していない。

- 5.6.2 回答者全員が RA8976、EPAHP、DOST の補助金やソフトローンを資金源の候補として認識しておらず、RA11037 を認識しているのはインタビューに応じた 1 名のみであった。
- 5.6.3 すべての協同組合は、DOST/科学技術省（MOST）の援助を受けてミキサー機を取得することによって強化することを望んでおり、彼らは MOST によって、最初は要件の検討と DOST-FNRI 宛ての趣意書を通じて、その申請を支援されることになります。最初の評価では、精米機を持っていること、援助を利用するための書類要件に加えて、三相の電気供給を設置できることを優先する必要があります。
- 5.6.4 Faeldonia Rice Trading は、すでに自社のブレンドマシンを使って米の強化を行っているが、DOST-FNRI の IRK の技術を利用し、DOST の支援で押出機を取得する意向である。

農業省の協同組合開発局は、農民協同組合に米の強化への支援を呼びかけるためのセミナーやオリエンテーションを実施する必要があります。

## 5.7 複数の微量栄養素の強化

すべての IFR 生産者は、政府の政策があり、価格競争力があり、鉄分の FDA 基準に合格する限り、微量栄養素を強化したカーネルを使用することを希望していた。

IRK の輸入業者は、鉄以外のビタミンやミネラルを含む IRK を提供することができます。しかし、最低発注量 5MT は制限されており、現時点では、これだけの量の IRK を購入できるのは NFA だけかもしれない。4 台のブレンディング・マシンを使ったパイロット・テスト・プロジェクトでは、NFA は 84MT の IRK を必要とするが、NFA の納品スケジュールからすると輸入業者しか供給する能力がない。輸入業者も、IRK/FRK を小規模生産者に販売できるよう戦略を練るべきである。

FNRI は、複数の微量栄養素の強化に考慮できる多栄養素の押し出し米穀粒を開発し、その使用をテストしている。しかし、地元には多栄養素押出米穀の生産者がいない。

## 5.8 米の栄養強化のための資金・技術援助

### 5.8.1 科学技術部

DOST は、4 つのプログラムを通じて、鉄分強化米の技術採用者を増やすことに貢献しています。これらのプログラムの要件は、DOST のウェブサイトからアクセスすることができます。これらのプログラムへの申請は、DOST の地域事務所で受け付けられ、処理される。

- 5.8.1.1 科学技術振興調整費（GIA）プログラムは、国の科学技術力を活用し、持続可能な経済成長と開発を促進し、達成することを目的としている。関連する科学技術（S&T）事業への資金提供を通じて、適切な技術の創出と促進により、フィリピン人の生産性向上と生活の質の向上に貢献することを目的としている。与えられる支援は助成金である。
- 5.8.1.2 科学技術のためのコミュニティ強化（CEST） - 「進歩的で、権限を与えられた、回復力のある農村コミュニティを構築することを目的とした科学技術介入のパッケージ」である。このプログラムは、健康・栄養、水・衛生、基礎教育・識字、生計・経済事業開発、災害リスク軽減・気候変動適応の科学技術介入を通じて、国内の最も貧しく落ち込んだコミュニティの能力向上を目標としている。与えられる支援は、助成金でもある。
- 5.8.1.3 小規模企業技術向上（SETUP） - 「零細・中小企業（MSME）が技術革新を導入して製品、サービス、業務を改善し、生産性と競争力を高めることを奨励・支援する全国戦略」である。特に、無利子で3年後に支払われるが、6ヶ月の猶予期間があるソフトローンで設備の購入を支援するものである。
- 5.8.1.4 Technology Application and Promotion Institute - 主に中小企業に対して、200万ペソから500万ペソの無利子ソフトローンを提供している。これまでのところ、米の強化に関する申請はない。

## 5.8.2 DOST-食品・栄養研究所

DOST-FNRIは、米の栄養強化のための技術を開発し、特にプレミックス用の熱間押出機とIFR用の混合機を用いたIRKの製造を行った。2013年にはミンダナオ島とルソン島で啓発セミナーを開催し、2台の押出機（CLGとNutridense）と4台のブレンド機の技術移転を行った。

最近、FNRIは、鉄、ビタミンB1、ビタミンB2、ビタミンA、葉酸、亜鉛を含むマルチ栄養押出米穀粒の製造に成功しました。この米粒は、マラウィ包囲網で被災した77世帯の補食用米に使用されました。FNRIは、マルチ栄養食品をベトナムとカンボジアに輸出し、その利用可能性を調査している。

FNRIは、技術移転のプロトコルに沿って、関心のある当事者からレターオブインテントを提出されることから始まります。その後、協議会、技術ニーズ調査、調査結果の評価と査定が行われる。評価が良好であれば、さらに交渉が行われ、最終的にTLAが締結される。FNRIは、TLA締結後、工場レイアウト、機器・設備、生産試験・管理、製品品質向上などに関するトレーニングやアドバイスを通じて、技術支援を行う。

FNRIは、DOSTの地域事務所と連携して、TLAを持つ企業を、特にビジネスパフォーマンスと製品品質に沿って監視・評価する。

FNRIと鉄強化米に関するTLAを締結する場合、IRKの生産に対して50,000ペソ、IFRの生産に対して15,000ペソの初期費用とIRKおよびIFRの総売上高の2%のロイヤリティを支払うことになる。

一部のステークホルダーは、TLAのライセンス料とロイヤリティに懸念を示し、DOST Region 1は、より多くの導入者を促すためにライセンス料とロイヤリティを削減または免除するよう要求した。FNRIはまだこの懸念に対応しなければならない。

また、現在のブレンダーのデザインは精米機用であるため、精米機が小さい、またはない場合など、他のブレンダーのデザインを開発する必要性も指摘された。

FNRIは消費者とLGUをターゲットにしたIFRに関するIEC資料も作成したが、これらは普及されていない。

### 5.8.3 BARMMの科学技術省

BARMMの科学技術省は、「科学、研究、発明、技術教育、それらの開発における方向性とリーダーシップを設定することを義務づけられている」のである。

他の農協を支援する前に、コタバト州カルメンにIFR製造のパイロット施設を設置することを意図していた。しかし、この構想は、認定加工業者がいなかったために混合機の入札に失敗し、困難に直面した。しかし、MOSTは今後も、米の栄養強化に関連するDOSTの支援プログラムと連携できる他の農民組合を探す予定である。

インタビューの中で、MOSTの代表者は、IFRの許容性に関する問題は、押出成形技術の使用によって解決されたことを知らされた。MOSTはまた、認定された加工業者のリストと、BARMMのパートナー候補として訪問した協同組合のリストも提供された。MOSTはまた、DOSTの技術支援を受けるための最初のステップとして、DOST-FNRIへの趣意書の必要性についても助言を受けた。

## 5.9 社会的セーフティネットプログラム／米を使用した給食プログラム

### 5.9.1 教育省

DepEdは、2010-2011年度に栄養失調の学童を対象とした朝食給食プログラムを開始し、2012-2013年度まで試験的な実施を続けている。120日間の給食

の試験的実施の結果、プログラム参加者の73%が正常な状態に転換し、授業の出席率(98%)、成績、健康習慣が改善されたことが分かった。この結果を踏まえ、DepEdはSY2014-2015からSBFPと名称を変更し、実施を開始した。このプログラムでは、KindergartenからGradeまでの急性栄養失調の小学生に、120日間、栄養価の高い食事を提供する。このプログラムの継続的な実施は、その効果を示す指標に触発されている。学校年度(SY)2018-2019とSY2019-2020では、プログラム参加者の約72.8%と76.6%がそれぞれリハビリテーションを受けたが、BARMMの実績はそれほど良くなく、SY2018-2019ではプログラム参加者の20.5%がリハビリテーションを受けたと報告された。2019-2020ではBARMMに関するデータは提供されていない。

前述の通り、SBFPはRA 11037の成立により制度化され、プログラム参加者に提供される食事に強化食品を含めることなどが義務づけられた。

そのため、SY2020-2021のSBFPガイドラインでは、ガイドラインのAnnex 4.1に基づき、鉄ライスプレミックスと鉄強化米を含む「栄養価の高い食品」を使用するよう求めていた。2021-2022年度のガイドライン(DO 031 S 2021)でも、使用可能な食品に米が含まれていたが、4キログラムの上限、すなわち最大10日間に400グラムのIFRを提供することが規定された。SY 2021-2022の補足ガイドライン(DO 010 S 2022)はSY 2021-2022の2022年の部分のプログラム実施をカバーし、米の350グラムの提供のための5日間の上限を提供した。

#### 5.9.1.1 DepEdによるIFRの調達

これらの発行により、DepEdはIFRの主要な買い手となり、2021年に85,640,857ペソ相当のIFRを調達した(付属書9参照)が、セブ州のカルカル市とリージョン11のマティ市とディゴス市の確認待ちの学校を除くルソン州の学校が主な対象である。なお、リージョン1のパンガシナン州だけで、DepEdが調達したIFRの61.7%にあたる52,861,326ペソを調達している。これは、同地域に3社のIFR生産者が存在することが寄与していると考えられる。このため、多くの精米所や協同組合が鉄強化米に関心を持ち、2022年末までにさらに5つの精米所を設立する予定である。

#### 5.9.1.2 IFRのDepEdの必要量予測

学校での対面授業が可能になり、120日間の給食で5日あたり350gの米を使用する温かい食事が提供されるようになると、対象者一人あたりに必要な米は約8.4キログラムである。3,642,031人のプログラム参加者を予測すると(SY2021-2022の目標に基づく)、合計30,593MTのIFRが必要となる(地域ごとのSBFPの米の要件を含む付属書10)。この量は、すでに稼働しているIFR生

産者と研修中で、2022年に稼働する予定の生産者の最大能力のち  
ょうど約26.2%である。

#### 5.9.1.3 DepEd の IFR 使用に関する問題点と懸念事項

昨年 2021 年 12 月の IATF-ZH, DepEd への報告書において、DepEd  
は以下の問題点や懸念事項を指摘している。

- DepEd が要求しているように、サプライヤーは FNRI から  
IFR 認証の手続きと承認を受けなければならない、その結果  
IFR の調達が遅れることとなった。 オクシデンタル ミンド  
ロの場合、入札者が FNRI との TLA を締結していないた  
め、調達が進まなかった。TLA の要件は、入札仕様書の一  
部である。しかし、この要件は SBFP のガイドラインには  
含まれていない。
- IFR のコストは高く、1kg あたり 60～90 ペソで、400g あた  
り 18 ペソ（1kg あたり 45 ペソ）の予算をはるかに超えてお  
り、オクシデンタルミンドロ州の場合は入札が失敗したほ  
どである。
- IFR のサプライヤーは、DO No.031 s. 2021 に規定されてい  
る IFR 400g あたり P18 または P45/kg のコストは、利益を生  
むには十分でないと評価し、IFR の要件に対する入札を拒  
否している。FNRI との協議の結果、DO No.10 S.2022 によ  
り、入札価格の上限が 350 グラムあたり 18 ペソ、または 1  
キロあたり 51 ペソに引き上げられた。

### 5.9.2 社会福祉・開発省

DSWD は、SSNP のための IFR の使用に関する NNC 管理委員会決議第 1 号に  
従い、IFR を使用すべきいくつかのプログラムを有している。以下は、これ  
らのプログラムの概要である。

#### 5.9.2.1 児童発達支援センターのための補助給食プログラム（SFP）。

DSWD は、DepEd の SBFP と同様に、児童発達センター（以前は  
デイケアセンターと呼ばれていた）における補食プログラムを長  
年にわたって支援してきた。このプログラムは、監視付きの近所  
の遊びに参加している子どもたちも対象としている。

DSWD が IFR を SFP に利用しようとしたのは、2012 年に発行され  
た行政命令第 8 号「補食プログラム（SFP）実施におけるオムニバ  
ス・ガイドライン」で、IFR の調達について「米は DSWD-ARMM  
や州・市・町社会福祉・開発事務所が国家食糧庁地域事務所から



調達することができる」と規定したことから始まった。納入される米は、可能な限り、鉄分強化されたものであるべきだ。しかし、NFA IFR の使用は、IFR の感覚的・物理的な問題から、最初の調達後、継続されなかった。

2020 年のメモ・サーキュラー12 号シリーズでは、すべての児童発達センターと監督された近隣の遊びにおける子ども一人あたりの米の必要量は、100 グラム/日/参加者、120 日間、合計 12 キロ/参加者、サイクル年である。これは、Memo Circular No.13 s. 2019 に規定されているように、パンデミック前もそうであったため、パンデミック後も継続される見込みである。なお、SFP の予算は、米、ビアンドともに 15 ペソ/子である。

プログラムの実施は分散化されており、プログラム用の食糧の調達は DSWD 現地事務所またはパートナー LGUs のいずれかで行われている。米の調達は入札によって行われるが、必要な米のほとんどは NFA から調達している。EPAHP の実施に伴い、補食プログラム用の食料も地元の農家から調達している。

DSWD 中央事務局は、2018 年 5 月に実施者に IFR 生産者のリストを提供した。しかし、「市場にも NFA にもない」「価格が高い」「IFR の味が気になる」などの理由で、IFR の調達は行われなかった。

地域別目標を含む付属書 7 に記載されている 2,053,383 人の年間目標（2015 年）と、子供一人当たり 1 日 100g の米の割り当てに基づき、IFR の総所要量は約 24,640MT、123.2MT の IRK が必要である。このレベルの IFR は、パイロット段階における NFA の最大能力の約 50% である。

最高裁のマンドナス-ガルシア判決から生じる完全な権限委譲により、SFP は最終的に 2023 年までに LGU に完全に委譲されることになる。これは、実施と調達が LGU によって行われることを意味する。その結果、IFR が SFP のために調達され使用されることを保証することは、LGU の責任となる。DSWD は現在、この点に関する権限委譲移行計画を作成中である。

**SFP を LGU に移管する際には、IFR を使用する必要性について広範なアドボカシーが必要である。LGU が使用するオペレーションマニュアルには、本レポートで参考として提**

#### 5.9.2.2 バンサモロ・ウンブンガン・サ・ニュートリシオン (BangUN) 」。

このプログラムでは、BARMM の 0～12 歳の子どもたち約 22,000 人に 180 日間にわたり補食を提供する。 バシラン、スールー、タウィタウィは第 9 地域、ラナオデルスールは第 10 地域、マギンダナオは第 12 地域の DSWD 現地事務所が、MOA に示された LGU とのパートナーシップのもとで実施されている。 しかし、このプログラムは LGU に委譲されていない。

調達には DSWD フィールドオフィスが行い、必要な米は NFA から調達している。 2017 年にスールーで DOH-BARMM からの寄付として IFR を受け取ったが、給食プログラムでは IFR を使用していない。 しかし、子どもたちは感覚的・身体的な問題から IFR を食べなかった。

2021 年には、443.35 MT に相当する合計 8,867 袋の米が調達されました。 この必要量が一定であれば、IFR の生産には 2.22MT の IRK が必要である。

プロジェクト・コーディネーターによると、フードパックを提供した場合、他の家族も食べてしまうため、栄養状態が改善したのは対象児童の 10%程度にとどまったそうである。 しかし、現地で給食を実施すれば、プログラム参加者の 50～60%が栄養状態を改善できる可能性がある。

問題点としては、米の保管方法、IFR の品質が悪いという認識の継続、米を好む文化、栄養や関連するメッセージをプログラム参加者が理解できるような言葉で翻訳する必要性などが指摘された。

**BARMM の栄養状況を継続的に改善する必要性を考えると、BANGUN プログラムは、IFR が利用可能であり、BARMM の DepEd 学校給食プログラムに使用されていることから、そのガイドラインに**

#### 5.9.2.3 災害時の対応

DSWD は、国家災害リスク軽減・緩和評議会の食料・非食料品クラスターを主導している。 DSWD は、被災者のための食糧パックの提供など、災害時の救援を行うことを任務としている。 2015 年 7 月 31 日付の DSWD 内部文書に基づき、IFR を含む食料品で家族用フードパックを準備する。

政府プロジェクト用の米は NFA から調達するよう求める大統領令 51 条 1998 項により、NFA から米を調達している。 NFA は IFR を持っていないため、緊急時の家族向け食料パックに含める IFR は

調達されていない。しかし、インタビューに応じた人々は、NFA からであれば IFR を購入する意向を示している。

IFR に関するアドボカシーとプロモーションの不足が指摘され、この点に関して大統領府通信業務局と DTI の支援を求めることが提案された。

#### 5.9.2.4 DSWD *Pantawid Pamilyang Pilipino Program* (4Ps) プログラム

DSWD によると、4Ps プログラムは、教育や保健の条件を満たすことを条件に、適格世帯に現金を支給することで、人的資本の開発に焦点を当てた社会保護プログラムである。4Ps プログラムの受益者は 440 万世帯である。助成金には、毎月 600 ペソの米の補助金が現金で支給される。4Ps プログラムは、受益者のために、健康と栄養に関するモジュールを含む家族開発セッションを実施している。家族開発セッションのマニュアルは、現在更新中である。IATF-ZH または米の強化に関するサブ TWG から 4Ps プログラムのディレクターに要請があれば、米の強化に関するモジュールをこれらのセッションに含めることができる。

#### 5.9.3 国民栄養協議会 (NNC)

NNC は現在、COVID-19 の流行と関連する緊急事態への対応として、妊婦と生後 6～23 ヶ月の子どもを対象とした栄養補給プログラム「ツトックカイナン・プログラム」をモデル化している。

このプログラムでは、IFR を含む様々な食料品を対象者に提供している。すなわち、妊婦には 90 日間 IFR を 1 カップ、6～11 ヶ月の乳児には 180 日間 IFR を ¼ カップ、1 歳児（12～23 ヶ月）には 1½ カップの IFR を提供するものである。このプログラムでは、第 1 フェーズと第 2 フェーズを終了し、127,999kg の IFR を調達した(128M.T.)の IFR を調達し、さらに 107,111kg の IFR(107.1M.T.)の IFR を調達し、フェーズ 3～5 ではさらに 107,111kg の IFR を調達予定である。

Mandanas-Garcia 判決を受けた完全な権限委譲により、LGU は最初の 1000 日間で栄養補助食品プログラムを引き継ぐと予想される。

このプログラムでは、補食に加えて、テキストメッセージを用いた栄養教育も主要な戦略として行われている。このシステムでは、毎日受信者にテキストメッセージでメッセージが送られる。週に一度、クイズがあり、20 人に携帯電話がプレゼントされる。米の栄養強化に関連するメッセージも含ま

栄養教育の実施を含む *Tutok Kainan* ガイドラインは、LGU 実施のためにプログラムが移管された場合、LGU レベルでの給食プログラム実施における

れる予定である。現在の課題は、クイズへの回答が減少していること。しかし、テキストメッセージは1通あたり20セントボで受信者に情報を提供できるため、より費用対効果の高い戦略であることが指摘された。さらに、NNCは50のコミュニティラジオ局（Nutriskwela）のネットワークを持っており、そこを通じて栄養に関するメッセージを放送している。NNCはデジタルラジオ番組「One Nation One Nutrition」も持っており、栄養に関する懸念や栄養プログラムに取り組んでいる。この番組では、「食品強化の日」にちなんで、食品強化に関する悩みを取り上げている。これらのNNCの食育活動は、米の栄養強化の推進に活用することができる。

NNCはまた、国内の栄養活動の指針となる「フィリピン栄養行動計画（PPAN）2023-2028」を策定している。この取り組みの一環として、同時期に「社会・行動変容コミュニケーション戦略計画」を策定し、関連するイニシアティブの包括と指針を提供する必要がある。

## 5.10 消費者が見た栄養と鉄分強化米

BARMMの公立小学校のうち、特に学校給食にIFRを導入している4校を対象に、グループインタビューとディスカッションを交えた調査を行った。グループインタビューとディスカッションは、学校給食コーディネーターと一緒に行われた。

### 5.10.1 参加者のプロフィール

ディスカッション参加者のほぼ全員（98%）が女性である。年齢層は20～50歳が半数以上（57%）、50歳以上が37%である。学歴は、大卒が29%、高卒が18%、残りはそれ以下である。職業は、58%が主婦で、約4分の1（26%）が教師である。

### 5.10.2 栄養に関する情報源と Sangkap Pinoy シール

栄養に関する情報や *Sangkap Pinoy* シールに関する情報の入手先のトップ3は、保健所、テレビ、インターネットであった（図8）。

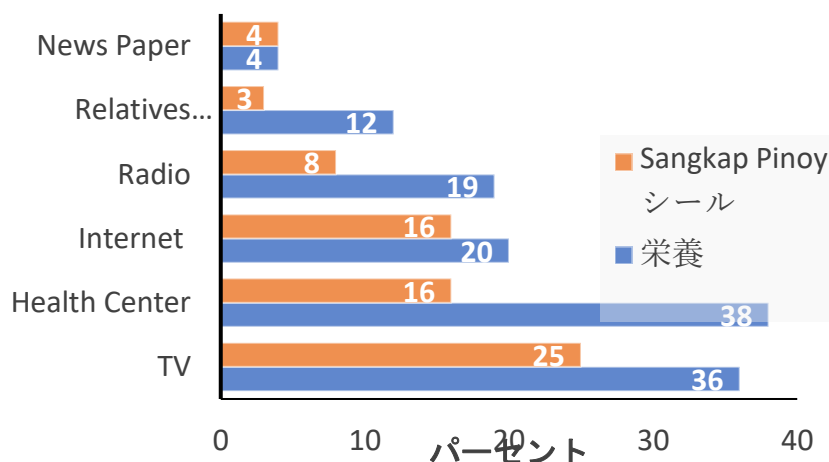


図8. 栄養に関する情報源と *Sangkap Pinoy* シール

### 5.10.3 栄養不良の認識

栄養失調とは何かという質問に対しては、標準体重以下、ビタミンやミネラルの不足、体格の弱さ、病弱、学校での成績不良、栄養のある食べ物の摂取不足という答えが返ってきた。

### 5.10.4 Sangkap Pinoy シール

88%が微量栄養素欠乏症について知っているという回答したように、*Sangkap Pinoy* シールを知っているのは43%のみである。*Sangkap Pinoy* シールのついた製品を買ったと答えたのは52%だが、SPSのついた製品を正しく認識できたのは35%にとどまった。

### 5.10.5 米の懸念

最も多く購入されているのは、Upi Rice、Masipag Rice、R 160 rice である。参加者の約半数（26%）がNFA米を購入し、価格は1キロあたり25ペソから38ペソであった。市販の米を購入する人は、1キロあたり36～50ペソを支払っている。

ディスカッション参加者の約80%がIFRについて知っていた。また、約85%がIFRを食べたことがあると回答し、87%が心地よい味（「*masarap*」または「*tastes good*」）、9%が不快な味と回答した。約3分の4（74%）が、自分の子どもがSBFPのためにIFRを摂取していることを認識していた。

ディスカッション参加者のほぼ全員（91%）が、IFR が非強化米より高くても、市場にあれば購入すると回答している。しかし、ほとんどの人（74%）は、2.00 ペソ程度多く支払うことを望んでいる。

栄養、微量栄養素の栄養失調、サンカップ・ピノイの製品、米の強化について短い講義を受けた後、討論参加者全員が、今後はサンカップ・ピノイのシールと IFR の付いた製品を購入すると答えた。

## 6.0 調査目的に基づく結果の分析

本調査の目的に沿った結果の分析は、フィリピンにおける食塩強化の生態系の枠組みで定義された主要なステークホルダーを対象に、デスクレビュー、KII、FGD から得られた情報に基づいている（13 ページの図 3）。

### 6.1 鉄分強化米の供給、受容、消費の低さを説明するためのギャップ

2021 年頃まで IFR の供給が少なかったのは、需要と供給の相互作用によるものである。

需要は主に SSNPs からもたらされた。例えば、AHMP（2005 年から 2010 年まで実施）の FSP が NFA に IFR の納入を要請したことで、比較的大規模な IFR が入手できるようになった。しかし、2010 年の政権交代に伴い AHMP が廃止されると、NFA は IRK の供給を賄うための短期間を除いて IFR の生産を停止した。

しかし、リージョン 1 とダバオ・デ・オロでの経験は、供給と需要の相互作用が、地方における IFR の利用可能性と利用を増加させるために、いかにポジティブに管理できるかを示している。

リージョン 1 では、Nutridense Food Manufacturing Corporation が給食プログラムにおける IFR の使用を執拗に訴え、DepEd、地方自治体、農家組合を目的のターゲットにした。その努力が実り、2017 年から地域の学区で IFR が使用されるようになった。2019 年に地域 1 開発評議会（地域の州知事、国の政府機関、選ばれた NGO の組織）が「すべての政府機関は、民衆の鉄欠乏問題に対処するための補完的戦略として鉄強化米の使用を愛用し促進する」（付属書 11）よう求めたことで、IFR の普及はさらに勢いを増した。また、DOST 地域事務所と州科学技術局長の支援も注目された。これらの要素により、リージョン 1 は、IRK 生産者 1 社、ブレンド機製造者 2 社、IFR 生産者 3 社、2022 年に稼働予定の追加 5 社と、少なくともその SSNP において米の強化を実施する能力が最も高い地域であると言える。2021 年に DepEd が調達した IFR のうち、5,720 万ペソ（67%）はリージョン 1 で調達され、パンガシナン州では 5,280 万ペソが調達された。リージョン 1 の経験を文書化し、他の地域と共有することで、インスピレーションや適応を得ることができる。

LGU の触媒的役割については、ダバオ・デ・オロの経験が、LGU が米の栄養強化プログラムを採用し、車両、セントラルキッチン（学校給食用）の職員の給与、その

他の設備、NGO ガワ・カリングによる実施の監視のための資金提供において DPD、州政府間の積極的協力を促進する方法を示している。

残念ながら、リージョン 1 やダバオ・デ・オロの経験は、国内の他の地域では再現されなかった。

このため、2013 年に FNRI が IFR 技術の初期導入企業である CLG Corporation、Bagayas Rice Mill、Loronix Rice Mill（いずれもミンダナオ島）を取り込んだとしても、IFR の需要がないため、これらの導入企業は事業を停止せざるを得なかった。

コーティングされた IRK で製造された IFR を使用した場合、IFR の受け入れと消費の低さは明らかであった。硫酸第一鉄を含む黄色に着色した IRK の使用に関連すると思われる米の変色や、不快な味への苦情があった。2018 年から始まった BangUN プログラムでも、コーティング IRK を使用した IFR の受給者から同様のフィードバックがあった。しかし、IFR を使用した給食プログラムに参加した子どもの親との FGD では、この米についてポジティブな経験、すなわち、味が良いということが示されている。これらのプログラムの IFR の製造には、押出 IRK が使用された。

コミュニケーション・キャンペーンの取り組みは、非常に限定的かつ局所的であった。供給量が少なく、IFR の味や色に否定的なフィードバックがあったため、コミュニケーターは IFR の普及にあまり熱心ではなかった。それでも、2016 年に精米業者、政府、消費者を動員して IFR を利用するためのコミュニケーションプランが策定された（Annex 12）。また、LGU と消費者に IFR を普及させるための情報、教育、コミュニケーション資料も 2018 年に作成された（Annex 13）。残念ながら、競合する懸念のため、2016 年に策定された計画は実施されず、IEC 資料も配布されなかった。

RA 11037 の可決により、DepEd と DSWD の給食プログラムにおける強化食品の使用が求められ、NNC 理事会が SSNPs における IFR の使用を決議し、*Kumain Webinars* の実施と DOST からの支援、FNRI の技術支援により 2020 年に IATF-ZH のイニシアチブが行われ、状況は変化している。IFR の需要は DepEd の要求により増加し、IFR と IRK の両方のサプライヤーも増加した、または増加する可能性がある。

## 6.2 フィリピンにおける米の鉄分強化能力とキャンペーン活動のマッピング

IRK と IFR の生産能力を含め、現在操業中の事業所と訓練中の事業所の米の強化能力を特定した（5.0 項）。

今年の生産者マップによると、ビサヤ地方とミンダナオ島では IFR の現地生産が不足している。IFR の現地生産は、NFA がバッファーストックの 50% を強化する計画を推進し、FNRI に技術移転を要請している 25 グループのすべてまたは一部が稼働する 2023 年に改善すると予想されている。IRK の生産も、ミンダナオ島のブキド



ノンとビサヤ地方のサマルにそれぞれ1つずつ工場を増設し、増加すると予想される。

IRKや多栄養素強化米の輸入業者も、地元のIRKと価格競争力があるので、供給することができる。

DepEdとDSWDのみを考慮した場合、IRKとIFR生産者の生産能力が需要を上回るという懸念がある。DepEdとDSWDのIFR需要合計(55,233MT)は、現在および将来のIFR生産者の最大生産能力(116,928MT)のわずか47.2%である。

キャンペーンの取り組みのほとんどは、2015年以前に、IFRの供給がある地域で実施されたものである。それでも、2016年のコミュニケーション計画やIFRに関するIEC資料など、IFRの生産能力が向上するにつれ、コミュニケーションキャンペーン構想の出発点となり得るリソースがある。

さらに、DSWDの4Ps家族開発セッション、親と教師の協会を通じたDepEd、テキストマネージャーソリューションと*Nutriskwela*を通じたNNCなど、既存の政府プログラムにおいてIFRの消費を促進する多くの可能な入り口が存在する。重要な入り口は、現在策定中の「社会行動変容コミュニケーション戦略計画2023-2028」である。

### 6.3 米の栄養強化義務化の実施を妨げるサプライチェーンの問題

IFRのためのサプライチェーンマネジメントのフレームワーク(図9)を用いると、米の栄養強化義務化の実施を阻害するサプライチェーンの課題は以下の通りである。

**6.3.1 需要** 現在のIFRの需要は、DepEdとDSWDの給食プログラムのための必要量に限られている。NNCは*Tutok Kainan*プログラムを通じて需要に貢献しているが、このプログラムはDSWD SFPと同様に最終的にはLGUsに引き継がれる予定である。IFRの供給量とDepEd SBFPおよびDSWD SFPのSSNPからの需要量を比較すると、DepEdとDSWDが必要とする55,233MTのIFRのほぼ3倍の181,440MTまで生産できる能力が存在することがわかる。この過剰な生産能力により、NGOのSSNP、病院、刑務所、介護施設など米を使用する政府機関、一部の民間企業の米手当、商業市場など、まだ十分に開拓されていない市場からの需要を喚起する必要がある。



6.3.2 計画すること。先に述べたように、IFR 生産者の一部では、IRK のタイムリーな入手が問題であった。当面の IFR の需要に対する IRK の生産能力はあるが、需要の予測がないため、IRK 生産者は IFR 生産者に対応できるような生産計画を立てることができない。微粉末ピロリン酸第二鉄の唯一の供給元である VitaChem Industries は、唯一の販売代理店を通じて、フィリピンに必要な量の予測を要求している。

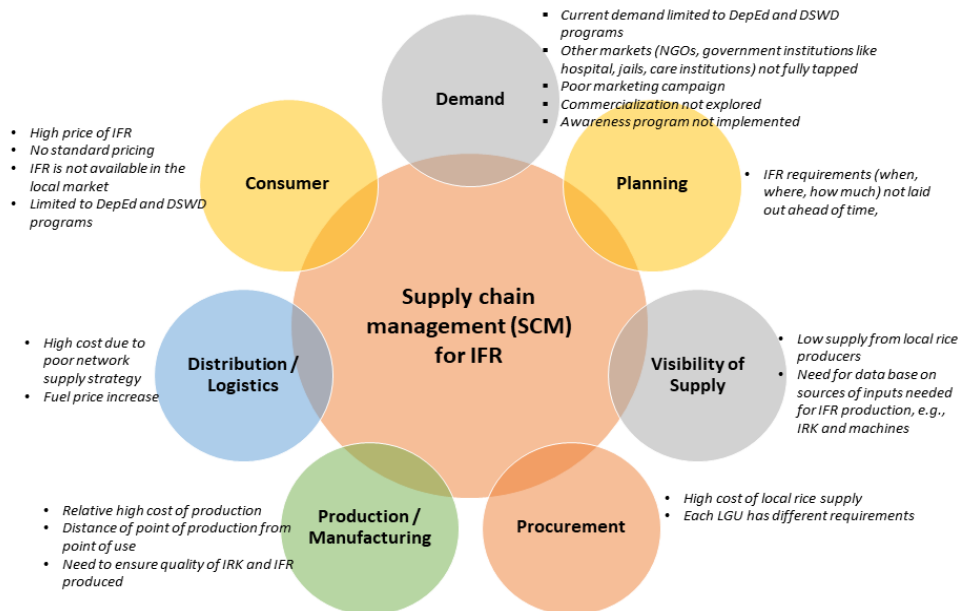


図9.米の栄養強化のためのサプライチェーンの課題

6.3.3 材料供給の可視化 IFR の生産に必要な資源に関する情報は容易に入手可能である。この調査は、誰が、どこに IRK 生産者と機械加工者がいるかという、現在までのすべての既知の情報を統合したものである。FNRI と DOST の地域事務所が地元の IFR 生産者に財政的・技術的支援を提供していることから、地元の IFR 生産者は、どこでどのように強化用の IRK と機械を手に入れるかの情報を入手できると考えてよいだろう。これらのリソースに関するデータベースの作成、更新、共有が必要である。

6.3.4 調達すること。IFR の調達は、調達主体の要件に従う。政府が主要な調達主体であるため、政府調達のプロセスに従う。必要な物資のコストを考慮すると、一般入札が主な調達様式である。例えば、一部の関係者が DepEd の要求する FNRI 認証（または TLA）を満たせなかったり、DepEd が設定した低い価格上限が IFR 要件の製造、包装、輸送のコストと一致せず、IFR 生産者が入札に参加できないなどの困難がある。

6.3.5 生産/製造。2022 年の IFR の総生産能力は 181,440MT/年、フィリピンの米消費量 1460 万 MT のわずか 1.24%、米の栄養強化義務化の実施が困難な農家消費を除けば 1.81%に過ぎない。生産に関する大きな懸念は、IFR の生産にかかる追加コストである。生産者は IFR の生産に 1 キロあたり 4 ペソかかると見積もっている。この内訳は、IRK の配送料が距離に応じて 375～450 ペソ

/kg となり、すでに 1.88~2.25 ペソ/kg が強化コストに加算されているが、IFR 生産者は 2% のロイヤルティと FNRI 費用（IFR コストが 45/kg の場合 0.9/kg）に加えて 65/50kg IFR または 1.3/kg（利益込）の手数料を請求している。この試算に基づくと、IFR の生産にかかる追加コストは 4~4.45 ペソ/kg となる。これは通常の精米コストの約 10% である。この追加コストは、FGD 参加者が IFR に支払ってもよいと回答した追加価格の 2 倍である。生産に関するもう一つの問題は、生産拠点が国内、特にビサヤとミンダナオに均等に配置されていないことである。品質保証に関しては、FNRI と DOST が TLA を持つ農家に対して技術支援とモニタリングを行っているため、IRK と IFR の生産が基準に従っていることが保証されている。DOST のサポートがない場合、FDA は IRK の生産者だけを監視することになる。現在、米の生産者と輸入者を誰が監視するかという問題は、FDA、DA、DTI の間でまだ議論されているところである。

- 6.3.6 **流通／ロジスティクス。** IRK と IFR を生産地から使用地まで移動させる施設やサービスプロバイダーは存在する。しかし、主な懸念は流通のコストである。IFR の生産者の多くはルソン島に拠点を置いているため、ビサヤとミンダナオの IFR のコストは、輸送コストを考えると高くなることが予想される。表 5)。ルソンから IFR を輸送する場合、1 キロあたり 3-5 ペソの追加コストが発生する。これは IFR の価格を 7-9 ペソ上げることになり、IFR の需要増を妨げる可能性がある。

テーブル5. ルソン島からビサヤ、ミンダナオ島への米輸送コスト

目的地	20 フィート車運賃	1袋あたりのコスト	キロ当たりのコスト
セブ	54,840	137.10	2.74
ドゥマゲテ	65,326	163.32	3.27
イロイロ	62,670	156.68	3.13
バコロド	62,670	156.68	3.13
タクロバン	64,609	161.52	3.23
ダバオ	71,560	178.90	3.58
カガヤン・デ・オロ	63,670	159.18	3.18
ブトゥアン市	73,000	182.50	3.65
ジェネラルサントス市	71,560	178.90	3.58
ザンボアンガ市	105,000	262.50	5.25

6.3.7 消費者。IFR に対する消費者の需要を高める必要があるため、コミュニケーション計画の一環として、費用対効果の高いテキストマネージャーソリューションを使ったソーシャルメディアキャンペーンを実施する必要がある。このテキストマネージャーソリューションのモデルは、NNC が *Tutok Kainan* プロジェクトの一環として、様々な地域の妊婦と 2 歳以下の子どもを対象に実施したものである。

## 7.0 結論と提言

この調査から、次のような結論が得られた。

- IFR の供給、受容、消費の低さは、様々な要因が相互作用した結果である。供給が少ないのは需要が少ないからであり、これはコーティング技術を使って製造された IFR の変色と金属味に対する否定的なフィードバックによって部分的に説明されるかもしれない。供給量が少ないため、コミュニケーション活動も思うように行えなかった。
- しかし、最近の政策やプログラムの進展、すなわち、とりわけ公立小学校や児童発達センターの給食プログラムにおける強化食品の使用を義務付ける RA 11037 (2018) の成立や SSNP における IFR の使用に関する NNC 運営委員会の決議 (2019)、FNRI による鉄米強化技術 (変色や味に関する懸念に対処した) の研究継続とその推進、DOST の支援によって、鉄米強化は大きな推進力になっている。

- したがって、2022年までに、4つの IRK 生産者と輸入業者、および施設が稼働し始めたならさらに2つの輸入業者、そして23の IFR 生産者が存在することを考えると、フィリピンは公立小学校や児童発達センターにおける政府の給食プログラムからの需要に応えることができる IFR 生産能力を有すると考えられる。
- しかし、IRK や IFR の生産者はルソン地域に多く、ミンダナオ島では2社のみで、ビサヤ地方にはないため、生産コスト（強化により4ペソのコスト増、その半分は IRK による）と流通・物流コストに問題がある。
- さらに、IFR の推定生産能力は、現在進行中の国の給餌プログラムの必要量の5倍であり、経済活動としての IFR 生産の持続性と実行可能性を脅かす可能性がある。

これらの結論を踏まえて、以下のことを提言する。

## 7.1 最も費用対効果の高い、効率的な IFR の対象受取人への提供

7.1.1 強化コストを約50%削減する方法、すなわち4.00～4.45 ペソ/kg から2～2.20 ペソに削減する方法を探る。

- 低価格の微粉末ピロリン酸鉄を使用。現在、太陽化学の微粉末ピロリン酸は約3,000 ペソ/kg で、IRK の約45%～50%のコストになっている。中国やインド産の500 ペソ/kg 程度の微粉末ピロリン酸を使用することは、IRK のコストを下げる大きな要因になる。
- NFA が IFR を50kg あたり35 ペソしか課さないことを考慮すると、IFR 生産者が見積もる65 ペソ/50kg の混合コストを削減する。
- FNRI 技術を採用する IRK および IFR 生産者が FNRI ロイヤリティを支払う要件を削減または廃止する提言の検討（現在検討中）。

7.1.2 クエン酸はピロリン酸第二鉄の溶解性と吸収性を高め、鉄をターゲットに届ける効果があることが研究で示されているため、IRK の製造には引き続きクエン酸などの酸性化合物を使用する。

- 7.1.3 IFR の効率的な流通のために、生産地と使用地をできるだけ近づけるという指針を採用し、そのために、ビサヤとミンダナオに焦点を当てる。

この線では、技術支援の提供者である FNRI と資金支援の提供者である DOST が、IRK 生産者と IFR 生産者が比較的近くにいることを確認する重要なゲートキーピング機能を持つ。

例えば、北ルソンと南ルソンに IRK 生産者を 2 社、ビサヤに 1 社、ミンダナオに 2 社（例えば東部と西部に 1 社）、そして州の規模に応じて州ごとに 1 ～2 社の IFR 生産者を置くという枠組みが考えられる。これらの IFR 生産者は、IFR 生産者から一定の半径内にある精米所とさらにネットワーク化する必要がある。同様に重要なことは、IRK と IFR 生産が実行可能な経済活動として持続可能であることを保証することである。

- 7.1.4 技術普及セミナーを継続するが、IRK や IFR の生産者がいない地域を対象に、より戦略的に実施する。

- 7.1.5 島間輸送には、より安価なロールオンロールオフ輸送を継続利用

- 7.1.6 IRK と IFR の生産者が基準に従って栄養強化ができるようにするための継続的な努力とともに、前述の努力をすること。これに関連して、どの政府機関が米の栄養強化を監視・規制すべきかという問題を解決する必要がある。この懸念は、関係機関（DA、DTI）に提起して解決することができる。

## 7.2 IFR の消費拡大に向けた戦略

- 7.2.1 最初の重要な戦略として、IFR の市場を拡大する。NGO や LGU の SSNP、病院、刑務所、孤児院などの施設、従業員に米を支給している民間企業なども検討すべき市場である。さらに、消費者だけでなく、レストランなどの外食産業への商業的な流通も検討する必要がある。

- 7.2.2 以下のように、IFR の使用を義務付けまたは奨励する機関・組織の政策文書を発行すること。

- DILG は LGU に対し、給食プログラム、災害救援物資、その他の米配布プログラムで IFR を使用することを推奨している。
- DOH、病院に食事サービスの提供における IFR の使用を要求
- 労働省は、企業に対して、米支給のインセンティブや特典の一部として IFR を提供することを奨励し、その他のすべての政府機関は、会議、カンファレンス、ワークショップで提供される食事に IFR を使用する。

- 地域開発評議会、第1地域開発評議会が発行したものをモデルとして、地域の米流通プログラムにおける IFR の使用を呼びかけている。

7.2.3 SSNP や外食店舗での IFR の使用を義務付ける条例（地方法）の採択と施行、および市場での IFR の入手可能性。

- ラ・ユニオン州、ダバオ・デ・オロ市、ダバオ市が採択した条例を LGU と共有することができる。
- このような働きかけは、アドボカシーフォーラムの中で、関連する IEC 資料を用いて行うことができる。2023 年に予想される完全な地方分権のシナリオを考えると、LGU に働きかけることの重要性は、いくら強調してもしすぎることはない。このシナリオでは、DSWD と NNC の給食プログラムは、LGU によって決定・管理されることになる。

7.2.4 アドボカシーフォーラムや、IFR を使う利点や IFR の供給源に関する IEC 資料の普及を通じて、IFR について NGO に働きかけを行う。

## 7.3 IFR の知識と受容を高めるためのコミュニケーション戦略

7.3.1 IFR に関するコミュニケーションプランを策定・実施し、2023～2028 年の PPAN 社会・行動変革コミュニケーションプランに統合または含まれるようにする。

- IFR の使用と消費の促進には、重要なコミュニケーション戦略が必要であり、望ましい行動の採用を可能にするために、異なるターゲットオーディエンス（地元の最高責任者、NGO のプログラムマネージャー、精米業者、消費者）に特定のメッセージを送る必要があることを認識すべきである。第1地域とダバオ・デ・オロでの IFR 推進の経験を文書化し、コミュニケーション計画の資料とすることができる。
- コミュニケーションの主要な対象者の範囲をカバーするコミュニケーション計画を持つことは、全体的なアプローチを確保するのに役立つ。この目的のために、2016-策定されたコミュニケーション計画（付属書 12）を再検討し、適応させることができる。
- 2023-2028 年の社会・行動変容コミュニケーション計画全体の中に、IFR のコミュニケーション上の懸念が統合されていることを確認することは、関連するイニシアティブの持続的な実施につながるであろう。

7.3.2 特に学習能力の向上と仕事の生産性の向上という点で、IFR を使用することの利点をすべてのターゲットオーディエンスに強調する。

7.3.3 消費者にリーチするためには、従来のメディアチャンネルよりも、ソーシャルメディアプラットフォームをより多く使用する必要がある。テキストマネージャーソリューションやバルクメッセージは、様々なモバイルネットワークを通じてターゲットオーディエンスに SMS メッセージを定期的送信することで検討することができる。

- 7.3.4 IFR に関するモジュールを開発し、既存の対面式栄養教育および関連活動（例：保健所での保健サービス提供時、DSWD の家族開発セッションまたは親の効果セッション、親学協会の会合やオリエンテーションなど）に統合することによって、対人コミュニケーションを継続的に利用すること。

## 7.4 全体的な結論

IFR の生産と消費の拡大に向けた動きが加速している。本調査では、米の栄養強化に関する能力、サプライチェーン、キャンペーンの取り組みを明らかにし、フィリピンにおける米の栄養強化の機運を維持し、さらに強化するための様々な提言を行った。本報告書で提示された提言の数を考慮すると、次のステップは、フィリピン食品強化プログラムの一環としてフィリピン米強化プログラムに資金を提供し、実施するための基礎となる省庁間戦略・運営計画を策定することであると思われる。この計画は、IATF-ZH と NNC が、政府、非政府コミュニティ、IRK と IFR の生産者、LGU の様々な組織からの参加を得て、開始することが可能である。





**World Food  
Programme**

# **WFP STUDY ON IRON RICE FORTIFICATION CAPACITIES, SUPPLY CHAIN AND CAMPAIGN INITIATIVES IN THE PHILIPPINES**

**Final Report, 27 June 2022**





**WFP STUDY ON IRON RICE FORTIFICATION CAPACITIES, SUPPLY CHAIN  
AND CAMPAIGN INITIATIVES IN THE PHILIPPINES (WFP/PH/RFP/006/2022)**

by

**NUTRITION FOUNDATION OF THE PHILIPPINES, INC.**

<b>List of Acronyms .....</b>	<b>iv</b>
<b>Executive Summary .....</b>	<b>vi</b>
<b>1.0 Introduction and rationale .....</b>	<b>1</b>
<b>2.0 Progress of rice fortification in the Philippines.....</b>	<b>3</b>
2.1 Studies to revive rice fortification .....	5
2.2 Major policy and program developments, 2019 to present.....	6
<b>3.0 Objectives .....</b>	<b>10</b>
3.1 General objective .....	10
3.2 Specific objectives .....	10
3.3 Study output .....	10
<b>4.0 Methodology .....</b>	<b>11</b>
4.1 Desk review.....	11
4.2 Key informant interviews.....	11
4.3 Focus group discussions .....	12
<b>5.0 Results and discussion .....</b>	<b>14</b>
5.1 Local iron-rice kernel producers/distributors.....	14
5.2 Importers of IRK .....	18
5.3 Importer of micronized ferric pyrophosphate .....	19
5.4 Fabricators and suppliers of equipment for rice fortification .....	19
5.5 Iron fortified rice producers .....	21
5.6 Suppliers of rice .....	27
5.7 Multiple micronutrient fortification .....	28
5.8 Financial and technical assistance for rice fortification .....	28
5.9 Social safety net programs / feeding programs that use rice .....	30
5.10 Consumer view of nutrition and iron-fortified rice .....	35
<b>6.0 Analysis of results based on the objectives of the study .....</b>	<b>37</b>
6.1 Gaps to explain the low supply, acceptance, and consumption of iron-fortified rice.....	37

6.2	Mapping of iron-rice fortification capacities and campaign initiatives of the Philippines .....	38
6.3	Supply chain issues that hinder the implementation of mandatory rice fortification .....	39
7.0	Conclusions and Recommendations .....	41
7.1	Most Cost-Effective and Efficient Delivery of IFR to Target Recipients .....	42
7.2	Strategies for the Increased Consumption of IFR .....	43
7.3	Communication Strategies for Increased Knowledge and Acceptance of IFR ...	44
7.4	Overall conclusion.....	44
References		45
Annexes		47

## List of Figures

<b>Figure 1.</b>	Trends in anemia prevalence in the Philippines, 1998 to 2013 (Food and Nutrition Research Institute (FNRI), National Nutrition Survey)	1
<b>Figure 2.</b>	Anemia prevalence among various age and population groups 2018 and 2019. (FNRI, National Nutrition Survey 2019)	2
<b>Figure 3.</b>	Rice fortification ecosystem in the Philippines.	13
<b>Figure 4.</b>	Mapping of producers and distributors of iron-rice kernel and fortified rice kernel in the Philippines	14
<b>Figure 5.</b>	Mapping of fabricators and distributors of equipment for rice fortification in the Philippines	20
<b>Figure 6.</b>	Mapping of current producers of iron fortified rice	21
<b>Figure 7.</b>	Mapping of producers in the training and calibration phase	23
<b>Figure 8.</b>	Source of information on nutrition and the Sangkap Pinoy seal	36
<b>Figure 9.</b>	Supply chain challenges for rice fortification	39

## List of Tables

<b>Table 1.</b>	Factors affecting malnutrition in BARMM.	2
<b>Table 2.</b>	Estimated production capacity of local producers of iron rice kernel	17
<b>Table 3.</b>	Production capacity of current producers of iron-fortified rice	22
<b>Table 4.</b>	Maximum capacity of production of iron-fortified rice and requirements for iron rice kernel	25
<b>Table 5.</b>	Cost of transporting rice from Luzon to Visayas and Mindanao	41

## Annexes

<b>Annex 1.</b>	NNC Governing Board Resolution No. 1 Series of 2019 – Scaling Up Rice Fortification with Iron for Social Safety Net Programs in the Philippines. ....	47
<b>Annex 2.</b>	FDA Circular No. 2007-010-A – Updated Standards for Iron-Rice Premix Amending Bureau Circular No. 2007-010 .....	53
<b>Annex 3.</b>	List of key informant interviews conducted .....	64
<b>Annex 4.</b>	List of producers of iron-rice kernel (IRK) .....	73
<b>Annex 5.</b>	List of fabricators for rice fortification.....	76
<b>Annex 6.</b>	List of producers of iron-fortified rice (IFR).....	78
<b>Annex 7.</b>	Location of NFA rice fortification blending facilities nationwide .....	88
<b>Annex 8.</b>	DSM rice kernel for fortification.....	89
<b>Annex 9.</b>	Iron-fortified rice procurement by DepEd School Division Offices, 2021 .....	90
<b>Annex 10.</b>	IFR requirement per region for DepEd SBFP (2022) and DSWD SFP (2015). ....	91
<b>Annex 11.</b>	Region 1 Regional Development Council Resolution No. 104 s.2019 .....	92
<b>Annex 12.</b>	Communications and strategic plan for rice fortification .....	94
<b>Annex 13.</b>	IFR IEC materials developed with FNRI.....	101

## List of Acronyms

<b>AHMP</b>	Accelerated Hunger Mitigation Program
<b>BangUn</b>	Bangsamoro Umpungan sa Nutrisyon
<b>BARMM</b>	Bangsamoro Autonomous Region in Muslim Mindanao
<b>CEST</b>	Community Empowerment for Science and Technology
<b>DepEd</b>	Department of Education
<b>DO</b>	Department Order
<b>DOH</b>	Department of Health
<b>DSWD</b>	Department of Social Welfare and Development
<b>DSWD-DRMB</b>	DSWD-Disaster Response Management Bureau
<b>DSWD-NRLMB</b>	DSWD-National Resource and Logistics Management Bureau
<b>DSWD-PMB</b>	DSWD-Program Management Bureau
<b>DTI</b>	Department of Trade and Industry
<b>EPAHP</b>	Enhanced Partnership Against Hunger and Poverty
<b>FDA</b>	Food and Drug Administration
<b>FGD</b>	Focus group discussions
<b>FNG</b>	Fill the Nutrient Gap Philippines
<b>FNRI</b>	Food and Nutrition Research Institute
<b>FSP</b>	Food for School Program
<b>GIA</b>	Grants-in-Aid
<b>IATF-ZH</b>	Inter-Agency Task Force Zero Hunger
<b>IEC</b>	Information, education and communication
<b>IFR</b>	Iron-fortified rice
<b>IRK</b>	Iron-rice kernel
<b>KII</b>	Key informant interviews
<b>LGU</b>	Local government unit
<b>MBHTE</b>	Ministry of Basic, Higher and Technical Education
<b>MOA</b>	Memorandum of agreement
<b>MOST</b>	Ministry of Science and Technology
<b>MSMEs</b>	Micro, small, and medium enterprises
<b>NBC</b>	Nutrition and Beyond Corporation
<b>NCR</b>	National Capital Region
<b>NFA</b>	National Food Authority
<b>NFMC</b>	Nutridense Food Manufacturing Corporation
<b>NGO</b>	Non-government organization
<b>NNC</b>	National Nutrition Council
<b>NNC-GB</b>	National Nutrition Council Governing Board

<b>PPAN</b>	Philippine Plan of Action for Nutrition
<b>PhilRice</b>	Philippine Rice Research Institute
<b>RA</b>	Republic Act
<b>SBFP</b>	School-based Feeding Program
<b>SETUP</b>	Small Enterprises Technology Upgrading Program
<b>SFP</b>	Supplementary Feeding Program
<b>SMS</b>	Short messaging service
<b>SPS</b>	Sangkap Pinoy Seal
<b>SSNP</b>	Social safety net program
<b>SY</b>	School Year
<b>S&amp;T</b>	Science and technology
<b>TAPI</b>	Technology Application and Promotion Institute
<b>TLA</b>	Technology Licensing Agreement
<b>TWG</b>	Technical working group
<b>UNICEF</b>	United Nations International Children's Fund
<b>WFP</b>	World Food Programme
<b>WHO</b>	World Health Organization
<b>4Ps</b>	Pantawid Pamilyang Pilipino Program

## Executive Summary

**Introduction.** The Philippines has been implementing mandatory rice fortification with iron with the passage of Republic Act (RA) 8976 or the Philippine Food Fortification Act on 7 November 2000 with full implementation in 2004.

In 2005, the Food for School Program (FSP) of the Accelerated Hunger Mitigation Program used iron fortified rice (IFR) with iron-rice kernel (IRK) coated with ferrous sulfate. The FSP involved the provision of a kilo of rice to Grade 1 and preschool children enrolled in identified public elementary schools; and all children 3-4 years old in identified DSWD-supervised day care centers. The National Food Authority (NFA) provided the IFR requirements of the program up to early 2010.

In addition, IFR was served in food service establishments in Davao City based on an executive order by then Mayor and now President Rodrigo Roa Duterte in 2007. It was also during this time that the Food and Nutrition Research Institute (FNRI) was developing hot extrusion technology with micronized ferric pyrophosphate as fortificant and blenders. FNRI started transferring the technology in 2013 resulting in localized rice fortification activities in Orion, Bataan and the provinces of Zambales and Davao de Oro, without much success except in Davao de Oro.

In 2014, the Philippine delegation participating the workshop on Scaling Up Rice Fortification in Asia agreed to initially focus rice fortification on social safety net programs. This was in recognition of the need to ensure access of the more vulnerable to IFR in the context of the challenge of fortifying the volume of rice consumed in the Philippines (about 10.2 MT).

In 2018, RA 11037 on mandatory feeding of malnourished children in public elementary schools and child development centers (formerly called day care centers) was passed. Among others, the law institutionalized the use of fortified foods in these feeding programs.

In 2019, the World Food Programme (WFP) conducted a pilot study on the use of IFR in the school feeding program in Maguindanao Province. The IFR was produced using local IRK from Pangasinan Province, local rice and the blending facilities of NFA. The pilot study demonstrated successfully that IFR with rice from local farmers can be used in school feeding programs.

In 2020, President Duterte issued an executive order organizing the Inter-Agency Task Force on Zero Hunger (IATF-ZH) headed by the Cabinet Secretary. Several meetings of the IATF-ZH and conduct of two (2) *Kumain* (literally means to eat) webinars among cooperatives and government agencies in 2021 resulted to a surge in rice fortification activities, with support from the Department of Science and Technology (DOST) that increased producers of IFR and purchase of IFR by the Department of Education (DepEd).

It is in this context that WFP Philippines, with support from Japan-based partners from WFP, International Life Sciences Institute and DSM, decided to conduct a study on the overall rice fortification capacities, supply chain, and campaign initiatives in the Philippines.

### Objectives

**Overall objective.** The study aimed to determine supply chain, advocacy, and campaign gaps that could explain the low supply, acceptance, and consumption of iron-fortified rice.

**Specific objectives** were to map iron-rice fortification capacities and campaign initiatives of the Philippines, and to identify the supply chain issues that hinder the implementation of mandatory rice fortification as stipulated in RA 8976.

**Expected output** include recommendations along:

1. Most cost-effective and efficient delivery of IFR to target recipients;
2. Strategies for the increased consumption of IFR through social safety net programs, and commercialization on the supply side, i.e., IRK suppliers and IFR producers through rice millers, distributors and retailers and involving local farmers and communities for access to the technology for the production of IFR; and
3. Communication strategies for increased knowledge and acceptance of IFR by consumers, local officials, non-government organizations, and other stakeholders.

**Methodology.** The study involved a desk review of previous researches and activities on rice fortification. Key informant interviews (KIIs) and focus group discussions (FGDs) were done covering stakeholders based on a framework on the ecosystem of rice fortification. KIIs covered 7 producers of iron-rice kernels, 11 iron fortified rice producers, 4 machine fabricators and importers, 4 farmers cooperatives and a rice mill in BARMM, representatives of 4 agencies involved in social safety net programs (feeding programs and disaster response), representatives from DOST at national and regional levels, and representatives of 4 government agencies or organizations in BARMM. The results of the desk review, KIIs, and FGDs were analyzed as basis for the recommendations for rice fortification.

**Results and discussion.** Current IFR production capacity is 181,440 MTs/year or only 1.81% of the fortifiable rice of 10.2 million MT.

An analysis of the supply of IFR vs demand from feeding programs of the DepEd and the Department of Social Welfare and Development (DSWD) shows the presence of the capacity to produce up to 181,440 MT of IFR, more than three times higher than the 55,233 MT of IFR needed by DepEd and DSWD.

The maximum capacity to produce IRK is 1,359.36 MT, almost 5 times higher than the IRK needed to produce the IFR for DepEd and DSWD programs.

Currently, there are 2 producers of IRK and 2 importers of IRK and multi nutrient rice kernels. Two more IRK producers are expected once their production facility is operational by the end of 2022. There are 10 producers of IFR while an additional 8 producers of IFR will be operating by the end of 2023. Most of these IFR producers are in Luzon. DOST and FNRI provided financial and technical support, respectively to most IFR producers. NFA started pilot testing of the production of IFR in 4 regions with a target of full production of 50% (150,000 MTs) of its buffer stocks by 2023. In addition, 25 potential IFR producers have requested FNRI for technical support. These requests are being evaluated. Given this scenario, production of IFR is expected to increase substantially in 2022-2023 and would be more than enough to supply IFR to the feeding programs of DepEd and DSWD. However, based on the mapping of producers of IFR, currently there are no producers in the Visayas and 2 in Mindanao. This presents supply chain concerns especially along the cost of distribution for the use of IFR in these areas.

According to the producers, there is an additional cost of P4 due to fortification. A little more than half (about P1.88 to P2.25/kg of rice) of this additional cost is contributed by IRK, (locally priced at P375 – P450/kg). An IFR producer estimates the cost of blending at P65/50 kg or P1.30/kg. However, NFA's cost of blending is only at P35/50 kg or 0.70/kg. Another element of the cost of fortification is FNRI's royalty fee for technology adoption, which is 2% of total sales.

Distribution and logistics is a significant factor to consider in the supply chain of IFR since most of the IRK and IFR producers are in the island group of Luzon. Transporting IFR or IRK from Luzon to the Visayas and Mindanao can add P2-5/kg more in addition to the cost of fortification. Thus, the FNRI evaluation of requests for technology adoption should consider the lack of IRK and IFR producers in the Visayas and Mindanao island groups.

Other supply chain concerns are on the fortification of imported rice and quality monitoring of IFR producers as the regulatory function of NFA in the rice industry has been discontinued through RA 11203 or the Rice Tariffication Law. These issues have not yet been resolved.

Advocacy and communications campaigns on IFR were more localized, while current advocacy efforts at the national level are focused on the production of IFR. Advocacy and promotion of IFR in Region 1 and Davao de Oro could be considered as models that can be replicated in other regions and provinces. A communication plan to promote IFR was formulated in 2016 but was not implemented. In addition, various information education and communication materials targeting local government units and consumers were developed in 2018 but were not used due to issues on the supply of IFR.

The main source of information of consumers on nutrition and rice fortification is television, health centers and social media.

### **Conclusions and recommendations:**

The Philippines has the capacity to fortify rice for the requirements of mandatory feeding programs in public elementary schools and child development centers. However, this capacity exceeds the requirements of mandatory feeding programs. Furthermore, the capacity to produce IFR is relatively weak in the Visayas and Mindanao since most of the IRK and IFR producers are in the Luzon regions.

For more cost-effective and efficient distribution the first recommendation is to reduce the cost of fortification by half by 1) considering alternative and less costly sources of micronized pyrophosphate, 2) reducing the cost of blending, and 3) revising the FNRI royalty fee requirement. The resulting cost is within consumer affordability based on the results of the FGDs.

In addition, the guiding principle of bringing the sites of production of both IRK and IFR closer to each other is recommended to be adopted. DOST and FNRI being primary supporters of IFR production are key gatekeepers in this regard, and a focus should be the Visayas and Mindanao. Continued use of an acidic compound is likewise recommended together with efforts to ensure quality fortification.

To increase consumption of IFR, market expansion is recommended to cover 1) social safety net programs of non-government organizations, government institutions that use rice like hospitals and jails, private companies that give rice allowance to their employees, and 2) commercial market. In addition, relevant policies on the use of IFR from national government agencies like the Departments



of Health, the Interior and Local Government, Labor and Employment and local government units (in the form of local ordinances or laws) are recommended to be issued and implemented.

To increase the demand for IFR, an advocacy and communication plan can be formulated and implemented to assist local producers on how best to distribute IFR targeting national, local government, and non-government organizations that can use IFR, as well as consumers. Experiences in Region 1 and Davao de Oro could be shared for adaptation by other regions and LGUs. *KUMAIN* webinars of the IATF-ZH and DOST regional seminars could continue to be implemented to increase the supply and demand for IFR. To reach out to consumers to use IFR, social media channels and bulk text messaging could be used together. Existing interpersonal communication channels can be tapped, e.g., the nutrition education component of the *Tutok Kainan* Program of the National Nutrition Council (NNC), family development sessions of the *Pantawid Pamilyang Pilipino* Program (4Ps) and parents effectiveness sessions of the DSWD, parent-teacher association orientations and meetings. The 2016-developed communication plan can be a starting point for this effort.

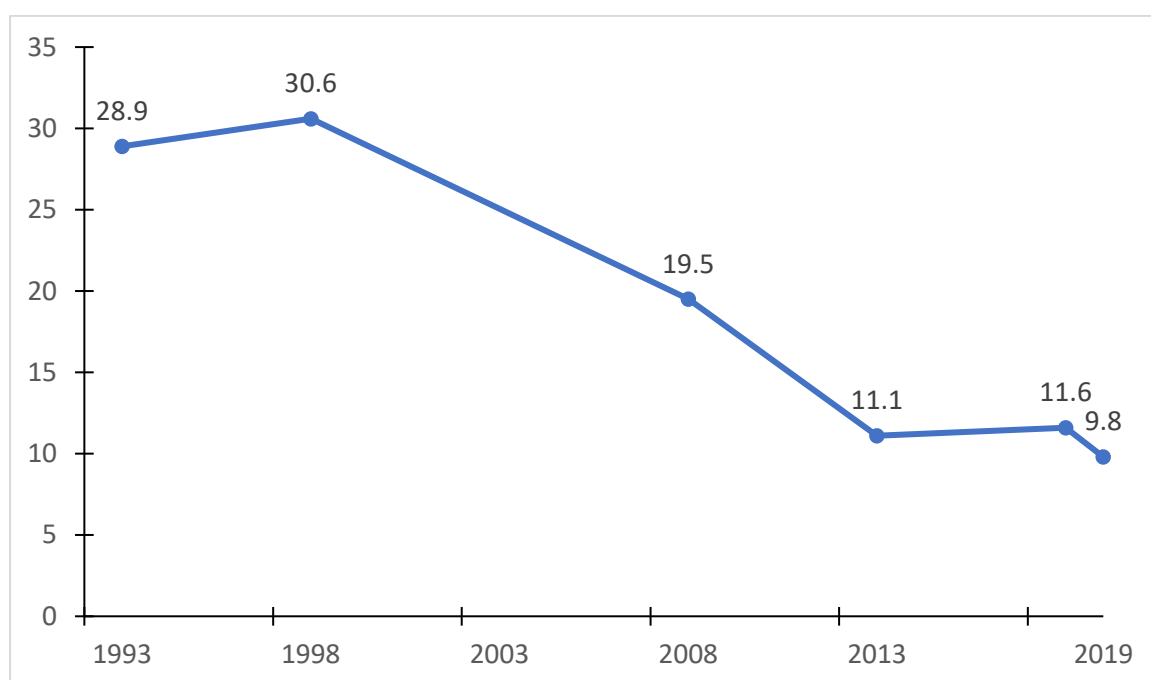
Finally, given the number of recommendations provided in the report, the next step would be the development of an interagency strategic and operational plan that will become the basis for the funding and implementation of the Philippine Rice Fortification Program which can be initiated by IATF-ZH and NNC and advocated as a priority program of the next administration.

## 1.0 Introduction and rationale

The Philippines enacted Republic Act (RA) 8976, An Act Establishing the Philippine Food Fortification Program and Other Purposes in 2000, with full implementation of mandatory fortification by 2004. RA 8976 mandates fortification of milled rice with iron, wheat flour with vitamin A and iron, cooking oil with vitamin A and refined sugar with vitamin A. It also provides for voluntary fortification of processed food with vitamin A, iron, and iodine using the *Sangkap Pinoy* Seal (SPS) as the main communications handle.

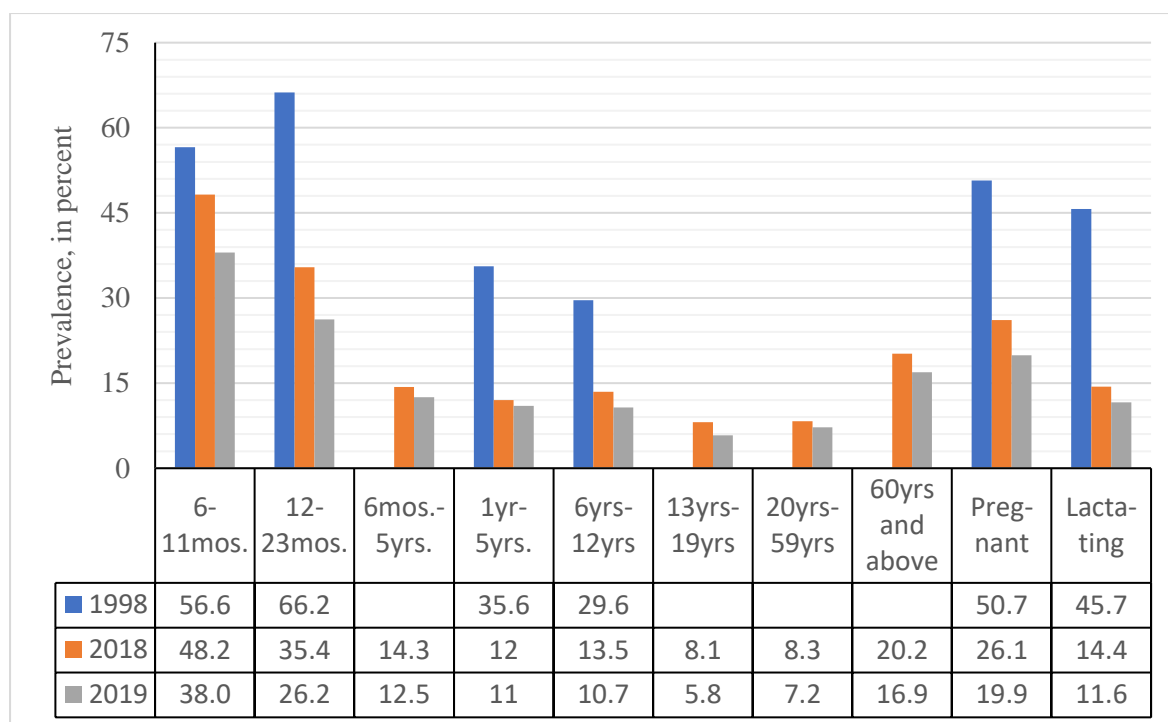
Since 2004, the law has not been fully implemented due to various issues and concerns. Rice fortification was implemented sporadically. Local wheat flour and labeled vegetable and palm cooking oil have been fortified but compliance to fortification levels needs to be determined. Imported flour, and unlabeled cooking oil sold in transparent packaging with about 65% market share are not fortified, while refined sugar has never been fortified.

Even with these setbacks, micronutrient deficiencies, including anemia prevalence, have improved starting in 2008 or after full implementation of RA 8976 (Figure 1). The decline in anemia prevalence continued until 2019, with a slight increase between 2013 and 2018.



**Figure 1.** Trends in anemia prevalence in the Philippines, 1998 to 2013 (Food and Nutrition Research Institute (FNRI), National Nutrition Survey)

The decline in anemia prevalence between 1998 and 2018 and 2019 was evident across all age and population groups (Figure 2). Based on World Health Organization (WHO) cut-off for public health significance for anemia, the prevalence among almost all age / population groups are indicative of a mild problem except for the age group 6 – 11 mos. old and one-year old for which anemia is of a moderate level.



**Figure 2.** Anemia prevalence among various age and population groups 2018 and 2019. (FNRI, National Nutrition Survey 2019)

Since reestablishing its presence in the Philippines in 2006, World Food Programme (WFP) has focused its technical assistance in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) as it ranks lowest in human development due to internal conflict and insecurity resulting in restricted access to basic social services. In 2018, the WFP conducted a study entitled the “Fill the Nutrient Gap (FNG): Philippines”, a nutrition analysis framework and decision tool.

Table 1 is the summary of the results of the FNG study that shows the factors affecting malnutrition particularly in its project area of BARMM as compared to other regions.

**Table 1.** Factors affecting malnutrition in BARMM.

Indicator	Results for BARMM	Ranking	Result for lowest/highest ranking region	Remarks for BARMM
Stunting (Among children under-five years old)	45%	1	23% (Region 3) – lowest prevalence	Highest prevalence among regions
Median daily household food expenditure (Rural)	P154	2	P151 (Region 10) – lowest expenditure	2 <sup>nd</sup> lowest expenditure
Median daily household food expenditure (Urban)	P155	1	P370 (National Capital Region [NCR]) -highest expenditure	Lowest expenditure
Daily cost of energy-only diet	P120	2	P133 (NCR) – highest cost	2 <sup>nd</sup> highest daily cost

Indicator	Results for BARMM	Ranking	Result for lowest/highest ranking region	Remarks for BARMM
Percentage of households that would not be able to afford energy-only diet	23%	1	NCR lowest at 0% - lowest percentage	Highest among all regions
Daily cost of a nutritious diet	P 165.00	4	P 148.00 (Region 5) – lowest	4 <sup>th</sup> lowest daily cost of nutritious diet
Relationship between daily cost and non-affordability of a nutritious diet by region	58%	2	59% (Region 10) – lowest	2 <sup>nd</sup> lowest daily cost

Part of the WFP technical assistance is the conduct of school feeding based on Department of Education (DepEd) Department Order (DO) 39, S. 2017 – Operational Guidelines on the Implementation of School-based Feeding Program for School Year 2017-2022.

RA 11037, An Act Institutionalizing a National Feeding Program for Undernourished Children in Public Day Care, Kindergarten and Elementary Schools to Combat Hunger and Undernutrition among Filipino Children and Appropriating Funds Therefor institutionalized feeding programs in public elementary schools and child development centers (formerly called day care centers). The law encourages the use of iron-fortified rice (IFR) in feeding programs as also provided in RA 8976. However, the use of IFR in school feeding has been limited to a few areas that were supported by local government units (LGUs) in Pangasinan and Davao de Oro Provinces prior to the enactment of RA 11037.

It is in this context that WFP conducted a pilot study on the use of IFR for school feeding in Maguindanao Province, results of which were documented and presented to various stakeholders, particularly with the government’s Interagency Task Force on Zero Hunger (IATF-ZH) headed by the Cabinet Secretary.

As a follow-up to the successful pilot study, WFP is undertaking this study on iron rice fortification capacities, supply chain and campaign initiatives in the Philippines. The results of this research can hopefully be used to expand rice fortification not only in BARMM but also nationwide.

## 2.0 Progress of rice fortification in the Philippines

Rice fortification has long been a strategy in the Philippines to address micronutrient malnutrition with the successful efficacy testing in 1946 with the addition of thiamine to address the problem of beri-beri as well as niacin and iron using a technology from Hoffman LaRoche. The research was pioneered by the then Secretary of Health, Dr. Juan Salcedo, Jr., the founder of the Nutrition Foundation of the Philippines, Inc. To ensure the eradication of beri-beri, the Philippines enacted the Rice Enrichment Law in 1952 but since the law was used as basis for taxation, it eventually was not implemented, but by the end of the 1950s, beri-beri was eradicated.

The success of the aforementioned rice fortification initiative was the basis for the continued research by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) on iron fortification of rice in the 1980s and 1990s.

At that time, ordinary rice was coated with iron to produce the iron-rice kernel (IRK), which was mixed with milled rice to produce IFR. Based on this technology, RA 8976 was enacted. The law's implementing rules and regulations (IRR) mandated the iron fortification of rice at 6 to 9 milligrams (mgs) of iron/100 grams of milled rice.

This technology was used in the iron fortification of rice for the Food for School Program (FSP) of the Accelerated Hunger Mitigation Program (AHMP). The FSP involved the provision of a kilo of rice to Grade 1 and preschool children enrolled in identified public elementary schools; and all preschoolers 3-4 years old in identified day care centers supervised by the Department of Social Welfare and Development (DSWD). The National Food Authority (NFA) provided the IFR, which was either imported from Vietnam or locally-produced rice with coated IRK using ferrous sulfate from the Wright Group from USA. This was done from 2005 to 2010 by NFA.

From 2011-2013, NFA conducted a major communications campaign for the distribution of IFR through commercial outlets primarily to mop up its supply of IFR. When the supply of IFR ran out, the commercial distribution was also discontinued.

In 2007, one of the LGUs that initiated rice fortification was Davao City when then Davao City Mayor and now President Rodrigo Roa Duterte issued Executive Order No. 19 that established the Davao City Monitoring Task Force with a budget of P500,000. The task force monitored food service establishments on the use of iodized salt and IFR. Advocacy activities were conducted in malls among health workers resulting in the serving of IFR in major fastfood outlets such as Jollibee, Chowking, McDonalds. METAVCO Rice Mill produced IFR using coated IRK from CLG Foods, with Grains Fortificant Marketing as distributor. However, following the change in local leadership in 2010, no funds were provided for the task force and the program was discontinued.

In 2002, FNRI started developing hot extrusion technology for the production of IRK through which the iron was imbedded in the kernel instead of being coated. Using extruded IRK for IFR resulted to a minimum of 90% retention of iron, much higher than the estimated 50% iron retention for the coated technology. (The loss in iron was due to the practice of washing rice prior to cooking.) Superlative Snacks Corporation adopted the technology in 2006 and in 2007 Goldilocks Corporation, a major fastfood chain, used IFR in its rice meals. Also in 2006, FNRI conducted a market trial of IFR commercialization in Orion, Bataan with support of an ordinance and a communications campaign. This was implemented on a bigger scale in Zambales Province with the commercialization of IFR in one city and seven municipalities complete with a communication campaign using television, launching events, parades, billboards and information, education and communication (IEC) materials. Following the changes in administration, these initiatives in Orion and Zambales were discontinued. At about the same time, there was a significant decrease in anemia among Filipinos as shown in Figure 1.

In 2014, during the workshop on Scaling Up Rice Fortification in Asia, the Philippine delegation composed of representatives from government agencies (DSWD, FNRI, Food and Drug Administration (FDA), National Nutrition Council (NNC), NFA), UNICEF, WFP, and rice millers and traders (Nutridense Food Manufacturing Company, Nutrition and Beyond Corporation, Philippine Confederation of Grains) decided to pursue rice fortification, initially, for social safety net programs (SSNPs).

This decision recognized that fortifying all the rice supply in the Philippines would be challenging given the volumes involved.

Based on the data of the Philippine Statistics Authority, in 2018, the average annual per capita consumption was 103.25 kg. and with an estimated 110 million population, estimated total rice intake is 11,375.5 million tons at 70% for commercial use, about 8 million metric tons are needed to be fortified under mandatory fortification of rice. This would be difficult to achieve given the number of rice millers that should do rice fortification. As such, focusing the distribution of IFR to the more needy vulnerable groups who are usually covered by SSNPs translates to a volume of rice for fortification that can be controlled and monitored.

## **2.1 *Studies to revive rice fortification***

Following the end of the AHMP in 2010 and the NFA IFR commercial distribution in 2013, various studies were conducted to revive rice fortification, while FNRI started the transfer of technology on the local production of extruded IRK (currently the technology used for local production of IRK), and rice fortification with its blending machines. These studies, managed by NNC, were as follows:

- 2.1.1 **“Rice Supply Chain Diagnostic in the Philippines”**, 2014, supported by UNICEF and the Food Fortification Initiative. The study looked into the rice supply chain and experiences related to rice fortification to determine how rice fortification can be scaled up. This led the NNC to organize the ad hoc technical working group (TWG) on rice fortification. Based on the findings of the study, the TWG, agreed to focus rice fortification on rice distributed through the government’s SSNPs and developed a workplan for this purpose.
- 2.1.2 **“Rice Consumption for SSNPs of the Government of the Philippines and Non-Government Organizations”**, 2015-2016, supported by UNICEF. This was a follow-up technical assistance project for the scale up of rice fortification in the Philippines. The study identified various SSNPs particularly of the DepEd and DSWD, estimated the cost of using IFR in their feeding programs, identified sources of IFR, and showed models of rice fortification for SSNPs for implementation by LGUs. The study was used to conduct advocacy activities in regions with sources of IFR. A communications plan to promote rice fortification for SSNP was also formulated.
- 2.1.3 **“Technical assistance on rice fortification for SSNPs”**, 2017-2018, supported by Nutrition International. This initiative involved various activities, as follows:
  - 2.1.3.1 Conduct of a landscape policy analysis of rice fortification for SSNPs;
  - 2.1.3.2 Documentation of best practices on LGU implementation of rice fortification in Davao de Oro and Urdaneta City;
  - 2.1.3.3 Development of a national policy guidance for government agencies involved in rice fortification for SSNPs;
  - 2.1.3.4 Development of mechanisms for production, supply and distribution of IFR within SSNPs;

- 2.1.3.5 Formulation of an NNC Governing Board resolution in support of rice fortification (approved in 2019); and
- 2.1.3.6 Development of IEC materials to advocate for rice fortification for SSNPs, targeting local chief executives and consumers.

## 2.2 *Major policy and program developments, 2019 to present*

Following the conduct of the aforementioned studies and continued advocacy for the use of IFR in the feeding programs of DepEd and DSWD as well as models of implementation of school feeding using IFR in Davao de Oro and Urdaneta City as identified in the aforementioned reports, the following were major policy and program developments in increasing the production and consumption of IFR:

- 2.2.1 **Passage of RA 11037**, An Act Institutionalizing a National Feeding Program for Undernourished Children in Public Day Care, Kindergarten and Elementary Schools to Combat Hunger and Undernutrition among Filipino Children and Appropriating Funds Therefor or the *Masustansyang Pagkain para sa Batang Pilipino* Act (Nutritious Food for Pilipino Children). The law, passed on 24 July 2017, encourages the use of IFR in the school feeding program of DepEd for malnourished schoolchildren and for all pre-school children in child development centers of DSWD.

In response to RA 11037, DepEd and DSWD, which were already implementing feeding programs even prior to the law, developed guidelines to ensure its implementation and at the same time encourage the use of IFR.

- 2.2.2 **Adoption of the policy on use of IFR in SSNPs through National Nutrition Council Governing Board Resolution No. 1, S. 2019**, “Scaling Rice Fortification with Iron for Social Safety Net Programs in the Philippines” (Annex 1).
- 2.2.3 **Adoption of the Enhanced Partnership Against Hunger and Poverty (EPAHP)** through the signing of a Memorandum of Understanding among 14 national government agencies, 10 attached agencies of the 14 national government agencies, and 2 government banks in 2019. Among others, the partnership aims to increase farm productivity and income, ensure food security and nutrition, and mitigate hunger and malnutrition. Among others, its strategic measures include tapping community-based organizations as suppliers of the food requirements of supplementary feeding programs and capacitating these organizations so that they can supply the food requirements of supplementary feeding programs. Capacitation involves the adoption of policies and processes that will allow increased access to credit facilities and increased ability to participate in community-based procurement, and the provision of farm technologies and extension services.
- 2.2.4 **Organization of the Inter Agency Task Force on Zero Hunger (IATF-ZH)**, through Executive Order 101 by President Rodrigo Duterte in 2020. The IATF-ZH is headed by the Cabinet Secretary. The IATF-ZH aims to end hunger by 2030, in line with the United Nations Sustainable Development Goal No. 2 through the adoption and implementation of the National Food Policy.

The National Food Policy covers six key result areas, namely *a)* review and rationalize existing policies, rules, and regulations related to zero hunger; *b)* ensure available and affordable food; *c)* secure nutrition adequacy; *d)* secure food accessibility and safety; *e)* ensure sustainable food systems, food resiliency, and stability; and *f)* ensure information, education, awareness, and people participation. Accomplishments reported by member agencies in December 2021 were as follows:

- 2.2.4.1 Procurement of IFR for the DepEd School-based Feeding Program (SBFP) amounting to P 85,640,857.81. DepEd district offices mainly in Luzon were involved although two cities in Mindanao (Mati City and Digos City) were waiting for the confirmation of their orders. It was noted though the price range of IFR was P60 to 90 per kg mainly due to transport costs.
- 2.2.4.2 Conduct of the WFP pilot study on the use of IFR in school feeding in Maguindanao. The study showed the feasibility of producing IFR in BARMM using facilities of NFA and rice from local farmers with IRK from Nutridense Food Manufacturing Corporation based in Pangasinan province.
- 2.2.4.3 Revision of the standards for IRK with the issuance of FDA Bureau Circular 2007-0010A (Annex 2). When the 2019 WFP study was being conducted, the standard used for the production of IFR was 60 to 90 ppm iron as provided by RA 8976 and its IRR. This was based on the coating technology for the production of IRK that was the only technology available at the time the law was enacted. However, FNRI has developed and tested successfully the use of the hot extrusion technology for IRK production with minimal loss of iron and with more acceptable sensory and physical characteristics of IFR compared to IFR produced using the coating technology. Various meetings were held to review the proposed revised standards for IRK given the FNRI researches. Following a meeting of the IATF-ZH on 20 December 2021, the Department of Health (DOH) assured the approval of the revised standard which was eventually issued the following day on 21 December 2021.  
  
The standard for the iron content of IFR was lowered from 60 ppm - 90 ppm iron to 20 ppm – 60 ppm iron.
- 2.2.4.4 Development of an NFA workplan for rice fortification for 2022, implementation of which started with the procurement of four blending machines for the pilot production of IFR for NCR and Regions 2, 3, and 4-A. NFA targets to eventually fortify 50% of its rice buffer stocks starting with its pilot study in 2022. It was able to source the budgetary requirements of its pilot IFR production in 2022 and would include the fortification of 50% of its buffer stocks in its 2023 annual budget proposal.
- 2.2.4.5 Conduct of the *1<sup>st</sup> Kumain* (literally means to eat) Webinar in August 2021 organized by the IATF-ZH, that may have triggered the increase in



the number of producers and potential producers of IFR particularly through the DOST Community Empowerment for Science and Technology (CEST) Program. A follow-up *Kumain* webinar was held last 25 January 2022. Please see related discussions in Section 5.0.

- 2.2.4.6 Implementation of NNC's dietary supplementation program called *Tutok Kainan* (means targeted feeding) that has reported to have procured 127,999 kgs of IFR for pregnant women and children 6 to 23 months old.
- 2.2.4.7 Commitment of DOH to issue a policy for all DOH hospitals, canteens, programs and projects to use only IFR and to design and implement a communications campaign for IFR.
- 2.2.4.8 Ongoing and about-to-be completed NNC assessment of the Philippine Food Fortification Program that has, among others, identified factors that facilitate and deter food fortification, which should be considered for scaling up the food fortification program especially rice fortification.
  - 2.2.4.8.1 Factors that facilitate rice fortification based on the KII conducted according to the respondents in parenthesis.
    - 2.2.4.8.1.1 Support from national government, LGUs and government agencies (NFA, DSWD-National Resource and logistics Management Bureau (NRLMB), fortificant supplier).
    - 2.2.4.8.1.2 Continuous research and development with other participating agencies (NFA, Philippine Rice Research Institute (PhilRice), DSWD-NRLMB)
    - 2.2.4.8.1.3 Promotional campaigns on the use of fortified products (PhilRice, DSWD-Program Management Bureau (PMB), DSWD-NRLMB)
    - 2.2.4.8.1.4 Availability of fortificants (DSWD-PMB)
    - 2.2.4.8.1.5 Regulatory monitoring (DSWD – PMB, DSWD-NRLMB)
    - 2.2.4.8.1.6 Consultation, collaboration, and coordination of agencies (DSWD-Disaster Response Management Bureau (DRMB), DSWD-NRLMB, fortificant supplier)
    - 2.2.4.8.1.7 NFA production of IFR (DSWD-DRMB)
    - 2.2.4.8.1.8 Political advocacy on cost-effectiveness of food fortification (DSWD-NRLMB)

- 2.2.4.8.2 Factors that deter rice fortification
  - 2.2.4.8.2.1 Lack of information dissemination on the benefits of IFR (NFA)
  - 2.2.4.8.2.2 Budgetary requirements for IFR production (NFA, DSWD-DRMB)
  - 2.2.4.8.2.3 Limited capacity of rice fortification equipment and the need to sustain production (NFA, DSWD-DRMB)
  - 2.2.4.8.2.4 Cost of fortification (DSWD-PMB, DSWD-NRLMB)
  - 2.2.4.8.2.5 Executive Order 51 s.1998 requiring all rice for government projects to be purchased from NFA (DSWD-DRMB)
  - 2.2.4.8.2.6 Lack of adequate food control (DSWD-NRLMB, PhilRice)
  - 2.2.4.8.2.7 Start-up cost for fortification (DSWD-NRLMB)
- 2.2.4.8.3 Recommendations for rice fortification
  - 2.2.4.8.3.1 Identify appropriate agency tasked to strictly monitor compliance (NFA)
  - 2.2.4.8.3.2 Develop and implement a memorandum of agreement (MOA) among the agency tasked to monitor, rice millers, and traders (NFA)
  - 2.2.4.8.3.3 Regular monitoring and strict implementation (PhilRice)
  - 2.2.4.8.3.4 Strengthen agency collaboration for effective communication among government agencies (PhilRice)
  - 2.2.4.8.3.5 Public-private partnership with clear well-defined terms of partnership (fortificant supplier)
  - 2.2.4.8.3.6 Private sector support to the promotion of fortified foods (DSWD-DRMB)
  - 2.2.4.8.3.7 Develop strategies to reach vulnerable and at-risk population, consider supplementation if cannot be reached (DSWD-NRLMB)

- 2.2.4.8.3.8 More aggressive policy advocacy and need political will to legislate and regulate for public sector support and private sector involvement (DSWD-NRLMB, PhilRice, Fortificant Supplier)
- 2.2.4.8.3.9 Assess resources, constraints, quality assurance, consumption patterns, acceptability and cost (DSWD-NRLMB)
- 2.2.4.8.3.10 Tax incentives for private partner (Fortificant supplier)

These developments are important to consider in determining actions to address the gaps in iron fortification of rice.

## 3.0 Objectives

### 3.1 *General objective*

The study aimed to determine supply chain, advocacy, and campaign (social and behavior change communication) gaps that could explain the low supply, acceptance, and consumption of iron-fortified rice

### 3.2 *Specific objectives*

- 3.2.1 To map iron-rice fortification capacities and campaign initiatives of the Philippines
- 3.2.2 To identify the supply chain issues that hinder the implementation of mandatory rice fortification as stipulated in the Philippine Food Fortification Act of 2000 and its Implementing Rules and Regulations.

### 3.3 *Study output*

The study output includes recommendations and actionable guidelines to create stronger policies to help address the micronutrient gaps, specifically:

- 3.3.1 Most cost-effective and efficient delivery of IFR to target recipients;
- 3.3.2 Strategies for the increased consumption of IFR through SSNPs and its commercialization on the supply side (IRK suppliers and IFR producers) through millers, distributors and retailers and involving local farmers and communities for access to the technology for the production of IFR; and.
- 3.3.3 Communication strategies for increased knowledge and acceptance of IFR by consumers, local officials, non-government organizations (NGOs), and other stakeholders.

## 4.0 Methodology

The following data collection methods were used.

### 4.1 Desk review

Relevant documents were reviewed to determine the documented progress of rice fortification in the Philippines. The desk review helped frame the guides for the key informant interviews (KII) and focus group discussions (FGDs). Documents reviewed were WFP reports on its involvement in food fortification in the Philippines, various studies done on scaling up rice fortification in the country in SSNPs, and reports of accomplishment of agencies involved in the IATF-ZH.

A summary of the desk review is presented in Section 2.0.

### 4.2 Key informant interviews

#### 4.2.1 Stakeholders interviewed

The framework of the iron rice fortification ecosystem (Figure 3) was developed and used in determining the stakeholders to be covered by the KIIs. The ecosystem shows the inputs needed to produce IFR, i.e., the IRKs (local and imported), milled rice and the inputs needed to produce these, i.e., fortificant, machines (extruders and blenders), support and technical assistance. It also shows the users of IFR particularly government SSNPs. Based on the IFR ecosystem, the following were interviewed as key informants:

- 4.2.1.1 Seven producers / potential producers / importers of IRKs;
- 4.2.1.2 Eleven producers / potential producers of IFR;
- 4.2.1.3 Four fabricators / importers of extrusion, and blending machines;
- 4.2.1.4 Four farmers cooperatives and a rice miller in BARMM;
- 4.2.1.5 Twenty representatives of 4 national government agencies that are involved in social safety net programs;
- 4.2.1.6 Representatives from the DOST at national and regional levels (four regions), including those from the FNRI, and the Technology Application and Promotion Institute (TAPI); and
- 4.2.1.7 Representatives of four BARMM government agencies/organizations and four LGUs in Maguindanao.

Most KIIs were done virtually, via the Zoom platform. However, the KIIs for stakeholders based in BARMM, Nutrition and Beyond, and DSM were done face-to-face. The list of those interviewed can be found in Annex 3.

When needed, additional information was sent by the respondents usually by e-mail.

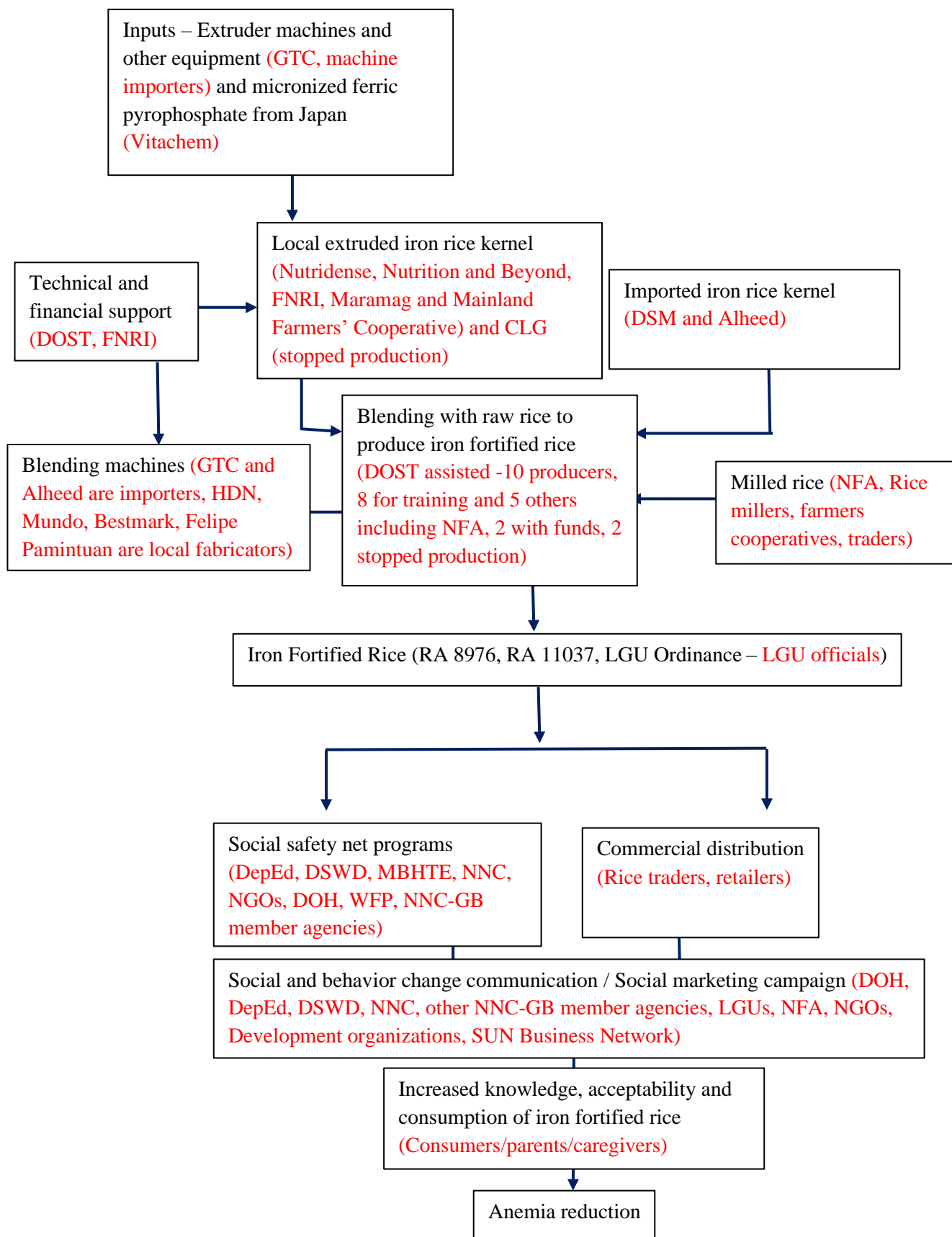
#### 4.2.2 Key informant interview guide

Key informant guides were developed specific to each stakeholder. However, in general, these guides generated information on the stakeholder's experiences and plans in the production or distribution or use of IFR, e.g., reasons for engaging in rice fortification, production capacity if applicable, extent of use of IFR in SSNPs, thoughts on the use of multiple micronutrient fortificant, problems encountered, and recommendations to help scale up the production and distribution of IFR.

### 4.3 *Focus group discussions*

Four focus group discussions were also done covering four public elementary schools in Maguindanao that used IFR in their school feeding program. The FGDs were done face-to-face with the members of the project team as facilitators and documentors with the assistance of the school feeding coordinators.

Among others, the FGDs explored what the participants knew of nutrition, sources of information, *Sangkap Pinoy* Seal as well as their thoughts and experiences on the IFR used in school feeding program and possible purchase of IFR.



**Figure 3.** Rice fortification ecosystem in the Philippines.

## 5.0 Results and discussion

The following are the major findings and highlights of the KIIs and FGDs. Sections 5.1 to 5.8 relate to stakeholders related to the capacity to produce IFR, while Sections 5.9 and 5.10 cover the users and potential users of IFR.

### 5.1 Local iron-rice kernel producers/distributors

Based on the desk review, there are eight producers or distributors of IRK (Annex 4), six of which are local producers and two are importers. Of the six local producers, three are operational (two are based in Luzon and one in NCR), two are in the organizational stage (one in a region in the Visayas and the other in a region in Mindanao) and have received DOST assistance, while one producer (Mindanao-based), one of the early adopters of the technology that availed of DOST assistance, stopped its operations for lack of demand (Figure 4). The two importers / distributors also have multiple micronutrient rice premixes. These are based in Metro Manila.

Three producers of IFR namely Food Baskets Corporation based in Rizal Province in Luzon, CamSur Multipurpose Cooperative (also in Luzon) in Region 5 and Faeldonia Rice Trading in South Cotabato (Mindanao) signified their intention to produce IRK.

The following are the results of their interviews and research conducted related to their operation.



**Figure 4.** Mapping of producers and distributors of iron-rice kernel and fortified rice kernel in the Philippines

**5.1.1 Nutridense Food Manufacturing Corporation (NPMC)** - The second adaptor of the IRK and IFR technology is NPMC, based in Sta. Barbara, Pangasinan. It is also an adaptor of several other technologies of the DOST-FNRI.

The corporation has a license to operate and certificate of product registration from FDA. It is also registered with the Philippine Government Electronic Procurements System that allows it to participate in bidding for high-value procurement of government agencies and LGUs.

The participation of the corporation's president in a 2014 Bangkok workshop on Scaling Up Rice Fortification in Asia triggered the corporation's involvement in rice fortification.

**Nutridense president, Mr. Racky Doctor said, “The Bangkok workshop was a breakthrough for me”. He noted that during the workshop he saw the opportunity to address the gaps in anemia through rice fortification even with their small company.**

The company acquired its extrusion machine through a soft loan from DOST under the Small Enterprises Technology Upgrading Program (SETUP) of DOST Region I

It started its production of IRK in 2015 although the first years were a “heartbreak” because the “demand of the market was not as energetic”.

NFMC supplied the IRK used by the WFP in its 2019 pilot run of using IFR in school feeding programs in BARMM. This means that the IRK had to be shipped all the way to Maguindanao Province, adding on to the cost of the IRK.

Starting the last quarter of 2020, through 2021 up to 2022, there was a surge in the demand for IFR and consequently also of IRK primarily for feeding programs of DepEd and DSWD. This surge may have resulted from the implementation of RA 11037 and the push for IFR from the IATH-ZH. This surge in demand boosted the production of extruding machines from 80-100 kg/hr to the full capacity of 150 kg/hr in 2021. NFMC procured approximately 1,240 kgs of micronized ferric pyrophosphate for the production of IRK in 2021.

NFMC is also a producer of IFR and related discussions are in Section 5.4.

- 5.1.2 **Nutrition and Beyond Corporation /JD Aguilar Commercial, Inc.**— JD Aguilar Commercial, Inc. is a big rice miller based in San Leonardo, Nueva Ecija Province. It is one of the first to adopt the FNRI extrusion technology for the production of IRK.

It established the Nutrition and Beyond Corporation (NBC) for the production of IRK. Its extrusion machine and other equipment were provided through a grant from ILSI Japan with the assistance of DOST-FNRI.

NBC also tried to market IFR commercially, targeting high-end costumers. It sold IFR of good-quality rice at P 90/kg that were distributed in supermarkets. It stopped production of IFR for a while. Issues encountered in distributing in supermarket were the additional expense of the listing fee and lack of marketing and promotional campaign that resulted in losses.



It resumed operations to supply some of the IFR requirements of DepEd in 2021, costing at P17/350 grams of IFR. In 2021, responding to the surge in demand for IFR, NBC procured 200 kgs of micronized ferric pyrophosphate to produce the IRK for the IFR that it also produced.

It responds to a minimum order of 100 bags of IFR. Its blending productivity is 300 bags (50 kgs/bag)/hour.

Delivery cost is free within 150 kms from the production area. Beyond the 150 kms, a delivery fee of P45/bag of 50 kgs of IFR is charged.

A concern raised by NBC is on whether DepEd will continue to procure IFR as was observed during the pandemic when DepEd may have had additional budget for IFR instead of ordinary rice due to virtual learning and savings from its budget for maintenance and other operating expenses.

- 5.1.3 **Maramag Community Multi-Purpose Cooperative** in Maramag, Bukidnon in Region 10 where a complete continuous line extruder machine and a blending machine has been delivered for commissioning, calibration and training and possible operation in July 2022. The machine was a grant from the DOST CEST Program through DOST Region 10. This project is in partnership with the Bukidnon Provincial Government that is financing the improvement and construction of the building for the facility. This cooperative will have the opportunity to supply IRK for IFR producers in Mindanao.
- 5.1.4 **Nutritional Food Processing Facility of FNRI** Nutritional Food Processing Facility of the DOST-FNRI is located at Bicutan, Taguig City. It is used to produce small volumes of new technology-based products developed by the Institute. When not in use, this facility is offered for rent to licensed (with Technology Licensing Agreement or TLA) FNRI partners/adaptors for a certain fee per hour. It is an FDA-accredited facility in terms of good manufacturing practices. For rice fortification, the processing plant has a pilot scale extruder machine, a testing extruder machine and a complete continuous line extruder machine among others with capacities of 50-80, 5-10 and 80-100 kgs/hr, respectively. In the last quarter of 2020 up to 2021, when there was a surge in the demand for IFR for feeding programs of DepEd, NBC rented this facility to produce several tons of IRK. Other partners like NFMC also rented this facility prior to IFR commercialization. This pilot plant facility produced not only IRK but also different types of multi-nutrient extruded rice kernel.
- 5.1.5 **LGU of Laoang, Northern Samar in Region 8 in partnership with Mainland Farmers' Producers Cooperative.** DOST 8-Northern Samar has downloaded project funds to the LGU of Laoang for the purchase of a complete line extruder machine and a blending machine. This is also another support from the CEST program. To date, the LGU Laoang is preparing the bid documents for the purchase of the machines, while the cooperative is working towards the availment of the IFR technology from DOST-FNRI through a letter of intent. When operational, the cooperative could cater to the IRK and IFR needs of the provinces of Leyte and Samar, and possibly the rest of the Visayas, once operational.

5.1.6 **CLG Health Food, Inc.** based in General Santos City was one of the first to produce IRK using extrusion technology of FNRI with support through a soft loan from the DOST-SETUP. Prior to that in 2006, it produced coated IRK to produce IFR. It has stopped production due to losses incurred due to lack of demand. Its last production was multi nutrient extruded rice kernel for the research conducted by DOST-FNRI in Marawi City. Lately, its extruder machine was found to still be in good working condition. Currently, CLG is discussing with DOST Region 12 and FNRI on the next steps for the operation of the extruder machine.

If the currently operational producers of IRK and the would-be producer in Maramag, Bukidnon operate on full capacity, total production of IRK in a year would be about 1,360 metric tons of IRK (Table 2). This assumes that the extruding machines work at full capacity per hour, operate 8 hours a day, and 6 days in a week for 48 weeks. However, this is the ideal scenario which may increase if needed (e.g., run two 8-hour shifts) or decrease depending on demand. At a price of P350 to P400/kg total sales could range from P475,776,000 to P543,744,000.

Using a 1:200 blending ratio, the estimated production of IRK in a year can produce about 271,872 metric tons of IFR.

**Table 2.** Estimated production capacity of local producers of iron-rice kernel

Producer	Maximum capacity in kg/ hr	Total production in kgs	
		<i>Per day</i> (8 hours / day)	<i>Per year</i> (8 hours per day for 6 days per week for 48 weeks)
Nutridense Food Manufacturing Company	100	800	230,400
Nutrition and Beyond Corporation	200	1,600	460,800
FNRI	190	1,520	437,760
Maramag (once operational by July 2022)	100	800	230,400
<b>Total, in kgs</b>	<b>590</b>	<b>4,720</b>	<b>1,359,360</b>
<b>Total in metric tons</b>	<b>0.59</b>	<b>4.72</b>	<b>1,359.36</b>

**The total maximum local production of FRK is 1,359.36 MT for 1 shift of 8 hrs/day for 6 days a week and 48 weeks. However, this is the most ideal scenario which may increase if needed (for 2 shifts) or decrease depending on demand. At a price of P375 to P450/kg the total sales could amount to approximately P500 million/year**

## 5.2 *Importers of IRK*

- 5.2.1 **Alheed International Trading Corporation** – The company imports IRK and agricultural equipment including blenders for rice fortification. It has a sister company, Alheed International Agro Industries, Inc. that produces IFR.

It supplies both coated and extruded IRK imported from the Wright Group based in Ohio, USA. In addition to IRK or IRONRICE, the Wright Group also supplies NUTRARICE a multi micronutrient kernel with vitamin A, iron and folic acid. According to the interviewee from Alheed International Trading Corporation, the Wright Group can supply IRK through its IRONRICE based on any specifications by the buyer for use at various mixing ratios from 1:100 to 1:400.

Alheed International Trading Corporation supplied NFA with the coated IRK with ferrous sulfate, during the AHMP from 2005 to 2010. The interviewee noted that the coated IRK is cheaper than the extruded IRK of the Wright Group. Currently, Alheed has not been able to sell IRK or IRONRICE.

It requires a minimum order of 5 tons and estimates a 60-days lead time for the importation of IRONRICE.

The shelf life of coated, IRONRICE, is five years and two years for extruded IRK.

- 5.2.2 **DSM/IMCD.** DSM produces nutritional and pharmaceutical ingredients and industrial chemicals that are distributed worldwide. One of its major nutritional products is fortified rice kernel for rice fortification.

In the Philippines, IMCD Philippines is one of its distributors and together with DSM both are working in the promotion and distribution of DSM fortified rice kernel. DSM's fortified rice kernel, produced through the extrusion process, is produced in Thailand. Its premix consists of eight vitamins and minerals. Annex 8 shows the composition of the vitamins and minerals of the DSM fortified rice kernel as well as the intake of these micronutrients based on the 2002 Recommended Energy and Nutrient Intake of FNRI (still being used by FDA for nutrition labeling) assuming consumption by the vulnerable group at either 100 grams or 200 grams of cooked fortified rice using DSM fortified kernel mixed with milled rice at 1:100 as required in the old FDA standard for IFR. It is to be noted though that mandatory food fortification standards (Annex 2) cover only iron and not the other nutrients in the DSM fortified rice kernel.

IMCD supplied an initial five metric tons of fortified rice kernel. In the Philippine rice fortification program.

Based on the labeled iron content of DSM fortified kernel at 600 mgs/100 grams if mixed at 1:100 ratio with milled rice, the fortified rice would contain, 6 mg/100 grams of rice which is the upper limit of the current standard of 2 mgs to 6 mgs iron/100 grams for IFR.

Based on this, it is still feasible to mix the DSM fortified kernel at 1:200 ratio similar to the locally produced IRK using the local blending machines calibrated at 1:200 mixing ratio, in which case the IFR would then contain approximately 3 mgs of iron per 100 grams which is still within the standard to 2 mgs to 6 mgs per 100 grams IFR. At this ratio, DSM should also test the iron content of the cooked fortified rice if it is not less than 0.6 mg/100 grams of cooked rice as provided in the standard.

The price of the DSM fortified rice kernel was determined to be competitive for use for the Philippine rice fortification program even with the seven minerals and vitamins in addition to iron.

Minimum order requirement is 5 metric tons due to its production batch. If mixed at 1:200 ratio, this minimum order can fortify 1,000 metric tons of rice, which could be a limiting factor for the sales of the fortified rice kernels given the capacity of the IFR producers (See Section 5.5) given the budget needed to procure this much rice and the IRK. Only those with a high fortified kernel requirement, e.g., NFA, may have the capability to buy this quantity of fortified kernel. Other IFR producers could be compelled to buy local fortified kernel due to their limited capability

The shelf life of one year could again be a limiting factor in consideration of the 5 metric tons (MT) minimum order.

DSM would require a lead time of 3 months for the delivery of the fortified rice kernel.

**The market for imported fortified kernel is limited by the minimum requirement of 5 MT that would require 1 million kgs of rice to produce of IFR at 1:200 mixing ratio requiring an investment of about P50 million. Only those with big IRK requirements, e.g., NFA, or those with this capital may have the capability to buy this amount of IRK.**

### **5.3** *Importer of micronized ferric pyrophosphate*

**Vitachem Industries** is the exclusive distributor of micronized ferric pyrophosphate from Taiyo Kagaku Ltd., based in Japan, which funded the FNRI research on the use of their fortificant for extrusion technology for the production of IRK. Micronized ferric pyrophosphate is currently the only fortificant being used for the production of local IRK.

In 2021, Vitachem supplied 1,440 kgs of the fortificant and it has a current inventory of 1,500 kgs of the fortificant to be able to ensure that there is available supply of the fortificant. The manufacturer has requested Vitachem to make projections on the needed supply of the fortificant given also the problems being encountered by Taiyo Kagayyu in the production of the fortificant due to the decrease in demand.

### **5.4** *Fabricators and suppliers of equipment for rice fortification*

There are six major suppliers of equipment for rice fortification but only one is supplying a complete line for extruder machine for the production of IRK (Annex 5).

Five of these suppliers are in Luzon, and one is in Mindanao. Figure 5 shows the location of these fabricators and suppliers.

- 5.4.1 **GTC Propack Corp** based in Taguig City, importer of continuous line extruder with a capacity of 80 to 120 kg/hour and blending machine at 30 to 40 bags (50 kg/bag)/hour; both machines are from China; already supplied 5 extruder machines and 1 blending machine.
- 5.4.2 **Mundo Engineering Works** based in Nabunturan, Davao de Oro; fabricates portable blending machine at 30 to 40 bags/hour; already supplied 4 blending machines.
- 5.4.3 **HDN Technology and Resources Inc.** based in Carmona, Cavite; fabricates portable blending machines at 30 to 40 bags (50 kg/bag)/hour; already supplied 9 blending machines mostly for cooperatives. This company has a TLA with DOST-FNRI as it used the design of FNRI for the fabrication of blenders.



**Figure 5.** Mapping of fabricators and distributors of equipment for rice fortification in the Philippines

- 5.4.4 **Bestmark Agro Industrial Corporation** based in Santa Barbara, Pangasinan; fabricates blending machines at 50 bags (50 kg/bag) per/hour already supplied 3 blending machines.
- 5.4.5 **Felipe Pamintuan Machine Shop and Fabrication** based in San Carlos City, Pangasinan; fabricates blending machines at 50 bags (50 kg/bag)/hour already supplied 1 blending machine.

- 5.4.6 **Alheed International Trading Corporation** based in Pasig City, importer of blending machines from Vietnam, at 5 metric tons (100 bags of 50 kilograms per bag)/hour; supplied NFA with 23 blending machines (see Annex 7 for the location of these blending machines) for the AHMP from 2005 to 2010, which NFA said would be difficult to revive due to lack of spare parts; currently supplied 4 new blending machines for NFA pilot testing of iron rice fortification.

**Alheed International Trading Corporation should assist NFA in reviving its blending machines used for AHMP from 2005 to 2010 as part of its after-sales service.**

## 5.5 *Iron fortified rice producers*

Annex 6 is the list of IFR producers with blending machines. Most of these producers are assisted by DOST Regional Offices and DOST-FNRI through their various financial and technical assistance programs. Of the 23 producers, 10 are operational. Eight 8 already have their equipment delivered to them and these will still need to be calibrated, 1 is procuring the machine, 1 is still organizing partner cooperative, 1 is pilot testing (NFA) and 2 have stopped operations.

### 5.5.1 IFR producers with operational blending machines

Only 2 of the 10 operational IFR producers are in Mindanao and the rest are in Luzon (Figure 6). Eight of these producers have a TLA with FNRI, while 2 do not have such licensing agreement. Figure 6 is a mapping of the current IFR producers while Table 3 shows their respective production capacities.



**Figure 6.** Mapping of current producers of iron fortified rice

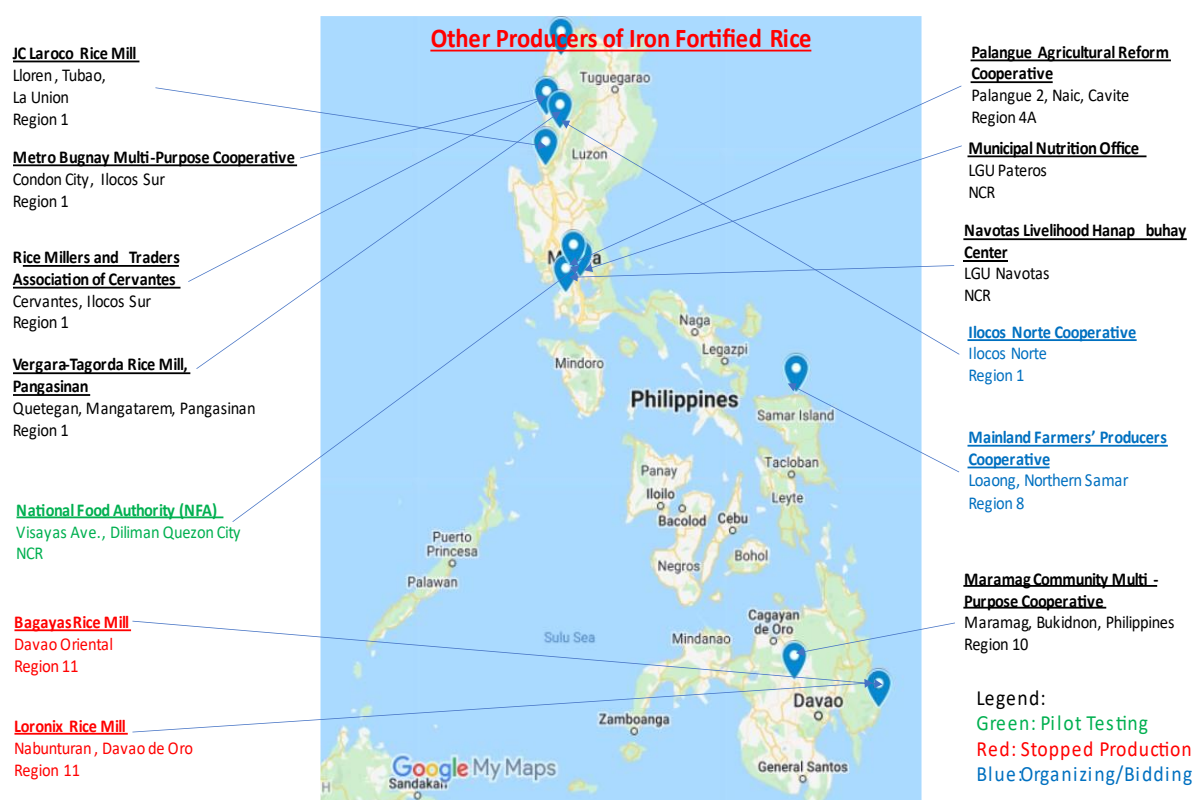
**Table 3.** Production capacity of current producers of iron-fortified rice

Company / Group	Production capacity (tons/hour)
<i>DOST-assisted with FNRI TLA</i>	
1. Nutridense Food Manufacturing Corporation in Pangasinan	4.5
2. Tangcarang Techno Demo Farm of the Local Government Unit in Alaminos City, Pangasinan	2.5
3. San Pablo Multipurpose Cooperative	2.5
4. JD Aguilar Commercial, Inc	5.0
5. Food Basket Corporation	5.0
6. CamSur Multipurpose Cooperative	2.0
7. Antofel Trading/Saavedra Rice Mill	2.0
8. FNRI (For rental only to FNRI Licensed producers)	4.5
<i>No TLA with FNRI, machines were company-purchased</i>	
1. Alheed International Agro-Industries, Inc.	5.0
2. Faeldonia Rice Trading	5.0

- 5.5.2 DOST-assisted with blending machines, for training of staff and calibration of machines**– By the 3<sup>rd</sup> quarter of 2022, there will be eight additional producers of IFR after completing the training and commissioning of the machines by FNRI and DOST Regional Offices, which are currently ongoing.

Figure 7 is the mapping of these future IFR producers. Seven of these 8 producers are based in Luzon and 1 is based in Mindanao. Of the 7 based in Luzon, 4 are from Region 1. Seven of these producers have a production capacity of 2 tons/hour and one has a slightly higher capacity at 2.5 tons/hour.





**Figure 7.** Mapping of producers in the training and calibration phase

**5.5.3 “Others” category of iron-fortified rice**—In addition to IFR producers that are operational and will be operational toward the end of the year, there are IFR producers that can be put in the “others” category.

**5.5.3.1** NFA will be pilot testing the production of IFR. It has procured 4 blending machines that will be installed in NFA warehouses in Regions 2, 3, NCR and 4 (all in Luzon). Each blending machine has a maximum production capacity of 5 tons/hr. About 84,000 kgs (84 MT) of IRK will be procured for the pilot testing.

If the pilot testing is successful, NFA will procure 27 additional blending machines to meet its target of fortifying 50% of the buffer stock (or approximately 150,000 MT requiring 750 MT of IRK) by 2023.

It is to be recalled that NFA used to buy and sell rice, which are at subsidized price to protect both producer and consumer from price shocks. There is also an executive issuance Executive Order 51 s. 1998 that requires the procurement of NFA rice for government projects that use rice.

NFA previously distributed IFR, with the IRK produced using the coating technology as part of the AHMP during the presidency of Gloria Macapagal Arroyo. As part of its commitment to implement RA 8976, it installed blending machines nationwide as shown in Annex 7.



However, with the enactment of RA 11203 or the Rice Tariffication Law in 2018, the role of NFA from being the government regulatory and rice stabilization agency is now limited to buffer stocking of rice reserved for use by DSWD and LGUs in emergency situations. This resulted in concerns on which agency will monitor the rice industry including IFR production. This issue has not yet been resolved among the Department of Agriculture, FDA and the Department of Trade and Industry (DTI).

Nonetheless, in 2021, NFA committed to fortify 50% of its buffer stocks. It developed a workplan with a budget of P530.5 million. Based on this workplan, NFA will not use its existing blending machines as these were deemed not in working condition and cannot be revived. It would procure 31 new blending machines at a cost of P175 million. Four of these machines have been procured as noted earlier in this section.

5.5.3.2 Ilocos Norte, Region 1 (Luzon). The equipment for IFR production in Ilocos Norte are available but DOST Region 1 is still identifying a partner cooperative.

5.5.3.3 LGU Laoang, North Samar (Visayas) in partnership with Mainland Farmers' Producers Cooperative, in Region 8. DOST funds have been downloaded to the LGU that is procuring the equipment for IFR production and is at the bidding stage.

5.5.3.4 Loronix Rice Mill in Nabunturan, Davao de Oro and Bagayas Rice Mill in Davao Oriental. These two producers, both from Region 11 in Mindanao, were the first to avail of blending machines from DOST-Region 11 but have stopped operations due to lack of demand for IFR. Each of these producers have a capacity of 2 tons/hour.

#### 5.5.4 Maximum capacity for local production of IFR and IRK requirement

The maximum production of IFRs that are currently operational, and those that are in the training and calibration phase totals 116,928 MT/year requiring about 585.08 MT of IRK (Table 4), which is 43% of the maximum local capacity for IRK of 1,359.36 MT. Including the IRK requirements of those in the “others” category, except NFA as it is likely to buy imported IRK, an additional 92.16 MT of IRK is needed, for a total of 677.24 MT. This volume requirement is about 50% of the maximum IRK production.

The approval of the 25 letters of intent to avail of the IRP/IFR technology could further increase the capacity for IFR production to “meet” the capacity for IRK production.

**Table 4.** Maximum capacity of production of iron-fortified rice and requirements for iron-rice kernel

Producer	Maximum capacity in MT/ hr	Total production in metric tons		IRK requirement (Mixing ratio of 1:200 of IRK:rice)
		<i>Per day</i> (8 hours / day)	<i>Per year</i> (8 hours per day for 6 days per week for 48 weeks)	
Nutridense Food Manufacturing Corporation	4.5	36	10,368	51.84
Tangcarang Techno Demo Farm of the Local Government Unit in Alaminos City, Pangasinan	2.5	20	5,760	28.80
San Pablo Multipurpose Cooperative	2.5	20	5,760	28.80
JD Aguilar Commercial, Inc	5.0	40	11,520	57.60
Food Basket Corporation	1.25	10	2,880	14.40
CamSur Multipurpose Cooperative	2.0	16	4,608	23.04
Antofel Trading/Saavedra Rice Mill	2.0	16	4,608	23.04
FNRI	4.5	36	10,368	51.84
Alheed	5.0	40	11,520	57.60
Faeldonia	5.0	40	11,520	57.60
<b><i>Currently operational</i></b>	<b>34.25</b>	<b>274</b>	<b>78,912</b>	<b>394.6</b>
JC Laroco Rice Mill	2	16	4,608	23.04
Metro Bugnay Multi-Purpose Cooperative	2	16	4,608	23.04
Rice Millers and Traders Association of Cervantes	2	16	4,608	23.04
Vergara-Tagorda Rice Mill	2.5	20	5,760	28.80
Palangue Agricultural Reform Cooperative	2	16	4,608	23.04

Producer	Maximum capacity in MT/ hr	Total production in metric tons		IRK requirement (Mixing ratio of 1:200 of IRK:rice)
		<i>Per day</i> (8 hours / day)	<i>Per year</i> (8 hours per day for 6 days per week for 48 weeks)	
Municipal Nutrition Office of Pateros	2	16	4,608	23.04
Navotas Livelihood Hanapbuhay	2	16	4,608	23.04
Maramag Community Multi-purpose Cooperative	2	16	4,608	23.04
<b><i>Producers in training and calibration phase</i></b>	<b><i>16.5</i></b>	<b><i>132</i></b>	<b><i>38,016</i></b>	<b><i>190.08</i></b>
NFA	20	160	46,080	230.40
Ilocos Norte, DOST Region I	2	16	4,608	23.04
Mainland Farmers' Producers Cooperative	2	16	4,608	23.04
Bagayas Rice Mill	2	16	4,608	23.04
Loronix Rice Mill	2	16	4,608	23.04
<b><i>Others</i></b>	<b><i>28</i></b>	<b><i>224</i></b>	<b><i>64,512</i></b>	<b><i>322.56</i></b>

**According to most of the producers of IFR with support from DOST, the cost of fortification is approximately P4. The additional cost covers 1) the cost of IRK (P1.88 to P2.25/kg (assuming IRK costs P375 to P450/kg), 2) mixing cost of P1.30/kg or P65/50-kg-bag as estimated by Faeldonia, but only P35/50-kg-bag for NFA, and 3) FNRI royalty fee of 2% of total sales. The royalty fee does not apply to those without a TLA**

#### 5.5.5 Issues and concerns of IFR producers

- Lack of IRK supply or delay in acquiring IRK in 2021, which is partly due to the sudden surge of requirements, for which producers were not prepared.
- Lack of promotion on rice fortification, resulting to low demand and eventually to the closure of the two early technology adopters.
- FNRI royalty fee as disadvantageous to those required to pay the fee in addition to the P15,000 fee for the TLA. Some of those interviewed especially DOST Provincial Directors requested a lowering or waiver of these fees especially for cooperatives as also a way to encourage more adaptors particularly from cooperatives.
- Potential negative effect on sales of IFR producers once NFA starts producing IRK since the price of NFA rice is much lower than that of commercial rice.
- Low maximum bid price of DepEd for IFR, which is not realistic given the price of milled rice and the additional cost of fortification, packaging, and transport.

## 5.6 *Suppliers of rice*

Millers are the major suppliers of rice. Several of the IFR producers and those that expressed interest to produce IFR are farmer's cooperatives with the hope that rice fortification could increase their profitability.

Current producers of IFR that are millers are NBC, Alheed International Agro-Industries, Inc, CamSur Multi-Purpose Cooperative, Antofel Trading and Faeldonia Rice Trading as well as NFA after its pilot testing.

Four farmer's cooperatives and one private miller in South Cotabato were interviewed with the following highlights:

- 5.6.1 Three cooperatives have rice mills all assisted through a grant from the BARMM Ministry of Agriculture. Of the three cooperatives interviewed, Al Rahman Farmers' Cooperative in Mamasapano, Maguindanao is operational, while the other two were non-operational – one in Pamatuladan in Datu Saudi Ampatuan due to the need to repair the mill and in Talapaso in Guindulugan due to lack of power supply.
- 5.6.2 All respondents were not aware of RA 8976, EPAHP and DOST grants and soft loans as possible source of funding, while only one interviewee is aware of RA 11037.

- 5.6.3 All of the cooperatives are **willing to fortify** by acquiring a blender machine with assistance from DOST/Ministry of Science and Technology (MOST), and they will be assisted in their application by MOST, initially through a review of the requirements and a letter of intent addressed to DOST-FNRI. For the initial evaluation, priority should be given to those with a rice mill and those that can install a 3- phase electrical supply in addition to the documentary requirements to avail of the assistance.
- 5.6.4 Faeldonia Rice Trading is already fortifying its rice, using its own blending machines and is willing to avail of the technology of IRK from DOST-FNRI and acquire an extruder machine with assistance from DOST

**The Cooperative Development Authority with the Department of Agriculture should conduct seminars/orientations with farmer's cooperatives to advocate their support for rice fortification.**

## 5.7 *Multiple micronutrient fortification*

All of the IFR producers were willing to use multi micronutrient fortified kernel for as long as there is a government policy, the price is competitive, and the kernel would pass FDA standard for iron content.

Importers of IRK can provide IRK that contains vitamins and minerals other than iron. However, their minimum order requirement of 5 MT is limiting. At this time, only NFA may have the capability to buy this amount of IRK. For its pilot testing project using 4 blending machines, NFA would require 84 MT of IRK, which only importers are capable of supplying based on NFA delivery schedule. Importers should also devise strategies to be able to sell their IRK/FRK to small producers.

FNRI has developed and tested the use of multi nutrient extruded rice kernel that can be considered for multiple micronutrient fortification. However, there is no local producer of multi nutrient extruded rice kernel.

## 5.8 *Financial and technical assistance for rice fortification*

### 5.8.1 **Department of Science and Technology**

The DOST has been instrumental in increasing the number of adopters of the technology of iron rice fortification through four of its programs. The requirements for these programs can be accessed from the DOST website. Applications to these programs are received and processed at the DOST Regional Offices.

- 5.8.1.1 Grants-in-Aid (GIA) Program “aims to harness the country’s scientific and technological capabilities to spur and attain sustainable economic growth and development. Through the funding of relevant science and technology (S&T) undertakings, the GIA program aims to contribute to productivity improvement and quality of life of Filipinos by generating and promoting appropriate technologies.” The assistance given is a grant.

- 5.8.1.2 Community Empowerment for Science and Technology (CEST) – “a package of S&T interventions, which aims to build progressive, empowered and resilient rural communities. The program is targeting to empower the poorest and most depressed communities in the country, via S&T interventions in health and nutrition, water and sanitation, basic education and literacy, livelihood/economic enterprise development, and disaster risk reduction and climate change adaptation.” The assistance given is also a grant.
- 5.8.1.3 Small Enterprise Technology Upgrading (SETUP) – “a nationwide strategy encouraging and assisting micro, small, and medium enterprises (MSMEs) to adopt technological innovations to improve their products, services, operations and increase their productivity and competitiveness”. Among others it supports the acquisition of equipment on soft loan that is interest free, payable in three years but with a 6-months grace period.
- 5.8.1.4 Technology Application and Promotion Institute – provides soft loans, interest free, mostly to MSMEs, ranging from P2 million to P5 million. So far, no application on rice fortification have been received.

## 5.8.2 DOST-Food and Nutrition Research Institute

The DOST-FNRI developed technologies for rice fortification specifically the production of IRK using hot extrusion for premix and blending machines for IFR. In 2013, it conducted awareness seminars in Mindanao and Luzon resulting to the transfer of technology for two complete line extruder machines (CLG and Nutridense) and four blending machines.

Recently, FNRI successfully produced multi nutrient extruded rice kernel with iron, Vitamin B1, Vitamin B2, Vitamin A, folic acid and zinc. These kernels were used in rice used for supplementary feeding of 77 families who were affected by the Marawi Siege. FNRI exported multi nutrient extruded rice kernel to Vietnam and Cambodia for research on its possible use.

FNRI follows a technology transfer protocol that starts with the submission of a letter of intent by an interested party. This is followed by consultative meetings, technology needs assessment, and assessment and evaluation of the results of the assessment. Once the assessment is favorable, further negotiations are done ending in the finalization and signing of the TLA. With a signed TLA, FNRI provides technical assistance through trainings and advise related to various concerns, e.g., plant layout, equipment and facilities, production trials and control, and product quality improvement.

FNRI, in coordination with the regional offices of DOST, monitors and evaluates those with TLAs, specifically along business performance and product quality.

Entering into a TLA on iron rice fortification with FNRI will involve an initial payment of P50,000 for IRK production, and P15,000 payment for IFR production, and 2% royalty of the total sales of IRK and/or IFR.

Some stakeholders expressed concerns on the fees for the TLA and the royalties, with DOST Region 1 requesting that licensing fees and royalties be reduced or waived to encourage more adopters. FNRI still has to respond to this concern.

The need to develop other blender designs, e.g., for those with small or no rice mills, was also noted since the current design of the blender is for rice mills.

FNRI also developed IEC materials on IFR, targeting consumers and LGUs but these have not been disseminated.

### 5.8.3 Ministry of Science and Technology in BARMM

The Ministry of Science and Technology in BARMM “is mandated to set direction and leadership in science, research, inventions, technology education, their development”.

It intended to set up a pilot facility for IFR production in Carmen, Cotabato before assisting other farm cooperatives. However, this initiative was challenged by a failed bidding for a blending machine due to the lack of accredited fabricators. However, MOST will continue to look for other farmer cooperatives that can be linked to the DOST programs of assistance related to rice fortification.

During the interview, representatives of MOST were informed that the issue on the acceptability of IFR was addressed with the use of extrusion technology. MOST was also, provided a list of accredited fabricators, and a list of cooperatives visited in BARMM possible partners. MOST was also advised on the need for letter of intent to DOST-FNRI as initial step to acquire DOST technical assistance.

## 5.9 *Social safety net programs / feeding programs that use rice*

### 5.9.1 Department of Education

The DepEd launched a breakfast feeding program for malnourished schoolchildren in SY 2010-2011 and continued its pilot implementation up to SY 2012-2013. Results of the pilot implementation for 120 days feeding showed that 73% of program participants were converted to normal status and improved class attendance (98%), performance and health habits. Based on these results, DepEd renamed and started implementation of the SBFP in SY 2014-2015. The program involves the provision of nutritious meals to acutely malnourished elementary school children from Kindergarten to Grade for 120 days. The continued implementation of the program is inspired by indications of its impact. About **72.8% and 76.6% of program participants were rehabilitated** in school year (SY) 2018-2019 and SY 2019-2020, respectively however, the performance in BARMM was not as good with **20.5% of program participants reported to have been rehabilitated** in SY 2018-2019. in 2019-2020 no data on BARMM were provided.

As noted earlier, the SBFP was institutionalized with the passage of RA 11037, that among others, requires the inclusion of fortified foods in the meals to be served to program participants.

Thus, the SBFP guidelines for SY 2020-2021 called for the use of “nutritious food products” that, based on the guidelines’ Annex 4.1, included iron-rice premix and iron-fortified rice. The guidelines for SY 2021-2022 (DO 031 S 2021) also included rice among foods that can be used but specified a 4-kilograms cap, i.e., providing 400 grams of IFR for a maximum of 10 days. The supplemental guidelines for SY 2021-2022 (DO 010 S 2022) covered program implementation in the 2022 parts of SY 2021-2022 and provided a 5-day cap for the provision of 350 grams of rice.

#### 5.9.1.1 DepEd procurement of IFR

With these issuances, DepEd became the main buyer of IFR, procuring P85,640,857 worth of IFR in 2021 (see Annex 9) mostly for schools in Luzon except for Carcar City in Cebu Province with Mati City and Digos City, both in Region 11 awaiting confirmation. Note that Pangasinan alone in Region 1, procured P52,861,326 worth of IFR or 61.7% of the total IFR procured by DepEd. This could have been facilitated by the presence of 3 operational IFR producers in the region. This may have partly triggered the interest of a number of rice mills and cooperative to be involved in iron rice fortification with an additional 5 by the end of 2022.

#### 5.9.1.2 Projected DepEd requirement for IFR

As the country moves to a situation that will allow face-to-face attendance in schools, the serving of hot meals that will use 350 grams of rice per 5 days during the 120-day feeding is a safe assumption, each target participant will then need approximately 8.4 kilograms of rice. Projected to 3,642,031 program participants (based on targets for SY 2021-2022), a total of 30,593 MT of IFR is needed (Annex 10 that includes rice requirements for SBFP by region). This volume is just about 26.2 % of the maximum capacity of already-operational IFR producers and those that are in training and will be operational in 2022.

#### 5.9.1.3 Issues and concerns on DepEd use of IFR

In its report to the IATF-ZH, DepEd last December 2021, DepEd noted the following issues and concerns:

- The suppliers should undergo processing and approval of IFR certification from FNRI as required by DepEd, which resulted in delays in procurement of IFR. In the case of Occidental Mindoro, the procurement did not push through due to the bidder’s lack of a TLA with FNRI. The requirement for a TLA is part of the bidding specifications. However, this requirement is not included in the guidelines for the SBFP.
- The cost of IFR is high and varies from P60 to P90 per kg, way above the P 18-peso per 400 grams (P45/kg) budget such that in the case of Occidental Mindoro, the bidding failed.



- Suppliers of IFR refuse to bid for the requirement for IFR as they assess that the cost of P18 per 400 grams of IFR or P45/kg as provided in DO No. 031 s. 2021 is not high enough to generate profit. Following discussions with FNRI, the maximum bid price was increased to P18 per 350 grams or P51/kg under DO No. 10 S. 2022.

## 5.9.2 Department of Social Welfare and Development

The DSWD has several programs that should use IFR following NNC Governing Board Resolution No. 1 on the use of IFR for SSNPs. The following gives an overview of these programs.

### 5.9.2.1 Supplementary Feeding Program (SFP) for Child Development Centers:

Like the DepEd SBFP, the DSWD has long supported supplementary feeding programs in child development centers (formerly called day care centers). The program also covers children participating in supervised neighborhood play.

DSWD's attempt to use IFR in SFP started in 2012 with the issuance of Administrative Order No. 8 s. 2012 "Omnibus Guidelines in the Implementation of Supplementary Feeding Program (SFP)" that among others provided for the procurement of IFR, "The rice could be procured by the DSWD-ARMM, provincial/city/municipal social welfare and development office from National Food Authority Regional Office. The rice that shall be delivered should be iron-fortified, to the extent possible." However, the use of NFA IFR did not continue after the initial procurement of IFR due to sensory and physical problems of the IFR.

Under Memorandum Circular 12 Series of 2020, the rice requirement per child in all child development centers and supervised neighborhood play is 100 grams/day/participant for 120 days for a total of 12 kgs/participant for the cycle year. This is expected to continue even after the pandemic as this was also the case before the pandemic as provided in Memo Circular No. 13 s. 2019. In addition, the SFP budget is P15/child for both the rice and viand.

Program implementation is decentralized and procurement of food for the program is done either by DSWD Field Offices or partner LGUs. The procurement of rice is done through bidding but most of the rice requirement is procured from NFA. With the implementation of the EPAHP, food for the supplementary feeding program are also procured from local farmers.

The DSWD Central Office provided implementors with a list of IFR producers in May 2018. However, no IFR was procured due to the following: not available in the market nor in NFA, high price, and the unpleasant taste of IFR.

Based on an annual target of 2,053,383 participants (2015) as provided in Annex 7 including regional targets, and on a 100 g-rice allocation per child per day, the total requirement for IFR is about 24,640 MT that requires 123.2 MT of IRK. This level of IFR is about 50% of the maximum capacity of the NFA in the pilot stage.

With full devolution arising from the Supreme Court Mandanas-Garcia ruling, the SFP will eventually be fully devolved to LGUs by 2023. This means that implementation and procurement will be done by LGUs. Consequently, ensuring that IFR is procured and used for the SFP will be a responsibility of the LGU. DSWD is currently crafting its devolution transition plan in this regard.

**The transfer of the SFP to the LGU's would require extensive advocacy on the need to use IFR. The operations manual to be used by the LGUs should include various sources of IFR and types, including multi micronutrient premix as provided in this**

#### 5.9.2.2 Bangsamoro *Umpungan* sa Nutrisyon or BangUN

The program involves supplementary feeding of about 22,000 children 0-12 years old for 180 days in the BARMM. It is implemented by DSWD Field Offices in Region 9 for Basilan, Sulu, and Tawi-Tawi, Region 10 for Lanao del Sur, and Region 12 for Maguindanao, in partnership with LGUs as expressed in a MOA. The program though is not devolved to LGUs.

Procurement is done by DSWD Field Offices with the rice requirements being procured from NFA. The program has not used IFR in its feeding program although it received IFR in 2017 in Sulu as a donation from the DOH-BARMM. However, the children did not eat the IFR due to sensory and physical issues.

In 2021, a total of 8,867 bags of rice, equivalent to 443.35 MT, were procured. If this requirement remains constant, then 2.22 MT of IRK are needed to produce the IFR.

According to the project coordinator, when food packs were provided, only about 10% of target children improved their nutritional status as the food packs were also eaten by other family members. However, if the feeding is implemented through an on-site scheme, 50% to 60% of program participants could improve their nutritional status.

Identified problems were on storage of rice, continued perception on the bad quality of IFR, cultural preference for rice, and the need to translate nutrition and related messages in terms that is understandable to program participants.

**Given, the need to continuously improve the nutrition situation in BARMM, the BANGUN Program should include in its guidelines the use of IFR as IFR is available and being used in BARMM for the DepEd School-Based Feeding Program.**

#### 5.9.2.3 Disaster response

The DSWD leads the Food and Non-food Items Cluster of the National Disaster Risk Reduction and Mitigation Council. It is tasked to provide relief during disasters including the provision of food packs for the victims of disaster. It prepositions family food packs with food items as per DSWD Internal Memorandum dated 31 July 2015, that among others includes IFR.

It procures rice from NFA due to Executive Order 51 s. 1998 that requires rice for government projects to be procured from NFA. Since NFA does not have IFR, no IFR has been procured for inclusion in the family food packs for emergencies. Nonetheless, those interviewed indicated willingness to buy IFR if it is from NFA.

The lack of advocacy and promotion on IFR was noted with a suggestion to seek the assistance of the Presidential Communications Operations Office and DTI in this regard.

#### 5.9.2.4 DSWD *Pantawid Pamilyang Pilipino* Program (4Ps) Program

According to DSWD, the 4Ps Program is a social protection program that focuses on human capital development through the provision of cash grants to eligible households subject to their compliance to education and health conditionalities. There are 4.4 million family beneficiaries of the 4Ps program. Included in the grant is a P600 monthly rice subsidy given as cash. It conducts family development sessions for the beneficiaries that includes a module on health and nutrition. The manual for the family development sessions are currently being updated. That a module on rice fortification can be included in these sessions through a request of IATF-ZH or the Sub-TWG on rice fortification addressed to the Director of the 4Ps Program.

### 5.9.3 National Nutrition Council (NNC)

The NNC is currently modeling a dietary supplementation program that targets pregnant women and children 6-23 months old, the *Tutok Kainan* Program as a response to the COVID-19 pandemic and related emergencies.

The program includes the provision of various food items to targets, including IFR, i.e., 1 cup of IFR for pregnant women for 90 days, ¼ cup of IFR for infants 6-11 months old and ½ cup of IFR for one-year olds (12-23 months old) for 180 days. The program completed phase 1 and phase 2 that procured 127,999 kgs. (128 M.T.) of IFR, while an additional 107, 111 kgs (107.1 M.T) of IFR will be procured for phases 3-5.

With full devolution following the Mandanas-Garcia ruling, LGUs are expected to take over the dietary supplementation program in the first 1000 days.

In addition to supplementary feeding, the program also involves a nutrition education component, using text messaging as a main strategy. Under this system daily messages are sent to recipients through text messaging. Once a week, there is a quiz through which 20 winners get a mobile load prize. Messaging related to rice fortification will be included. Current issues is the declining responses to the quiz. Nonetheless, it was noted that text messaging was a more cost-effective strategy in providing information to recipients as it costs only 20 centavos per text to the beneficiaries. In addition, NNC has a network of 50 community radio stations (*Nutriskwela*) through which nutrition messages are aired. NNC also has a digital radio program, One Nation One Nutrition, that tackles nutrition concerns as well as nutrition programs. This program has featured concerns on food fortification in connection with Food Fortification Day. All of these NNC nutrition education initiatives can be tapped for the promotion of rice fortification.

**The *Tutok Kainan* Guidelines, including the conduct of nutrition education, can be used as a guide in the implementation of the feeding program at the LGU level when the program is transferred for LGU implementation.**

The NNC is also formulating the Philippine Plan of Action for Nutrition (PPAN) 2023-2028 to guide nutrition action in the country. Part of this effort is the formulation of the Social and Behavior Change Communication Strategic Plan for the same period, which should provide the umbrella and guidance for related initiatives.

## **5.10 *Consumer view of nutrition and iron-fortified rice***

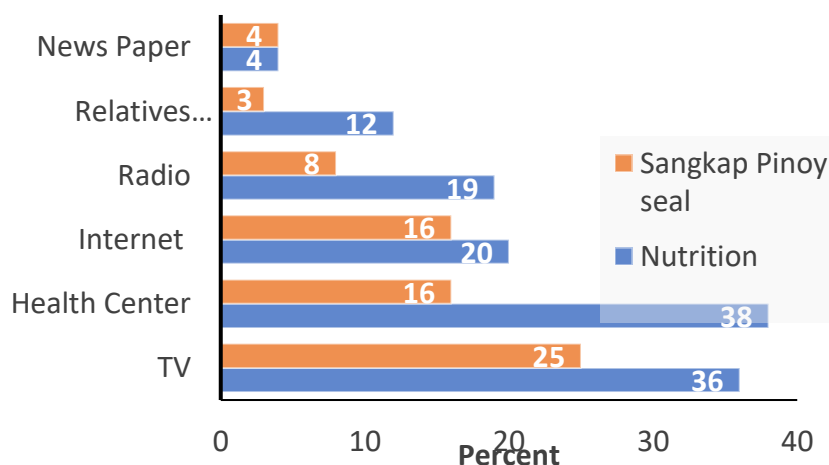
A mix of group interview and discussions was done in four public elementary schools in BARMM, particularly those that have used IFR in school feeding. The group interview and discussions were done together with the school feeding coordinators.

### **5.10.1 Profile of participants.**

Almost all (98%) of the discussion participants are female. More than half (57%) belong to the 20-50 years age group and 37% are older than 50 years old. In terms of educational background, 29% are college graduates, 18% high school graduates, and the rest had lower levels of educational attainment. In terms of occupation, 58% are housewives, while about one-fourth (26%) teachers.

### 5.10.2 Source of information on nutrition and the Sangkap Pinoy seal

Top 3 sources of nutrition information and information on the *Sangkap Pinoy* seal were health center, television, and the internet. (Figure 8).



**Figure 8.** Source of information on nutrition and the *Sangkap Pinoy* seal

### 5.10.3 Perception of malnutrition

When asked on what malnutrition is, responses were: below normal weight, inadequate vitamins and minerals, weak physique, sickly, poor performance in schools and inadequate consumption of nutritious foods.

### 5.10.4 Sangkap Pinoy seal

As 88% said they know about micronutrient deficiency, only 43% are familiar with the Sangkap Pinoy seal. Only 52% said they bought products with the *Sangkap Pinoy* seal, but only 35% identified products with SPS correctly.

### 5.10.5 Rice concerns

The most common rice variety bought are Upi Rice, *Masipag* Rice, and R 160 rice. About ¼ of discussion participants (26%) buying NFA rice with a price range of P25 to P38 per kilo. **Those who bought commercial rice shelled out P36-P50 per kilo.**

About 80% of discussion participants knew about IFR. About 85% also said they have eaten IFR, with 87% saying it has a pleasant taste (*“masarap”* or tastes good), while 9% said it has unpleasant taste. About ¾ (74%) were aware that their children consumed IFR for the SBFP.

Almost all (91%) of the discussion participants said that they will buy IFR if it is available in the market even if it costs more than non-fortified rice. However, most (74%) are willing to pay P2.00 more.

After a short lecture on nutrition, micronutrient malnutrition, *Sangkap Pinoy* products, and rice fortification, all discussion participants said they will now buy products with *Sangkap Pinoy* Seal and IFR.

## 6.0 Analysis of results based on the objectives of the study

The analysis of the results according to the objectives of the study is based on information generated from the desk review, KIIs, and FGDs among the major stakeholders defined in the framework of the ecosystem of rice fortification in the Philippines (Figure 3 on page 13).

### 6.1 *Gaps to explain the low supply, acceptance, and consumption of iron-fortified rice.*

The low supply of IFR until about 2021 was due to the interplay of supply and demand.

The demand came primarily from SSNPs. For instance, IFR became available at a relatively large scale when the FSP of the AHMP (implemented from 2005 to 2010) requested NFA to deliver IFR. However, when the AHMP was discontinued with the change in administration in 2010, NFA stopped producing IFR except for a brief period to mop up its supply of IRK.

However, the experience in Region 1 and Davao de Oro showed how the interplay of supply and demand can be managed positively for increased availability and use of IFR in a locality.

In Region 1, Nutridense Food Manufacturing Corporation relentlessly advocated for the use of IFR in feeding programs, targeting for the purpose DepEd, local governments, and farmers cooperatives. The effort paid off and since 2017 a local school district has been using IFR. The promotion of IFR received a further boost when in 2019, the Region 1 Development Council (an organization of provincial governors, national government agencies, and selected NGOs in a region) called on “all government instrumentalities to patronize and promote the use of iron-fortified rice as a complementary strategy to address the iron deficiency problem of the populace” (Annex 11). The support of the DOST Regional Office and the Provincial Science and Technology Directors was also notable. With these elements, Region 1 is the most capable to implement rice fortification at least for its SSNPs with one IRK producer, two blending machine fabricators, three current producers of IFR with an additional five to be operational in 2022. Of the P85M of IFR procured by DepEd in 2021, P57.2M (67%) was procured in Region 1, with P52.8M being procured by Pangasinan Province. The Region 1 experience can be documented and shared with other regions for inspiration and adaptation.

On the catalytic role of LGUs, the Davao de Oro experience shows how LGUs can adopt rice fortification for rice distribution programs and facilitate the active collaboration among DepEd, the provincial government in providing funds for vehicles, salary of personnel of the central kitchen (for the school-based feeding) and other amenities and monitoring of implementation by an NGO, the *Gawad Kalinga*.

Unfortunately, the Region 1 and Davao de Oro experiences were not replicated in other parts of the country.

Thus, even if FNRI was successful in engaging initial IFR technology adaptors in 2013, i.e., CLG Corporation, Bagayas Rice Mill and Loronix Rice Mill (all in Mindanao), these adopters had to stop operations because there was no demand for IFR.

Low acceptance and consumption of IFR was evident when IFR produced with coated IRK was being used. There were complaints of discoloration of the rice, possibly related to the use of yellow-colored IRK with ferrous sulfate, and unpleasant taste. Similar feedback was received from recipients of IFR with coated IRK in the BangUN Program, which started in 2018. However, the FGDs with parents of children who participated in feeding programs that used IFR indicate positive experience with the rice, i.e., tastes good. Extruded IRK was used to produce IFR for these programs.

Communication campaign initiatives were very limited and localized. Communicators were not too keen on promoting IFR because of the low supply and the negative feedback on the taste and color of IFR. Nonetheless, a communications plan was formulated in 2016 (Annex 12) to mobilize rice millers, government, and consumers to use IFR. Information, education, and communication materials to promote IFR to LGUs and consumers were also developed in 2018 (Annex 13). Unfortunately, due to competing concerns, the 2016-developed plan was not implemented nor were the IEC materials distributed.

The landscape has changed with the passage of RA 11037 that calls for the use of fortified foods in feeding programs of DepEd and DSWD, the NNC Governing Board resolution calling for the use of IFR in SSNPs, and the initiative of the IATF-ZH in 2020 through the conduct of *Kumain* Webinars and support from DOST and technical assistance of FNRI. The demand for IFR has increased with the requirements of DepEd, suppliers of both IFR and IRK have also increased or have the potential to increase.

## **6.2 *Mapping of iron-rice fortification capacities and campaign initiatives of the Philippines***

Capacities for rice fortification from those currently operating and those that are being trained were identified including their production capacities both for IRK and IFR (Section 5.0).

Based on the mapping of producers for this year, local (closer to point of use) production of IFR is lacking in the Visayas and Mindanao. Local production of IFR is expected to improve in 2023 when NFA pursues its plan to fortify the fortification of 50% of its buffer stocks, and as all or some of the 25 groups that have requested FNRI for technology transfer become operational. IRK production is also expected to increase with 2 additional plants -- one in Bukidnon in Mindanao and 1 in Samar in the Visayas.

The importers of IRK and multi-nutrient fortified rice kernels can also provide the supply as their price is competitive to local IRK.

An emerging concern is on the production capacities of IRK and IFR producers being more than the demand if the requirements only of DepEd and DSWD are considered. The total IFR requirements of DepEd and DSWD (55,233 MT) are only 47.2% of the maximum production capacities of current and future IFR producers (116,928 MT).

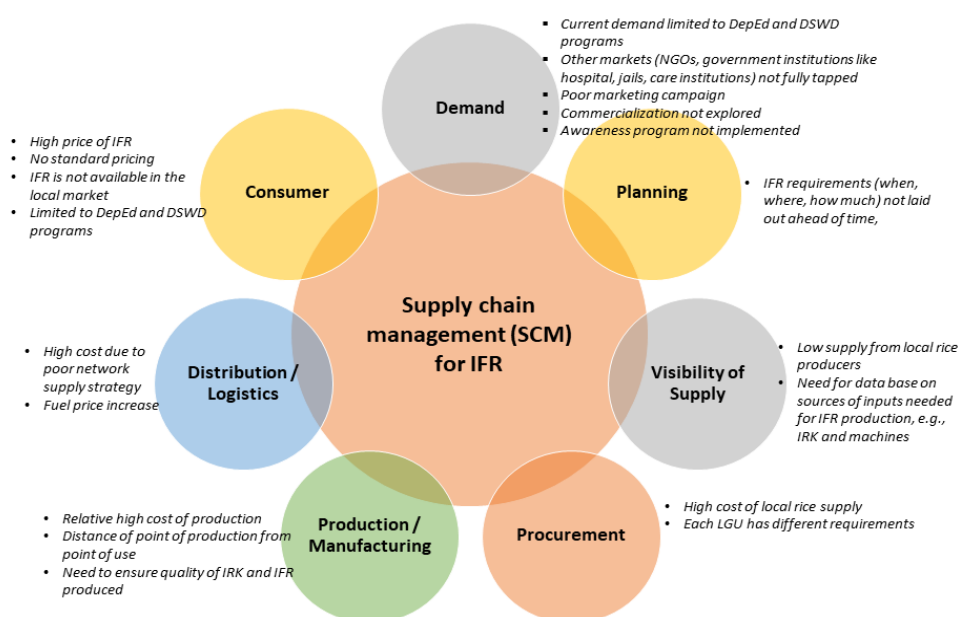
Most of the campaign initiatives were implemented prior to 2015 and in areas with a supply of IFR. Nonetheless, there are resources, e.g., 2016 communications plan and IEC materials on IFR that can be starting points for communication campaign initiatives as capacities to produce IFR improve.

In addition, there are many possible entry points for promoting the consumption of IFR in existing government programs, e.g., DSWD 4Ps family development sessions, DepEd through the parent- teachers associations, NNC through the text manager solutions and *Nutriskwela*, to cite a few. A critical entry point is the Social Behavior Change Communication Strategic Plan 2023-2028 that is currently being formulated.

### 6.3 Supply chain issues that hinder the implementation of mandatory rice fortification

Using the supply chain management for IFR framework (Figure 9), the following are supply chain issues that hinder the implementation of mandatory rice fortification.

- 6.3.1 **Demand.** The current demand for IFR is limited to the requirements of DepEd and DSWD for their feeding programs. The NNC through its *Tutok Kainan* Program contributes to the demand but the program will be turned over eventually to LGUs as well as the DSWD SFP. An analysis of the supply of IFR vs demand from SSNP of DepEd SBFP and DSWD SFP shows the presence of the capacity to produce up to 181,440 MT of IFR, almost three times higher than the 55,233 MT of IFR needed by DepEd and DSWD. With this excess production capacity, there is a need to generate more demand from markets that have not been fully tapped such as SSNPs of NGOs; government institutions that use rice, e.g., hospitals, jails, care institutions; rice allowance benefits of some private corporations, and the commercial market.
- 6.3.2 **Planning.** As noted earlier, the timely availability of IRK was an issue with some of the IFR producers. While the capacity to produce the IRK for the immediate IFR requirements is present, the absence of a forecast of requirements prevented IRK producers to plan their production to be more responsive to IFR producers. The sole source of micronized ferric pyrophosphate, VitaChem Industries, has requested the Philippines, through its sole distributor, to give a forecast of requirements.



**Figure 9.** Supply chain challenges for rice fortification



- 6.3.3 **Visibility of materials supply.** Information on the resources needed for the production of IFR are readily available. This study consolidates all known information to date on who and where IRK producers and machine fabricators are. With FNRI and DOST regional offices providing financial and technical support to local IFR producers, it is safe to assume that local IFR producers will have access to information on where and how they can access IRK and machines for fortification. The creation, updating, and sharing of a data base on these resources is a necessity.
- 6.3.4 **Procurement.** The procurement of IFR follows the requirements of the procuring entity. Since government is a main procurement entity, government procurement processes are followed. Public bidding is the main procurement mode given the cost of the supplies needed. The DepEd procurement of IFR has been challenged with certain difficulties, e.g., some interested parties could not comply with the DepEd requirement for an FNRI certification (or TLA), the low price ceiling set by DepEd is not consistent with the cost of producing, packaging and transporting the IFR requirement, which prevented IFR producers from participating in the bidding.
- 6.3.5 **Production / manufacturing.** Total IFR capacity in 2022 is 181,440 MT/year or only 1.24% of Philippine rice consumption of 14.6 million MTs or 1.81% if farmers consumption is excluded which the difficulty in implementing mandatory rice fortification. A major concern on production is on the additional cost for producing IFR. Producers have estimated that producing IFR costs P4/kilo. This can be broken down to the cost of IRK at P375 – P450/kg depending on the distance related to the delivery cost as this already amounts to P1.88 to P2.25/kg to the cost of fortification while for blending cost, an IFR producer charges P65/50 kg IFR or P1.3/kg (profit included) in addition to the FNRI charge of 2% royalty fee or P0.9/kg if IFR cost is P45/kg. Based on this estimate, additional cost for producing IFR is P4 to P4.45/kg. This is about 10% of the cost of regular milled rice. This additional cost is also twice the additional price that FGD participants said they were willing to pay for IFR. Another issue on production is on the points of production not being evenly distributed in the country, particularly in Visayas and Mindanao. On quality assurance, the technical assistance and monitoring from FNRI and DOST to those with TLA gives a level of assurance that IRK and IFR production would be according to standards. For those without DOST support, FDA will be monitoring only those producing IRK. Currently, the issue on who will monitor producers and importers of rice is still being discussed between FDA, DA and DTI.
- 6.3.6 **Distribution / logistics.** There are facilities and service providers that will allow the movement of IRK and IFR from point of production to point of use. However, a main concern is on the cost of distribution. Since many of the IFR producers are based in Luzon, the cost of IFR in Visayas and Mindanao is expected to be higher given the cost of transport. Based on prevailing rates (Table 5), transporting IFR from Luzon can add P3-5 to each kilo of rice. This will increase the price of IFR by P7-9, which may prevent creating more demand for IFR.

**Table 5.** Cost of transporting rice from Luzon to Visayas and Mindanao

Destination	20-footer freight cost	Cost per bag	Cost per kilo
Cebu	54,840	137.10	2.74
Dumaguete	65,326	163.32	3.27
Iloilo	62,670	156.68	3.13
Bacolod	62,670	156.68	3.13
Tacloban	64,609	161.52	3.23
Davao	71,560	178.90	3.58
Cagayan de Oro	63,670	159.18	3.18
Butuan City	73,000	182.50	3.65
General Santos City	71,560	178.90	3.58
Zamboanga City	105,000	262.50	5.25

6.3.7 **Consumers.** As there is a need to increase consumer demand for IFR, as part of the communications plan, a social media campaign using the cost-effective **text manager solution** should be implemented given the Philippines being considered as the world's text capital such that various information to promote on the benefits of IFR, availability, standard pricing can be disseminated. A model for this text manager solution was implemented by NNC as part of its *Tutok Kainan* project for pregnant women and children below 2 years old in various regions.

## 7.0 Conclusions and Recommendations

The following are concluded from this study:

- The low supply, acceptance, and consumption of IFR is the result of an interplay of various factors. The low supply can be attributed to low demand, which could be explained partly by the negative feedback on the discoloration and metallic taste of IFR produced using the coating technology. Because of the low supply, communication initiatives could not be undertaken as intensively as desired.
- However, recent policy and program developments, i.e., the passage of RA 11037 (2018) that among others mandates the use of fortified foods in feeding programs in public elementary schools and child development centers and the NNC Governing Board resolution on the use of IFR in SSNPs (2019); FNRI's continued work on iron-rice fortification technology (that addressed the concerns on discoloration and taste) and its promotion; and DOST support have given iron-rice fortification a major push.
- Thus, by 2022, given the presence of 4 IRK producers and importers and 2 additional ones once their facilities become operational, and 23 IFR producers, the Philippines would have the capacity to produce IFR that can respond to the demand from government feeding programs in public elementary schools and child development centers.

- However, elements of the supply chain are challenged along the cost of production (incremental cost of P4.00 due to fortification, half of which is due to the IRK) and the cost of distribution and logistics since most of the IRK and IFR producers are in Luzon regions with only 2 currently in operation in Mindanao, and none in the Visayas.
- In addition, the estimated production capacity of IFR is five times higher than the requirements of ongoing national feeding programs which can threaten the sustainability and viability of IFR production as an economic activity.

Given these conclusions the following are recommended:

## **7.1 *Most Cost-Effective and Efficient Delivery of IFR to Target Recipients***

7.1.1 Explore ways to reduce the cost of fortification by about 50%, i.e., from P4.00 – P4.45/kg to P2-2.20 through:

- Use of lower-priced micronized ferric pyrophosphate. Currently the micronized ferric pyrophosphate being used from Taiyo Kagaku costs about P3,000/kg which is about 45% to 50% to the cost of IRK. Using micronized ferric pyrophosphate from China or India, which costs approximately P500/kg, is a big factor in reducing the cost of IRK.
- Reduction of the P65/50 kg blending cost as estimated by an IFR producer considering that that NFA charges only P35/50-kg IFR.
- Consideration of the recommendation to reduce or eliminate the requirement for IRK and IFR producers that adopt the FNRI technology to pay the FNRI royalty fee (currently being discussed)

7.1.2 Continue the use of an acid compound such as citric acid in producing the IRK as studies have shown that citric acid increases the solubility and absorption of ferric pyrophosphate making it more effective in delivering iron to targets.

7.1.3 Adopt the guiding principle to bring the site of production as close as possible to the site of use for more efficient distribution of IFR and for this purpose, focus on the Visayas and Mindanao.

1

Along this line, the FNRI, as provider of assistance on technology, and DOST, as provider of funding support have an important gatekeeping function to ensure that IRK producers and IFR producers are relatively close to each other.

For instance, a working framework could be to have two IRK producers for Northern Luzon and Southern Luzon, one for Visayas, and two for the Mindanao (e.g., one for the eastern part and one for the western part); and one to two IFR producers per province depending on the size of a province. These IFR producers should be networked further with rice mills within a certain radius from the IFR producer. An equally overriding concern should be to ensure the sustainability of IRK and IFR production as a viable economic activity.

- 7.1.4 Continue conducting technology dissemination seminars but more strategically, targeting areas that do not have IRK and IFR producers.
- 7.1.5 Continue using the cheaper roll-on-roll-off transportation for interisland delivery
- 7.1.6 Pursue the aforementioned efforts with continued efforts to capacitate IRK and IFR producers to ensure fortification according to standards. Related to this is the need to resolve the issue on which government agency should monitor and regulate rice fortification. The concern can be brought up to the agencies concerned (DA, DTI) for resolution.

## 7.2 *Strategies for the Increased Consumption of IFR*

- 7.2.1 Expand the market for IFR as a first key strategy: Additional markets to consider include SSNPs of NGOs and LGUs, institutions like hospitals, jails, orphanages and the like, and private companies that provide rice allowance for its employees. In addition, commercial distribution should be considered reaching out not only to consumers but also to food service outlets like restaurants.
- 7.2.2 Issuance of agency / organizational policy instruments mandating or encouraging the use of IFR as follows:
  - DILG enjoying LGUs to use IFR in their feeding programs, disaster relief commodities, and other rice distribution programs
  - DOH requiring hospitals to use IFR in providing dietary services
  - DOLE encouraging companies to provide IFR as part of the rice allowance incentive or benefit, all other government agencies to use IFR in meals served for meetings, conferences, and workshops.
  - Regional development councils calling for the use of IFR in rice distribution programs in the region, with that issued by the Region 1 Regional Development Council as model
- 7.2.3 Adoption and enforcement of local ordinances (local laws) that require the use of IFR in SSNPs and food service outlets, and the availability of IFR in the market.
  - Ordinances adopted by La Union Province, Davao de Oro, and Davao City could be shared with LGUs.
  - This encouragement could be integrated in advocacy fora supported by related IEC materials. The importance of reaching out to LGUs cannot be overemphasized given the expected full devolution scenario in 2023. Under this set up, the feeding programs of DSWD and NNC will be decided on and managed by LGUs.

- 7.2.4 Reach out to NGOs on IFR through advocacy fora and the dissemination of IEC materials on the advantages of using IFR and on sources of IFR.

### **7.3 *Communication Strategies for Increased Knowledge and Acceptance of IFR***

- 7.3.1 Formulate and implement a communications plan on IFR and ensure its integration or inclusion in the PPAN Social and Behavior Change Communication Plan for 2023-2028.
- The promotion of the use and consumption of IFR would involve key communication strategies and should recognize that different target audiences (local chief executives, NGO program managers, rice millers, consumers) to be reached with specific messages to enable the adoption of desired behaviors. The experience in promoting IFR in Region 1 and in Davao de Oro could be documented and become resources for the communication plan.
  - Having a communications plan to cover the range of key target audiences for communication will help ensure a holistic approach. For this purpose, the 2016-developed communications plan (Annex 12) can be revisited and adapted.
  - Ensuring that IFR communication concerns are integrated in the overall social and behavior change communication plan for 2023-2028 will help ensure sustained implementation of related initiatives.
- 7.3.2 Highlight the benefits of using IFR especially in terms of improved learning capacity and improved work productivity to all target audiences.
- 7.3.3 To reach consumers, social media platforms should be used more rather than traditional media channels given the shifting behavior of consumers on use of these channels. The text manager solution or bulk messaging could be considered through which SMS messages are sent regularly to target audiences through various mobile networks.
- 7.3.4 Continue to use interpersonal communications by developing modules on IFR and integrating these in existing face-to-face nutrition education and related activities, e.g., in health centers during provision of health services, the family development sessions or parents' effectiveness sessions of DSWD and parent-teacher association meetings and orientations.

### **7.4 *Overall conclusion***

There is a fast and movement towards the increased production and consumption of IFR. This study has identified the capacities, supply chain and campaign initiatives on rice fortification and provided various recommendations related to maintain and further strengthen this momentum for rice fortification in the Philippines. Given the number of recommendations provided in this report, the next step would be the development of an interagency strategic and operational plan to be the basis for funding and implementing the Philippine Rice Fortification Program as a component of the Philippine Food Fortification Program. The planning could be initiated by the IATF-ZH and NNC with participants from various organizations from government, the non-government community, IRK and IFR producers, and LGUs.

## References

- Angeles-Agdeppa, Capanzana, Barba, Florentino, Takanashi. Efficacy of iron-fortified rice in reducing anemia among schoolchildren in the Philippines. *International journal for vitamin and nutrition research*. 2008 Mar 1;78(2):74-86.
- Department of Education. (2017, August 7). *Department Order 39, S. 2017 – Operational Guidelines on the Implementation of School-based Feeding Program for School Year 2017-2022* . Retrieved from Department of Education: <https://www.deped.gov.ph/2017/08/07/do-39-s-2017-operational-guidelines-on-the-implementation-of-school-based-feeding-program-for-school-years-2017-2022/>
- Department of Science and Technology - Food and Nutrition Research Institute (FNRI-DOST). (2015a). *Philippine Nutrition Facts and Figures 2013: Government Program Participation Survey*. Retrieved from <http://enutrition.fnri.dost.gov.ph/site/preview.php?>
- DOST-FNRI, UNICEF, World Food Programme. (2019). *Fill the Nutrient Gap: Philippines Nutrition Situation Analysis Framework and Decision Tool*. World Food Programme.
- Hackl, L. et. al., 2016. Cofortification of ferric pyrophosphate and citric acid/trisodium citrate into extruded rice grains doubles iron bioavailability through in situ generation of soluble ferric pyrophosphate citrate complexes. *Am J Clin Nutr*. 2016 May; 103 (5): 1252-9
- Introducing Iron-Fortified Rice in School Feeding Programme in Mindanao: After Action Review (16-19 December 2019)
- Iron bioavailability of ferric pyrophosphate in fortified, extruded rice increased by pre-treatment with a citrate buffer*. facts. (2014, June 16). Retrieved June 15, 2022, from [https://www.nutri-facts.org/en\\_US/news/articles/Iron-bioavailability-of-Ferric-Pyrophosphate-in-fortified-extruded-rice-increased-by-pre-treatment-with-a-citrate-buffer.html](https://www.nutri-facts.org/en_US/news/articles/Iron-bioavailability-of-Ferric-Pyrophosphate-in-fortified-extruded-rice-increased-by-pre-treatment-with-a-citrate-buffer.html)
- Maglalang, H., Codling, K., Gwartz, J., Ymata, C. (September 2014). Rice Supply Chain Diagnostic Towards Scaling Up Rice Fortification in the Philippines. National Nutrition Council and UNICEF
- Maglalang, H. Terminal Report on the Technical Assistance of Nutrition International – Technical Assistance for Nutrition for the Scaling Up of Rice Fortification within the Social Safety Net Program in the Philippines. *Nutrition International*
- Maglalang, H. National Policy Guidance Dissemination Report. *Nutrition International*
- Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC). (2019). *Better Criteria for Better Evaluation: Revised Evaluation Criteria Definitions and Criteria for Use*. Retrieved from OECD-DAC: [https://www.betterevaluation.org/sites/default/files/revised-evaluation-criteria-dec-2019\\_0.pdf](https://www.betterevaluation.org/sites/default/files/revised-evaluation-criteria-dec-2019_0.pdf)
- RA 11037 (2017, July 24). *An Act Institutionalizing a National Feeding Program for Undernourished Children in Public Day Care, Kindergarten and Elementary Schools to Combat Hunger and*

*Undernutrition among Filipino Children and Appropriating Funds therefor:*  
<https://www.officialgazette.gov.ph/2018/06/20/republic-act-no-11037>

RA 8976. (2000, November 7). *Policy - An Act Establishing the Philippine Food Fortification Program and for Other Purposes*. Retrieved from Department of Health:  
[https://www.doh.gov.ph/sites/default/files/policies\\_and\\_laws/RA08976.pdf](https://www.doh.gov.ph/sites/default/files/policies_and_laws/RA08976.pdf)

The Implementing Rules and Regulations of Republic Act No. 8976. (2004, November 7). Retrieved from Food and Drug Administration:  
[https://ww2.fda.gov.ph/attachments/article/29049/RA%208976\\_IRR.pdf](https://ww2.fda.gov.ph/attachments/article/29049/RA%208976_IRR.pdf)

World Food Programme (2021) *Enhanced School Feeding with Iron Fortified Rice in Maguindanao*. World Food Programme, Manila.

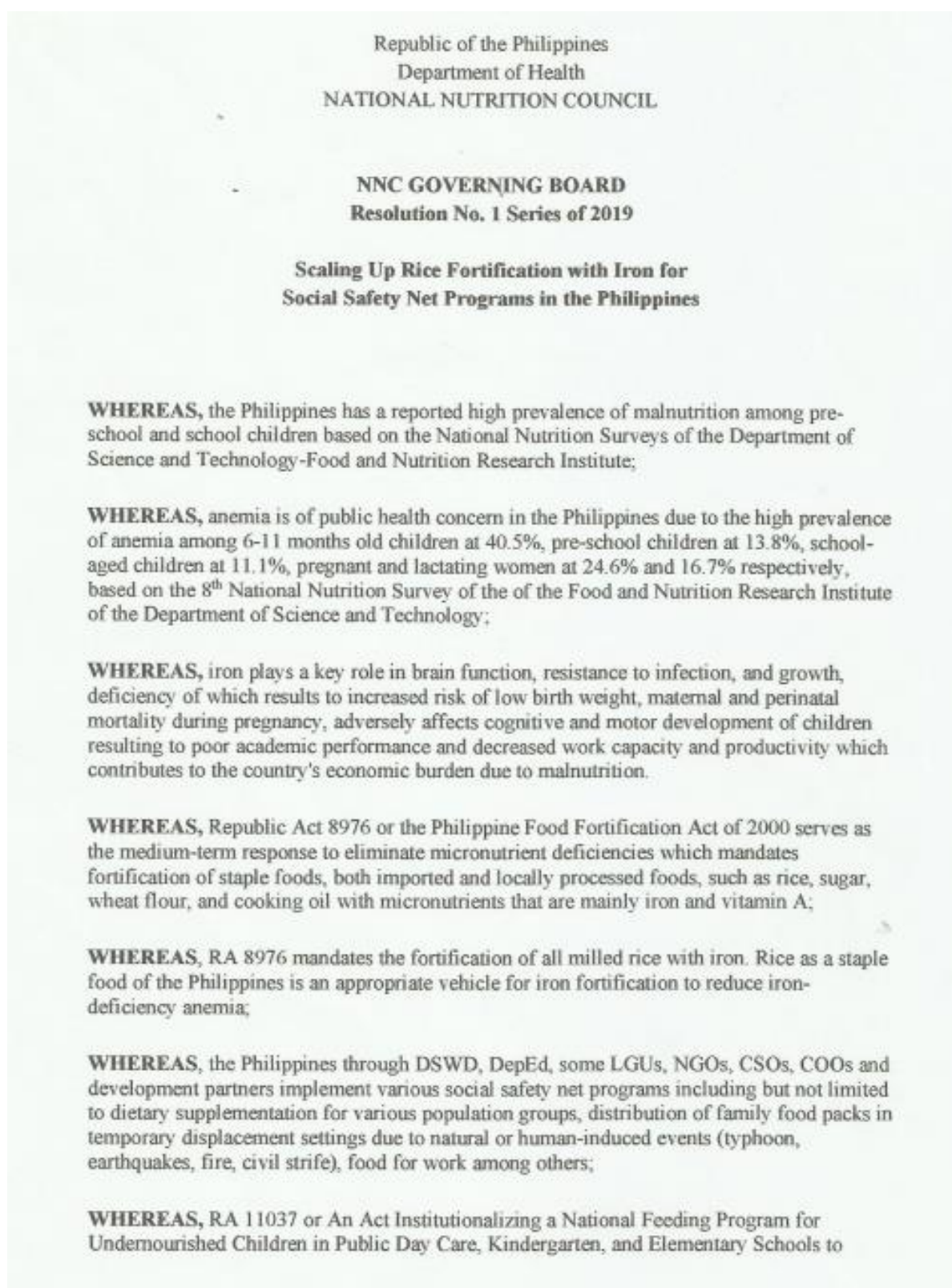
World Food Programme (2020) *WFP Support to the Philippine Government Initiatives in Achieving Zero Hunger by 2030*. Retrieved from  
<https://reliefweb.int/sites/reliefweb.int/files/resources/WFP-0000122047.pdf>

World Food Programme. The Journey of Scaling Up Rice Fortification in Asia. Connecting Food systems with social protection to enhance diets of those who need it most. *Policy Guide with success stories from four countries*.



## Annexes

**Annex I.** NNC Governing Board Resolution No. 1 Series of 2019 – Scaling Up Rice Fortification with Iron for Social Safety Net Programs in the Philippines.





NNC GOVERNING BOARD  
Resolution No.1 Series of 2019

**Scaling Up Rice Fortification with Iron for  
Social Safety Net Programs in the Philippines**

Combat Hunger and Undernutrition Among Filipino Children, requires the provision of at least one fortified meal per day for 120 days for malnourished children in day care centers and public elementary schools, compliance to which will necessarily use iron-fortified rice.

**WHEREAS**, government-managed social safety net programs procure their rice requirements from NFA, which currently faces challenges in producing iron-fortified rice;

**WHEREAS**, these social safety net programs provide rice as a major commodity, but use of iron-fortified rice is currently negligible;

**WHEREAS**, efficacy trials of the Department of Science and Technology – Food and Nutrition Research Institute on iron-fortified rice showed the reduction of anemia among schoolchildren in the Philippines and provided evidences on high acceptability of iron-fortified rice;

**WHEREAS**, the model on scaling up rice fortification program through techno transfer of DOST-FNRI enabled private millers to acquire and adopt the technology in the production of iron rice premix and iron-fortified rice

**WHEREAS**, studies have shown that the current supply of iron rice premix and iron-fortified rice from the private sector, including cooperatives, can meet the requirements for these social safety net programs;

**WHEREAS**, iron-fortified rice provided as part of the Accelerated Hunger Mitigation Program from 2005-2010 may have contributed to the significant decrease in anemia prevalence in the general population from 30.6% in 1998 to 19.5% in 2008 to 11.1% in 2013 based on the National Nutrition Surveys of the Food and Nutrition Research Institute of the Department of Science and Technology;

**NOW, THEREFORE, BE IT RESOLVED, AS IT IS HEREBY RESOLVED**, in consideration of the aforementioned premises, we the NNC Governing Board do hereby declare the need for collective effort in scaling up the use of iron-fortified rice for social safety net programs of the Philippines for the control of anemia particularly for vulnerable groups;

**RESOLVED FURTHER**, that iron-fortified rice be used for social safety net programs that use rice as a commodity as implemented by DepEd, DSWD, DOH, LGUs and NGOs, and development partners;

**RESOLVED FURTHER**, for the NNC Secretariat in close coordination with the Sub-Technical Working Group on Mandatory Food Fortification, to undertake the following:

1. Support and work with NFA on its compliance to mandatory rice fortification as provided in RA 8976 and to this Governing Board Resolution

NNC GOVERNING BOARD  
Resolution No.1 Series of 2019

Scaling Up Rice Fortification with Iron for  
Social Safety Net Programs in the Philippines

2. Develop and implement an advocacy and communication effort to promote sale and consumption on the use of iron-fortified rice in the general population
3. Coordinate with government agencies, institutions and organizations that are not members of the NNC Governing Board, e.g. DAR that can be tapped to provide assistance on cascading the advocacy and promotion on the use of iron fortified rice for social safety net programs and NGOs.

**RESOLVED FURTHER**, to generate support of local chief executives to implement mandatory rice fortification through the enactment of related ordinances and to monitor compliance to these ordinances and provide reports thereafter on the compliance to these ordinances;

**RESOLVED FURTHER**, to promote the importance of rice fortification to the rice industry, beneficiaries of Pantawid Pamilyang Pilipino Program (4Ps), non-government organizations, and the general population;

**RESOLVED FURTHER**, for the following agencies to undertake the following specific actions:

The **Department of Health** shall issue a policy for all DOH hospitals, canteens, programs and projects that convene activities during which rice is served to use only iron-fortified rice; design and implement a promotional campaign on iron-fortified rice and explore the allocation of a budget for the iron-rice premix for use by NFA and other rice millers; Food and Drug Administration to set standards for rice fortification, including iron-rice premix and monitor quality and compliance in the production and importation of iron rice premix;

The **Department of Agriculture** through the National Food Authority shall develop its own policy to regulate millers, traders and retailers for the production of iron-fortified rice for government purchase, for social safety net programs and for the general population; enable their field personnel to assist in monitoring as provided by RA 8976 and promote rice fortification to farmers' groups and cooperatives.

The **Department of the Interior and Local Government** shall issue a policy instrument enjoining LGUs to: 1) use iron-fortified rice for their social safety net programs such as for disaster response and rehabilitation and for feeding programs and for use in their canteens, hospitals and meetings and to enact ordinances in support of rice fortification similar to the ordinances of the provinces of Compostela Valley Provincial Ordinance No. 29-2015 An Ordinance Providing Mechanisms For Use Of Iron-Fortified Rice In The Province Of Compostela Valley Known As Comval I-Rice and La Union Ordinance No. 118-2017 An Ordinance Providing Mechanisms for the Production, Distribution and Use of Iron-Fortified Rice or the "La-Union Fortified Rice Ordinance of 2017"; and 2) monitor rice fortification through their agricultural officers in coordination with NFA field personnel; and 3) promote rice fortification to farmers' groups and cooperatives;

**Scaling Up Rice Fortification with Iron for  
Social Safety Net Programs in the Philippines**

The **Department of Education** shall issue an order on the use of iron-fortified rice for the School-Based Feeding Program; for school canteens to sell only iron-fortified rice, and promote the use of iron-fortified rice through Parent Teachers Associations.

The **Department of Social Welfare and Development** shall undertake the following activities for the implementation of Social Safety Net Programs:

1. For Supplementary Feeding Program –remove the requirement on the use of NFA rice to allow procurement from the private sector, require the use of iron-fortified rice particularly by LGUs that receive funds from the DSWD. The guidelines should include the list of suppliers of iron-fortified rice (as also included in the DepEd Guidelines).
2. For Disaster Preparedness and Response – Implement the memorandum on the revised composition of the family food pack that among others indicates the use of iron-fortified rice.
3. For the Rice Subsidy Program of the 4Ps – Include the promotion of iron fortified rice for the beneficiaries of 4Ps.
4. For Bangsamoro Umpungan sa Nutrisyon (BangUN) Program – Use iron-fortified rice in the supplementary feeding for children, pregnant and lactating mothers.

The **Department of Science and Technology** shall continue research to reduce the cost of fortification (i.e. cheaper iron fortificant, cheaper blending machines for millers) and continue to provide incentives through interest-free loan for investors for the production of iron-rice premix and iron-fortified rice; and provide technical assistance to rice industry on rice fortification.

The **Department of Trade and Industry** shall adopt a policy that would provide incentives for investors/producers of iron-rice premix and iron-fortified rice through the Investments Priority Plan. It shall also assist relevant micro- and small enterprises along rice fortification through its Shared Services Facilities Program.

The **National Economic and Development Authority** shall assist in identifying ways of incentivizing those who are compliant to mandatory fortification of rice and other staples, including salt.

The **Department of Labor and Employment** shall promote the use of iron-fortified rice in company rice subsidy for employees and company canteens to help improve work productivity.

The **non-government organizations** shall promote the use of iron-fortified rice to their respective clientele; adopt a policy on the use of only iron-fortified rice for those with programs that use rice; and assist in advocating for the enactment of ordinances in support of rice fortification (League of Municipalities of the Philippines), explore the provision of incentives to compliant industry players, assist in the advocacy for the provision of rice fortification budget to NFA (Philippine Legislators' Committee on Population Development).



NNC GOVERNING BOARD  
Resolution No.1 Series of 2019

Scaling Up Rice Fortification with Iron for  
Social Safety Net Programs in the Philippines

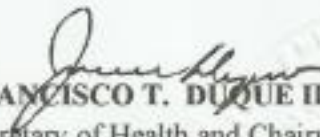
The **development partners** (i.e. relevant UN agencies and bilateral organizations that procure and provide milled rice as part of its programs) shall distribute only iron-fortified rice; All UN agencies and bilateral organizations shall support the promotion, sale and consumption of iron-fortified rice.

The **other national government agencies** shall promote the use of iron-fortified rice to their respective employees

**RESOLVED FURTHER**, for agencies concerned to implement their roles and responsibilities as provided for in Republic Act 8976, "An Act Establishing the Philippine Food Fortification Program and other purposes";

**RESOLVED FURTHER**, for the National Nutrition Council Secretariat to ensure that this policy is disseminated as widely as possible, implemented accordingly, and compliance to RA 8976 is monitored regularly with an annual report submitted and presented to the NNC Governing Board.

Approved this 15<sup>th</sup> day of February 2019.



FRANCISCO T. DUQUE III, MD, MSc  
Secretary of Health and Chairperson  
National Nutrition Council Governing Board

Attested:





AZUCENA M. DAYANGHIRANG, MD, MCH, CESO III  
Council Secretary and Executive Director  
National Nutrition Council

NNC GOVERNING BOARD  
Resolution No.1 Series of 2019

Scaling Up Rice Fortification with Iron for  
Social Safety Net Programs in the Philippines


CONFORME:


  
**EMMANUEL F. PIÑOL**  
*Secretary of Agriculture*  
Vice-Chairperson, NNC Governing Board

  
**EDUARDO M. AÑO**  
*Secretary of the Interior and Local Government*  
Vice-Chairperson, NNC Governing Board


  
**BENJAMIN E. DIOKNO**  
*Secretary of Budget and Management*  
Member, NNC Governing Board

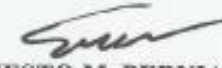



  
**LEONOR M. BRIONES**  
*Secretary of Education*  
Member, NNC Governing Board

  
**SILVESTRE H. BELLO III**  
*Secretary of Labor and Employment*  
Member, NNC Governing Board


  
**FORTUNATO T. DELA PEÑA**  
*Secretary of Science and Technology*  
Member, NNC Governing Board


  
**ROLANDO JOSEITO D. BAUTISTA**  
*Secretary of Social Welfare and Development*  
Member, NNC Governing Board

  
**ERNESTO M. PERNIA**  
*Secretary of Socio-Economic Planning*  
National Economic and Development Authority  
Member, NNC Governing Board

  
**RAMON M. LOPEZ**  
*Secretary of Trade and Industry*  
Member, NNC Governing Board



  
**ROMEO C. DONGETO**  
*Executive Director of Philippine Legislators' Committee on Population and Development Foundation, Inc. (PLCPD)*  
Private Sector Representative to the  
NNC Governing Board

  
**AMADO R. FARAWAN**  
*Health and Nutrition Advisor of Save the Children and Representative of the Philippine Coalition of Advocates for Nutrition Security (PhilCAN)*  
Private Sector Representative to the  
NNC Governing Board

**Annex 2.** FDA Circular No. 2007-010-A – Updated Standards for Iron-Rice Premix Amending Bureau Circular No. 2007-010



Republic of the Philippines  
Department of Health  
**FOOD AND DRUG ADMINISTRATION**



**FDA CIRCULAR**  
No. 2007-010-A

22 DEC 2021

**SUBJECT :** **Updated Standards for Iron-Rice Premix Amending Bureau Circular No. 2007-010 entitled “Guidelines in the Initial Issuance and Renewal of License To Operate for Iron Rice Premix Manufacturer/Repacker/Importer and Setting Forth the Standards for Iron Rice Premix”**

## **I. BACKGROUND**

Pursuant to Republic Act (RA) No. 8976 entitled *An Act Establishing the Philippine Food Fortification Program and for Other Purposes*, particularly iron fortification of rice to achieve its goal of addressing Iron Deficiency Anemia (IDA), the subject Bureau Circular No. 2007-010 entitled “*Guidelines in the Initial Issuance and Renewal of License To Operate for Iron Rice Premix Manufacturer/Repacker/Importer and Setting Forth the Standards for Iron Rice Premix*” needs to be revised to ensure the iron content in *iron-rice premix* is at the suitable level to help curb IDA in the country.

Rice fortification includes the addition of highly concentrated iron-rice premix to raw rice at required mixing ratio to enable the iron-fortified rice to be within the standard. During the enactment of the law in 2000, the technology available for the production of iron-rice premix was coating rice with iron to produce the premix. This technology was used as the basis for the standard of iron fortified rice as well as in the BFAD Circular No. 2007-010 subject of this revision. While the use of coating technology for the preparation of iron-rice premix has improved over time to reduce iron losses during the usual washing prior to cooking and to produce kernels that meet nutrient retention requirements under different conditions and preparation methods, an evolving technology such as extrusion is an additional option for iron-rice premix fortification. The Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology has developed an extrusion technology for the production of iron-rice premix. The iron-rice premix produced by extrusion has minimal loss of iron during washing of rice prior to cooking. Studies of FNRI also showed that iron-rice premix produced by extrusion is efficacious.

Establishing a common standard of iron content of iron fortified rice using either the coating or extruding technology for iron fortified premix is unlikely, thus a computed

Civic Drive, Filinvest Corporate City, Alabang 1781 Muntinlupa, Philippines  
Trunk Line +63 2 857 1900  
Website: [www.fda.gov.ph](http://www.fda.gov.ph)

Fax +63 2 807 0751  
Email: [info@fda.gov.ph](mailto:info@fda.gov.ph)



iron level of raw and cooked fortified rice using extruded and coated iron-rice premix per blending ratio as a standard level of iron in the iron-rice premix is established.

Based on the foregoing, the amendment of Bureau Circular No. 2007-010 is hereby imperative.

## **II. OBJECTIVES**

This Circular aims to provide guidelines on updated standards in the manufacture, repack, and/or import of iron-rice premix to help address iron deficiency anemia in the country.

## **III. SCOPE**

This Circular shall cover person(s) or establishment(s) that manufacture, repack and/or import iron-rice premix used as an ingredient for iron fortification of rice as provided in RA No. 8976.

Further, this Circular shall be applicable as guidance to all Food and Drug Regulatory Officers under the Regional Field Offices in conducting evaluation and inspection of iron-rice premix manufacturer/repacker/importer for the initial issuance and renewal of License to Operate.

## **IV. DEFINITION OF TERMS**

For the purpose of this issuance, the following terms shall mean:

- A. Food Additives** – refers to any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include contaminants or substances added to food for maintaining or improving nutritional qualities.

- B. Food Standard** – regulatory guideline that defines the identity of a given food product (i.e. its name and the ingredients used for its preparation) and specifies the minimum quality factors and when necessary, the required fill of the container. It may also include specific labeling requirements generally applicable to all prepackaged foods.
- C. Fortificant** – a substance, in chemical or natural form, added to food to increase its nutrient value.
- D. Fortification** – the addition of nutrients to processed foods or food products at levels above the natural state. As an approach to control micronutrient deficiency, food fortification is addition of a micronutrient, deficient in the diet, to a food which is widely consumed by specific at-risk groups.
- E. Good Manufacturing Practices (GMP)** – a quality assurance system aimed at ensuring that products are consistently manufactured, packed, repacked or held to a quality appropriate for the intended use. It is thus concerned with both manufacturing and quality control procedures.
- F. Ingredient** – means any substance, including a food additive, used as a component in the manufacture or preparation of food and present in the final product (in its original or modified form).
- G. Kernel Shavings** – very thin kernels or randomly sized or shaped clumps of dried extruded iron-rice premix.
- H. Labeling** – means any written, printed or graphic matter (1) upon any article or any of its container or wrappers or (2) accompanying the packaged food.
- I. Lot/Batch** – refers to quantity of food produced under essentially the same conditions during a particular production schedule.
- J. Lumped Kernels** – a kernel, thin kernel, and/or shaving that merged to form a large lump; some may look like enlarged whole kernels.
- K. Moisture Content** – the percentage weight of water in relation to the dry weight of the product.
- L. Packaging** – refers to an activity where a product is contained AND SEALED with the intention of storage and/or transport.



**M. Thin Kernel** – kernel with only half the size of a whole kernel or is crescent-shaped.

**N. Whole Kernel** – kernel with shape and size similar to well-milled rice; most prominent shape or size throughout the iron-rice premix.

## **V. GUIDELINES**

**A.** The procedures and requirements for Licensing and Inspection of iron-rice premix manufacturer/repacker/importer shall be consistent and in accordance with the following:

1. Updated standards for iron-rice premix stipulated in the Annex A; and
2. Computed iron level of raw and cooked fortified rice using extruded and coated iron-rice premix per blending ratio in Annex B of this issuance;
3. Administrative Order (AO) No. 2014-0029 entitled *Rules and Regulations on the Licensing of Food Establishments and Registration of Processed Food, and Other Food Products, and For Other Purposes*;
4. AO No. 2020-0017 entitled *Revised Guidelines on the Unified Licensing Requirements and Procedures of the Food and Drug Administration Repealing Administrative Order No. 2016-0003*; and
5. AO No. 153 s. 2004 entitled *Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food* or latest amendments and pertinent rules and regulations containing the specific procedures of FDA.

**B.** Food establishments and other concerned personnel covered by the Scope of this Circular shall remain knowledgeable and updated in every provision of the said AOs and above-mentioned requirements and other pertinent rules and regulations.

## **VI. PENALTY CLAUSE**

Any establishment found to be in violation of any provision of this issuance shall be a ground for disapproval of application and suspension or cancellation of License or Authorization pursuant to Section 4, Article 1, Book II of the Implementing Rules and Regulation (IRR) of RA No. 9711.

Notwithstanding the preceding paragraph, nothing in this section shall restrict the FDA in imposing the penalty and sanctions as prescribed under RA No. 8976 otherwise known as "Philippine Food Fortification Act of 2000" and its IRR.

## **VII. SEPARABILITY CLAUSE**

If any provision of this Circular, or application of such provision to any circumstances, is held invalid, the remainder of the provisions of this Circular shall not be affected.

## **VIII. REPEALING CLAUSE**

Provisions of previous issuances such as Bureau Circular (BC) No. 2007-010 which are contrary to those reflected hereon are modified/amended and/or repealed accordingly.

## **IX. EFFECTIVITY**

This Circular shall take effect after fifteen (15) days following its publication in a newspaper of general circulation and upon filing three (3) certified copies to the University of the Philippines Law Center.

  
**ROLANDO ENRIQUE D. DOMINGO, MD**  
Director General

*DTN 20211006083010*

**UPDATED STANDARDS FOR IRON-RICE PREMIX****I. SCOPE**

This standard applies to iron-rice premix for domestic market distribution intended for human consumption.

**II. DESCRIPTION OF THE PRODUCT**

Iron-Rice Premix shall be made from rice and food grade ferrous sulphate, or (micronized) ferric pyrophosphate or any FDA Approved iron fortificant stipulated in the AO No. 4-A s. 1995 and food grade binders and additives sufficient to ensure quality, efficacy, and shelf life stability at ambient conditions and shall be packed in any suitable packaging material that could prevent the entry of moisture and contaminants

**III. COMPOSITION AND QUALITY FACTORS****A. General Requirements**

Iron-rice premix shall have the following characteristics:

**1. Iron Content**

The product shall contain a minimum of 300 mg iron (Fe)/100 grams (g) and a maximum of 2,400 mg Fe/100 g provided that the mixing ratio of not less than 1:100 up to not more than 1:400 is indicated in the label resulting in an iron content of 2 to 6 mg Fe/100 g of raw (uncooked) iron fortified rice and 0.6 to 2.2 mg Fe/100g of cooked iron fortified rice. For further information on how to arrive at values: see Annex B for reference in terms of proportion and the availability of iron in raw and uncooked iron fortified rice also considering the losses during washing.

**2. Moisture Content**

The product shall have a maximum moisture content of 13%.

3. Color

The iron-rice premix shall have light yellow to yellow color based on the prevailing scientific reference.

4. The iron rice kernels shall be composed of at least 85% whole kernels and not more than 15% off-shaped kernels, namely: lumped, thin-shaped, and/or shavings.

5. No rancid-like odors.

6. Free from insects, filth and other extraneous matter.

#### IV. FOOD ADDITIVES

Food additives when used shall be in accordance with the current regulations established by the Food and Drug Administration i.e. BC 2006-016: Updated List of Food Additives or latest revision, updated CODEX STAN 192-1995 on General Standards for Food Additives or latest revision.

#### V. HYGIENE

A. It is recommended that the Iron-Rice Premix covered by the provision of this standard shall be prepared and handled in accordance with the appropriate sections of the DOH A.O. No. 153 s. 2004 entitled "*Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food*" and recommended International Code of Practice – General Principles of Food Hygiene (CXC 1-1969, Revised 2020) or latest revisions.

B. When tested by appropriate methods of sampling and examination, the iron-rice premix shall conform with the specific safety criteria in Table 1 and Table 2.

**Table 1. Limit for Microorganisms and Contaminant in Iron-Rice Premix**

Test Parameters	n	c	m	M
Molds and Yeast count, cfu/g	5	2	10 <sup>3</sup>	10 <sup>4</sup>
Aflatoxin, Total (ppb)	10			
Reference: (MR26) USDA Commodity Requirements Milled Rice and Fortified Milled Rice for Use in International Food Assistance Programs Effective Date: 13 July 2018				

**Table 2. Maximum Level for Arsenic, Cadmium, and Lead in Iron-Rice Premix**

Test Parameters	Maximum Level (ML) mg/kg
Arsenic	0.2
Cadmium	0.4
Lead	0.2
Reference: (PNS/BAFS 194:2017) General Standard for Contaminants and Toxins in Food and Feed	

## VI. PACKAGING

The packaging material shall provide adequate product protection against the entry of moisture and adequate strength to withstand normal handling condition e.g., opaque polyethylene or polypropylene plastic and aluminum stand up pouches.

## VII. STORAGE CONDITION

The product shall be stored in a cool dry place under 30 to 34 degrees Celsius with relative humidity not greater than 85%, away from ultraviolet light. The premises, warehousing, and distribution should be in accordance with AO No. 153 s. 2004 or its latest version.

## VIII. LABELING

A. Each container shall be handled and marked with the following information or in accordance with A.O. No. 2014-0030 entitled *“Revised Rules and Regulation Governing the Labelling of Prepackaged Food Products Further Amending Certain Provisions of Administrative Order No. 88-B s. 1984”* or its latest amendments:

1. The name of the product shall be “Iron Coated Rice Premix” or “Iron Extruded Rice Premix” in accordance with the method of fortification used and shall be prominently and legibly indicated on the label of Iron-Rice Premix.
2. The brand name and/or trademark.

If the establishment has a registered brand name or trademark, it shall be mandatory to declare the brand name or trade mark. May not be declared on the label if the product will be used for further processing.

3. The complete name and address of the manufacturer, packer and distributor.
4. Open date marking.

The words “Expiry” or Expiry Date”/ “Use-by-date”/ “Consume Before Date (Recommended last consumption date)” indicating the end of period at which the product shall retain its optimum quality attributes at defined storage conditions.

Expiration/expiry date shall be printed clearly, conspicuously and legibly on all product labels in the following order: Day, Month, Year. The declaration of day and year are numerical while the declaration of month must be in words to avoid confusion (e.g., Expiry date: 01 January 2012 or 01Jan12).

5. Lot/Batch identification code.
6. The words “Product of the Philippines” or the country of origin, if imported.
7. Complete list of ingredients specifying the type of iron fortificant used.
8. Instruction for use including mixing ratio.

Page 4 of 5

9. The statement "This product is not suitable for direct human consumption" shall be indicated on the label conspicuously in big and BOLD letters.
  10. Net weight shall be in International System of Units (SI Units).
  11. Storage instructions.
  12. Specific iron content.
- B.** The ink of the label graphics shall not smear or wear off upon contact with any liquid and/or hard surface.

## **IX. METHODS OF ANALYSIS AND SAMPLING**

**A. Determination of Iron Content**

According to the AOAC Official Method of Analysis (2019) 21st Edition, AOAC 975.03; AOAC Official Method of Analysis (2019) 21<sup>st</sup> Edition, AOAC 944.02.

**B. Determination of Moisture Content**

According to AOAC Official Method of Analysis (2019), 21st Edition, AOAC 945.38B; AOAC Official Method of Analysis (2019) 21st Edition, AOAC 925.10.

**C. Determination of Aflatoxin**

ELISA Method or Liquid Chromatography Method.

**D. Determination of Heavy Metals**

Atomic Absorption Spectrophotometric Method.

**E. Method of Sampling**

Sampling plan shall be in accordance with the Codex General Guidelines on Sampling CAC/GL 50-2004.

### Computed Iron Level of Raw and Cooked Fortified Rice Using Extruded and Coated Iron-Rice Premix per Blending Ratio

Premix	Computed iron level of Iron Rice Premix (IRP), mg iron/100g based on revised FDA standard (300-2400 mg/100g)																							
Mixing ratio	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400		
Raw IFR	Computed iron level of raw iron fortified rice (IFR) based on revised FDA standard (2-6 mg/100g)																							
1:100	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00		
1:200	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00		
1:300	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33	6.67	7.00	7.33	7.67	8.00		
1:400	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00		
Cooked Extruded IFR-FP	Computed iron level of cooked IFR based on the retention data of extruded micronized dispersible Ferric Pyrophosphate (FNRI-DOST and ILSI Project) (minimum of 0.6 mg/100g)																							
1:100	1.25	1.66	2.08	2.49	2.91	3.32	3.74	4.15	4.57	4.98	5.40	5.81	6.23	6.64	7.06	7.47	7.89	8.30	8.72				10	
1:200	0.63	0.83	1.04	1.25	1.45	1.66	1.87	2.08	2.28	2.49	2.70	2.91	3.11	3.32	3.53	3.74	3.94	4.15	4.36				5	
1:300	0.42	0.55	0.69	0.83	0.97	1.10	1.25	1.38	1.52	1.66	1.80	1.80	2.08	2.21	2.35	2.49	2.63	2.76	2.91				3.3	
1:400	0.31	0.42	0.52	0.62	0.73	0.83	0.93	1.04	1.14	1.25	1.35	1.45	1.56	1.66	1.76	1.87	1.97	2.08	2.18				2.5	
Cooked Extruded IFR-FS	Computed iron level of cooked iron fortified rice (IFR) based on the retention data of extruded Ferrous Sulfate (FNRI-DOST and ILSI Project) mg iron/100g																							
1:100	1.17	1.56	1.95	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.45	5.84	6.22	6.67	7.00	7.39	7.78	8.17				9.4	
1:200	0.59	0.78	0.97	1.17	1.36	1.56	1.75	1.95	2.14	2.33	2.53	2.72	2.92	3.11	3.31	3.50	3.70	3.89	4.08				4.7	
1:300	0.39	0.52	0.65	0.78	0.91	1.03	1.17	1.30	1.42	1.56	1.68	1.68	1.95	2.07	2.20	2.33	2.46	2.59	2.72				3.1	
1:400	0.29	0.39	0.49	0.58	0.68	0.78	0.88	0.97	1.07	1.17	1.26	1.36	1.46	1.56	1.65	1.75	1.85	1.95	2.04				2.3	
Cooked Coated IFR-FS	Computed iron level of cooked iron fortified rice (IFR) based on the retention data using coated ferrous sulfate (FNRI-DOST and ILSI Project), mg iron/100g																							
1:100	0.97	1.29	1.61	1.93	2.25	2.58	2.90	3.22	3.54	3.86	4.19	4.51	4.83	5.15	5.47	5.80	6.12	6.44	6.76				7.7	
1:200	0.48	0.64	0.81	0.97	1.13	1.29	1.45	1.61	1.77	1.93	2.09	2.25	2.42	2.58	2.74	2.90	3.06	3.22	3.38				3.9	
1:300	0.32	0.43	0.54	0.64	0.75	0.86	0.97	1.07	1.18	1.29	1.39	1.39	1.61	1.72	1.82	1.93	2.04	2.14	2.25				2.9	
1:400	0.24	0.32	0.40	0.48	0.56	0.64	0.72	0.81	0.89	0.97	1.05	1.13	1.21	1.29	1.37	1.45	1.53	1.61	1.69				1.9	

For details, refer to Annex A, Section III. 1. a. Iron Content



**Annex 3.** List of key informant interviews conducted

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
March 15, 2022	Jeorge Aguilar Commercial Center/Nutrition and Beyond	Face-to-face	Jeorge Aguilar	0917-6201887	1. Hector Maglalang 2. Kristoffer Dela Cruz
March 18, 2022	Department of Science and Technology (DOST) Region XI	Zoom	Grace Ricardo	-	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi 4. Marcela Saises 5. Maria Lourdes Vega 6. Fabiola Allysa Bringas
			Laarnie D. Albacite	<a href="mailto:ldalbacite@region11.dost.gov.ph">ldalbacite@region11.dost.gov.ph</a>  smalegado@region11.dost.gov.ph	
			Kenneth Barroga	-	
	Loronix Rice Mill		Gaspar Lorono gapslorn@gmail.com		
	Antofel Trading/Saavedra Rice Mill		Ricardo Saavedra 0948-7305736 0920 906 5332 cardingsaavedra@gmail.com		
March 19, 2022	Nutridense Food Manufacturing Corporation		Racky Doctor	0923-7032198 0999-7290234 0916-6418611	1. Hector Maglalang 2. Marcela Saises 3. Maria Lourdes Vega
March 22, 2022	Food Baskets Corporation	Zoom	Arnel Pantaleon – QA Manager	arnel.pantaleon@foodbasketscorp.com	7. Hector Maglalang 8. Kristoffer Dela Cruz 9. Jesus Jose Maria Bombasi 10. Marcela Saises 11. Maria Lourdes Vega 12. Fabiola Allysa Bringas
			Ramon Santos – Sales and Logistics Department (Commissary)	-	
	Mundo Engineering Works		Edmundo Jacalan – Owner	mundoengineering2021@gmail.com	
			Hanna Jacalan - Owner		
	DSM	Face-to-face	Jane Chen	Jane.Chen@dsm.com	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
March 23, 2022	DOST National Capital Region (NCR)	Zoom	Albei Keith Tolete – Food Technologist	<a href="mailto:ncr@dost.gov.ph">ncr@dost.gov.ph</a>	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi 4. Marcela Saises 5. Maria Lourdes Vega 6. Fabiola Allysa Bringas
			Elvin Almazar	<a href="mailto:almazarelvin@gmail.com">almazarelvin@gmail.com</a>	
	Pateros Municipal Nutrition Committee		Meizl Sincuya – Municipal Nutritionist Dietitian	<a href="mailto:meizlsincuya@gmail.com">meizlsincuya@gmail.com</a> paterosnutrition@gmail.com	
	HDN Technology and Resources, Inc.		Aileen Ursolino – CAD Designer	<a href="mailto:hdn_metalfabrication@yahoo.com">hdn_metalfabrication@yahoo.com</a> aileen_hdncad@yahoo.com	
March 24, 2022	CamSur Multi Purpose Cooperative	Zoom	Annielen L. Panerio – General Manager	<a href="mailto:camsur.mpc@gmail.com">camsur.mpc@gmail.com</a> Tel # 0931-783-2295 (TNT) , 0936-921-0344 (Globe)	1. Marcela Saises 2. Fabiola Allysa Bringas
March 29, 2022	DOST Region X	Zoom	Virgilio Mapa Fuertes – DOST X	-	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega
			Ritchie Mae Guno – DOST X	-	
	National Food Authority (NFA)		Elimar C. Regindin – Department Manager and Team, Operations Coordination Department	administrator@nfa.gov.ph, ocd@nfa.gov.ph	
			Engr. Eva Castillejo – TSD, Division Manager	-	
			Jocelyn	-	
March 30, 2022	National Nutrition Council – Central Office	Zoom	Rita Papey – Deputy Executive Director	<a href="mailto:rita.papey@nnc.gov.ph">rita.papey@nnc.gov.ph</a>  joan.labita@nnc.gov.ph oed_nnc@yahoo.com	5. Hector Maglalang 6. Kristoffer Dela Cruz 7. Jesus Jose Maria Bombasi 8. Marcela Saises 9. Maria Lourdes Vega 10. Fabiola Allysa Bringas

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
	IMCD Philippines		Ma. Nancy S. Soyangco – Managing Director	0928 893 0789 Nancy.Soyangco@imcd.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Fabiola Allysa Bringas
			Eloisa De Leon – Nutritionist Dietitian	-	
			Sherryl Aguilar	-	
			Daisy Fernandez – Sales Executive, DSM promotions	<a href="mailto:Daisy.Fernandez@imcd.ph">Daisy.Fernandez@imcd.ph</a> 0917-8127717	
March 31, 2022	Department of Social Welfare and Development (DSWD) Supplementary Feeding Program (SFP) Program Managment Bureau	Zoom	Mary Grace G. Flores – Nutritionist Dietitian III	(02) 931-8101 to 07 local 409 sfpc@dswd.gov.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
April 1, 2022	GTC Propack Corporation	Zoom	Alvin Joseph Alviar	<a href="mailto:sales01@gtcpropack.com">sales01@gtcpropack.com</a> hrd@gtcpropack.com	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
April 4, 2022	WFP BARMM	Face-to-face	Mishael Argonza	0917 880 3135	1. Hector Maglalang 2. Jesus Jose Maria Bombasi
	Bangsamoro Food Sufficiency Task Force (BFSTF)		Engr. Mohajirin T. Ali, MNSA, Director General, Bangsamoro Planning and Development Authority, Head of BFSTF Secretariat	-	
	National Nutrition Council BARMM		Dr. Kadil M. Sinolinding, Jr. DPBO, Regional Director	-	
	Tapayan-Tuka Irrigators Multi-Purpose Cooperative		Warda S. Sulaiman – Manager	0917 703 0038 0935 540 7129 sulaimanwarda938@gmail.com	1. Marcela Saises 2. Kristoffer Dela Cruz

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
			Rahib M. Ambac – Asst. Manager	0935 525 5868	
			Fatima S. Lurunoc - Cashier	0927 970 6228	
April 5, 2022	Datu Abdullah Sangki	Face-to-face	Mayor Samsodhen Ampatuan Sangki	aiocsiomilg@gmail.com	1. Hector Maglalang 2. Jesus Jose Maria Bombasi
	Datu Abdullah Sangki School-Based Feeding Program (SBFP)		Gisela Tampus, RN – SBFP Coordinator	ma.gisela.tampus@deped.gov.ph	
			Jennifer Abesar	-	
			Maria Fe Hechanova	-	
			Amy Calibara	-	
			Veronica Silva	-	
			Marydith Belandres	-	
			Danesa Leal	-	
			Mary Grace Aguna	-	
			Mary Jane Hecnanova	-	
			Aileen Sibnga	-	
	Datu Saudi Ampatuan		Mayor Edris Asim Sindatok	<a href="mailto:adzmintan1995@gmail.com">adzmintan1995@gmail.com</a>	
	Datu Saudi Ampatuan School-Based Feeding Program (SBFP)		Bryan Lovelace Demabildo, RN – SBFP Coordinator	bldemabildo16@gmail.com	
			Tata Latip	-	
			Ilabai Kamensa	-	
			Mary Jane Dimanicom	-	
			Hader Esmael	-	
			Bailyn Bitol	-	
			Amsurin Lumena	-	
			Haguiar Esmail	-	
			Alamain Ebrahim	-	
			Saida Amino	--	
			Salih Guimat	-	
			Alibai Anri	-	
			Suraina Usop	-	
			Sahada Menak	-	

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers	
	Al Rahman Farmers' Cooperative		Modrika A. Masukat	0977 206 6069	1. Kristoffer Dela Cruz 2. Marcela Saises	
			Rahib W. Mamaluba	0926 378 2322		
			Tauti A. Mines	-		
			Muhlisin Usap	0955 591 7656		
	Pamatuladan A Bayanihan Peoples Organization		Nanding R. Sayutin	0936 596 8901		1. Kristoffer Dela Cruz 2. Marcela Saises
			Ali S. Luna	0921 318 9769		
			Mohidin U. Tungao	0926 462 1906		
			Nhoman Tumba	0936 039 9054		
	Talaposao Farmers Marketing Cooperative		Duri B. Kasim – Chairman	0916 173 8515	1. Kristoffer Dela Cruz 2. Marcela Saises	
			Norul-Izah B. Kasim	0936 318 1138		
			Adan G. Kaling	0905 132 0962		
			Omar U. Abdullah	0916 546 2438		
			Kagul B. Abdullah	0916 841 4344		
			Badurdin Anak	0916 218 6190		
			Soriya M. Malang	0916 173 8515		
	Department of Social Welfare and Drevelopment (DSWD) Disaster Response Management Bureau (DRMB)	Blended (face-to-face, Google Meet)	Clifford Cyril Y. Rival – Bureau Director	drmb@dswd.gov.ph	1. Maria Lourdes Vega 2. Fabiola Allysa Bringas	
			Sittie Warda M. Moslem	-		
			Trixcymae P. Bernal	-		
			Mariel B. Ferrariz	-		
			Corazon	-		
			Mark Poul B. Agno	-		
			Abigail Lorraine	-		

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
	World Food Programme Philippines (WFP)		Carleneth S. San Valentin	Neth.sanvalentin@wfp.org	
April 6, 2022	City of Upi	Face-to-face	Mayor Ramon Piang Sr.	pdcagara@yahoo.com	1. Hector Maglalang 2. Jesus Jose Maria Bombasi
	City of Upi School Based Feeding Program (SBFP)		Rhea Diosanta, RN – SBFP Coordinator	-	
			Analiza Maglasang	-	
			Rishain Escano	-	
			Elanie Dequito	-	
			Gina Salcedo	-	
			Jennyrose Sitjar	-	
			Margie Momalayag	-	
			Cristie May Solmerano	-	
			John Mark Managuit	-	
			Ma. Teresa Samtandor	-	
			Randy Pacio	-	
	Datu Blah Sinsuat		Mayor Datu Marshal Sinsuat	-	
	Datu Blah Sinsuat School Based Feeding Program (SBFP)		Myla Sinsuat, RN – SBFP Coordinator	mylasinsuat2017@gmail.com	
			Rogaya Ayunan	-	
			Aida Guignahan	-	
			Airah Ginalzali	-	
			Ashria Magundanno	-	
			Amina Adam	-	
			Muslina Mama	-	
			Asmaira Utto	-	
			Lambaina Alim	-	
			Alma Pangilinan	-	
			Faeldonia Rice Trading (FRT)	Marie Antonette C. Faeldonia	0917 192 9677 frt_justinrice@yahoo.com
	Rolando V. Uy			0917 528 9383	

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
	Ministry of Science and Technology (MOST)		Minister Aida Silangar	-	1. Marcela Saises
			Badria S. Lidasan	-	
			Vasrodin Buisan	-	
			Monawar Abdullah	0905 642 559	
			Abadradil Serde	-	
April 7, 2022	WFP BARMM	Face-to-face	Hasna Adam	0917 882 4798	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Kristoffer Dela Cruz 4. Marcela Saises
			Mishael Argonza	0917 880 3135	
			Rolando V. Uy	0917 528 9383	
April 8, 2022	DSWD – Bangsamoro Umupungan sa Nutritisyon (BangUn)	Zoom	Rommel Teofilo Aguilar – DSWD Central Office National Program Monitoring Office for BangUn. Nutritionist-Dietitian supervising nutrition-related matters of the project	<a href="mailto:BangUn@dswd.gov.ph">BangUn@dswd.gov.ph</a> 0908 981 0981	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi 4. Marcela Saises 5. Maria Lourdes Vega 6. Fabiola Allysa Bringas
April 11, 2022	Department of Education (DepEd) School Based Feeding Program (SBFP)	Zoom	Mei-ling Duhig – NFP National Focal Person	<a href="mailto:meiling.duhig@deped.gov.ph">meiling.duhig@deped.gov.ph</a> sbfp@deped.gov.ph	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
			Magdalene Cariaga – Senior Education Program Specialist	cherry.corpuz002@deped.gov.ph	
			Dr. Ma. Corazon C. Dumalao – Chief Health Program Officer, DepEd School Health Division	blss.shd@deped.gov.ph maria.dumlao@deped.gov.ph	
	Department of Science and Technology (DOST) Food and Nutrition Research Institute (FNRI)		Alexis Ortiz – Supervising Science Research Specialist	-	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi
			Abbie Padrones – Senior Science Research Specialist	<a href="mailto:abbie.padrones@yahoo.com">abbie.padrones@yahoo.com</a>	

Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
			Engr. Charlie Adona	-	4. Marcela Saises 5. Maria Lourdes Vega 6. Fabiola Allysa Bringas
	Alheed International		Nelvin Co – Vice President	0917-7350028 633-5892	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
April 18, 2022	DOST Region 1	Zoom	Decth Libunao – CEST Project Lead	<a href="mailto:mail@region1.dost.gov.ph">mail@region1.dost.gov.ph</a> dplibunao@region1.dost.gov.ph	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi 4. Marcela Saises 5. Maria Lourdes Vega 6. Fabiola Allysa Bringas
			Jordan Abad – Regional Director	jlabad@region1.dost.gov.ph	
			Bernadine Suniega – Project staff	jmviernes@region1.dost.gov.ph	
April 19, 2022	Department of Health (DOH) Health Promotion Bureau (HPB)	Zoom	Edna Nito – HEPO IV, Capacity Building and External Relations Division	<a href="mailto:enito.hpcs@gmail.com">enito.hpcs@gmail.com</a> hpb@doh.gov.ph	1. Hector Maglalang 2. Kristoffer Dela Cruz 3. Jesus Jose Maria Bombasi 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
	DOST Region VIII (Catarman, Northern Samar)	By phone	Engr. Veronica Aniban Laguitan	<a href="mailto:valaguitan@region8.dost.gov.ph">valaguitan@region8.dost.gov.ph</a> 09981925726	1. Marcela Saises
April 20, 2022	DOST Technology Application and Promotion Institute (TAPI)	Zoom	Mylene Alano – Senior Science Research Specialist	<a href="mailto:info@tapi.dost.gov.ph">info@tapi.dost.gov.ph</a> m.alano@tapi.dost.gov.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas



Date	Stakeholder	Channel	Respondent/s	Contact Details	Interviewers
May 2, 2022	Vitachem Industries	Zoom	Felix Co - President/General Manager/Technical Sales Head	T: +63 2 7759-8730   F +63 2 8929-8218 M: +63 917 534 4330 felix.co@vitachem.com.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
May 6, 2022	NNC – Nutrition Information and Education Division (NIED) and Nutrition Surveillance Division (NSD)	Zoom	Maria Renali Evangelista – NSD	renali.evangelista@nnc.gov.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Kristoffer Dela Cruz 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
			Julia Los Baños - NSD	julia.losbanos@nnc.gov.ph	
			Genrev Esguerra - NIED	genrev.esguerra@nnc.gov.ph	
			Ellen Ruth Abella – OIC, NSD	ellen.abella@nnc.gov.ph	
	DSWD Pantawid Pamilyang Pilipino Program (4Ps)		Maria Teresa Janiz D. Aldea	mtjdaldea@dswd.gov.ph	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas
			Arvin Longcop – Project development officer	atlongcop@dswd.gov.ph	
	WFP Better Access for Mothers and Babies on Integrated Nutrition Agenda (BAMBINA) Project		Dr. Ronald del Castillo – Consultant, Social and Behavior Change Communication (SBCC) UN WFP	ronald.delcastillo@wfp.org	1. Hector Maglalang 2. Jesus Jose Maria Bombasi 3. Marcela Saises 4. Maria Lourdes Vega 5. Fabiola Allysa Bringas

**Annex 4.** List of producers of iron-rice kernel (IRK)

Company/Contact Number	Plant Location/ Office	Type of Business	Source of Assistance (DOST/ Int'l Organization, etc.)	Type of Kernel	Process Used	Source of Product	Capacity kg/hr	Minimum Order, kg	Owner of Premix Technology	Status
<b>Local Producers – Operational</b>										
1. Nutridense Food Manufacturing Corporation (NFMC) 0999-7290234 0916-6418611 0923-7032198 <a href="mailto:nutridensefmc@yahoo.com.ph">nutridensefmc@yahoo.com.ph</a>	Sta. Barbara, Pangasinan, Region 1	Food Manufacturer of Healthy, Nutritious Foods	Small Enterprises Technology Upgrading Program (SETUP)- DOST-1  1 Extruder Machine only	Iron Rice Kernel	Extruded	Locally Produced	80-100	Not answered in the interview	With License from DOST-FNRI	Operational
2. Nutrition and Beyond Corporation (NBC)  0917-6201887 <a href="mailto:jayjdaci@gmail.com">jayjdaci@gmail.com</a>	San Leonardo, Nueva Ecija, Region 3	Rice Mill	1. Grant from International Life Sciences Institute (ILSI)-CHP Japan Through The DOST-FNRI Market Trial Project of IFR in Bataan-  1-Complete Line Extrusion Machine but not Continuous line  2. Company Owned - Newly Purchased Extruder Machine	Iron Rice Kernel	Extruded	Locally Produced	30-50  100-150	100	With License from DOST-FNRI	Operational
3. Nutritional Food Processing Facility  DOST-FNRI 837-3164 839-1836	Bicutan, Taguig City, NCR	Government Research Institution	DOST-TECHNICOM  1-Pilot scale Extruder Machine  1-Testing Extruder Machine	Iron Rice Premix and Multi-nutrient Rice Kernel	Extruded	Locally Produced	50-80  5-10	Facilities for rent only to Licensed Partners	DOST-FNRI	Operational

Company/Contact Number	Plant Location/ Office	Type of Business	Source of Assistance (DOST/ Int'l Organization, etc.)	Type of Kernel	Process Used	Source of Product	Capacity kg/hr	Minimum Order, kg	Owner of Premix Technology	Status
<a href="mailto:iangelesagdeppa@yahoo.com.ph">iangelesagdeppa@yahoo.com.ph</a> 8372071 <a href="mailto:milflorg1013@yahoo.com">milflorg1013@yahoo.com</a>			1-Complete Continuous Line Extruder Machine				80-100	Per hour basis		
<b>Importers of Fortified Rice Kernels and/or Iron Rice Kernels</b>										
1. Alheed International Trading Corporation 0917-7350028 8633-5892	Office - Pasig City, NCR	Importer rice premixes and agricultural Machineries	Company Owned	Iron Rice Kernel and multi nutrient rice kernel	Both Coated and Extruded	Imported from the Wright Group, USA	Not applicable	5,000	Wright USA	Awaiting orders
2. DSM Nutritional Products Philippines, Inc./IMCD 63-917-8652639 <a href="mailto:jan.chen@dsm.com">jan.chen@dsm.com</a> <a href="mailto:candie.gagpanam@dsm.com">candie.gagpanam@dsm.com</a>	Office – DSM BGC, Taguig City, NCR, IMCD – Makati City	Importer of Chemical and Nutritional Products	Company Owned	Multi-nutrient Rice Kernel	Extruded	Imported from DSM Plant in Thailand	Not applicable	5,000	DSM	Awaiting orders
<b>Local Producers -For training and testing, Awaiting Orders, Documents for Processing</b>										
1. Loaong LGU in partnership with Mainland Farmers' Producers Cooperative	Loaong Northern Samar, Region 8	Farmers' Cooperative	CEST Program, DOST -8 1-Complete Continuous Line Extruder Machine	Iron Rice Kernel	Extruded	Locally Produced	80-100	Not yet available Waiting for the delivery of the equipt.	Under negotiation With DOST-FNRI	Processing of documents for bidding

Company/Contact Number	Plant Location/ Office	Type of Business	Source of Assistance (DOST/ Int'l Organization, etc.)	Type of Kernel	Process Used	Source of Product	Capacity kg/hr	Minimum Order, kg	Owner of Premix Technology	Status
2. Maramag Community Multi-Purpose Cooperative 09177701588 09177051460 vmfuentes@dost.cpm.ph <a href="mailto:Bukidnonregion10@dost.gov.ph">Bukidnonregion10@dost.gov.ph</a>	Maramag, Bukidnon, Region 10	Farmers' Cooperative	CEST Program, DOST - 10 1-Complete Continuous Line Extruder Machine	Iron Rice Kernel	Extruded	Locally Produced	80-100	Not yet available Awaiting for the delivery of the equipt.	For finalization DOST-FNRI License	Start July 2022
<b>Stopped Production</b>										
1. CLG Health Food, Inc.	General Santos City, Region 12	Family Food Business	SETUP, DOST-12 1-Complete Continuous Line Extruder Machine	Iron Rice Kernel	Extruded	Locally Produced	80-100	Not available	With License from DOST-FNRI	Stopped due to low demand

**Annex 5.** List of fabricators for rice fortification

<b>Company/Contact Number</b>	<b>Address</b>	<b>Type of Business</b>	<b>Machine Offered for Rice fortification</b>	<b>Type of Product</b>	<b>With License from DOST-FNRI</b>	<b>Capacity/hour</b>	<b>Number of Machines Fabricated/ delivered</b>
1. Mundo Engineering Works 0907-153-6748 0905-429-6619 mundoengineering2021@gmail.com	P-7 Poblacion Nabunturan, Davao de Oro	Welding and Machining Engine Reconditioning Machineries Fabrication etc.	Portable Blending Machine	Local	No  (Has been part of the Project with DOST-FNRI on the scaling up of IFR in Mindanao)	30-40 bags of 50kg/hour of Iron Fortified Rice	4 Blending Machines
2. HDN Technology and Resources, Inc.  (046) 482 0300 hdn_metalfabrication@yahoo.com  09175862071 aileen_hdncad@yahoo.com	B9, L-1C 5 <sup>th</sup> St., Golden Mile Bus Park Carmona, Cavite	Manufacturer of high-quality products made of STAINLESS STEEL & other metallic and nonmetallic material	Portable Blending Machine	Local	Yes  (Equipment designed by DOST-FNRI)	30-40 bags of 50 kg/hour of Iron Fortified Rice	9 blending machines

<b>Company/Contact Number</b>	<b>Address</b>	<b>Type of Business</b>	<b>Machine Offered for Rice fortification</b>	<b>Type of Product</b>	<b>With License from DOST-FNRI</b>	<b>Capacity/hour</b>	<b>Number of Machines Fabricated/ delivered</b>
3. GTC Propack Corporation  Alvin Joseph Alviar 0998 977 5025 sales01@gtcpropack.com	GF KB VFP Bldg. C peter bilt Compound Veterans Center, Taguig City	Philippines' distributor of Food Processing, Packaging, and Pharmaceutical Machines	Continuous line Extruder Machine  and Blending Machine	Imported	Not applicable (Importer)	80-120 kgs/hour of Iron Rice Kernel  30-40 bags of 50kg/hour of Iron Fortified Rice	5 extruder machines  1 blending machine
4. Alheed International Corporation  0917-7350028 633-5892	Unit 2701 Antel Global Corp. Ctr. Julia Vargas Ave., Ortigas Center, Pasig City	Importer of Grain Dryers, Rice Milling Machineries and fortified rice kernel	Blending Machine	Imported	Not applicable (Importer)	5 tons/hour	23 old (c/o NFA) + 4 new Blending Machines
5. Bestmark Agro-Industrial Corporation  0998 868 2838 <a href="mailto:bestmarkagro@gmail.com">bestmarkagro@gmail.com</a>	151 Banaoang, Sta. Barbara, Pangasinan	Machine Fabricator	Blending Machine	Local	Not applicable (Company's design)	50bags of 50kg/hr	3
6. Felipe Pamintuan Machine Shop and Fabrication 0947 958 4447 0920 835 7879 0932407 2654	42 Brgy., Bugallon-Posada, San Carlos City, Pangasinan	Machining Solutions and Fabrication	Blending Machine	Local	Not applicable (Company's design)	50bags of 50kg/hr	1

**Annex 6.** List of producers of iron-fortified rice (IFR)

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
<b>Operational</b>										
1. Nutridense Food Manufacturing Corporation (NPMC)  0999-7290234 0916-6418611 0923-7032198 <a href="mailto:nutridensefmc@yahoo.com.ph">nutridensefmc@yahoo.com.ph</a>	<b>Region 1 -</b> Sta. Barbara, Pangasinan	Food Manufacturer of Healthy, Nutritious Foods	2 Blending Machines	Mundo Engineering Works, Davao de Oro, and  Felipe Pamintuan Machine Shop and Fabrication, San Carlos City, Pangasinan	Company Owned	RC 160  RC18	30-40 bags of 50 kg/hour  50 bags of 50 kg/hour  Total of 4.5 Tons/hour	None	Yes	Operational
2. San Pablo Multi-Purpose Cooperative 0919-576-9519 0951-865-0246 0906-480-9877 <a href="mailto:macosta@region1.dost.gov.ph">macosta@region1.dost.gov.ph</a>	<b>Region 1 -</b> Balaoan, La Union	Farmers' Cooperative	1 Blending Machine	Bestmark Agro-Industrial Enterprise,  Sta. Barbara, Pangasinan	DOST SET-UP Region 1	Not mentioned during the interview	50 bags of 50 kg/hour	None	Yes	Operational

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
3. Tangcarang, Techno-Demo Farm  0908-895-4121 agricultureoffice_alaminoscity@yahoo.com	<b>Region 1</b> - Alaminos City, Pangasinan	Local Government Unit (LGU)	1 Blending Machine	Bestmark Agro-Industrial Enterprise  Sta. Barbara, Pangasinan	DOST Grant-In-Aid (GIA) Region 1	Not mentioned during the interview	50 bags of 50 kg/hour	None	Yes	Operational
4. Alheed International Trading Corporation  0917-7350028 633-5892	<b>Region 2</b> – Isabela Province	Importer of Grain Dryers, Rice Milling Machinery, Blenders and fortified rice kernel	Big Blending Machine	Imported from Vietnam	Company Owned	Various	5 tons/hour	Yes	No  Used Company's mixing technology	Operational
5. JD Aguilar Commercial, Inc.  0917-6201887 jayjdaci@gmail.com	<b>Region 3</b> - San Leonardo, Nueva Ecija,	Rice Mill (Big)	Continuous blending machine	Imported	Company Owned	R64 Type Sinan-doming Dinorado RC160	5 tons/hour	Yes	Yes	Operational



Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
6. Food Baskets Corporation  arnel.pantaleon@foodbasketscorp.com  0977 8332745  rds_ccbpi@yahoo.com	<b>Region 4A -</b> Antipolo City, Rizal	Engaged in Canteen Operations, Catering, Food Processing, Leasing, Toll Packaging and Restaurant Operations	Special blending packaging machine for 400g IFR	Imported	Company Owned	NFA Rice	Around 1,200 sacks per week or about 1.25 tons/hour	None	Yes	Operational
7. CamSur Multi-Purpose Cooperative  0936-921-0344 0917 5144796 09989851252 <a href="mailto:camsur.mpc@gmail.com">camsur.mpc@gmail.com</a>	<b>Region 5 -</b> Zone 4 Cadlan, Pili, Camarines Sur	Farmers' Cooperative	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	No Assistance from DOST-Bicol Region  Cooperative Funds	Triple 2, RC 216, hybrid	30-40 bags of 50 kg/hour	Yes	Yes	Operational
8. Antofel Trading or Saavedra Rice Mill	<b>Region 11 -</b> Mongkayo,	Rice Trader and Rice Mill	1 Blending machine	Mundo Engineering	DOST SET UP Region XI	Tonner	30-40 bags of 50 kg/hour	Yes	Yes	Operational

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
0948-7305736 0920 906 5332 <a href="mailto:cardingsaavedra@gmail.com">cardingsaavedra@gmail.com</a>	Davao de Oro			Works, Davao de Oro						
9. Faeldonia Rice Trading and FRT Rice Mill  0917 192 9677 0908-880-7795 <a href="mailto:frt_justinrice@yahoo.com">frt_justinrice@yahoo.com</a>	<b>Region 12 -</b>  Noral, South Cotabato	Rice Mill (Big)	2 Blending Machines	Imported from Taiwan	Company Owned	Tonner	5 tons/hour	Yes	Did not apply  Used their own mixing technology	Operational
10. Nutritional Food Processing Facility, DOST-FNRI  837-3164 839-1836 <a href="mailto:iangelesagdeppa@yahoo.com.ph">iangelesagdeppa@yahoo.com.ph</a> 8372071 <a href="mailto:milflorg1013@yahoo.com">milflorg1013@yahoo.com</a>	Bicutan, Taguig City, NCR	Government Research Institution	2 Blending Machine	1-Satake machine Imported from Japan  1- HDN Technology and Resources, Inc., Carmona, Cavite	Foreign funded  DOST-TAPI	Various	50 bags of 50 kgs/hr  30-40 kgs of 50kg.hr	No	Not applicable	Facilities for rent only to Licensed Partners Per hour basis  Operational

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
<b>With Equipment (for delivery, training, and calibration)</b>										
1. JC Laroco Rice Mill  0925-871-0888 0917-719-7108 <a href="mailto:jennlaroco@yahoo.com">jennlaroco@yahoo.com</a>	<b>Region 1 -</b>  Lloren, Tubao,  La Union	Rice Mill	1 Blending Machine	HDN Technology and Resources, Inc.  Carmona, Cavite	DOST SET-UP Region 1	Variety not yet identified  Production not yet started	30-40 bags of 50 kg/hour	Yes	Under negotiation	For delivery
2. Metro Bugnay Multi-Purpose Cooperative  09297885899 I 09178408203 09959708808 <a href="mailto:jlabad@region1.dost.gov.ph">jlabad@region1.dost.gov.ph</a>	<b>Region 1 -</b>  Condon City, Ilocos Sur	Farmers' Cooperative	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	CEST-DOST-Region-1  LGU for the Building	Variety not yet identified  Production not yet started	30-40 bags of 50 kg/hour	None	Under negotiation	Staff Trained and machine calibrated by DOST-FNRI conducted
3. Rice Millers and Traders Association of Cervantes  09162978835	<b>Region 1 -</b>  Cervantes, Ilocos Sur	Rice Millers	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	CEST-DOST-Region-1	Special RC 160	30-40 bags of 50 kg/hour	Yes	Under negotiation	Staff trained and machine calibrated by DOST-

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
09178408203 09959708808 <a href="mailto:jlabad@region1.dost.gov.ph">jlabad@region1.dost.gov.ph</a>					LGU-for the Building					FNRI conducted
4. Vergara-Tagorda Rice Mill, Pangasinan  0939-914-6321 <a href="mailto:cesartagorda64@gmail.com">cesartagorda64@gmail.com</a>  <a href="mailto:pangasinan@region1.dost.gov.ph">pangasinan@region1.dost.gov.ph</a> <a href="mailto:phacsantos@region1.dost.gov.ph">phacsantos@region1.dost.gov.ph</a> 0998-962-0228	<b>Region 1 -</b>  Quetegan, Mangatarem, Pangasinan	Rice Mill	1 Blending Machine	Bestmark Agro-Industrial Enterprise, Sta. Barbara, Pangasinan	DOST SET UP Region 1	Variety not yet identified  Production not yet started	50 bags of 50 kg/hour	Yes	Yes	For calibration by DOST-FNRI
5. Palangue Agricultural Reform Cooperative  0926 011 7158 <a href="mailto:palarc@gmail.com">palarc@gmail.com</a> 0935 329 8312	<b>Region 4A -</b>  Palangue 2, Naic, Cavite	Farmers' Cooperative	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	DOST Grant-In-Aid (GIA)- Region 4A	Variety not yet identified  Production not yet started	30-40 bags of 50 kg/hour	None	Under negotiation	For training and calibration

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
<a href="mailto:pstccavitedost@gmail.com">pstccavitedost@gmail.com</a>										
6. Maramag Community Multi- Purpose Cooperative  09177701588 09177051460 vmfuentes@dost.cpm.ph Bukidnonregion10@dost.gov.ph	<b>Region 10 -</b>  Maramag, Bukidnon, Philippines	Farmers' Cooperative	1 Blending Machine	Imported from China through GTC Propack, Taguig City	CEST-DOST Region 12	White Tonner	30-40 bags of 50 kg/hour  Automated with bucket conveyor	Yes	Under negotiation	For training and calibration by DOST-FNRI
7. Pateros Municipal Nutrition Office  09399364037 meizlsincuya@gmail.com atienzak178@gmail.com 0287726157 0285710403	<b>NCR - LGU</b> Pateros	Local Government Unit (LGU)	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	CEST Program of DOST-NCR	Variety not yet identified  Production not yet started	30-40bags of 50kg/hr	None	Under negotiation	For training and calibration by DOST-FNRI

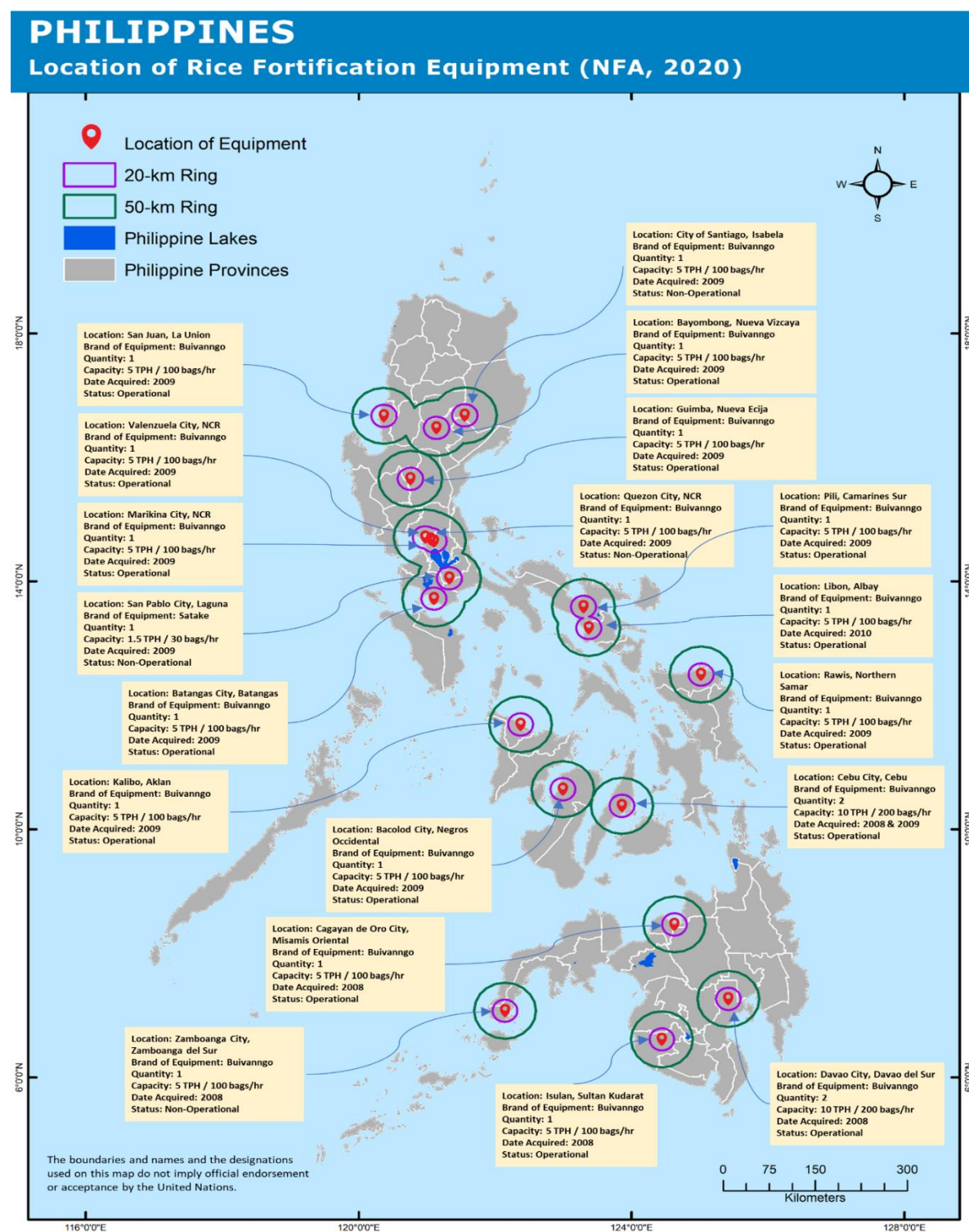
Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
8. Navotas Livelihood Hanap buhay Center  09273127222 <a href="mailto:warredd@gmail.com">warredd@gmail.com</a> 0287726157 0285710403 <a href="mailto:almazarelvin@gmail.com">almazarelvin@gmail.com</a> <a href="http://records@ncr.dost.gov.ph">records@ncr.dost.gov.ph</a>	NCR - LGU Navotas	Local Government Unit (LGU)	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	CEST-DOST-NCR	Variety not yet identified  Production not yet started	30-40bags of 50kg/hr	None	Under negotiation	For training and calibration by DOST-FNRI
<b>Others</b>										
1. Ilocos Norte Cooperative  0917 5444357 <a href="mailto:dplibunao@region1.dost.gov.ph">dplibunao@region1.dost.gov.ph</a>	<b>Region 1 -</b> Ilocos Norte	Farmers' Cooperative	1 Blending Machine	HDN Technology and Resources, Inc., Carmona, Cavite	CEST-DOST Region 1	Variety not yet identified  Production not yet started	30-40bags of 50kg/hr	None	Under negotiation	Organizing Cooperative in Ilocos Norte
2. Mainland Farmers'	<b>Region 8 -</b>	Farmers' Cooperative	1 Blending Machine	Imported from China through	CEST-DOST Region 8	Variety not yet identified	30-40 bags of 50kg/hr	Yes	Under negotiation	Funds available, Preparing

Company	Site of Rice Mill/ Blending Facility	Classification	Blending Equipment	Fabricator	Assistance/ Source of Funds	Variety of Rice	Capacity/ hour	With Rice Mill	With License from FNRI	Status
Producers Cooperative  In partnership with LGU Loaong DOST-N. Samar  0998 192 5726 <a href="mailto:valaguitan@region8.dost.gov.ph">valaguitan@region8.dost.gov.ph</a>	Loaong, Northern Samar			GTC Propack, Taguig City		Production not yet started				documents for bidding
3. Bagayas Rice Mill  0927-5275317 <a href="mailto:smalegado@region11.dost.gov.ph">smalegado@region11.dost.gov.ph</a> 087 3884 085 <a href="mailto:ord@region11.dost.gov.ph">ord@region11.dost.gov.ph</a>	<b>Region 11 -</b> Davao Oriental	Rice Mill and Rice Trader	1 Blending Machine	Mundo Engineering Works, Davao de Oro	DOST SET UP Region X1	Tonner	30-40 bags of 50kg/hr	Yes	Did not apply	Stopped due to low demand
4. Loronix Rice Mill  0920-4129151 <a href="mailto:gapslorn@gmail.com">gapslorn@gmail.com</a>	<b>Region 11 -</b> Nabunturan, Davao de Oro	Rice Mill and Rice Trader	1 Blending Machine	Mundo Engineering Works, Davao de Oro	DOST SET UP Region-X1	Tonner	30-40 bags of 50kg/hr	Yes	Did not apply	Stopped due to low demand

<b>Company</b>	<b>Site of Rice Mill/ Blending Facility</b>	<b>Classification</b>	<b>Blending Equipment</b>	<b>Fabricator</b>	<b>Assistance/ Source of Funds</b>	<b>Variety of Rice</b>	<b>Capacity/ hour</b>	<b>With Rice Mill</b>	<b>With License from FNRI</b>	<b>Status</b>
5. National Food Authority (NFA)  455-5274	<b>NCR -</b> Visayas Ave., Diliman Quezon City	Government Agency for rice buffer stocking	Importation of 31 Big blending machines	Imported from Vietnam from Alheed	Gov't Funds	Various so called NFA Rice	5 tons/hr x 4 = 20 tons/hr.	Yes	Not applicable	Pilot testing of 4 blending machines



## Annex 7. Location of NFA rice fortification blending facilities nationwide



## Annex 8. DSM rice kernel for fortification

### Assumptions:

Mixing ratio of premix to rice is 1:100 to produce fortified rice  
 Conversion factor of cooked rice to milled rice is 0.417 (source FNRI)  
 100 grams cooked rice = 41.7 grams fortified rice (approximately ½ cup cooked rice well packed)

200 grams cooked rice = 83.4 grams fortified rice (approximately 1 cup cooked rice well packed)  
 Based on 2002 RENI Table  
 Iron and Zinc RENI for pregnant women based on 2<sup>nd</sup> trimester

Fortificant	Amount in Premix/ 100 gms	Amount in 100 gms fortified rice raw	1 to 3 years old			4 to 6 years old			7 to 9 years old			Pregnant women		
			RENI	% RENI 100 gms cooked	% RENI 200 gms cooked	RENI	% RENI 100 gms cooked	% RENI 200 gms cooked	RENI	% RENI 100 gms cooked	% RENI 200 gms cooked	RENI	% RENI 100 gms cooked	% RENI 200 gms cooked
Vitamin A	18,340 mcg	183 mcg	400	19.1	38.2	400	19.1	38.2	400	19.1	38.2	800	9.5	19
Vitamin B1	40 mg	0.4 mg	0.5	33.4	67	0.6	27.8	55.6	0.7	23.8	47.7	1.4	11.9	23.8
Vitamin B6	39 mg	0.39 mg	0.5	32.5	65	0.6	27.1	54.2	1.0	16.3	32.6	1.9	8.6	17.2
Vitamin B12	72 mg	0.72 mg	0.9	33.4	66.7	1.2	25	50	1.8	16.7	33.4	2.6	11.5	23.1
Niacin	480 mg	4.8 mg	6	33.4	66.8	7	28.6	57.2	9	22.2	44.4	18	11.1	22.1
Folic Acid	8,000 mcg	80 mcg	160	20.9	41.7	200	16.7	33.4	300	11.1	22.2	600	5.6	11.1
Iron	600 mg	6 mg	8	31.3	62.6	9	27.8	55.6	11	22.7	45.5	34	7.4	14.7
Zinc	192 mg	1.92 mg	4.5	17.8	35.6	5.4	14.8	29.6	5.4	14.8	29.6	6.6	12.1	24.2

**Annex 9.** Iron-fortified rice procurement by DepEd School Division Offices, 2021

## Schools Division Offices (SDOs) with Procurement of Iron-Fortified Rice

Region	SDO	Contract Amount	Status
I	La Union	3,880,440.00	On-going delivery
I	Pangasinan I	52,861,326.00	On-going delivery
I	San Fernando City	445,680.00	On-going delivery
III	Malolos	688,704.00	On-going delivery
III	Aurora	7,196,475.00	On-going delivery
III	Bulacan	9,459,720.00	On-going delivery
III	Tarlac City	1,921,035.90	On-going delivery
III	Pampanga	5,501,503.91	On-going delivery
IV-A	San Pablo	2,063,520.00	On-going delivery
IV-A	Cavite Province	8,499,677.00	On-going delivery
IV-A	Binan City	1,779,300.00	On-going delivery
IV-A	Laguna	9,308,700.00	Done
VII	Carcar City	803,196.00	
NCR	Manila	4,525,400.00	On-going delivery
<b>Total</b>		<b>85,640,857.81</b>	

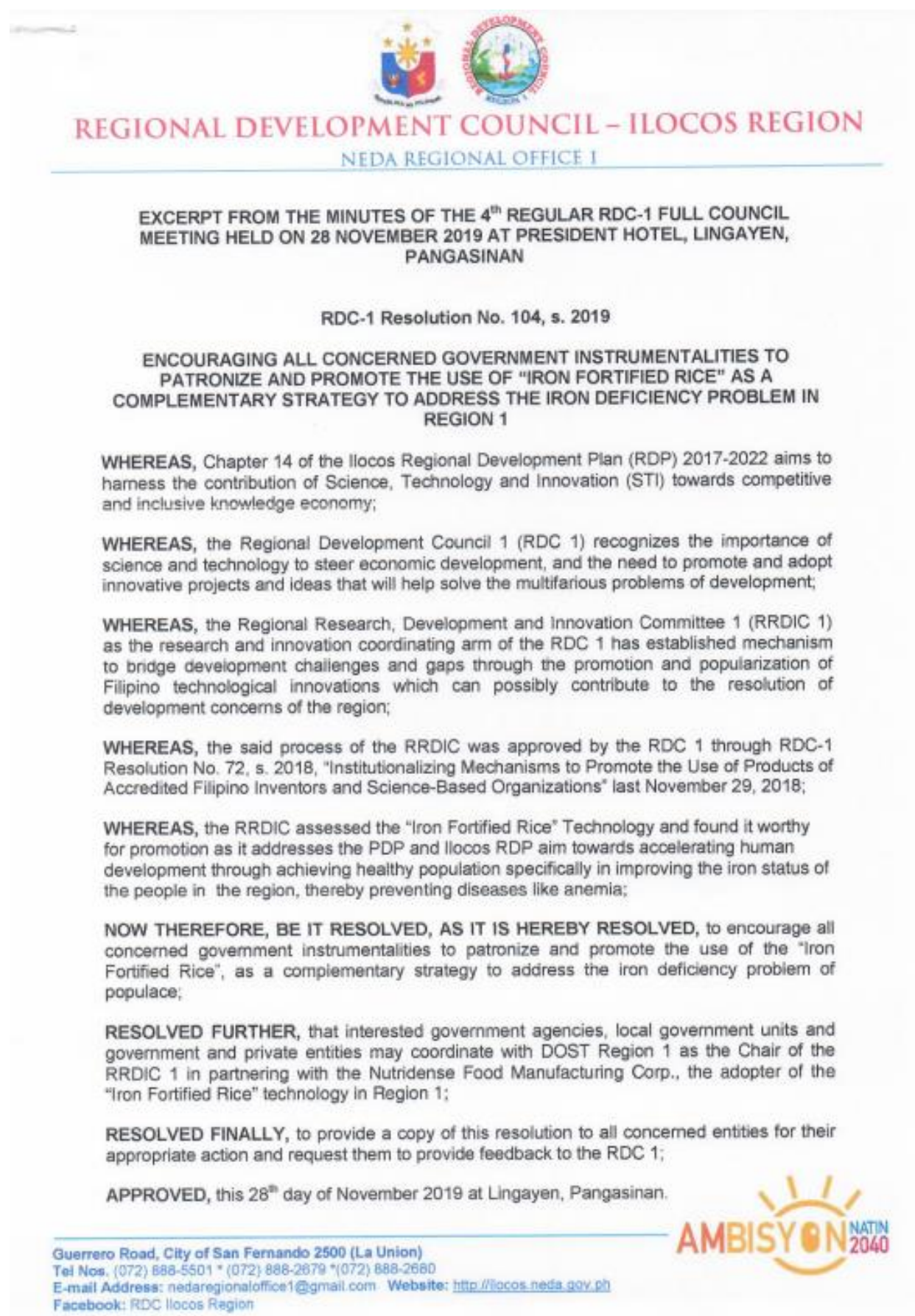
**Annex 10.** IFR requirement per region for DepEd SBFP (2022) and DSWD SFP (2015).

Assumption:

DepEd requirement per beneficiary is 350 grams/5 days or 8.4 kg IFR per beneficiary

DSWD requirement per beneficiary is 100 grams/day or 12 kg IFR per beneficiary

<b>Region</b>	<b>DepEd Targets</b>	<b>IFR Needed (MT)</b>	<b>DSWD Targets</b>	<b>IFR Needed (MT)</b>	<b>Total IFR needed DepEd and DSWD (MT)</b>
I – Ilocos	176,929	1,486.20	84,532	1014.384	2,500.59
II – Cagayan	108,483	911.26	91,712	1100.544	2,011.80
III – Central Luzon	334,448	2,809.36	128,073	1536.876	4,346.24
IV-A - Calabarzon	553,714	4,651.20	189,320	2271.84	6,923.04
IV-B - Mimaropa	147,971	1,242.96	78,479	941.748	2,184.70
V – Bicol	299,417	2,515.10	150,000	1800	4,315.10
VI – Western Visayas	277,003	2,326.83	193,922	2327.064	4,653.89
VII – Central Visayas	272,079	2,285.46	143,255	1719.06	4,004.52
VIII – Eastern Visayas	189,607	1,592.70	69,590	835.08	2,427.78
IX - Zamboanga	152,945	1,284.74	109,553	1314.636	2,599.37
X – Northern Mindanao	180,296	1,514.49	166,825	2001.9	3,516.39
XI – Davao	153,666	1,290.79	120,000	1440	2,730.79
XII - SOCCSKSRAGEN	171,142	1,437.59	99,121	1189.452	2,627.04
XIII - CARAGA	109,754	921.93	75,791	909.492	1,831.43
NCR	313,720	2,635.25	130,960	1571.52	4,206.77
CAR	40,857	343.20	45,045	540.54	883.74
BARMM	160,000	1,344	102,409	1228.908	2,572.91
<b>Philippines - Grand Total</b>	<b><u>3,642,031</u></b>	<b><u>30,593</u></b>	<b><u>1,978,587</u></b>	<b><u>23,743</u></b>	<b><u>54,336</u></b>







**REGIONAL DEVELOPMENT COUNCIL – ILOCOS REGION**  
NEDA REGIONAL OFFICE 1

**CERTIFIED TRUE AND CORRECT:**

**DONALD JAMES Gawe**  
RDC-1 Secretary  
(NEDA RO1 Asst. Regional Director)

**ATTESTED BY:**

**NESTOR G. RILLON**  
RDC-1 Vice-Chairperson  
(NEDA RO1 Regional Director)

Guerrero Road, City of San Fernando 2500 (La Union)  
Tel Nos. (072) 888-5501 \* (072) 888-2679 \* (072) 888-2680  
E-mail Address: [nedaregionaloffice1@gmail.com](mailto:nedaregionaloffice1@gmail.com) Website: <http://ilocos.neda.gov.ph>  
Facebook: RDC Ilocos Region



**Annex 12.** Communications and strategic plan for rice fortification  
(An output of a workshop held on 10-12 February 2016.)

Republic of the Philippines  
Department of Health  
National Nutrition Council

**Table 12.1** Setting milestones/ targets, identifying key barriers, enablers, strategies, involved agency and timeline

Barrier	Enablers	Strategies	Involved agency	Timeline
FDA standards on fortification Specifications of fortificants Mixing process Ratio of fortificant	Existing technology on fortification	Convene a small group meeting to review and discuss the IFR as well as revisit the study conducted by NCP and review recommendations	FNRI, NFA, NNC, FDA, HCM, Rice Industry	February 11, 2016
Issues on the legalities of IFR (specific issues must be addressed)	Study on the Policy Review on Mandatory Fortification (NCP, 2012)	Technical working group of Food Fortification will write to FDA to address the issues on IFR with consultation from FNRI as they know the technology and strategy on fortification Revise and study RA 8976 and its IRR	NNC, HCM, FNRI, NFA, FDA, Rice Industry  NNC as lead	End of February 2016
Perception on the quality of the product	Consumer demand for IFR as DSWD and DepEd need this for SFP	Conduct of advocacy meeting and dialogues to include NAPC and NFAC	NNC, NFA, DA	See output of Workshop 2
	An existing DSWD guidelines on feeding program	Discuss and arrange the proper mechanism on the procurement of fortificant between Disaster Group of DSWD and NFA	Disaster group of DSWD and Marketing group of NFA	On-going

Barrier	Enablers	Strategies	Involved agency	Timeline
	<p>DSWD Manual on SFP can buy IFR from private sector</p> <p>Existences of ordinances like Compostella Valley's</p> <p>RA 9184 "Government Procurement Reform Act" and Government Procurement Policy Board</p>	<p>Development of manual of SFP</p> <p>Disseminate Compostella Valley ordinance as model</p> <p>Download the guidelines on alternative mode of procurement on GPPB website and disseminate</p>	<p>DSWD PSD</p> <p>DOH and DILG</p> <p>NNC</p>	<p>On-going and provide update by March 2016</p> <p>During advocacy meetings</p> <p>February 19, 2016</p>
Lack of supply of fortificant (ferric pyrophosphate) and fortified kernels	<p>Existence of Supplier of fortificant</p> <p>Local technology transfer for fortified kernel available</p>	<p>Distributor to discuss with fortificant producer possible discount</p> <p>FNRI to conduct seminars to encourage millers and rice industry to produce fortified kernels</p>	<p>FNRI and VITACHEM</p> <p>FNRI and NFA</p>	<p>On going</p> <p>As needed</p>
Funds for Communication and Promotions	Existing media programs of NNC and other agencies	Text blasting, Radyo ng Bayan, Social Media, Segment buying Existing media programs of agencies needs evaluation on how well it directs message to the mass	PIA and NNC	ASAP
Proper/No Enforcement of the Law	Upcoming presidential election	Write to COMELEC malnutrition issues and	NNC	February 19, 2016



Barrier	Enablers	Strategies	Involved agency	Timeline
		SDG2 as topic in presidential debates  MOA Review between NFA and FDA.  Identify role of LGUs	FDA and NFA  NNC with DILG and BLHD	Schedule with FDA  For discussion

**Table 12.2a** Communications plan on rice fortification for rice industry

<b>Target Group/Audience: Rice Industry (Millers, Farmers, Wholesalers, Middlemen, Retailers)</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
Awareness of RA 8976 (ALL)	Benefits of mandatory rice fortification for anemia reduction that benefits whole family	NFA during renewal of license Provision of IEC materials (flyers and posters) Seminars pre-requisite for renewal BAEx	During renewal of license (give flyer) Seminars monthly	Yearly as needed	DA for farmers NFA (BAEx) LGU's as part of business permits NAPC/ NAFC	No. of licenses granted with IFR No. of agriculturists trained % attendees who gained knowledge based on evaluation form
To understand the need for premix and blenders to produce IFR (millers, wholesalers)	It is important to produce premix and mix properly the premix to rice to obtain correct level of iron	NFA during renewal of license Provision of IEC materials (flyers and posters) Seminars pre-requisite for renewal and connect millers to fabricators of blenders	During renewal of license (give flyer) Seminars monthly	Yearly as needed	NFA LGU's as part of business permits  FNRI	% attendees who gained knowledge based on evaluation form  % of attendees who purchased blending machines  No. of millers producing premix and IFR
Retailers/dealers and traders to sell IFR	Benefits of IFR Inform suppliers of IFR	NFA during renewal of license	During renewal of	Yearly as needed	NFA	No. of retailers and traders selling IFR

<b>Target Group/Audience: Rice Industry (Millers, Farmers, Wholesalers, Middlemen, Retailers)</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
		Provision of IEC materials (flyers and posters) Seminars pre-requisite for renewal and connect them to suppliers of IFR	license (give flyer) Seminars monthly			
Industry associations (PHILCONGRAIN S, GRECON, Farmers groups)	To be convinced that they should be partners in advocating rice fortification	Advocacy meeting with NFA and DA	Quarterly	Start by 3 <sup>rd</sup> Quarter of 2016	NFA, DA	Industry associations advocating rice fortification to members  No. of seminars organized by the association to members

**Table 12.2b** Communications plan on rice fortification for consumers, focused on social safety net programs

<b>Target Group/Audience: Social Safety Net Program Participants and their Parents/Care-givers</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
Increased knowledge on the advantage of using IFR vs non-fortified rice	Health benefits of IFR – controls anemia	PTA meetings-serve IFR during meetings  School-based activities (Nutrition Month)  Parent effectiveness sessions/ family development sessions(develop complementary	At least twice a year  At least once a year  At least one session per year	2016	DepEd-homeroom teachers  DSWD-parent leader, municipal link, Day care workers	Pre- and post- interview (develop survey form)  Indicator: % increased of parents of the participants who increased their knowledge on IFR

<b>Target Group/Audience: Social Safety Net Program Participants and their Parents/Care-givers</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
		material on IFR to be included in the module)  Existing media programs of NNC and other government agencies  Convene international and national NGOs involved in feeding programs			NNC, PIA  NNC, DOH, DSWD, DILG, ULAP, DepEd	Proportion of NGOs who attended the forum who bought IFR for their SSNP
NGOs to buy IFR for their SSNP	New technology produces colorless, tasteless and odorless IFR					

**Table 12.2c** Communications plan on rice fortification for government, including LGUs

<b>Target Group/Audience: Government/LGUs</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
Commitment to enforce/implement the law Agencies to adhere/implement the law for safety net programs NFA – fortification/distribution Ensure budget allocation	Agencies to integrate activities re: implementation of the law  Orientation (key messages to be delivered)  Distribution of IFR for safety net programs  Ensure procurement of IFR for government safety net programs  to act on the pending revised standards for fortification document submitted	NNC to convene Governing Board (Secretaries)  NNC- To also convene face meetings with Secretaries of DSWD, DOH, FDA, NFA, DOST	Twice a Year	April 2016  February-March 2016	NNC Secretariat  NNC + selected TWG members	% of SF programs utilizing IFRs % of IFR distributed during calamities  Revised and published standards

<b>Target Group/Audience: Government/LGUs</b>						
<i>Expected behavior</i>	<i>Message</i>	<i>Channel to convey message</i>	<i>Frequency</i>	<i>Timeline</i>	<i>Responsibility</i>	<i>Evaluation to determine effectiveness</i>
Phase Implementation Licensing of rice millers	to reconvene the TWG for review and revision of the IRR	Tech Com and NNC Governing Board		March – December 2016	Small group to be convened by NNC Secretariat	% of industry compliance Kernel quality monitored
DSWD/DEPED/DOH – to utilize IFR for safety net programs with sufficient funds for procurement FDA-DOH – to ensure approval and enforcement of standards, to conduct monitoring and review (re-issuance of circular on hospitals to use IFR/ use of IFR on undernourished High school students )	Government agencies to provide fund for the relaunch  Government canteens to serve IFR  Rice subsidy of local gov't employees should be IFR					Presented to Techcom and Approved by NNC Governing Board  Full implementation of the law by responsible agencies
NNC- Review and revise IRR and if needed, all existing policies on rice fortification.						
Nationwide Relaunching of IFR with full media blast		Through NNC		July	NNC	
LGU to develop local ordinance						



# Do You Know that...

## IRON DEFICIENCY ANEMIA IS STILL PREVALENT IN THE PHILIPPINES?



- Iron deficiency anemia (IDA) or anemia affects 30% of the world's population, making it the most common nutritional deficiency.
- In developing countries like the Philippines, the most common cause of anemia is **insufficient intake of iron-rich food in the diet.**
- **Anemia was the most important contributing factor to the global burden of disease,** according to the World Health Organization in 2002.
- **Anemia mostly affects 4 out of 10 infants ages 6 to 11 months** in the Philippines and is still considered as "**severe**" public health problem, according to the Food and Nutrition Research Institute's 2013 National Nutrition Survey (FNRI NNS, 2013).
- **1 in 10 school-aged children has anemia,** which adversely effects their cognitive performance, behavior, and physical growth (FNRI NNS, 2013).
- Pregnant and lactating women are at-risk, with 1 out of 4 pregnant women and 2 out of 10 lactating mothers with anemia (FNRI NNS, 2013).
- Anemia during pregnancy increases health risks for mothers and newborns, as well as increases risk of haemorrhage, sepsis, maternal mortality, perinatal mortality and low birth weight (WHO, Iron Deficiency Anaemia Assessment, Prevention, and Control - A guide for programme managers, 2001).
- Anemia leads to poor physical performance, decreased productivity, weight loss, weak resistance and immunity to sickness, anemic babies born by anemic mothers and even death in serious cases.
- Lack of iron in the blood is largely due to lack of consumption of iron-rich foods like liver, meat, chicken blood, fish, shellfish, eggs, beans, nuts, dried fruits, dark green leafy vegetables, seaweeds and iron-fortified products.
- Iron-Fortified Rice (IFR) is an ideal source of iron for Filipinos since we eat rice three times a day on the average.
- IFR developed by the FNRI of the Department of Science and Technology (DOST) is now increasingly made available commercially by technology adaptors nationwide.

### Buy and eat Iron-Fortified Rice and see your productivity rise!



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934; [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com); [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
 or visit your DOST regional or provincial office.  
 Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.



# Do You Know that...

## ANEMIA POSES HEALTH RISKS AND DECREASES PRODUCTIVITY?



- Iron is an important micronutrient responsible for many body processes, like bringing oxygen to all part of the body, production of genetic material, healthy nerves, energy absorption and cell development.

- There is an increased demand for iron by our body especially during the rapid growth stage among children, adolescents, pregnant women and breastfeeding mothers.

- Lack of iron in the blood or iron deficiency anemia (IDA) is largely due to the lack of consumption of iron-rich foods like liver, meat, chicken blood, fish, shellfish, eggs, beans, nuts, dried fruits, dark green leafy vegetables, seaweeds and iron-fortified products.

- IDA leads to poor physical performance, decreased productivity, weight loss and weak immune system leading to infection.

- In serious cases, anemic babies born to anemic mothers are more at-risk of death.

- Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.

- IFR developed by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) is now increasingly made available commercially by technology adoptors nationwide.

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like  
our Facebook page: Development, production and dissemination made possible through the collaboration  
among DOST-FNRI, DOST regional and provincial offices, Nutrition International,  
National Nutrition Council, FNRI IFR adaptors and LGUs concerned.





# Do You Know that...

## ANEMIA POSES HEALTH RISKS AND DECREASES PRODUCTIVITY?



- Children with anemia have poor physical, mental and overall school performance.
- The effects of anemia are serious in the first 1,000 days of life or the period from a child's conception to two years of age.
- This critical window of opportunity determines an individual's future, physical and mental health, emphasizing the importance of addressing anemia in infants and children.
- For all age groups, anemia can decrease immunity from infections and other diseases.
- Pregnant women with anemia have increased risk for complications in pregnancy, like premature birth and abnormal growth of the baby in the womb.
- Lack of iron in the blood or iron deficiency anemia (IDA) is largely due to the **lack of consumption of iron-rich foods like liver, meat, chicken blood, fish, shellfish, eggs, beans, nuts, dried fruits, dark green leafy vegetables, seaweeds and iron-fortified products.**
- Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.
- IFR developed by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) is now **increasingly made available commercially by technology adoptors nationwide.**

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like  
our Facebook page: Development, production and dissemination made possible through the collaboration  
among DOST-FNRI, DOST regional and provincial offices, Nutrition International,  
National Nutrition Council, FNRI IFR adoptors and LGUs concerned.





# Do You Know that...

## IRON DEFICIENCY ANEMIA CAN BE PREVENTED?



- **Consumption of iron-rich food is the most desirable and sustainable methods of preventing anemia.**

- Strategies in preventing anemia should improve availability of and access to iron-rich foods, especially among at-risk groups.

- Campaign for addressing anemia must be sustained to influence feeding practices towards consumption of iron-rich foods.

- Consume foods that increase iron absorption like meat, poultry, fish, and seafood, plus those high in vitamin C like citrus fruits, juices, tubers, green leafy vegetables, cauliflower and cabbage, among many others to increase iron absorption in foods.

- Plan meals carefully. Avoid food that reduces iron absorption like cereal bran, flour from whole grains, legumes, nuts, and seeds, plus those with high inositol content like energy drinks as well as those high in tannins like tea, coffee, cocoa and herbal infusions.

- Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.

- IFR developed by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) **is now increasingly made available commercially by technology adoptors nationwide**

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:

**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph) or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like

our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adoptors and LGUs concerned.



# Do You Know that...

## IRON FORTIFICATION OF RICE IS MANDATORY?



- **Fortification is the process of increasing the nutritional value of food by adding vitamins and minerals to prevent nutritional deficiencies and provide a health benefit with minimal risk.**

- Iron fortification in staple foods, such as rice, has been found as an effective long-term approach to improving the iron status of populations.

- **Compliance aspects indicate that iron fortification is better than supplementation.**

- In the Philippines, Republic Act 8976, also known as the "Philippine Food Fortification Act of 2000", is the legal basis for the mandatory food fortification of rice with iron.

- **Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.**

- **Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.**

- IFR developed by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) is now increasingly made available commercially by technology adaptors nationwide.

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



TOGETHER,  
**WE RISE FOR  
FORTIFIED RICE**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.





# Do You Know that...

## SUCCESSFUL PARTNERSHIPS FOR IRON-FORTIFIED RICE EXIST?



- **The National Nutrition Council (NNC) coordinates programs to scale-up rice fortification in the Philippines.**

- **"Moving Forward Towards Mandatory Rice Fortification in the Philippines"** is a collaboration with the United Nations Children's Fund (UNICEF) and Food Fortification Initiative.

-The collaboration brings Iron-Fortified Rice to school children through the Department of Education's (DepEd) school-based feeding program (SBFP) for malnourished kindergarten to Grade 6 pupils and the Department of Social Welfare and Development's (DSWD) supplementary feeding program for children 2-5 years old in daycare centers.

-The Department of Science and Technology's Food and Nutrition Research Institute conducted a project on **"Scaling-Up Rice Fortification Program through Technology Transfer: A Strategy towards Nutrition Security"** in Regions XI and XII.

- This model that includes the implementation of an ordinance in support of rice fortification is now implemented at Compostela Valley province and strives to go nationwide for its campaign on IFR and prime-up production through partnerships.

- In 2017, the Nutrition International (NI) offered its technical assistance for scaling up rice fortification for Social Safety Net Programs (SSNP)

- Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.

-IFR was developed by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST) **and is now increasingly made available commercially**

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.



# Do You Know that...

## COMPOSTELLA VALLEY IS A MODEL OF PARTNERSHIP FOR IRON-FORTIFIED RICE PROGRAM?



- **Compostella Valley (ComVal) is implementing a model of the Department of Science and Technology's Food and Nutrition Research Institute (DOST-FNRI) for a feeding program using iron-fortified rice (IFR), in cooperation with Gawad Kalinga's Kusina ng Kalinga.**

- The ComVal Provincial Ordinance mandates use of IFR in Social Safety Net Program(SSNP) and Food Service Establishments **to strengthen the campaign for iron-fortified rice.**

- The Department of Science and Technology's Food and Nutrition Research Institute of the (DOST-FNRI) and DOST Region XI were conferred with the 2017 Civil Service Commission (CSC) Pagasa Award for the effective implementation of rice fortification in Compostella Valley.

- This DOST-FNRI project also garnered the Alberto Romualdez Outstanding Health Research Award (AROHRA) given by the DOST's Philippine Council for Health Research and Development in August 2017.

- **Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.**

- **IFR was developed by the DOST-FNRI and is now increasingly made available commercially by technology adoptors nationwide.**

**Buy and eat Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like

our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.





# Do You Know that...

## LOCAL GOVERNMENT UNITS ARE KEY TO ANEMIA PREVENTION THROUGH IRON-FORTIFIED RICE (IFR)?



- **Iron-Fortified Rice (IFR) has been proven to help address anemia.**

- IFR is produced by mixing iron rice premix with ordinary rice to produce IFR that provides 50% of our daily requirement for iron if we consume 4 to 5 cups of IFR daily.

- Anemia is due to the lack of iron in the blood.

- Anemia leads to poor physical performance, decreased productivity, weight loss and weak resistance and immunity to sickness.

- In serious cases, anemic babies born by anemic mothers are at greater risk of dying.

- Lack of iron in the blood is largely **due to lack of consumption of iron-rich foods like liver, meat, chicken blood, fish, shellfish, eggs, beans, nuts, dried fruits, dark green leafy vegetables, seaweeds and iron-fortified products.**

- Iron-Fortified Rice (IFR) is an ideal source of iron since we eat rice three times a day on the average.

- A model partnership among DOST-FNRI, DOST Compostella Valley provincial office, Nutrition International, Gawad Kalinga, Saavedra Rice Mill of Moncayo and the concerned local government units of Compostela Valley has been successful in addressing anemia by feeding school children with IFR.

- Local government units with high prevalence of anemia can avail of the IFR technology from DOST-FNRI by coordinating with DOST regional and provincial offices to facilitate similar partnership.

**Adopt Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page  
Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, Saavedra Rice Mill of Moncayo and the Local Government of Compostela Valley.



# Do You Know that...

## ENTREPRENEURS CAN HELP FIGHT ANEMIA BY SUPPORTING RICE FORTIFICATION



Anemia remains to be a persistent National health problem with 1 in 10 (11.2%) Filipinos suffering from it.

- IFR is ordinary rice mixed with an iron fortificant that provides 50% of our daily requirement for iron if we consume 4 to 5 cups of IFR daily.

- NFMC is the technology adopter of IFR developed by the Department of Science and Technology's Food and Nutrition Research Institute.

- **NFMC sells IFR under the brand NUTRIDENSE Rice for Php 45.00 per kilo.**

- The added cost of fortifying rice with iron to combat anemia is just **Php 2.00 per kilo.**

- The estimated capital needed to produce the premix to fortify rice with iron is around Php 5 million, depending on the planned scale of production.

- NFMC delivers nationwide through various shipment methods.

- DOST-FNRI developed IFR to help address anemia that still significantly affects infants, pregnant and lactating women and the elderly.

- Anemia is due to the lack of iron in the blood.

- Anemia leads to poor physical performance, decreased productivity, weight loss, weak resistance and immunity to sickness, anemic babies born by anemic mothers and even death in serious cases.

- Local government units with high prevalence of anemia can avail of the IFR technology from DOST-FNRI by coordinating with DOST regional and provincial offices to facilitate partnerships with rice millers, local government units (LGUs) and NGOs.

**Adopt Iron-Fortified Rice and see your productivity rise!**



For more information on Iron-Fortified Rice, contact:

**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph) or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page

Also contact **Mr. Racky Doctor**, **NUTRIDENSE President**, at Malanay, Santa Barbara, Pangasinan through

**Telefax: (075) 600 8251**; Manila Office at UP-ISSI, Virata Hall, UP Diliman, Quezon City;

**Mobile: 0999-729-0234, 0916-641-8611, 0923-703-2193**; Email: [nutridensefmc@yahoo.com.ph](mailto:nutridensefmc@yahoo.com.ph).

Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices Nutrition International, National Nutrition Council and the Provincial Health and Nutrition Offices of Pangasinan.



**D** La Union Province recently enacted an ordinance on rice fortification.

**E** In Urdaneta City, Pangasinan, all public elementary schools are providing iron- fortified rice in the school-based feeding program for Kindergarten to Grade 6.

**F** Compostela Valley (ComVal) Province enacted an ordinance for rice fortification in 2015. In 2016, a pilot study on a central kitchen model for school feeding with Gawad Kalinga (GK) and DepEd resulted in the significant decrease in anemia and malnutrition (93.4% increase to normal status). The implementation of the ordinance and Central Kitchen Model resulted in ComVal together with FNRI, DOST ComVal and Region XI being given the 2017 PAGASA Award of the Civil Service Commission conferred by President Rodrigo Duterte and the 2017 Benita Catalino Yap Foundation Award for Innovations on local governance for ComVal LGU.

**13 What are the on-going activities and plans in Compostela Valley to ensure the provision of iron-fortified rice to Comvalenos?**

There are now 14 Central Kitchens in all its 11 municipalities feeding 9,889 malnourished schoolchildren with IFR. It has generated funds through an Ending Hunger Summit that expanded its feeding program to about 3,000 individuals in geographically isolated areas. It also plans to buy IRP for production and distribution of IFR by NFA through a MOA and for millers and retailers to produce and sell IFR.

**14 How was the partnership between ComVal and Gawad Kalinga established?**

When Typhoon Pablo devastated Compostela Valley, Gawad Kalinga partnered with the Local Government to build houses through volunteerism. This started a series of activities through a partnership on Education and addressing Hunger through the Kusina ng Kalinga Program.

**15 How can we avail of technical assistance from National Agencies to provide iron-fortified rice for my constituents?**



DOST-FNRI provides technical assistance for the production of IRP and IFR for millers and investors. Presently, FNRI has transferred the technology to four IRP producers and six IFR producers. The Regional and Provincial Offices of DOST promote the said technology and conduct advocacy activities while the National Nutrition Council through their Nutrition Action Officers provide assistance in the development of local ordinances and their implementation. The Department of Social Welfare and Development and DepEd provide funding for feeding of pre-school and schoolchildren.

## Frequently Asked Questions



TOGETHER,  
**WE RISE** FOR  
**FORTIFIED RICE**

Developed by: 

In Collaboration with:  

## 1 What is Republic Act 8976?

Republic Act 8976 or the Food Fortification Law of 2000 mandates the fortification of rice with iron, wheat flour with vitamin A and iron, cooking oil with vitamin A and refined sugar with vitamin A.

## 2 Why do we need to mandate the fortification of staple foods?

The fortification of staple foods with micronutrients is an effective strategy to control micronutrient malnutrition. Iron deficiency anemia (IDA) is the most prevalent form of micronutrient malnutrition.

## 3 What are the consequences of micronutrient malnutrition?

Micronutrient malnutrition leads to increased death rates, sickness due to decreased immunity to infection, slow physical and mental development resulting in slow learning and low school performance, blindness and less productive population among others.

## 4 Why is anemia the most prevalent form of micronutrient malnutrition among Filipinos?

Prior to the enactment of the fortification law in 2000, 3 out of 10 (30.6%) Filipinos are anemic, affecting mostly infants, pre-school children, women of reproductive age, pregnant and lactating women based on the 1998 nutrition survey of the Department of Science and Technology - Food and Nutrition Research Institute (DOST-FNRI). IDA is **due to lack of intake of iron-rich foods and vitamin C foods and increased intake of iron inhibitors such as phytates in rice**. Vitamin C enhances iron absorption. These negative consequences need to be addressed immediately.

## 5 Is food fortification an effective strategy to control anemia?

Iron fortification of staple foods is a major contributor in controlling IDA. In combination with other strategies such as deworming, provision of iron tablets for pregnant women and nutrition education. These strategies significantly decrease anemia prevalence currently at 1 out of 10 based on the 2013 nutrition survey of the DOST-FNRI. This prevalence is still of public health significance that needs to be addressed.

## 6 Why is rice included in the mandatory iron fortification?

Rice is the most widely-consumed staple food by Filipinos. Frequent

consumption of iron-fortified rice may address

## 7 How is iron-fortified rice produced?

Iron-fortified rice is made by first producing iron rice premix using extrusion process. The iron-rice premix has similar shape and appearance of ordinary rice containing high concentration of iron. The iron rice premix is blended with ordinary rice at 1:200 ratio to produce iron-fortified rice.

## 8 How do we cook and consume iron-fortified rice?

Iron fortified rice is washed, cooked and consumed like ordinary rice.

## 9 How much iron can iron-fortified rice provide?

A day's intake of **4-6 cups** of cooked iron-fortified rice provides more than 50% of iron requirement of the body.

## 10 How much is the additional cost to produce iron fortified rice?

An estimated **2.00 pesos** is added to the cost of ordinary rice to produce IFR.

## 11 Where can we buy iron fortified rice?

Producers of iron rice premix and iron fortified rice that can supply nationwide and are PhilGEPS registered are as follows:

- **Nutridense Food Manufacturing Corporation, Pangasinan**, (0917-6878611 and 0923-7032198)
- **Antofel Trading, Compostela Valley**, (0920-9065332)
- **AIHeed Corporation**, (uses imported coated or extruded iron rice premix), Pasig City (0917-7350028)
- **Nutrition and Beyond Corporation, Nueva Ecija**, (0917-6201887 and 0905-2973539) and Quezon City, (0917-8950467)

## 12 Are there local government units that have initiatives of providing iron-fortified rice to their constituents?

Yes, examples of which are as follows:

- A** Davao City Mayor and now President Rodrigo R. Duterte in 2007 signed an Executive Order requiring food service establishments (Jollibee, McDonalds, Chowking etc.) to serve IFR and established a task force for monitoring. Establishments serving iron fortified rice were provided with a tarpaulin certificate indicating that they are serving IFR signed by then Mayor Duterte.



# Infobits

## Anemia in the Philippines

**Anemia remains to be a persistent National health problem with 1 in 10 (11.2%) Filipinos suffering from it.**

According to the 8th National Nutrition Survey of the Department of Science and Technology's Food and Nutrition Research Institute, (DOST-FNRI),

**1 out of 4 Filipino pregnant women and 4 out of 10 infants have Iron Deficiency Anemia (IDA), majority of whom belong to the poor sector.**

**Iron Deficiency Anemia** can be due to insufficient iron in the diet, blood loss and increased iron requirement during pregnancy and growth.

An anemic individual may experience decreased work in school performance, decreased immunity, and slow cognitive development among others.

**If anemia remains untreated it can cause serious complications, such as heart and lung problems, premature birth, low birthweight and even infant death.**

**Anemia would also affect the country with increased morbidity and decreased productivity, Gross domestic product (GDP) loss of 4.05% and 2.5% decrease in income.**

**Let us consume more iron-rich foods or iron fortified products to combat anemia!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like  
our Facebook page: Development, production and dissemination made possible through the collaboration  
among DOST-FNRI, DOST regional and provincial offices, Nutrition International,  
National Nutrition Council, FNRI IFR adaptors and LGUs concerned.

# Infobits

## Iron Fortified Rice on the Rise

In response to the pressing problem of anemia in the Philippines and the mandatory food fortification of staple food under the Republic Act (RA) 8976, the Department of Science and Technology-Food and Nutrition Research Institute (DOST FNRI) developed:

**Iron Fortification Rice (IFR) technology to help address Iron Deficiency Anemia (IDA) in the Country.**

**Iron-Fortified Rice** is enriched rice produced by mixing ordinary rice and Iron Rice Premix (IRP) a grain-like kernel made from a blend of rice flour and iron using hot extrusion technology.

The efficacy study conducted by FNRI in an elementary school in Pasig City, the community pilot market trial in Orion, Bataan and the trial in Zambales provided evidences for the high acceptability and effectiveness of IFR in decreasing the prevalence of anemia among school children.

Recognizing this, local government units who are mandated by RA 7160 (Local Government Code of 1991) to promote health, may respond to the public health problem of anemia by ensuring the supply of iron-fortified rice.

This can be done with strong political support by enactment and implementation of ordinances as in Compostela Valley and La Union experiences, cooperation and commitment with the partners like **Gawad Kalinga, Department of Science and Technology (DOST), Department of Education (DepEd), Department of Social Welfare and Developments, Department of Health (DOH)** and among others.

**Let us consume more iron-rich foods or iron fortified products to combat anemia!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.



# Infobits

## Implementation of Iron Fortified Rice (IFR) Ordinance

**Compostela Valley and La Union** have ordinances on the use of Iron-Fortified Rice (IFR) to significantly reduce the number of anemic individuals in their respective provinces.

Compostela Valley has Provincial Ordinance No. 29-2015, an ordinance providing mechanisms for the production and use of IFR in the province of Compostela Valley, otherwise known as **COMVAL i-Rice Ordinance of 2015**.

COMVAL i-Rice is now available in **Monkayo and Nabunturan, Compostela Valley**. The primary beneficiaries are 9,889 public school elementary students through **Gawad Kalinga's Kusina ng Kalinga**.

La Union is Provincial Ordinance No. 118 series of 2017 or the Iron Fortified Rice Ordinance that mandates all local government units (LGUs), National Government Agencies, and other government agencies to use **La Union IFR in feeding programs, disaster relief operations, daycare centers, government hospitals, rehabilitation centers, local government unit canteens, school canteens and other food establishments serving rice**.

La Union and COMVAL's on going IFR ordinances serve as a model from which other LGUs can pattern their similar programs.

**Let us consume more iron-rich foods or iron fortified products to combat anemia!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.

## Infobits

### Partnership key to success of Iron Fortification Rice

Success of the mandatory food fortification law or Republic Act (RA) 8976 strongly relies on the political will of local chief executives and the partnerships they can establish with supportive agencies and institutions.

**Compostela Valley (ComVal)** has been using **Iron-fortified Rice (IFR)**, one of the technologies developed by the Department of Science and Technology's Food and Nutrition Research Institute (DOST-FNRI).

**The IFR is being used for school-based feeding program of the Department of Education (DepEd) schools through the Gawad Kalinga's (GK) Kusina ng Kalinga central kitchen.** Together with DepEd and GK, ComVal established 14 central kitchens throughout the province to feed **9,889 malnourished school-children**. Success of the program paved the way for bagging prestigious awards like the Civil Service Commission (CSC) Pagasa Award, Alberto Romualdez Outstanding Health Research Award (AROHRA), and Benita & Catalino Yap Foundation Innovation Award.

The victory and partnership between ComVal, DepEd, GK, DOST-FNRI, DOST-XI and DOST-ComVal serve as an example of bayanihan towards healthier and more productive citizens of the country.

**Let us consume more iron-rich foods or iron fortified products to combat anemia!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_@yahoo.com](mailto:mar_v_@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like  
our Facebook page: Development, production and dissemination made possible through the collaboration  
among DOST-FNRI, DOST regional and provincial offices, Nutrition International,  
National Nutrition Council, FNRI IFR adaptors and LGUs concerned.



# Infobits

## Healthier Rice now within reach

The **two peso per kilo** difference between regular commercial rice and Iron-Fortified Rice (IFR) can go as far as preventing Iron Deficiency (IDA) in the Philippines.

Iron-fortified Rice is now locally available through suppliers who adopted the technology of the Department of Science and Technology Food and Nutrition Research Institute (DOST-FNRI) and have been distributing IFR to several areas in the country.

**Nutridense Food Manufacturing Corporation, Nutrition and Beyond Corporation, Alheed International Trading Corporation, and CLG Health Food Products Incorporated are among the suppliers that distribute IFR nationwide. Antofel Trading supplies IFR in Compostela Valley, Agusan del Sur and Davao City.**

**Through these IFR technology adoptors, IFR is now within reach of Filipinos for healthier, livelier and more productive Philippines.**

**Let us consume more iron-rich foods or iron fortified products to combat anemia!**



For more information on Iron-Fortified Rice, contact:  
**Dr. Mario V. Capanzana**, DOST-FNRI Director at 837-2934, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.

Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like our Facebook page: Development, production and dissemination made possible through the collaboration among DOST-FNRI, DOST regional and provincial offices, Nutrition International, National Nutrition Council, FNRI IFR adaptors and LGUs concerned.

# Iron Fortified Rice (IFR) Helps to Fight Anemia!

Iron Fortified Rice is an enriched rice made by blending..



Iron Fortified Rice helps to fight anemia. In the Philippines, Anemia affects:



## What is Iron Deficiency Anemia?

Anemia is caused by iron deficiency resulting in low red blood cells that causes:



Poor Cognitive Development



Weakness and Fatigue



Poor Birth Outcome and Maternal Hemorrhage

A day's intake of 4 -6 cups of IFR will meet more than 50% of the daily iron requirement of the body.

50%

Iron Fortified Rice is just an ordinary rice that be washed!



For more information on Iron-Fortified Rice, contact:  
Dr. Mario V. Capasana, DOST-FNRI Director at 837-3554, [mar\\_v\\_c@yahoo.com](mailto:mar_v_c@yahoo.com), [mvc@fnri.dost.gov.ph](mailto:mvc@fnri.dost.gov.ph)  
or visit your DOST regional or provincial office.  
Visit our website at [www.fnri.dost.gov.ph](http://www.fnri.dost.gov.ph) and like  
our Facebook page: Development, production and dissemination made possible through the collaboration  
among DOST-FNRI, DOST regional and provincial offices, Nutrition International,  
National Nutrition Council, FNRI IFR adaptors and LGUs concerned.